National Institute for Health and Care Excellence

Final

Urinary incontinence and pelvic organ prolapse in women: management

[L] Evidence review for management of mesh complications

NICE guideline NG123

Evidence reviews

April 2019

Final

These evidence reviews were developed by the National Guideline Alliance hosted by the Royal College of Obstetricians and Gynaecologists

Disclaimer

The recommendations in this guideline represent the view of NICE, arrived at after careful consideration of the evidence available. When exercising their judgement, professionals are expected to take this guideline fully into account, alongside the individual needs, preferences and values of their patients or service users. The recommendations in this guideline are not mandatory and the guideline does not override the responsibility of healthcare professionals to make decisions appropriate to the circumstances of the individual patient, in consultation with the patient and/or their carer or guardian.

Local commissioners and/or providers have a responsibility to enable the guideline to be applied when individual health professionals and their patients or service users wish to use it. They should do so in the context of local and national priorities for funding and developing services, and in light of their duties to have due regard to the need to eliminate unlawful discrimination, to advance equality of opportunity and to reduce health inequalities. Nothing in this guideline should be interpreted in a way that would be inconsistent with compliance with those duties.

NICE guidelines cover health and care in England. Decisions on how they apply in other UK countries are made by ministers in the Welsh Government, Scottish Government, and Northern Ireland Executive. All NICE guidance is subject to regular review and may be updated or withdrawn.

ISBN: 978-1-4731-3319-8

Contents

Management of mesh complications

Review questions

This evidence report contains information on 5 evidence reviews relating to the management of mesh complications:

- What are the most effective management options for vaginal complications (including exposure, extrusion, erosion and infection) after mesh surgery?
- What are the most effective management options for sexual dysfunction after mesh surgery?
- What are the most effective management options for pain after mesh surgery?
- What are the most effective management options for urinary complications after mesh surgery?
- What are the most effective management options for bowel symptoms after mesh surgery?

Introduction

Complications following surgery for urinary incontinence or pelvic organ prolapse (POP) using mesh can cause significant morbidity and may occur years after initial surgery. Mesh complications may occur after synthetic mid-urethral mesh sling surgery or vaginally or abdominally placed synthetic mesh for pelvic organ prolapse. These can include vaginal complications, such as exposure or extrusion, infection, sexual dysfunction, pain, as well as urinary and bowel complications. There is no consensus as to how these complications should be managed and whether removal of mesh, either partially or completely, is necessary.

A standardised approach to care would help to guide clinicians when managing such complex cases and ensure women receive appropriate care. The Mesh Oversight Group Report, July 2017, advised that women with mesh complications should be seen in a specialised mesh centre offering a multidisciplinary team approach consisting of urogynaecology, urology, specialist radiology, specialist pain management and specialist diagnostic medical / allied health professional team members. This review aims to determine the most effective management strategies for complications following mesh surgery.

Summary of the protocols

Table 1, Table 2, Table 3, Table 4 and Table 5 present a summary of the Population, Intervention, Comparison and Outcome (PICO) characteristics of the protocols for the 5 mesh complications reviews. These are related to the management of vaginal, sexual dysfunction, pain, urinary and bowel complications after mesh or mesh sling surgery respectively.

Table 1: Summary of protocol (PICO table) for management of vaginal complications after mesh or mesh sling surgery

Population	Women (aged 18 years and over) who are experiencing vaginal complications after mesh surgery (both biological and synthetic materials) for UI, POP or both. Women presenting the following complications will be included: • Mesh erosion (including exposure and extrusion) • Mesh infection
Intervention	The following management options will be considered:

	• Mesh removal surgery (vaginal removal or trimming of mesh, abdominal/laparoscopic removal of mesh) • Partial or complete mesh removal • Vaginal oestrogen • Antibiotics, systemic or local • Drainage/collection of pus
Comparison	• Mesh removal surgery *vs.* no surgery • Mesh removal surgery *vs.* vaginal oestrogen • Mesh removal surgery *vs.* antibiotics • Vaginal oestrogen *vs.* no treatment • Partial removal of mesh *vs.* complete removal • Drainage/collection of pus *vs.* no treatment • Drainage/collection of pus *vs.* antibiotics • Drainage/collection of pus *vs.* removal of mesh
Outcomes	**Critical** • Continued or repeated exposure/extrusion/infection • Adverse events (immediate post-op or perioperative): ○ Severe bleeding requiring a blood transfusion ○ Internal organ injury (to bladder or bowel) • Long-term complications (> 12 months) ○ Pain ○ Mesh erosion or extrusion ○ Fistula ○ Need for catheterisation ○ Infection ○ De novo overactive bladder symptoms ○ Sexual dysfunction ○ Wound complications (infection and tissue breakdown) **Important** • Health-related quality of life (validated scales only) • Patient satisfaction ○ Patient reported improvement ○ Patient Global Impression of Improvement • Repeat surgery (for mesh complications) • Recurrence of urinary incontinence or prolapse

POP, pelvic organ prolapse; UI, urinary incontinence.

Table 2: Summary of protocol (PICO table) for management of sexual dysfunction complications after mesh or mesh sling surgery

Population	Women over 18 years of age experiencing new or worsening sexual dysfunction after mesh surgery for UI, POP or both.
Intervention	• Mesh removal surgery • Vaginal dilation • Vaginal reconstruction/vaginaplasty • Vaginal oestrogen • Pain management for dyspareunia (including psychosexual counselling, local anaesthetic, physiotherapy, systemic analgesics, botulinum toxin)

Comparison	• Vaginal oestrogen *vs*. mesh removal surgery • Any intervention *vs.* no treatment • Any surgery *vs*. pain management
Outcomes	**Critical** • Continued or repeat sexual dysfunction • Adverse events (severe bleeding, unintentional organ injury) • Patient satisfaction (patient reported improvement, Patient Global Impression of Improvement) **Important** • Health-related quality of life • Repeat surgery for UI, POP, or mesh complications • Long-term complications (pain, fistula, need for catheterisation, infection, wound complication) • Partner satisfaction

POP, pelvic organ prolapse; UI, urinary incontinence.

Table 3: Summary of protocol (PICO table) for management of pain complications after mesh or mesh sling surgery

Population	Women over 18 years of age experiencing pain after mesh surgery.
Intervention	• Mesh removal (partial or complete) surgery • Vaginal oestrogen • Systemic or local antibiotics • Pus collection or drainage • Pain management (including local anaesthetic, physiotherapy, systemic analgesic, botulinum toxin)
Comparison	• Vaginal oestrogen *vs*. mesh removal surgery • Any intervention *vs.* no treatment • Any surgery *vs*. pain management • Pus collection/drainage *vs*. antibiotics • Pus collection/drainage *vs.* mesh removal surgery
Outcomes	**Critical** • Pain (using validated scale) • Patient satisfaction (patient-reported improvement, Patient Global Impression of Improvement) • Adverse events (severe bleeding, unintentional organ injury) • Health-related quality of life **Important** • Repeat surgery for UI, POP, or mesh complications) • Long-term complications (pain, fistula, need for catheterisation, infection, wound complications, de novo OAB symptoms, sexual dysfunction) • Recurrence of UI or POP

OAB, overactive bladder; POP, pelvic organ prolapse; UI, urinary incontinence.

Table 4: Summary of protocol (PICO table) for management of urinary complications after mesh or mesh sling surgery

Population	Women over 18 years of age experiencing urinary complications after mesh surgery.
Intervention	• Mesh removal surgery

	• Transurethral excision • Vaginal approach to mesh excision • Division of tape/mesh Subgroups • Type of surgical approach (e.g. laparoscopy/open) • Complete versus partial
Comparison	• Mesh removal *vs.* no mesh removal • Excision *vs.* vaginal open excision • Laser *vs.* open excision • Laser *vs.* abdominal removal • Mesh division *vs.* no surgery
Outcomes	**Critical** • Continued or repeated urinary complications • Adverse events o Severe bleeding requiring blood transfusion o Unintentional organ injury • Long-term complications o Pain o Fistula o Need for catheterisation o Infection o Wound complications o Urinary incontinence **Important** • Quality of life o ICIQ-VS o EPAQ o PFIQ-7/PFDI-21 o BFLUTS o i-QOL o SUIQQ o UISS o SEAPI-QMM o ISI o KHQ • Patient satisfaction (measured by PFDI, patient reported) • Repeat surgery for UI, POP, or mesh complications)

BFLUTS-SF, Bristol Lower Urinary Tract Symptoms Scored Form EPAQ, Electronic Patient Assessment Questionnaire-Pelvic Floor; ICIQ-VS: International Consultation on Incontinence Modular Questionnaire – Vaginal Symptoms; i-QoL, Urinary Incontinence Quality of Life Scale; ISI, Incontinence Severity Index; KHQ, King's Health Questionnaire; PFIQ-7/PFDI-21, Pelvic Floor Distress Inventory Short Form/Long Form; POP, pelvic organ prolapse; SEAPI-QMM, Stress, Emptying Ability, Anatomy, Protection, Inhibition of bladder activity-Quality of life, Mobility, Mental status standardised reporting system; SUIIQQ, Stress and Urgency Incontinence and Quality of Life Questionnaire UI, urinary incontinence; UISS, Urinary Incontinence Severity Score.

Table 5: Summary of protocol (PICO table) for management of bowel complications after mesh or mesh sling surgery

Population	Women (aged 18 years or older) experiencing bowel complications after mesh surgery for UI, POP or both. Both functional complications (directly related to bowel action) and non-functional complications (not directly related to action of bowel, but occurring in the location of the bowel) will be included.

	Women with any of the following bowel complications will be considered:
	• Non-functional
	  ○ Mesh erosion presented as: fever, malaise, pelvic pain, mucous or bloody discharge per rectum
	  ○ Bowel stricture
	  ○ Bowel fistulation
	• Functional
	  ○ Obstructed defecation
	  ○ Faecal incontinence

Intervention	For non-functional complications: • Mesh removal (vaginal or abdominal) • Resection • Re-anastomosis • Stoma For functional complications: • Laxatives and aperients • Lifestyle modifications: diet, exercise, weight loss • Biofeedback • Complex targeted laxatives: prucalopride, linaclotide • Rectal irrigation • Sacral nerve stimulation • Laparoscopic ventral mesh rectopexy • Stapled Transanal Resection of the Rectum (STARR) • Stoma/Antegrade Colonic Enema (ACE)
Comparison	Each management option against each other, separated according to the type of complication: non-functional or functional)

Outcomes	**Critical**
	• Reduction in bowel symptoms
	• Adverse events (severe bleeding requiring blood transfusion; unintentional internal organ injury)
	• Health-related quality of life
	
	Important
	• Complications
	  ○ Pain
	  ○ Fistula
	  ○ Infection
	  ○ Wound complications
	  ○ Mesh erosion or extrusion
	  ○ Sexual dysfunction
	• Patient satisfaction
	• Repeat surgery for UI, POP or mesh complications
	• Recurrence of urinary incontinence or prolapse
	
	Complications will be stratified as follows:
	• Short-term: complications occurring after one year or less (≤ 1 year)
	• Medium-term: complications occurring after one year and up to five years (> 1 year and ≤ 5 years)
	• Long-term: complications occurring after 5 years (> 5 years)

POP, pelvic organ prolapse; UI, urinary incontinence.

For further details see review protocols in appendix A.

Methods and process

This evidence review was developed using the methods and process described in Developing NICE guidelines: the manual. Methods specific to this review question are described in the review protocol in appendix A and appendix N (network meta-analysis). For a full description of the methods see supplementary material C

Declarations of interest were recorded according to NICE's 2014 conflicts of interest policy until 31 March 2018. From 1 April 2018, declarations of interest were recorded according to NICE's 2018 conflicts of interest policy. Those interests declared until April 2018 were reclassified according to NICE's 2018 conflicts of interest policy (see Register of Interests).

Clinical evidence

Included studies

Due to the paucity of available evidence for each individual complication, the committee decided to consider some of the excluded studies that did not strictly meet the inclusion criteria of the individual mesh complications reviews for in order to inform the recommendations about the management of mesh complications. As such, it was decided to include case series studies with more than 50 participants, reporting outcomes of women with a variety of mesh complications (see the 'General section on mesh complications' below).

For a summary of the included studies see Tables 6 to 12. See also the literature search strategies in appendix B, study selection flow charts in appendix C, study evidence tables in appendix D, forest plots in appendix E and GRADE tables in appendix F.

Management of vaginal complications after mesh or mesh sling surgery

No RCT were identified for this review. Five observational studies - 1 prospective cohort Domingo 2005), 1 retrospective cohort (Jambusaria 2016), and 3 case series (Begley 2005; Cheng 2017; Kohli 1998) – were included in this review.

Two cohort studies compared partial to complete removal of a synthetic mesh sling in women with SUI and mesh sling erosion or exposure (Domingo 2005; Jambusaria 2016).

Two one-arm case series studies (Begley 2005; Kohli 1998) examined the management of mesh erosion by partial or complete removal in women with POP who had abdominal sacrocolpopexy

One case series study (Cheng 2017) examined the management of mesh erosions by conservative management or if this failed mesh removal in women with greater than stage 1 POP-Q who had vaginal mesh kit repair.

Management of sexual dysfunction and pain complications after mesh or mesh sling surgery

No RCT studies were identified for either of these reviews. Three observational studies - including one prospective cohort (Hou 2014), one retrospective cohort (Jambusaria 2016) and 1 single-arm case series study (Danford 2015) were identified as relevant to this review.

All 3 studies examined synthetic mesh sling removal or mesh sling revision surgery in women with pain-related (including sexual dysfunction) complications after mesh sling

surgery for treatment of SUI. No study was identified that was relevant only to the population of interest for the separate review questions.

Management of urinary complications after mesh or mesh sling surgery

No RCT or cohort studies were identified for this review. One single-arm case series study (Crescenze 2016) was identified that examined the management of mesh complications in women with a variety of lower urinary tract symptoms after mesh sling surgery for treatment of SUI.

Management of bowel complications after mesh or mesh sling surgery

A systematic review of the clinical literature was conducted but no studies were identified which were applicable to this review question.

General management of mesh complications after mesh or mesh sling surgery

Seventeen observational studies - 3 retrospective cohort (Hokenstad 2015; Ramart 2017; Shaw 2017) and 14 case series (Abbott 2014; Cardenas-Trowers 2017; Crosby 2014; Fabian 2015; George 2013; Lee 2013; Marcus-Braun 2010; Misrai 2009; Parden. 2016; Pickett 2015; Rac 2017; Renezeder 2011; Skala 2011; Warembourg 2017) were identified that examined the treatment and management of women with SUI and/or POP who had complications after the insertion of mesh or mesh sling. The participants in these studies were referred for treatment because of a variety of mesh related complications, with the majority of treatments consisting of mesh (e.g. revision or removal) surgery. Most studies had a follow up of less than 12 months.

Three retrospective cohort studies (Hokenstad 2015; Ramart 2015; Shaw 2017) were identified that examined different types of mesh surgery in women with pure SUI, stress-predominant mixed UI, and/or POP. Two of the retrospective cohort studies (Shaw 2017; Ramart 2017) examined surgery to treat mesh complications in women who had previously had synthetic mesh sling inserted to treat SUI, with one study comparing mesh sling division to mesh sling removal, whilst the other compared the removal of retropubic synthetic mesh slings to that of transobturator synthetic mesh slings. The other study (Hokenstad 2015) compared partial removal to complete removal of vaginally-placed mesh for the treatment of women with POP.

The majority of the participants in the case series studies had partial or complete mesh or mesh sling removal surgery and were referred for mesh surgery for the treatment and management of more than one complication.

Excluded studies

Studies not included in this review with reasons for their exclusion are provided in appendix K. For a list of excluded studies relevant to the general sections on the management of mesh complications, please see the excluded studies lists of the individual reviews in appendix K.

Summary of clinical studies included in this review

Summary of cohort studies included in the evidence review

Table 6 provides a brief summary of the 2 included cohort studies (Domingo 2005; Jambusaria 2016) in the review of the management of vaginal complications after mesh or mesh sling surgery, both of which compared partial to complete vaginal mesh removal in women after mesh surgery for treatment of POP.

Table **10** provides a brief summary of the 2 included cohort studies in the review of the management of sexual dysfunction and/or pain complications (Hou 2014; Jambusaria 2016), both of which compared partial to complete mesh sling removal in women with sexual dysfunction and/or pain complications after mesh sling surgery for treatment of SUI.

Table 15 provides a brief summary of the 1 included retrospective cohort study (Hokenstad 2015) in the review of the general management of complications after mesh surgery that compared partial to complete removal of mesh in women who had vaginally-placed mesh for the treatment of POP.

Table 16 provides a brief summary of the 1 included retrospective cohort study (Shaw 2017) in the review of the general management of complications after mesh sling surgery that compared mesh division to partial or complete removal of mesh in women who had synthetic mesh sling for the treatment of SUI. See appendix D for full evidence tables.

Table 17 provides a brief summary of the 1 included retrospective cohort study (Ramart 2017) in the review of the general management of complications after mesh sling surgery that compared removal of transobturator mesh sling to that of retropubic mesh sling in women who had synthetic mesh sling for the treatment of SUI. See appendix D for full evidence tables.

See appendix D for full evidence tables of included studies.

Summary of case series studies included in the evidence review

Table 7 lists the characteristics of the 3 case series studies included in the review of vaginal complications after mesh or mesh sling surgery (Begley 2005; Cheng 2017; Kohli 1998), and Table 8 provides a summary of the results.

Table 11 lists the characteristics of the 1 case series study (Crosby 2014) identified for the review of the management of sexual dysfunction and/or pain complications after mesh or mesh sling surgery, and Table 12 provides a summary of the results

Table 13 lists the characteristics of the 1 case series study (Crescenze 2014) identified for the review of the management of urinary complications after mesh or mesh sling surgery, and Table 14 provides a summary of the results.

Table 18 lists the characteristics of the 14 case series studies included in the review of the general management of mesh complications after mesh or mesh sling surgery (Abbott 2014; Cardenas-Trowers 2017; Crosby 2014; Fabian 2015; George 2013; Lee 2013; Marcus-Braun 2010; Misrai 2009; Parden. 2016; Pickett 2015; Rac 2017; Renezeder 2011; Skala 2011; Warembourg 2017), whilst Table 19 provides a summary of the results.

See appendix D for full evidence tables of all included studies.

Table 6: Summary of included studies for complete mesh vaginal removal versus partial mesh vaginal removal in review of management of vaginal complications

Study Country Type of study	Number of participants	Characteristics[a]	Length of follow up (weeks)	Original surgery[b]	Main reasons for referral[c]	Interventions[d]	Outcomes
Domingo 2005 USA Prospective cohort	9	Median age 54 (range 40-77) BMI: NR Parity: NR	52	Transobturator synthetic sling	• Vaginal mesh extrusion/exposure 100%	• Complete mesh vaginal removal 89% • Partial mesh vaginal removal 11%	Recurrent SUI
Jambusaria 2017 USA Retrospective cohort	94	Age: 55.2 (12.1) BMI: 29.5 (6.9) kg/m^2 Parity: 2.1 (1.2)	~6 & ~29	Retropubic or transobturator synthetic sling	• Vaginal mesh extrusion/exposure 100%	• Complete mesh vaginal removal 62% • Partial mesh vaginal removal 38%	Postoperative SUI Postoperative pain Postoperative de novo urgency Repeat SUI surgery

Table 7: Study characteristics of case series studies in review of management of vaginal mesh complications

Study Country	Number of participants	Characteristics[a]	Length of follow up (weeks)	Original surgery[b]	Main reasons for referral[c]	Interventions[d]	Outcomes
Begley 2005 USA	7	Age: 53.4 BMI: NR Parity: Range 2-4	Unclear, data from last recorded follow up	Abdominal sacrocolpopexy	• Failure of conservative treatment for vaginal mesh erosion	• Complete vaginal mesh removal if partial vaginal mesh removal not successful	Repeat surgery for mesh complications POP recurrence
Cheng 2017 Taiwan	36	Age: 62.5 (11.2) BMI: 25.4 (3.5) kg/m^2 Parity: 3.5 (1.5)	Median ~52	Various synthetic vaginal mesh kit including Elevate, Prolify, Gynemesh, Apogee/Perigee and Prosima	• Failure of conservative treatment for vaginal mesh erosion	• Partial vaginal mesh removal	Recurrent erosion Repeat surgery for mesh complications
Kohli 1998 USA	7	Age 56.4 (10) Weight (lb): 162.7 (42.6) Parity: 3.0 (1.2)	79.6	Abdominal sacrocolpopexy	• Failure of conservative treatment for vaginal mesh erosion	• Partial vaginal mesh removal	Recurrent erosion Adverse events

Table 8: Outcomes of case series studies on mesh removal in women who had abdominal sacrocolpopexy for treatment of POP

Outcome	# of studies	# of participants	Rate (%)
Adverse events	1[a]	5	0.0
Recurrent mesh exposure/extrusion	1[a]	5	0.0
Repeat surgery for mesh exposure/extrusion	1[b]	7	57.1
POP recurrence at mean 15.5-mo FU	1[b]	7	29.0

Notes: [a], Kohli. 1998; [b], Begley 2005.

Table 9: Outcomes of case series studies on mesh removal in women who had vaginal mesh kit for treatment of POP

Outcome	# of studies	# of participants	Rate (%)
Recurrent mesh exposure/extrusion	1	36	16.7
Repeat surgery for mesh exposure/extrusion	1	36	16.7

Notes: [a], Cheng 2017.

Table 10: Summary of included studies for complete mesh sling removal versus partial mesh sling removal in review of management of sexual dysfunction and/or pain mesh complications

Study Country Type of study	Number of participants	Characteristics[a]	Length of follow up (weeks)	Original surgery[b]	Main reasons for referral[c]	Interventions[d]	Outcomes
Hou 2014 USA Prospective cohort	69	Mean age: 49 (range 41-63)	>26	Synthetic mesh 56%	• Persistent pain 100%	• Complete or partial mesh removal	Visual analogue scale pain scores Resolution of pain

Study Country Type of study	Number of participants	Characteristics[a]	Length of follow up (weeks)	Original surgery[b]	Main reasons for referral[c]	Interventions[d]	Outcomes
		BMI: 30 (range23-38) kg/m^2					
	54	Mean age: 53 (range 37-72) BMI: 27 (range24-36) kg/m^2		Synthetic tape (mesh sling) 44%			
Jambusaria 2017 USA Retrospective cohort	151	Age: 51.3 (12) BMI: 30 (6.5) kg/m^2 Parity: 2.2 (1.1)	~6 & ~29	Retropubic or transobturator synthetic mesh sling	• Pain (including dyspareunia) 100%	• Complete mesh removal 83% • Partial mesh removal 17%	Postoperative SUI Postoperative pain Postoperative de novo urgency Repeat SUI surgery

Table 11: Study characteristics of case series studies in review of management of pain and/or sexual dysfunction complications

Study Country Type of study	Number of participants	Characteristics[a]	Length of follow up (weeks)	Original surgery[b]	Main reasons for referral[c]	Interventions[d]	Outcomes
Danford 2015 USA	233	Mean age: 54 (range 23-89) BMI: NR Parity: NR	Most recent follow up	Synthetic mesh sling with or without concomitant transvaginal mesh	• Vaginal and/or pelvic pain	• Mesh division or mesh removal	Improvement in pain status

Table 12: Pain status outcomes after mesh surgery (sling division or mesh sling removal) in women with or without mesh exposure

Outcome[a]	# of participants	Mesh exposure (%)	No mesh exposure (%)
Improvement in pain	169	77	67
No change in pain status	45	18	21
Worsening in pain	19	5	12

Note: [a], Data from Danford 2015, n=233.

Table 13: Study characteristics of case series studies in review of management of urinary mesh complications

Study Country Type of study	Number of participants	Characteristics[a]	Length of follow up (weeks)	Original surgery[b]	Main reasons for referral[c]	Interventions[d]	Outcomes
Crescenze. 2016 USA Case series	107	Mean age: 54 (range 23-89) BMI: NR Parity: NR	Median ~126	Retropubic synthetic mesh sling 57% Transobturator synthetic mesh sling 43%	• Recurrent UTI 39% • Retention requiring catheterisation 23% • Obstructive voiding symptoms 90% • SUI 28%	• Mesh revision 21% • Partial removal 79%	Resolution of mesh complications De novo SUI SUI

Table 14: Outcomes of mesh surgery to resolve urinary mesh sling complications

Outcome[a]	# of studies	# of participants	Rate (%)
Resolution of obstructive voiding symptoms	1	107	78.9
Resolution of need for catheterisation	1	107	95.8

Outcome[a]	# of studies	# of participants	Rate (%)
Resolution of recurrent UTI	1	107	65.8
De novo SUI	1	107	35.5
SUI	1	107	57.0

Notes: [a], Data from Crescenze 2016, n=107.

Table 15: Study characteristics of included cohort studies for partial versus complete mesh removal in review of management of mesh complications

Study Country Type of study	Number of participants	Characteristics[a]	Length of follow up (weeks)	Original surgery[b]	Main reasons for referral[c]	Interventions[d]	Outcomes
Hokenstad 2015 USA Retrospective cohort	41	Age: 52 (11) BMI: 28.0 (5.1) kg/m^2 Median Parity: 2 (range 0-5)		Mesh augmentation 17% Mesh kit 83%	• Dyspareunia or de novo pain 82% • Faecal incontinence 15% • Urinary urgency and/or urge incontinence 31% • Vaginal bleeding or discharge 51%	Complete mesh removal 59% Partial mesh removal 41%	Continence-specific health-related quality of life Dyspareunia Health-related quality of life Improvement

Table 16: Study characteristics of included cohort studies for mesh division versus complete or partial mesh removal in review of management of mesh sling complications

Study Country Type of study	Number of participants	Characteristics[a]	Length of follow up (weeks)	Original surgery[b]	Main reasons for referral[c]	Interventions[d]	Outcomes
Shaw 2017 USA Retrospective cohort	102	Mean age: 53.5 Mean BMI: 25.1 kg/m^2 Median parity: 2	Range ~4-336	Retropubic synthetic sling 67% Transobturator synthetic sling 33%	• Mesh erosion/exposure/infection 42% • Pain 9% • Voiding dysfunction 49%	• Complete or partial mesh removal 56% • Mesh division 44%	Repeat surgery Recurrent SUI

Table 17: Study characteristics of included cohort studies for removal of synthetic transobturator versus retropubic mesh sling for management of women with mesh complications

Study Country Type of study	Number of participants	Characteristics[a]	Length of follow up (weeks)	Original surgery[b]	Main reasons for referral[c]	Interventions[d]	Outcomes
Ramart. 2017 USA Retrospective cohort	117	Age: 56.34 (10.7) BMI: 28.4 (5.5) kg/m^2 Vaginal delivery: 2.14 (1.4)	>12 weeks	Retropubic synthetic sling 60% Transobturator synthetic sling 40%	• Bladder outlet obstruction 56% • Dyspareunia 47% • Irritation 72% • Groin pain 22% • Hispareunia 7% • Leg pain 17% • Pelvic pain 32% • Suprapubic pain 22% • Urge incontinence 33% • Urinary retention 14% • Urinary tract mesh exposure 8% • UTI 38% • Vagina mesh exposure 31%	• Complete mesh removal 51% • Mesh division or partial mesh removal 49%	Repeat surgery

Table 18: Study characteristics of included case series studies on the general management of mesh complications

Study Country	Number of participants	Characteristics[a]	Length of follow up (weeks)	Original surgery[b]	Main reasons for referral[c]	Interventions[d]	Outcomes
Abbott 2014 USA	347	Age: 56.6 (12.7) BMI: 28.4 (5.3) kg/m^2 Parity: 2.6 (1.24)	Unclear, data from last recorded follow up	Sacrocolpopexy only 5% Sacrocolpopexy + Synthetic sling 2% Synthetic sling only 50% TVM only 21% TVM + Synthetic sling 22%	• Any lower gastrointestinal tract symptom 6% • Any vaginal symptom 46% • Dyspareunia 30% • Localised infection 11% Lower urinary tract symptoms 49% • Mesh erosion/exposure/extrusion 43% • Pain 36% • Recurrent or de novo prolapse 14% • Recurrent or de novo incontinence 25%	• Complete mesh removal 27% • Partial mesh removal 51% • Recurrent POP treatment 23% • Recurrent incontinence treatment 15% • Release of mesh arms 18% • Other 20%	Repeat surgery
Cardenas-Trowers 2017 USA	83	Age: 56 (11) BMI: 29 (6) kg/m^2 Parity: Median 3 (range 0-6)	Range 4-6	Anterior prolapse mesh 7% Posterior prolapse mesh 4% Apical prolapse mesh 4% Multi-compartment prolapse mesh 32% Synthetic sling 33% Synthetic sling + Prolapse mesh 19%	• Abdominal pain 6% • Buttock pain 4% • Dyspareunia 55% • Leg pain 6% • Mesh erosion 43% • Pelvic pain 50% • Rectal pain 12% • Urinary retention 16% • Vaginal bleeding 29% • Vaginal discharge 19% • Vaginal pain 62% • Voiding dysfunction 13%	• Mesh revision or removal 100%	Adverse events Repeat surgery Complications related to surgery to resolve mesh complications
Crosby 2014 USA	90	Age: 58 (11)	Median ~16	Various synthetic TVM including Perigee 24%, Apogee 20%, Anterior Prolift	• Bulge sensation 30% • Defecatory dysfunction 35%	• Anterior mesh removal 56%	Repeat surgery Resolution of mesh complications (all/mesh

Study Country	Number of participants	Characteristics[a]	Length of follow up (weeks)	Original surgery[b]	Main reasons for referral[c]	Interventions[d]	Outcomes
		BMI: 29.5 (11) kg/m^2 Parity: 3 (range 0-10)		19%, Anterior Avaulta 17%, Posterior Prolift 12% and Posterior Avaulta 11%	• Dyspareunia 48% • Mesh exposure 62% • Pelvic or vaginal pain 64% Recurrent infection 9% • Rectovaginal fistula 3% • SUI 28%	• Anterior +posterior mesh removal 23% • Posterior mesh removal 21%	erosion/pain/dyspareunia) Complications related to surgery to resolve mesh complications
Fabian 2015 Poland	67	Age: 61.5 (range 38-93) BMI/parity: NR	Mean 168.1	Retropubic synthetic sling 52% Transobturator synthetic sling 45% Two synthetic slings 3%	• Mesh erosion 25% • Overactive bladder 64% • Pain (including dyspareunia) 40% • SUI 59% • Urinary retention 40%	• Complete mesh removal 100%	Resolution of mesh complications (pain/urinary)
George. 2013 USA	71	Age: 57.4 (10.2) BMI: 30.9 (13.2) kg/m^2 Parity: 2.5 (1.2)	Mean 38.7	Abdominal sacrocolpopexy 14% Laparoscopic sacrocolpopexy 42% Other 3% Vaginal mesh kit 41%	• Dyspareunia 12% • Mesh exposure/extrusion 56% • Pelvic pain 16% • Vaginal bleeding/discharge 16%	• Complete mesh removal 37% • Partial mesh removal 63%	Adverse events Repeat surgery Recurrent POP
Lee 2013 USA	58	Age: 54.6 (range 32-80) BMI/parity: NR	Mean 53.3	Anterior TVM only 29% Anterior TVM + SIMS 2% Anterior TVM + retropubic synthetic sling 31% Anterior + posterior TVM only 10% Anterior + posterior TVM + retropubic synthetic sling 7% Anterior TVM + transobturator synthetic sling 16%	• Dyspareunia 72% • Infection 9% • Mesh exposure 74% • MUI 29% • Pelvic pain 45% • Recurrent UTI 16% • SUI 9% • Urge incontinence 19% • Vaginal discharge 21% Vesicovaginal fistula 2% • Voiding dysfunction 16%	• Mesh removal 100%	Adverse events Repeat surgery Resolution of mesh complications (pain/dyspareunia) Recurrent POP Complications related to surgery to resolve mesh complications

Study Country	Number of participants	Characteristics[a]	Length of follow up (weeks)	Original surgery[b]	Main reasons for referral[c]	Interventions[d]	Outcomes
				Anterior + posterior TVM + retropubic synthetic sling 6%			
Marcus-Braun 2010[e] France	83	Age/BMI/parity: NR	6 or ~24	TVM	• Granuloma 9% • Incomplete voiding 15% • Infection 21% • Malposition 4% • Mesh erosion 39% • Pain 8%	• Complete mesh removal	Adverse events Repeat surgery Recurrent POP/SUI Complications related to surgery to resolve mesh complications
Misrai 2009 France	75	Age: 60.7 (12) Median BMI: 27 kg/m^2 Parity: NR	Mean 157.4	Retropubic or transobturator synthetic sling	• Bladder outlet obstruction 39% • Chronic pelvic pain 21% • De novo incontinence or urgency 7% • Mesh erosion/extrusion 32%	• Complete mesh removal 45% • Partial mesh removal 55%	Recurrent SUI
Parden 2016 USA	69	Age: 54 (11.4) BMI <25 kg/m^2: 19% BMI 25-39 kg/m^2: 71% BMI >30 kg/m^2: 10% Vaginal delivery: Median 2 (range 2-3)	≥52	Synthetic mini-sing 12% Other synthetic sling 3% Retropubic synthetic sling 46% Transobturator synthetic sling 46% Unknown 6%	• Dyspareunia 35% • Leg, groin, pelvic or vaginal pain 42% • Mesh erosion/extrusion 42% • Recurrent UTI 15% • Urinary incontinence 13% • Voiding dysfunction 29%	• Complete mesh removal 51% • Mesh division 20% • Partial mesh removal 44%	Resolution of mesh complications (pain/dyspareunia)
Pickett 2015[f,g] USA	374	Age: 55.2 (11.8)	~28	Vaginal mesh 44% Sacrocolpopexy 34% Synthetic sling 77%	• Dyspareunia 57% • Mesh exposure 54% • Pain 63%	• Mesh revision or removal	Adverse events

Study Country	Number of participants	Characteristics[a]	Length of follow up (weeks)	Original surgery[b]	Main reasons for referral[c]	Interventions[d]	Outcomes
		BMI: 29.1 (6.8) kg/m^2 Median parity: 2 (IQR 2-3)			• Voiding dysfunction 39%		
Rac 2017[f] USA	277	Age: 57.2 (12) BMI: 29.5 (6.4) kg/m^2 Parity: NR	Mean 58.1	Mesh for SUI 55% Mesh for POP 5% Mesh for SUI + POP 39%	• Bladder outlet obstruction/urinary retention 55% • Bladder or urethra mesh erosion 15% • Lower urinary tract symptoms 16% • Vaginal mesh extrusion 33%	• Mesh revision, complete mesh removal, or partial mesh removal	Repeat surgery Complications related to surgery to resolve mesh complications
Renezeder 2011[h] Germany	118	Age/BMI/parity: NR	8	Various alloplastic materials including 72 cases of TVT, 11 cases of TOT-Obtape, 28 cases of other types of synthetic sling/TVM, and 9 cases mesh used not known	• De novo urgency 47% • Infection 16% • Mesh erosion 37% • Pain (including dyspareunia) 42% • Recurrent UTI and post-voiding residual urine>100 cm^3 39% • Vesicovaginal fistula 2%	• Bone stabilisation 1% • Complete mesh removal via laparotomy 13% • Excision of granulation tissue 3% • Partial mesh removal 65% • Tissue patch covering 18%	Complications related to surgery to resolve mesh complications
Skala 2011 [h,i] Germany	54	Mean age: 59.4 (range 33-82) BMI/parity: NR	~12	Various alloplastic materials including 33 cases of polypropylene mesh, 5 cases of other types of mesh, and 16 cases mesh used not known	• Dyspareunia 17% • Local infection 33% • Mesh erosion >1cm 56% • Pain 50% • Urgency 20% • Vaginal discharge 48%	• Partial mesh removal + tissue patch covering 17% • Partial mesh removal + vaginal revision 91%	Recurrent POP Repeat surgery Resolution of mesh complications (all/erosion/pain/dyspareunia/urinary)

Study Country	Number of participants	Characteristics[a]	Length of follow up (weeks)	Original surgery[b]	Main reasons for referral[c]	Interventions[d]	Outcomes
					• Vaginal bleeding 15%	• Wide mesh removal + laparotomy 19%	
Warembourg 2017 France	68	Mean age: 61.8 (range 35-84) Mean BMI: 25.1 (range 14.2-44.4) kg/m^2 Parity: NR	Mean 168.1	Hysterectomy 25% Sacrocolpopexy 10% TVM repair 3% Transvaginal native repair 12% Unknown surgery 5% Urinary incontinence surgery 19%	• Bladder mesh extrusion 6% • Medically-refractory neuropathic pain 4% • Pelvic abscess 12% • Rectal mesh extrusion 1% • Rectovisical fistula 1% • Symptomatic mesh contraction 20% • Ureteral kinking 3% • Vaginal mesh exposure 48% • Vesicovaginal fistula 3%	• Partial mesh removal 65% • Anterior TVM repair 51% • Posterior TVM repair 7% • Anterior + posterior TVM repair 13% • Anterior sacrocolpopexy mesh repair 3% • Anterior + posterior sacrocolpopexy mesh repair 16% • Anterior sacrocolpopexy + rectopexy mesh repair 6% • Rectopexy mesh repair 3%	Repeat surgery Resolution of mesh complications (all)

Notes: [a], Data for age, BMI, and parity is given as mean and standard deviation unless otherwise stated; [b], Participants may have had more than one type of mesh inserted. Many participants may have also had concomitant surgery (not shown); [c], Majority of participants had more than two or more indications for surgery to resolve mesh complications; [d], all participants received stated intervention unless otherwise stated. Participants may have had concomitant procedure for POP and/or SUI if indicated; [e], Reasons for referral are given in percentage of all 114 indications (84 patients reported 114 mesh complications); [f], Data for relevant types of surgery received or sling used not reported; [g], Pickett 2015: 82% had single-compartment mesh removal surgery, 12% had multi-compartment removal surgery, and 6% surgery not known; [h], Data for some of the POP participants in Skala 2011 are probably included the data reported for the sample in Renezeder 2011; [i], Participants in Skala 2011 may have received more than one intervention to resolve mesh complications. Abbreviations: IQR, interquartile range; MUI, mixed urinary incontinence; NR, not reported; TVM, transvaginal mesh; UTI, urinary tract infection.

Table 19: Outcomes of surgery to resolve mesh complications for review of general management of complications

	Mesh removal[a]			Various[b]		
Outcome	**# of studies**	**Total # of women**	**Rate (%)[c]**	**# of studies**	**Total # of women**	**Rate (%)[c]**
Adverse events	4	614	3.4	1	83	1.2
Repeat surgery	7	728	15.5	2	430	20.7
Recurrent SUI	1	75	24.0	1	83	16.9
Recurrent POP	3	177	10.2	2	123	6.5
Resolution of mesh complications						
All mesh complications	4	257	31.9	-	-	-
Mesh erosion/ extrusion/ exposure	2	86	90.7	-	-	-
Pain	5	231	58.4	-	-	-
Dyspareunia	4	127	32.3	-	-	-
Urinary – *any*	2	127	37.0	-	-	-
Urgency	1	11	63.6	-	-	-
Other	1	6	66.7	-	-	-
Bowel	1	7	100	-	-	-
Complications due to surgery to resolve mesh complications						
Pain	2	134	11.9	1	40	22.5
Fistula	1	15	6.7	2	123	0.8
Infection	2	327	11.9	1	40	7.5
Wound complications	-	-	-	1	40	0.0

Notes: [a], includes mesh revision, partial mesh removal and complete mesh removal; [b], management of mesh complications involves interventions other than surgery to amend or remove mesh ; [c], rate of outcome calculated as weighted average x 100.

Quality assessment of studies included in the evidence review

The Cochrane ROBINS-I checklist was used to assess the risk of bias for observational studies (e.g. cohort and case series studies). See appendix F for the full GRADE table for comparative outcomes.

Economic evidence

Included studies

A systematic review of the economic literature was carried out but no studies were identified which were applicable to this review question. See supplementary material D for further information.

Excluded studies

No studies were identified which were applicable to this review question.

Summary of studies included in the economic evidence review

No economic evaluations were identified which were applicable to this review question.

Economic model

This question was not prioritised for economic modelling because the evidence to base this on was anticipated to be limited.

Clinical evidence statements

Management of vaginal complications after mesh sling surgery

Partial vaginal mesh removal versus complete vaginal mesh removal

Continued or repeated exposure/extrusion/infection

No evidence was identified to inform this outcome.

Adverse events

No evidence was identified to inform this outcome.

Complications at ≤1 year and >1 year

- Very low quality evidence from 1 retrospective cohort study (n=94) showed no clinically important difference between partial and complete vaginal mesh sling removal in women with vaginal mesh sling complications on pain (RR 0.4 [95% CI 0.12-1.33]) and de novo urgency (RR 0.81 [95% CI 0.33-1.96) at mean 5.9 weeks follow up.
- Very low quality evidence from 1 retrospective cohort study (n=56) showed there may be a clinically important difference favouring partial over complete vaginal mesh sling removal in women with vaginal mesh sling complications on recurrent SUI at mean 28.6 weeks follow up, RR 0.36 (95% CI 0.11-1.16).
- Very low quality evidence from 1 retrospective cohort study (n=56) showed no clinically important difference between partial and complete vaginal mesh sling removal in women

with vaginal mesh sling complications on de novo urgency at mean 28.6 weeks follow up: RR 0.78 (95% CI 0.36-1.68).

Health-related quality of life

No evidence was identified to inform this outcome.

Patient satisfaction

No evidence was identified to inform this outcome.

Repeat surgery

- Very low quality evidence from 1 retrospective cohort study (n=56) showed a clinically important difference favouring partial over complete vaginal mesh sling removal in women with vaginal mesh sling complications on repeat surgery for any reason at mean 28.6 weeks follow up: RR 0.19 (95% CI 0.05-0.76).

Recurrent urinary incontinence or prolapse

- Very low quality evidence from 2 observational cohort studies (n=65) showed a clinically important difference favouring partial over complete vaginal mesh sling removal in women with vaginal mesh sling complications on recurrent SUI: RR 0.33 (95% CI 0.15-0.71)

Non-comparative data

Data from 3 case series studies, all of which were at serious risk of bias, showed that

- The recurrent erosion rate in 1 case series study (n=5) of women who had vaginal mesh removal after abdominal sacrocolpopexy for prolapse was 0%; however, the rate of repeat surgery for mesh extrusion/exposure in the other case series study (n=7) was 57.1%
- The rate of POP recurrence in 1 case series study (n=7) of women who had vaginal mesh removal after abdominal sacrocolpopexy for prolapse at mean 15.5-month follow up was 29%.
- The rate of recurrent mesh extrusion/exposure and the rate of repeat surgery for mesh extrusion/exposure in 1 case series study (n=36) of women who had vaginal mesh removal after vaginal mesh kit for prolapse was 16.7%

Management of sexual dysfunction and/or pain complications after mesh or mesh sling surgery

Partial mesh removal versus complete mesh sling removal

Continued or repeated sexual dysfunction

No evidence was identified to inform this outcome.

Pain

No evidence was identified to inform this outcome.

Adverse events

No evidence was identified to inform this outcome.

Patient satisfaction

No evidence was identified to inform this outcome.

Health-related quality of life

No evidence was identified to inform this outcome.

Repeat surgery

- Very low quality evidence from 1 retrospective cohort study (n=92) showed no clinically important difference between partial and complete mesh sling removal for pain or dyspareunia in women with SUI who need repeat surgery for SUI at mean 29 weeks follow up: RR 2.6 (95% CI 0.7-9.7).

Complications

- Very low quality evidence from 1 retrospective cohort study (n=151) showed no clinically important difference between partial and complete mesh sling removal for pain and/or sexual dysfunction in women with SUI on postoperative pain (RR 0.86 [95% CI 0.41-1.83]) urge incontinence (RR 0.51 [95% CI 0.23-1.16]) at mean 6.4 weeks follow up.
- Very low quality evidence from 1 retrospective cohort study (n=92) showed no clinically important difference between partial and complete mesh sling removal for pain or dyspareunia in women with SUI on postoperative pain (RR 0.56 [95% CI 0.2-1.58]) and urge incontinence (RR 0.7 [95% CI 0.29-1.66]) at a mean 29 weeks follow up.

Recurrent urinary incontinence or prolapse

- Very low quality evidence from 1 retrospective cohort study (n=151) showed no clinically important difference between partial and complete mesh sling removal for pain and/or sexual dysfunction on the number of women who have SUI at mean 6.4 weeks follow up: RR 0.65 (95% CI 0.36-1.18).
- Very low quality evidence from 1 retrospective cohort study (n=92) showed there may be a clinically important difference favouring partial over complete mesh sling removal for pain and/or sexual dysfunction in women with SUI on recurrent SUI at mean 29 weeks follow up: RR 0.44 (95% CI 0.19-1.02).

Mesh for prolapse versus mesh sling for SUI

Continued or repeated sexual dysfunction

No evidence was identified to inform this outcome.

Pain

No evidence was identified to inform this outcome.

Adverse events

No evidence was identified to inform this outcome.

Patient satisfaction

- Very low quality evidence from 1 retrospective cohort study (n=123) showed there may be a clinically important difference favouring removal of mesh sling for SUI over removal of mesh for prolapse on the number of women with SUI and/or POP whose pain is resolved

(RR 0.82 [95% CI 0.66-1.01]) and the number of women who have persistent pain (RR 2.87 [95% CI 0.84-9.78]) at mean 3 years follow up.

Health-related quality of life

No evidence was identified to inform this outcome.

Repeat surgery

No evidence was identified to inform this outcome.

Complications at ≤1 year and >1 year

No evidence was identified to inform this outcome.

Recurrent urinary incontinence or prolapse

No evidence was identified to inform this outcome.

Non-comparative data

Data from 1 case series study (n=233), which was at serious risk of bias, of women who had mesh removal surgery for the treatment of sexual dysfunction and/or pain complications showed that

- 77% of women who had concurrent mesh exposure showed an improvement in pain compared to 67% of those who did not.
- 18% of women who had concurrent mesh exposure showed no change in pain compared to 5% of those that did not.
- 5% of women who had concurrent mesh exposure showed a worsening of pain compared to 12% of those that did not.

Management of urinary complications after mesh or mesh sling surgery

Non-comparative data

Data from 1 cases series study (n=107), which was at serious risk of bias, of women that had mesh revision or mesh removal surgery after mesh sling for SUI showed that

- 78.9% of the women no longer had obstructive voiding symptoms, 95.8% no longer needed to use a catheter, and 65.8% no longer had recurrent UTI.
- 57% of the women had SUI (35.5% de novo).

General management of complications after mesh or mesh sling surgery

Partial mesh removal versus complete mesh removal

Adverse events

No evidence was identified to inform this outcome.

Complications

No evidence was identified to inform this outcome.

Health-related quality of life

- Very low quality evidence from 1 retrospective cohort study (n=41) showed a clinically important difference favouring complete mesh removal over partial mesh removal on the number of women with POP who show an improvement on the mental component of the SF-12 (Medical Outcomes Study Short Form) at range 4 to 14 years follow up: MD -8.92 (95% CI -14.19 to -3.65).
- Very low quality evidence from 1 retrospective cohort study (n=41) showed no clinically important difference between partial and complete mesh removal on the number of women with POP who show an improvement on either the physical component of the SF-12 (Medical Outcomes Study Short Form; MD +0.56 [95% CI -7.13 to +8.25]) or the PFDI-SF 20 (Pelvic Floor Distress Inventory Short Form; MD -27.95 [95% CI -60.67 to +4.77]) at range 4 to 14 years follow up.
- Very low quality evidence from 1 retrospective cohort study (n=33) showed no clinically important difference between partial and complete mesh removal on the number of women with POP who are sexually active and experience dyspareunia at range 4 to 14 years follow up RR 1.0 (0.7-1.42).

Patient-satisfaction

- Very low quality evidence from 1 retrospective cohort study (n=41) showed no clinically important difference between partial and complete mesh removal on the number of women with POP who show an improvement in mesh complications at range 4 to 14 years follow up: RR 0.66 (95% CI 0.34-1.26)

Repeat surgery

No evidence was identified to inform this outcome.

Recurrence of urinary incontinence or prolapse

No evidence was identified to inform this outcome.

Mesh division versus mesh removal

Adverse events

No evidence was identified to inform this outcome.

Complications

No evidence was identified to inform this outcome.

Health-related quality of life

No evidence was identified to inform this outcome.

Patient-satisfaction

No evidence was identified to inform this outcome.

Repeat surgery

- Very low quality evidence from 1 retrospective cohort study (n=102) showed a clinically important difference favouring mesh sling division over mesh sling removal on the number of women who have repeat surgery for SUI at range 1.5 to 48 months follow up: RR 0.16 (95% CI0.04-0.65).

Recurrence of urinary incontinence or prolapse

- Very low quality evidence from 1 retrospective cohort study (n=102) showed a clinically important difference favouring mesh sling division over mesh sling removal on the number

of women who have a recurrence of SUI at range 1.5 to 48 months follow up: RR 0.24 (95% CI0.11-0.52).

Transobturator mesh sling removal versus retropubic mesh sling removal

Adverse events

No evidence was identified to inform this outcome.

Complications

No evidence was identified to inform this outcome.

Health-related quality of life

No evidence was identified to inform this outcome.

Patient-satisfaction

No evidence was identified to inform this outcome.

Repeat surgery

- Very low quality evidence from 1 retrospective cohort study (n=117) showed no clinically important difference between the removal of transobturator mesh sling and retropubic mesh sling on the number of women with SUI who have repeat surgery for SUI at 3-months follow up: RR 0.88 (95% CI 0.54-1.45).

Recurrence of urinary incontinence or prolapse

No evidence was identified to inform this outcome.

Non-comparative data

Mesh removal (partial or complete)

Data, calculated as weighted averages, on the outcomes of mesh removal surgery to resolve mesh complications from 11 case series studies, all of which were at serious risk of bias, showed that:

- 31.1% of women in 4 case series studies (n=257) no longer had any mesh complications;
- 90.7% of women in 2 case series studies (n=86) no longer had mesh erosion/extrusion/exposure complications;
- 58.4% of women in 5 case series studies (n=231) no longer had pain;
- 32.3% of women in 4 case series studies (n=127) no longer had dyspareunia;
- 37% of women in 2 case series studies (n=127) showed that 37% no longer had any urinary complication;
- 63.6% of women in 1 case series studies (n=11) no longer had urgency urinary complications; had mesh removal to resolve mesh complications in 1 case series study (n=6) no longer had non-urgency urinary complications;
- 100% of women in 1 case series study (n=7) no longer had bowel complications;
- 3.4% of women in 4 case series studies (n=614) experienced an adverse event during mesh removal surgery;
- 15.5% of women in 7 case series studies (n=728) had repeat surgery for any reason;
- 24% of women in 1 case series study (n=75) had recurrent SUI;
- 10.2% of women in 3 case series studies (n=177) had recurrent POP;
- 11.9% of women in 2 case series studies (n=134) had a pain complication;
- 6.7% of women in 1 case series study (n=12) had a fistula complication;
- 11.9% of women in 2 case series studies (n=327) had an infection complication.

Various treatment strategies

Data, calculated as weighted averages, on the outcomes of women who had general mesh surgery management from 4 case series studies, all of which were at serious risk of bias, showed that:

- 1.0% of women in 2 case series studies (n=103) experienced an adverse event during general mesh surgery management;
- 20.4% of women in 3 case series studies (n=450) had repeat surgery for any reason;
- 16.9% of women in 1 case series study (n=83) had recurrent SUI;
- 7.3% of women in 3 case series studies (n=138) had recurrent POP;
- 18.2% of women in 2 case series studies (n=55) had a pain complication;
- 0.8% of women in 2 case series studies (n=123) had a fistula complication;
- 7.5% of women in 1 case series study (n=40) had an infection complication;
- 0% of women in 1 case series study (n=40) had a wound complication.

Economic evidence statements

No economic evidence on the cost effectiveness of interventions to manage mesh complications including mesh complications, vaginal complications, sexual dysfunction and pain, and urinary complications in women with UI, POP or both was available.

The committee's discussion of the evidence

Interpreting the evidence

The outcomes that matter most

The committee agreed that the critical outcomes for each review should be successful alleviation of the relevant mesh complication and the risks of adverse events for each intervention.

For the evidence review on the management of vaginal mesh complications, the committee agreed that continued or repeated exposure, extrusion or infection, adverse events, and complications more than 1 year after surgery, were the critical outcomes on which to base recommendations, and that validated measures of health-related quality of life, patient satisfaction, repeat surgery for mesh complications, and recurrence of urinary incontinence or prolapse were the most important.

For the evidence review on the management of sexual dysfunction, the committee agreed that continued or repeat sexual dysfunction, adverse events, and patient satisfaction were the critical outcomes on which to base recommendations, and that those of health-related quality of life, repeat surgery and complications >12 months were the most important. For the evidence review of the management of pain complications, the committee agreed that validated pain scales, patient satisfaction, adverse events, health-related quality of life, repeat surgery, complications >12-months and recurrence of UI or POP were the critical outcomes on which to base recommendations. But no studies were identified that used validated pain scales or reported continued or repeat sexual dysfunction

For the evidence review of the management of urinary complications, the committee agreed that the outcomes of continued or repeated urinary complications, adverse events, and complications >12 months were the critical outcomes on which to base recommendations, and that those of continence-specific health-related quality of life, patient satisfaction and repeat surgery were the most important.

For the evidence review on the management of bowel mesh complications, the committee agreed that reduction in bowel symptoms, adverse events, and health-related quality of life were the critical outcomes on which to base recommendations, and that those of complications, patient satisfaction, repeat surgery, and recurrence of urinary incontinence or prolapse were the most important.

For general management of mesh complications, the committee agreed that the outcomes common to all the reviews of specific mesh complications – persistence of symptoms, adverse events, repeat surgery, recurrent SUI/POP and complications of surgery to resolve mesh complications (pain, fistula, infection, and wound complications) were the most important on which to base recommendations.

The quality of the evidence

Overall the quality of the evidence from the six cohort studies included for the five reviews was very low because only two of the relevant outcomes could be pooled, the observational nature of the data, and the confidence intervals associated with the effect estimates are relatively wide. Although the review found two observational cohort studies of women who had partial or complete vaginal mesh sling removal for the treatment of vaginal complications, pooling of the outcomes was only possible in one instance (recurrent SUI). No relevant evidence was found for the review on the management of bowel complications, but the committee agreed that the current NICE guideline CG49 on faecal incontinence should be followed. The committee acknowledged that there was currently no NICE guideline on the treatment of obstructive defecation but that locally-agreed protocols should be used. No relevant evidence was found involving interventions such as pus drainage, antibiotics, pain management, and those for the functional and non-functional bowel complications.

The 19 included case series studies were all assessed using the Cochrane ROBINS-I tool as being at serious risk of bias because of concerns over confounding, selection of participants, and measurement of outcome data. Sixteen studies examined mesh division, revision or removal, and three studies used more than two specific treatments. Fourteen of the 19 case series studies did not meet the inclusion criteria for the specific reviews. However, because of the paucity of data the committee decided to consider studies that included women referred for a variety of mesh complications.

Benefits and harms

The limited available comparative evidence was observational in nature, mainly retrospective, of very low quality and limited to a short follow-up of one year and so could not support strong recommendations. Therefore the committee agreed that some of the studies that did not meet the inclusion criteria for the individual reviews but reported on the general management of mesh complications would be informative for their decision-making on the general management of mesh complications and the treatment of specific complications. The committee noted that the evidence from the included case series studies was wide-ranging, involving data from women with a variety of both mesh complications and associated synthetic mesh products, and accepted that the data were very uncertain. The committee agreed that the non-comparative data was consistent with both the comparative data and what would be clinically expected. They agreed that this suggested that mesh removal can sometimes resolve mesh complications but that its success varies widely with the specific mesh complication (e.g. vaginal, pain, urinary incontinence) and the complexity of the complications, and that some women who have complete removal of mesh will experience complications and recurrence of SUI and POP (or both), and need to have more surgery for these problems. The committee therefore based the majority of the recommendations on their expertise and experience and developed them by consensus.

General recommendations regarding management of mesh complications

The committee discussed the difficulties involved in managing mesh complications. They noted that women often have multiple mesh complications, which can be long lasting and impacting on quality of life by affecting many activities of daily living. These require the input of many professionals during their treatment and management. The committee therefore agreed, based on their expertise and experience, that women who are contemplating mesh removal for mesh-related complications need the opportunity to discuss their own cases with relevant specialists of a regional or supra-regional MDT that can call on the relevant expertise to manage the specific complication(s).

The committee recognised that although removal of synthetic mesh may be the preferred option for some women who experience mesh complications, the evidence was not enough to recommend its use as a first-line treatment as a matter of course. To support shared decision-making women need to be informed of the possible risks and benefits of mesh removal surgery so that they can make an informed choice. The committee agreed that synthetic mesh material can be difficult to remove completely and that it is not always possible to do so, and that partial removal may be as effective. They also agreed that it was important to emphasise that partial or complete removal of mesh may lead to a recurrence of urinary incontinence or prolapse because the source of organ support has been removed.

Three retrospective cohort studies of women who had surgery to resolve a variety of mesh complications provided three individual comparisons. In addition to the study comparing mesh division to mesh removal, one study of women who had partial or complete mesh removal suggested an increased probability of having an improved 'mental' quality of life (SF-12 mental component score) for complete compared to partial removal, although there was no difference between them in improving mesh complications, improving physical quality of life (SF-12 physical component score), continence-specific health-related quality of life (PDFI-SF 20 score), and the number of women with dyspareunia. One study of women who had either transobturator or retropubic mesh sling removal surgery showed no difference between the two routes on the number of women who had repeat surgery for SUI.

The committee noted that the evidence on the comparison of complete to partial removal of mesh sling suggested that partial removal had an increased risk of pain at approximately 29 weeks follow up, an increased risk of recurrent SUI, and an increased risk that repeat surgery will be needed. The committee recognised that this is not unexpected because there may still be some support to the urethra after partial removal, and so the risk of recurrent SUI is likely to be lower than after complete removal. In contrast, one cohort study that examined partial compared to complete removal in women with mesh complications showed complete mesh removal was associated with an increased probability of an improvement in mental quality of life (SF-12 mental component score). The committee noted that this was a common clinical finding and interpreted it as possibly reflecting the psychological relief felt after the removal of the problematic synthetic mesh.

Management of vaginal complications

On the management of vaginal complications, the committee noted that all the women in the included case series studies had unsuccessfully received conservative treatment before having surgery to resolve the complications. Given the limited evidence on the long-term effectiveness and safety of vaginal mesh removal, and based on their expertise and experience, the committee recommended that initial conservative treatment of an area of exposed mesh <1 cm^2 using topical vaginal oestrogen could be for at least 3 months before surgical options are considered. Although there was no evidence on the size of the mesh exposure that should be treated, the committee agreed, on the basis of their expertise and experience that vaginal oestrogen applied to exposed mesh with an area of ≥1cm^2 is not likely to be effective. Despite the limited evidence available, the committee wanted to make a relatively strong recommendation on the use of topical oestrogen cream. As it is a low risk intervention, it means the woman does not have to have surgery straight away, but if her exposure does not improve, she then has the option for further treatment. The committee

noted that some women who present with mesh exposure/extrusion may experience vaginal discharge, which may be diagnosed as an infection rather than as a sign of exposure/extrusion. So, based on their expertise and experience, the committee recommended that in such cases, imaging should be offered in order to clarify the source of discharge.

Based on their experience and knowledge and decisions related to conservative treatment above, the committee decided that for women in whom conservative treatment has been unsuccessfully tried for 3 months or who have a mesh sling exposure or extrusion that is larger than ≥1cm^2 partial or complete removal of the vaginal portion of mesh sling should be considered.

In addition to the general recommendations on mesh removal (for example, that complete removal may not be possible), the committee agreed that some recommendations were needed on the specific type of vaginal mesh or mesh sling and condition (incontinence or prolapse) that women can present with. One cohort study comparing complete with partial vaginal mesh sling removal contributed most of the evidence and suggested there was an increased risk of pain at approximately 29 weeks follow up, recurrent SUI, and repeat surgery following complete removal, but no difference between the two on pain and de novo urgency at approximately 6 weeks and the latter at approximately 29 weeks follow up. The committee agreed that these results were consistent with their knowledge and experience and that it was important to tell women that there may be an increased risk of recurrent SUI with complete mesh sling removal compared to partial. Moreover, they agreed that there are a priori reasons to think that there will also be a decreased risk of subsequent mesh extrusion due to the simple fact that there will be less or no synthetic mesh material to support the urethra that can become extruded.

For mesh inserted to resolve prolapse or abdominally-placed mesh, the committee agreed that attempting the complete removal of mesh carries with it the inherent risk that prolapse will recur because of the lack of organ support. Consistent with this, one small case series study of less than 10 women, showed that almost 1 in 3 women had a recurrence of POP after complete mesh removal. Although there was no evidence on the risk of urinary tract and bowel injury following the attempted removal of either mesh for POP (e.g. transvaginal mesh kit) or abdominally-placed mesh to resolve vaginal complications, the committee agreed by consensus, based on their knowledge and experience, that there is a risk of these injuries because the urinary tract and bowel are very close to the mesh, which can make surgery difficult. Two small case series studies provided evidence on the rate of recurrent erosion associated with complete mesh removal after abdominal sacrocolpopexy, with one study reporting a rate of zero per cent and the other a rate over 50%. The committee agreed that this evidence was consistent with the difficulties associated with the attempt to completely remove synthetic mesh material. For abdominally-placed mesh in particular, the committee noted that abdominal surgery may be indicated if parts of the mesh are not accessible by other routes or if there is evidence of infection or there have been previous unsuccessful attempts to remove the mesh vaginally

Management of sexual dysfunction and/or pain complications

The committee recognised that the management of sexual dysfunction and pain requires specialist assessment and agreed by consensus, based on their expertise and experience, that women who present with pain or painful sexual intercourse should be referred for this if they present in primary care. Even though evidence was limited the committee agreed (based on consensus) that this would be a strong recommendation for referral because of the impact that this complication has on the woman's life. They furthermore agreed that if these symptoms are confirmed to be related to the insertion of synthetic mesh, then advice should be sought from a regional or supra-regional MDT.

One retrospective cohort study of women who had partial or complete mesh sling removal for treatment of sexual dysfunction and/or pain complications suggested no difference on the

majority of outcomes (pain, urge incontinence, repeat surgery for SUI) at both approximately 6 and approximately 29 weeks follow up. However, the same study indicated that that there may also be an increased risk of postoperative SUI at approximately 29 weeks follow-up for complete compared to partial removal.

Evidence from another retrospective cohort study of women who had either mesh removal or mesh sling removal for treatment of sexual dysfunction and/or pain complications suggested that there is an increased probability of pain resolution and decreased risk of persistent pain when removing mesh sling for SUI compared to removing mesh for prolapse.

Given the relative lack of evidence, the committee agreed by consensus, using their knowledge and experience, that conservative treatments for pain and/or sexual dysfunction should be initially offered if no mesh abnormalities are detected and that advice from a regional or supra-regional MDT should be sought if these fail.

Management of urinary complications

The committee discussed the complexities of managing urinary complications and agreed by consensus, using their knowledge and experience, that women who have mesh that is perforating the lower urinary tract should be referred to a mesh complications centre for assessment and management with the requisite expertise. They agreed that this should be a strong recommendation for referral, despite a lack of evidence, because of the impact that these complications have on women's quality of life.

Given the uncertainty about the effectiveness and safety of mesh removal, the committee agreed by consensus that it was important that women are told that there is no guarantee that it will be successful in resolving urinary symptoms, that new symptoms or SUI may occur and indeed are more likely if removal is complete, and that there is a risk of both perioperative injury such as urinary tract fistula and repeat surgery.

The committee agreed that one retrospective cohort study of women with a variety of mesh complications, although not directly applicable to the review of urinary complications, was relevant to the recommendations. The study of women who had either mesh division or mesh removal showed an increased risk from the latter compared to the former on recurrence of SUI and risk of repeat surgery for SUI. The committee noted that almost all the women in whom mesh division was performed had voiding dysfunction, while those who had mesh removal had either mesh sling erosion or pain. Furthermore, they recognised that mesh division for the treatment of voiding dysfunction is standardly used to relieve tension in the mesh to permit successful voiding. The committee therefore agreed that mesh division, which can be performed in an outpatient setting, should be considered for resolving voiding dysfunction. However, they noted that women who had persistent voiding dysfunction should be referred to an appropriate mesh complications centre for appropriate diagnosis and management.

One case series study of women with lower urinary tract complications (e.g. obstructive voiding, recurrent urinary tract infection) who had either mesh revision or mesh removal suggested that the overall effectiveness of such surgeries for resolving specific urinary complications was variable and that there is some risk of persistent or de novo SUI. With this study in mind, the committee agreed by consensus, using their knowledge and experience, that it be explained to women considering surgery to resolve voiding symptoms that mesh removal has higher risk of recurrent SUI than mesh division and that further surgery may be needed.

Bowel complications

On the treatment of bowel complications associated with mesh or mesh sling, the committee recognised that there is a dearth of evidence but agreed that functional bowel disorders should be managed according to the NICE CG49 guideline for faecal incontinence, and the management of obstructed defecation should follow locally-agreed protocols. In line with the

recommendations on the general management of mesh complications, the committee agreed by consensus that an individualised treatment plan for women with non-functional bowel complications – that is, those related to the placement of synthetic mesh (e.g. erosion) – should be created with a regional or supra-regional MDT that has the relevant expertise.

In addition to the general point that complete removal of mesh may not be possible, the committee agreed that it was important that women should be told that there is a risk (albeit uncertain) that bowel symptoms will persist or recur at some (unknown) point in the future after mesh removal and that a temporary or even permanent stoma may be needed after removal surgery for bowel complications.

Due to the limited evidence for chronic pain management following mesh surgery, the committee made a research recommendation. This is important because, chronic pain and sexual dysfunction after mesh surgery can be debilitating and have a severe impact on a woman's quality of life. The committee were aware that there was very little evidence to support recommendations about the most appropriate management options for sexual dysfunction after mesh surgery or the most effective management options for women presenting with chronic pain 3 months after mesh surgery. Women are also requesting to have mesh removed in the expectation that it will improve their pain but there is insufficient evidence to guide women and their clinicians on the likelihood of pain improvement or resolution after mesh removal. In order to manage the sexual dysfunction and chronic pain most effectively for this group of patients research needs to be undertaken comparing the different management options currently practised.

Cost effectiveness and resource use

The committee acknowledged the lack of clinical and economic evidence on the management of vaginal complications, sexual dysfunction and/or pain, urinary complications, bowel complications, and general mesh complications in women with UI, POP or both.

The committee explained that the recommendations in this area may have resource implications, for example, more MDT reviews and individualised treatment plans, more imaging such as CT or MRI scans, more referrals to specialist centres for assessments, and an increase in the consultation times to explain the risks associated with the removal of mesh. The committee agreed that improving the chances of successfully treating women with mesh-related complications was essential and that these changes are likely to achieve this. The committee explained that timely treatment of these complications may improve outcomes and overall cost savings to the NHS, given that delays in appropriate management may result in worse problems needing more resource intensive management. Also, the committee explained that timely identification and appropriate management of mesh-related complications may reduce the overall burden of symptoms these women experience and have a significant positive impact on their quality of life, especially as some mesh–related complications can last for many years and require expensive long-term management.

Other factors the committee took into account

The committee took into account recommendations from the NICE guideline on faecal incontinence which would also be relevant to the treatment of some of the bowel complications women may experience in the context urinary incontinence and they therefore decided to cross refer to it.

References

Abbott 2014

Abbott, S., Unger, C. A., Evans, J. M., Jallad, K., Mishra, K., Karram, M. M., Iglesia, C. B., Rardin, C. R., Barber, M. D., Evaluation and management of complications from synthetic mesh after pelvic reconstructive surgery: a multicenter study, American Journal of Obstetrics & Gynecology, 210, 163.e1-8, 2014

Begley 2005

Begley, J. S., Kupferman, S. P., Kuznetsov, D. D., Kobashi, K. C., Govier, F. E., McGonigle, K. F., Muntz, H. G., Incidence and management of abdominal sacrocolpopexy mesh erosions, American Journal of Obstetrics & Gynecology, 192, 1956-62, 2005

Cardenas-Trowers 2017

Cardenas-Trowers, O. O, Malekzadeh, P, Nix, D. E, Hatch, K. D., Vaginal Mesh Removal Outcomes: Eight Years of Experience at an Academic Hospital, Female Pelvic Medicine & Reconstructive Surgery, 20, 20, 2017

Cheng 2017

Cheng, Y. W., Su, T. H., Wang, H., Huang, W. C., Lau, H. H., Risk factors and management of vaginal mesh erosion after pelvic organ prolapse surgery, Taiwanese Journal of Obstetrics & Gynecology, 56, 184-187, 2017

Crescenze 2016

Crescenze, I. M., Abraham, N., Li, J., Goldman, H. B., Vasavada, S., Urgency Incontinence before and after Revision of a Synthetic Mid-Urethral Sling, Journal of Urology, 196, 478-483, 2016

Crosby 2014

Crosby, E. C, Abernethy, M, Berger, M. B, DeLancey, J. O, Fenner, D. E, Morgan, D. M., Symptom resolution after operative management of complications from transvaginal mesh, Obstetrics & Gynecology, 123, 134-9, 2014

Danford 2015

Danford, J. M., Osborn, D. J., Reynolds, W. S., Biller, D. H., Dmochowski, R. R., Postoperative pain outcomes after transvaginal mesh revision, International urogynecology journal, 26, 65-9, 2015

Domingo 2005

Domingo, S., Alama, P., Ruiz, N., Perales, A., Pellicer, A., Diagnosis, management and prognosis of vaginal erosion after transobturator suburethral tape procedure using a nonwoven thermally bonded polypropylene mesh, Journal of Urology, 173, 1627-1630, 2005

Fabian 2015

Fabian, G, Kociszewski, J, Kuszka, A, Fabian, M, Grothey, S, Zwierzchowska, A, Majkusiak, W, Barcz, E., Vaginal excision of the sub-urethral sling: analysis of indications, safety and outcome, Archives of Medical Science, 11, 982-8, 2015

George 2013

George, A, Mattingly, M, Woodman, P, Hale, D., Recurrence of prolapse after transvaginal mesh excision, Female Pelvic Medicine & Reconstructive Surgery, 19, 202-5, 2013

Hokenstad 2015

Hokenstad, E. D, El-Nashar, S. A, Blandon, R. E, Occhino, J. A, Trabuco, E. C, Gebhart, J. B, Klingele, C. J., Health-related quality of life and outcomes after surgical treatment of complications from vaginally placed mesh, Female Pelvic Medicine & Reconstructive Surgery, 21, 176-80, 2015

Hou 2014

Hou, J. C., Alhalabi, F., Lemack, G. E., Zimmern, P. E., Outcome of transvaginal mesh and tape removed for pain only, The Journal of urology, 192, 856-60, 2014

Jambusaria 2016

Jambusaria, L. H, Heft, J, Reynolds, W. S, Dmochowski, R, Biller, D. H., Incontinence rates after midurethral sling revision for vaginal exposure or pain, American Journal of Obstetrics and Gynecology, 215, 764.e1-764.e5, 2016

Jeffery 2012

Jeffery, S. T, Nieuwoudt, A., Beyond the complications: medium-term anatomical, sexual and functional outcomes following removal of trocar-guided transvaginal mesh. A retrospective cohort study, International Urogynecology Journal, 23, 1391-1396, 2012

Kohli 1998

Kohli, N., Walsh, P. M., Roat, T. W., Karram, M. M., Mesh erosion after abdominal sacrocolpopexy, Obstetrics and Gynecology, 92, 999-1004, 1998

Lee 2013

Lee, D, Dillon, B, Lemack, G, Gomelsky, A, Zimmern, P., Transvaginal mesh kits--how serious are the complications and are they reversible? Urology, 81, 43-8, 2013

Marcus-Braun 2010

Marcus-Braun, N, von Theobald, P., Mesh removal following transvaginal mesh placement: a case series of 104 operations, International Urogynecology Journal, 21, 423-30, 2010

Misrai 2009

Misrai, V, Roupret, M, Xylinas, E, Cour, F, Vaessen, C, Haertig, A, Richard, F, Chartier-Kastler, E., Surgical resection for suburethral sling complications after treatment for stress urinary incontinence, Journal of Urology, 181, 2198-2202, 2009

Parden 2016

Parden, A. M, Tang, Y, Szychowski, J, Richter, H. E., Characterization of Lower Urinary Tract Symptoms Before and After Midurethral Sling Revision, Journal of Minimally Invasive Gynecology, 23, 979-985, 2016

Pickett 2015

Pickett, S. D, Barenberg, B, Quiroz, L. H, Shobeiri, S. A, O'Leary, D. E., The significant morbidity of removing pelvic mesh from multiple vaginal compartments, Obstetrics and Gynecology, 125, 1418-1422, 2015

Rac 2017

Rac, G, Greiman, A, Rabley, A, Tipton, T. J, Chiles, L. R, Freilich, D. A, Rames, R, Cox, L, Koski, M, Rovner, E. S., Analysis of Complications of Pelvic Mesh Excision Surgery Using the Clavien-Dindo Classification System, Journal of Urology, 19, 19, 2017

Ramart 2017

Ramart, P, Ackerman, A. L, Cohen, S. A, Kim, J. H, Raz, S., The Risk of Recurrent Urinary Incontinence Requiring Surgery After Suburethral Sling Removal for Mesh Complications, Urology, 106, 203-209, 2017

Renezeder 2011

Renezeder, K, Skala, C. E, Albrich, S, Koelbl, H, Naumann,G., Complications following the use of alloplastic materials in urogynecological surgery, European Journal of Obstetrics, Gynecology, and Reproductive Biology, 158, 354-357, 2011

Shaw 2017

Shaw, J, Wohlrab, K, Rardin, C., Recurrence of stress urinary incontinence after midurethral sling revision: A retrospective cohort study, Female Pelvic Medicine and Reconstructive Surgery, 23, 184-187, 2017

Skala 2011

Skala, C. E, Renezeder, K, Albrich, S, Puhl, A, Laterza, R. M, Naumann, G, Koelbl, H., Mesh complications following prolapse surgery: Management and outcome, European Journal of Obstetrics Gynecology and Reproductive Biology, 159, 453-456, 2011

Warembourg 2017

Warembourg, S, Labaki, M, de Tayrac, R, Costa, P, Fatton, B., Reoperations for mesh-related complications after pelvic organ prolapse repair: 8-year experience at a tertiary referral center, International Urogynecology Journal, Jan-13, 2017

Appendices

Appendix A – Review protocols

Review protocol for review question: What are the most effective management options for vaginal complications (including exposure, extrusion, erosion and infection) after mesh surgery?

Table 20: Review protocol for management options for vaginal complications after mesh surgery

Field (based on PRISMA-P	Content
Review question	What are the most effective management options for vaginal complications (including exposure, extrusion, erosion and infection) after mesh surgery?
Type of review question	Intervention
Objective of the review	Women might present with vaginal infection, extrusion and/or erosion following mesh surgery. Currently, there is no consensus on how to manage these complications.
Eligibility criteria – population/disease/condition/issue/domain	Women (aged 18 years and over) who are experiencing vaginal complications after mesh surgery (both biological and synthetic materials) for UI, POP or both. Women having repeat surgery for UI or POP or both as well as women having repeat surgery for mesh complications or those who are treatment naïve will be included. Women presenting the following complications will be included: • Mesh erosion (including exposure and extrusion) • Mesh infection
Eligibility criteria – intervention(s)/exposure(s)/prognostic factor(s)	The following management options will be considered: • Mesh removal surgery (vaginal removal or trimming of mesh, abdominal/laparoscopic removal of mesh) • Partial or complete mesh removal • Vaginal oestrogen • Antibiotics, systemic or local • Drainage/collection of pus

Field (based on PRISMA-P	Content
Eligibility criteria – comparator(s)/control or reference (gold) standard	• Mesh removal surgery vs. no surgery • Mesh removal surgery vs. vaginal oestrogen • Mesh removal surgery vs. antibiotics • Vaginal oestrogen vs. nothing • Partial removal of mesh vs. complete removal • Drainage/collection of pus vs. nothing • Drainage/collection of pus vs. antibiotics • Drainage/collection of pus vs. removal of mesh
Outcomes and prioritisation	**Critical** • Continued or repeated exposure/extrusion/infection • Adverse events (immediate post-op or perioperative): o Severe bleeding requiring a blood transfusion o Internal organ injury (to bladder or bowel) • Long-term complications (> 12 months): o Pain o Mesh erosion or extrusion o Fistula o Need for catheterisation o Infection o De novo overactive bladder symptoms o Sexual dysfunction o Wound complications (infection and tissue breakdown) **Important** • Health-related quality of life (validated scales only) • Patient satisfaction o Patient reported improvement o Patient Global Impression of Improvement

Field (based on PRISMA-P	Content
	• Repeat surgery (for mesh complications) • Recurrence of urinary incontinence or prolapse
Eligibility criteria – study design	Systematic reviews of randomised controlled trials (RCTs) RCTs Comparative cohort studies in the absence of other studies We will exclude conference abstracts (unless linked to an RCT)
Other inclusion exclusion criteria	No sample size restriction No date restriction
Proposed sensitivity/sub-group analysis, or meta-regression	Population subgroups: • Type of initial surgery: POP vs. SUI Intervention subgroups: • Type of surgical approach: laparoscopy vs. open • Complete vs. partial mesh removal The committee will make special considerations for the following group when drafting their recommendations: • Older women • Women with physical disabilities • Women with cognitive impairment • Women who are considering future pregnancy
Selection process – duplicate screening/selection/analysis	Dual sifting will be undertaken for this question using NGA STAR software. Sifting, data extraction, appraisal of methodological quality and GRADE assessment will be performed by the systematic reviewer. Dual weeding will be performed by a second systematic reviewer on 5% or 10% of records (depending on database size), with resolution of discrepancies in discussion with the senior reviewer if necessary. Quality control will be performed by the senior systematic reviewer. Dual data extraction will not be performed for this question.
Data management (software)	Pairwise meta-analyses, if possible, will be performed using Cochrane Review Manager (RevMan5). 'GRADEpro' will be used to assess the quality of evidence for each outcome. NGA STAR software will be used for generating bibliographies/citations, study sifting, data extraction and recording quality assessment using checklists.

Field (based on PRISMA-P	Content
Information sources – databases and dates	Sources to be searched: Medline, Medline In-Process, CCTR, CDSR, DARE, HTA, Embase Limits (e.g. date, study design): Apply standard animal/non-English language exclusion Limit to RCTs and systematic reviews in first instance but download all results Dates.
Identify if an update	This review question is not an update.
Author contacts	Developer: The National Guideline Alliance https://www.nice.org.uk/guidance/indevelopment/gid-ng10035.
Highlight if amendment to previous protocol	For details please see section 4.5 of Developing NICE guidelines: the manual 2014.
Search strategy – for one database	For details please see appendix B of the full guideline.
Data collection process – forms/duplicate	A standardised evidence table format will be used, and published as appendix D (clinical evidence tables) or H (economic evidence tables) of the full guideline.
Data items – define all variables to be collected	For details please see evidence tables in appendix D (clinical evidence tables) or H (economic evidence tables) of the full guideline.
Methods for assessing bias at outcome/study level	Standard study checklists were used to critically appraise individual studies. Appraisal of methodological quality will be conducted using the appropriate tool: • ROBIS (systematic reviews and meta-analyses), • Cochrane risk of bias tool (RCTs). • Cochrane risk of bias tool (Non-randomised studies) For further details please see section 6.2 of Developing NICE guidelines: the manual 2014 The risk of bias across all available evidence was evaluated for each outcome using the 'Grading of Recommendations Assessment, Development and Evaluation (GRADE) toolbox' developed by the international GRADE working group http://www.gradeworkinggroup.org/. Outcomes will be downgraded if the randomisation and/or concealment methods are unclear or inadequate. Outcomes will also be downgraded if there is considerable missing data (if there is a dropout of more than 20%, or if there is a difference of >20% between groups. Heterogeneity will be assessed using the i^2 statistic, outcomes will be downgraded once if $i^2 \geq 50\%$, twice if $i^2 \geq 80\%$. GRADE cannot be used for accurate assessment of bias for case series data and will not be used. Determining the quality of case series will include an assessment of bias, consecutive and comparative nature of series.

Field (based on PRISMA-P	Content
Criteria for quantitative synthesis (where suitable)	For details please see section 6.4 of Developing NICE guidelines: the manual 2014.
Methods for analysis – combining studies and exploring (in)consistency	For details please see the methods chapter of the full guideline.
Meta-bias assessment – publication bias, selective reporting bias	For details please see section 6.2 of Developing NICE guidelines: the manual 2014. If sufficient relevant RCT evidence is available, publication bias will be explored using RevMan software to examine funnel plots. Trial registries will be examined to identify missing evidence: Clinical trials.gov, NIHR Clinical Trials Gateway
Assessment of confidence in cumulative evidence	For details please see sections 6.4 and 9.1 of Developing NICE guidelines: the manual 2014.
Rationale/context – Current management	For details please see the introduction to the evidence review in the full guideline.
Describe contributions of authors and guarantor	A multidisciplinary committee https://www.nice.org.uk/guidance/indevelopment/gid-ng10035 developed the guideline. The committee was convened by the National Guideline Alliance and chaired by Dr Fergus Macbeth in line with section 3 of Developing NICE guidelines: the manual 2014. Staff from the National Guideline Alliance undertook systematic literature searches, appraised the evidence, conducted meta-analysis and cost-effectiveness analysis where appropriate, and drafted the guideline in collaboration with the committee. For details please see the methods chapter of the full guideline.
Sources of funding/support	The National Guideline Alliance is funded by NICE and hosted by the Royal College of Obstetricians and Gynaecologists.
Name of sponsor	The National Guideline Alliance is funded by NICE and hosted by the Royal College of Obstetricians and Gynaecologists.
Roles of sponsor	NICE funds the National Guideline Alliance to develop guidelines for those working in the NHS, public health, and social care in England.
PROSPERO registration number	Not registered with PROSPERO.

Review protocol for review question: What are the most effective management options for sexual dysfunction after mesh surgery?

Table 21: Review protocol for management options for sexual dysfunction after mesh surgery

Field (based on PRISMA-P	Content
Review question	What are the most effective management options for sexual dysfunction after mesh surgery?
Type of review question	Intervention
Objective of the review	The objective of this review is to establish the most appropriate management of women with new or worsening sexual dysfunction after mesh surgery for SUI and/or POP. Sexual dysfunction in women is complex and multifactorial and the committee recognises that sexual dysfunction relating to mesh complications has a profound effect on sexual function, relationships and quality of life.
Eligibility criteria – population/disease/condition/issue/domain	Women (aged 18 years or older) experiencing new or worsening sexual dysfunction after mesh surgery for UI, POP or both. Women having repeat surgery or those who are treatment naïve will be included.
Eligibility criteria – intervention(s)/exposure(s)/prognostic factor(s)	• Mesh removal surgery • Vaginal dilation • Vaginal reconstruction/vaginaplasty • Pain management for dyspareunia including psychosexual counselling, local anaesthetic, physiotherapy, systemic analgesics and botulinum toxin
Eligibility criteria – comparator(s)/control or reference (gold) standard	• Comparison of vaginal oestrogen to any intervention listed above • Comparison of all interventions vs. no treatment • Comparison of any surgery vs. pain management

Outcomes and prioritisation	**Critical**
	• Sexual function (measured using validated scales such as PISQ-IR or ePAQ)
	• Adverse events (immediate post-op or perioperative):
	  ○ Severe bleeding requiring blood transfusion
	  ○ Unintentional internal organ injury
	• Patient satisfaction
	  ○ Patient reported improvement

Field (based on PRISMA-P	Content
	○ Patient Global Impression of Improvement Justification: the committee is aware that removal of mesh is associated with risks including injury to surrounding structures and may not resolve the symptoms of sexual dysfunction and could worsen symptoms. As this question is related to sexual dysfunction, sexual function and patient satisfaction are critical outcomes. **Important** • Health-related quality of life • Repeat surgery (for UI or POP, or mesh complications) • Long-term complications (> 12 months): ○ Pain ○ Fistula ○ Infection ○ Wound complications • Partner satisfaction Justification: Repeat surgery for mesh complications is common and carries potential for long-term adverse events, including recurrence of incontinence, prolapse and pain, including dyspareunia. The committee is aware that sexual dysfunction has major effects on overall quality of life and relationships.
Eligibility criteria – study design	SR of RCT RCT If lack of full-text evidence, conference abstracts of RCTs will be considered. If lack of RCT evidence, comparative cohort studies will be considered. Case series will be considered if no comparative evidence is identified.
Other inclusion exclusion criteria	No restriction on number for RCT Case series with a minimum of 50 participants
Proposed sensitivity/sub-group analysis, or meta-regression	Population subgroups: • Previous surgery for stress urinary incontinence vs. previous surgery for pelvic organ prolapse • Abdominally placed mesh or vaginally placed mesh
Selection process – duplicate screening/selection/analysis	Sifting, data extraction, appraisal of methodological quality and GRADE assessment will be performed by the systematic reviewer. No dual weeding will be performed for this review questions.

Field (based on PRISMA-P	Content
	Quality control will be performed by the senior systematic reviewer. Dual data extraction will not be performed for this question.
Data management (software)	Pairwise meta-analyses, if possible, will be performed using Cochrane Review Manager (RevMan5). 'GRADEpro' will be used to assess the quality of evidence for each outcome. NGA STAR software will be used for generating bibliographies/citations, study sifting, data extraction and recording quality assessment using checklists.
Information sources – databases and dates	Sources to be searched: Medline, Medline In-Process, CCTR, CDSR, DARE, HTA, Embase Limits (e.g. date, study design): Apply standard animal/non-English language exclusion Limit to RCTs and systematic reviews in first instance but download all results.
Identify if an update	This review question is not an update.
Author contacts	Developer: The National Guideline Alliance https://www.nice.org.uk/guidance/indevelopment/gid-ng10035.
Highlight if amendment to previous protocol	For details please see section 4.5 of Developing NICE guidelines: the manual 2014.
Search strategy – for one database	For details please see appendix B of the full guideline .
Data collection process – forms/duplicate	A standardised evidence table format will be used, and published as appendix D (clinical evidence tables) or H (economic evidence tables) of the full guideline.
Data items – define all variables to be collected	For details please see evidence tables in appendix D (clinical evidence tables) or H (economic evidence tables) of the full guideline.
Methods for assessing bias at outcome/study level	Standard study checklists were used to critically appraise individual studies. Appraisal of methodological quality will be conducted using the appropriate tool: • ROBIS (systematic reviews and meta-analyses), • Cochrane risk of bias tool (RCTs). • Cochrane risk of bias tool (Non-randomised studies) For further details please see section 6.2 of Developing NICE guidelines: the manual 2014 The risk of bias across all available evidence was evaluated for each outcome using the 'Grading of Recommendations Assessment, Development and Evaluation (GRADE) toolbox' developed by the international

Field (based on PRISMA-P	Content
	GRADE working group http://www.gradeworkinggroup.org/. Outcomes will be downgraded if the randomisation and/or concealment methods are unclear or inadequate. Outcomes will also be downgraded if there is considerable missing data (if there is a dropout of more than 20%, or if there is a difference of >20% between groups. Heterogeneity will be assessed using the i^2 statistic, outcomes will be downgraded once if $i^2 \geq 50\%$, twice if $i^2 \geq 80\%$. GRADE cannot be used for accurate assessment of bias for case series data and will not be used. Determining the quality of case series will include an assessment of bias, consecutive and comparative nature of series.
Criteria for quantitative synthesis (where suitable)	For details please see section 6.4 of Developing NICE guidelines: the manual 2014.
Methods for analysis – combining studies and exploring (in)consistency	For details please see the methods chapter of the full guideline.
Meta-bias assessment – publication bias, selective reporting bias	For details please see section 6.2 of Developing NICE guidelines: the manual 2014. If sufficient relevant RCT evidence is available, publication bias will be explored using RevMan software to examine funnel plots. Trial registries will be examined to identify missing evidence: Clinical trials.gov, NIHR Clinical Trials Gateway
Assessment of confidence in cumulative evidence	For details please see sections 6.4 and 9.1 of Developing NICE guidelines: the manual 2014.
Rationale/context – Current management	For details please see the introduction to the evidence review in the full guideline.
Describe contributions of authors and guarantor	A multidisciplinary committee developed the guideline. The committee was convened by the National Guideline Alliance and chaired by Dr Fergus Macbeth in line with section 3 of Developing NICE guidelines: the manual 2014. Staff from the National Guideline Alliance undertook systematic literature searches, appraised the evidence, conducted meta-analysis and cost-effectiveness analysis where appropriate, and drafted the guideline in collaboration with the committee. For details please see the methods chapter of the full guideline.
Sources of funding/support	The National Guideline Alliance is funded by NICE and hosted by the Royal College of Obstetricians and Gynaecologists.
Name of sponsor	The National Guideline Alliance is funded by NICE and hosted by the Royal College of Obstetricians and Gynaecologists.
Roles of sponsor	NICE funds the National Guideline Alliance to develop guidelines for those working in the NHS, public health, and social care in England.

Field (based on PRISMA-P	Content
PROSPERO registration number	Not registered with PROSPERO.

Review protocol for review question: What are the most effective management options for pain after mesh surgery?

Table 22: Review protocol for management options for pain after mesh surgery

Field (based on PRISMA-P)	Content
Review question	What are the most effective management options for pain after mesh surgery?
Type of review question	Intervention
Objective of the review	The objective of this review is to establish the most appropriate management of women experiencing pain following mesh surgery for SUI and/or POP.
Eligibility criteria – population/disease/condition/issue/domain	Women (aged 18 years or older) experiencing pain after mesh surgery for UI, POP or both. Women having repeat surgery or those who are treatment naïve will be included.
Eligibility criteria – intervention(s)/exposure(s)/prognostic factor(s)	• Mesh removal surgery (vaginal removal or trimming of mesh, abdominal/laparoscopic removal of mesh) • Partial or complete mesh removal • Vaginal oestrogen • Antibiotics, systemic or local • Drainage/collection of pus • Pain management options • Local anaesthetic • Physiotherapy • Systemic analgesics • Botulinum toxin
Eligibility criteria – comparator(s)/control or reference (gold) standard	• Vaginal oestrogen vs. mesh removal surgery • Any intervention vs. no treatment • Any surgery vs. pain management • Drainage/collection of pus vs. antibiotics • Drainage/collection of pus vs. mesh removal
Outcomes and prioritisation	**Critical** • Pain (measured through a validated scale; appropriate MIDs to use if available will be identified through consultation with the GC) • Patient satisfaction

Field (based on PRISMA-P)	Content
	○ Patient-reported improvement ○ Patient Global Impression of Improvement • Adverse events (immediate post-op or perioperative): ○ Severe bleeding requiring blood transfusion ○ Unintentional internal organ injury **Important** • Health-related quality of life • Repeat surgery (for UI or POP, or mesh complications) • Long-term complications (> 12 months) ○ Pain ○ Fistula ○ Infection ○ Would complications ○ Mesh erosion or extrusion ○ De novo overactive bladder symptoms ○ Sexual dysfunction ○ Need for catheterisation • Recurrence of urinary incontinence or prolapse
Eligibility criteria – study design	SR of RCT RCTs If lack of full-text evidence, conference abstracts of RCTs will be considered. If lack of RCT evidence, comparative cohort studies will be considered. Case series studies ≥50 will also be considered if no comparative evidence is identified.
Other inclusion exclusion criteria	None
Proposed sensitivity/sub-group analysis, or meta-regression	Population subgroups: • Type of previous surgery (POP, SUI, or both) • Location of mesh (abdominally-placed, vaginally-placed)
Selection process – duplicate screening/selection/analysis	Sifting, data extraction, appraisal of methodological quality and GRADE assessment will be performed by the systematic reviewer. No dual weeding will be performed for this review questions.

Field (based on PRISMA-P)	Content
	Quality control will be performed by the senior systematic reviewer. Dual data extraction will not be performed for this question.
Data management (software)	Pairwise meta-analyses, if possible, will be performed using Cochrane Review Manager (RevMan5). 'GRADEpro' will be used to assess the quality of evidence for each outcome. NGA STAR software will be used for generating bibliographies/citations, study sifting, data extraction and recording quality assessment using checklists.
Information sources – databases and dates	Sources to be searched: Medline, Medline In-Process, CCTR, CDSR, DARE, HTA, Embase Limits (e.g. date, study design): Apply standard animal/non-English language exclusion Limit to RCTs and systematic reviews in first instance but download all results
Identify if an update	This review question is not an update.
Author contacts	Developer: The National Guideline Alliance https://www.nice.org.uk/guidance/indevelopment/gid-ng10035.
Highlight if amendment to previous protocol	For details please see section 4.5 of Developing NICE guidelines: the manual 2014.
Search strategy – for one database	For details please see appendix B of the full guideline.
Data collection process – forms/duplicate	A standardised evidence table format will be used, and published as appendix D (clinical evidence tables) or H (economic evidence tables) of the full guideline.
Data items – define all variables to be collected	For details please see evidence tables in appendix D (clinical evidence tables) or H (economic evidence tables) of the full guideline.
Methods for assessing bias at outcome/study level	Standard study checklists were used to critically appraise individual studies. Appraisal of methodological quality will be conducted using the appropriate tool: • ROBIS (systematic reviews and meta-analyses), • Cochrane risk of bias tool (RCTs). • Cochrane risk of bias tool (Non-randomised studies) For further details please see section 6.2 of Developing NICE guidelines: the manual 2014 The risk of bias across all available evidence was evaluated for each outcome using the 'Grading of Recommendations Assessment, Development and Evaluation (GRADE) toolbox' developed by the international GRADE working group http://www.gradeworkinggroup.org/. Outcomes will be downgraded if the randomisation and/or concealment methods are unclear or inadequate. Outcomes will also be downgraded if there is considerable missing data (if there is a dropout of more than 20%, or if there is a difference of >20% between groups. Heterogeneity will be assessed using the i^2 statistic, outcomes will be downgraded once if $i^2 \geq 50\%$, twice if $i^2 \geq 80\%$.

Field (based on PRISMA-P)	Content
	GRADE cannot be used for accurate assessment of bias for case series data and will not be used. Determining the quality of case series will include an assessment of bias, consecutive and comparative nature of series.
Criteria for quantitative synthesis (where suitable)	For details please see section 6.4 of Developing NICE guidelines: the manual 2014.
Methods for analysis – combining studies and exploring (in)consistency	For details please see the methods chapter of the full guideline.
Meta-bias assessment – publication bias, selective reporting bias	For details please see section 6.2 of Developing NICE guidelines: the manual 2014. If sufficient relevant RCT evidence is available, publication bias will be explored using RevMan software to examine funnel plots. Trial registries will be examined to identify missing evidence: Clinical trials.gov, NIHR Clinical Trials Gateway
Assessment of confidence in cumulative evidence	For details please see sections 6.4 and 9.1 of Developing NICE guidelines: the manual 2014.
Rationale/context – Current management	For details please see the introduction to the evidence review in the full guideline.
Describe contributions of authors and guarantor	A multidisciplinary committee developed the guideline. The committee was convened by the National Guideline Alliance by Dr Fergus Macbeth in line with section 3 of Developing NICE guidelines: the manual 2014. Staff from the National Guideline Alliance undertook systematic literature searches, appraised the evidence, conducted meta-analysis and cost-effectiveness analysis where appropriate, and drafted the guideline in collaboration with the committee. For details please see the methods chapter of the full guideline.
Sources of funding/support	The National Guideline Alliance is funded by NICE and hosted by the Royal College of Obstetricians & Gynaecologists.
Name of sponsor	The National Guideline Alliance is funded by NICE and hosted by the Royal College of Obstetricians & Gynaecologists.
Roles of sponsor	NICE funds the National Guideline Alliance to develop guidelines for those working in the NHS, public health, and social care in England.
PROSPERO registration number	Not registered with PROSPERO.

Review protocol for review question: What are the most effective management options for urinary complications after mesh surgery?

Table 23: Review protocol for management options for urinary complications after mesh surgery

Field (based on PRISMA-P	Content
Review question	What are the most effective management options for urinary complications after mesh surgery?
Type of review question	Intervention
Objective of the review	What is the best way of managing women who have problems with urinary complications following mesh surgery? These are new complications and therefore there is no current standard: it is important to know who and how this should be managed.
Eligibility criteria – population/disease/condition/issue/domain	Women (aged 18 years and over) experiencing any of the following urinary complications after mesh surgery (both biological and synthetic materials) for UI, POP or both: • Bladder perforation or mesh in bladder • Urinary retention • Voiding difficulties • Lower urinary tract infection including mesh in urethra • Ureteric or upper urinary tract complication • Fistula: vesicovaginal, urethra-vaginal, or urinary Women having repeat surgery or those who are treatment naïve will be included.
Eligibility criteria – intervention(s)/exposure(s)/prognostic factor(s)	• Mesh removal surgery, including laser and abdominal (including laparoscopic) surgery • Transurethral excision • Vaginal approach to mesh excision • Division of tape/mesh
Eligibility criteria – comparator(s)/control or reference (gold) standard	Mesh removal surgery vs. no surgery • Urethra: mesh removal vs. no removal • Transurethral excision vs. vaginal open excision of urethral mesh • Transurethral Laser vs. Transurethral excision • Transurethral laser vs. Vaginal open excision of urethral mesh • Bladder: transurethral laser vs. abdominal (including laparoscopic) removal of bladder mesh

Field (based on PRISMA-P	Content
	• Mesh division (urethrolysis) vs. no surgery

Outcomes and prioritisation	**Critical**
	• Continued or repeated urinary complications (as per above including mesh)
	• Adverse events (immediate post-op or perioperative):
	  ○ Severe bleeding requiring a blood transfusion
	  ○ Unintentional Internal organ injury (bladder or bowel or ureter)
	• Long-term complications (> 12 months):
	  ○ Pain
	  ○ Fistula
	  ○ Need for catheterisation
	  ○ Infection
	  ○ De novo overactive bladder symptoms
	  ○ Wound complications
	  ○ Urinary incontinence
	
	Important
	• Continence specific health-related quality of life:
	  ○ ICIQ
	  ○ BFLUTS
	  ○ i-QOL
	  ○ SUIQQ
	  ○ UISS
	  ○ SEAPI-QMM,
	  ○ ISI
	  ○ KHQ
	  ○ E-PAQ
	• Patient satisfaction
	  ○ Patient reported improvement
	  ○ Patient Global Impression of Improvement
	• Repeat surgery (for UI or POP, or mesh complications)

Eligibility criteria – study design	Systematic reviews of randomised controlled trials (RCTs)

Field (based on PRISMA-P	Content
	RCTs Comparative cohort studies in the absence of other studies Case series/expert opinion in the absence of other studies
Other inclusion exclusion criteria	20 minimum number 50 minimum for case series
Proposed sensitivity/sub-group analysis, or meta-regression	Population subgroups: • Type of previous surgery e.g. POP vs. SUI Intervention subgroups: • Type of surgical approach: e.g. laparoscopy vs. open • Complete vs. partial mesh removal • The committee will make special considerations for the following groups when drafting their recommendations Older women • Women with physical disabilities • Women with cognitive impairment • Women who are considering future pregnancy
Selection process – duplicate screening/selection/analysis	Dual sifting will be undertaken for this question using NGA STAR software. Sifting, data extraction, appraisal of methodological quality and GRADE assessment will be performed by the systematic reviewer. Dual weeding will be performed by a second systematic reviewer on 5% or 10% of records (depending on database size), with resolution of discrepancies in discussion with the senior reviewer if necessary. Quality control will be performed by the senior systematic reviewer. Dual data extraction will not be performed for this question.
Data management (software)	Pairwise meta-analyses, if possible, will be performed using Cochrane Review Manager (RevMan5). 'GRADEpro' will be used to assess the quality of evidence for each outcome. NGA STAR software will be used for generating bibliographies/citations, study sifting, data extraction and recording quality assessment using checklists.
Information sources – databases and dates	Sources to be searched: Medline, Medline In-Process, CCTR, CDSR, DARE, HTA, Embase Limits (e.g. date, study design): Apply standard animal/non-English language exclusion Limit to RCTs and systematic reviews in first instance but download all results No date restrictions will be applied.

Field (based on PRISMA-P	Content
Identify if an update	This review question is not an update.
Author contacts	Developer: The National Guideline Alliance https://www.nice.org.uk/guidance/indevelopment/gid-ng10035.
Highlight if amendment to previous protocol	For details please see section 4.5 of Developing NICE guidelines: the manual 2014.
Search strategy – for one database	For details please see appendix B of the full guideline.
Data collection process – forms/duplicate	A standardised evidence table format will be used, and published as appendix D (clinical evidence tables) or H (economic evidence tables) of the full guideline.
Data items – define all variables to be collected	For details please see evidence tables in appendix D (clinical evidence tables) or H (economic evidence tables) of the full guideline.
Methods for assessing bias at outcome/study level	Standard study checklists were used to critically appraise individual studies. Appraisal of methodological quality will be conducted using the appropriate tool: • ROBIS (systematic reviews and meta-analyses), • Cochrane risk of bias tool (RCTs). • Cochrane risk of bias tool (Non-randomised studies) For further details please see section 6.2 of Developing NICE guidelines: the manual 2014 The risk of bias across all available evidence was evaluated for each outcome using the 'Grading of Recommendations Assessment, Development and Evaluation (GRADE) toolbox' developed by the international GRADE working group http://www.gradeworkinggroup.org/. Outcomes will be downgraded if the randomisation and/or concealment methods are unclear or inadequate. Outcomes will also be downgraded if there is considerable missing data (if there is a dropout of more than 20%, or if there is a difference of >20% between groups. Heterogeneity will be assessed using the i^2 statistic, outcomes will be downgraded once if $i^2 \geq 50\%$, twice if $i^2 \geq 80\%$. GRADE cannot be used for accurate assessment of bias for case series data and will not be used. Determining the quality of case series will include an assessment of bias, consecutive and comparative nature of series.
Criteria for quantitative synthesis (where suitable)	For details please see section 6.4 of Developing NICE guidelines: the manual 2014.
Methods for analysis – combining studies and exploring (in)consistency	For details please see the methods chapter of the full guideline.
Meta-bias assessment – publication bias, selective reporting bias	For details please see section 6.2 of Developing NICE guidelines: the manual 2014. If sufficient relevant RCT evidence is available, publication bias will be explored using RevMan software to examine funnel plots. Trial registries will be examined to identify missing evidence: Clinical trials.gov, NIHR Clinical Trials Gateway

Field (based on PRISMA-P	Content
Assessment of confidence in cumulative evidence	For details please see sections 6.4 and 9.1 of Developing NICE guidelines: the manual 2014. Explain rationale and alternative methods if not using GRADE approach
Rationale/context – Current management	For details please see the introduction to the evidence review in the full guideline.
Describe contributions of authors and guarantor	A multidisciplinary committee developed the guideline. The committee was convened by the National Guideline Alliance and chaired by Dr Fergus Macbeth in line with section 3 of Developing NICE guidelines: the manual 2014. Staff from the National Guideline Alliance undertook systematic literature searches, appraised the evidence, conducted meta-analysis and cost-effectiveness analysis where appropriate, and drafted the guideline in collaboration with the committee. For details please see the methods chapter of the full guideline.
Sources of funding/support	The National Guideline Alliance is funded by NICE and hosted by the Royal College of Obstetricians and Gynaecologists.
Name of sponsor	The National Guideline Alliance is funded by NICE and hosted by the Royal College of Obstetricians and Gynaecologists.
Roles of sponsor	NICE funds the National Guideline Alliance to develop guidelines for those working in the NHS, public health, and social care in England.
PROSPERO registration number	Not registered with PROSPERO.

Review protocol for review question: What are the most effective management options for bowel symptoms after mesh surgery?

Table 24: Review protocol for management options for bowel symptoms after mesh surgery

Field (based on PRISMA-P	Content
Review question	What are the most effective management options for bowel symptoms after mesh surgery?
Type of review question	Intervention
Objective of the review	The objective of this review is to establish the most appropriate management strategy of women with bowel symptoms following mesh surgery.
Eligibility criteria – population/disease/condition/issue/domain	Women (aged 18 years or older) experiencing bowel complications after mesh surgery for UI, POP or both. Both functional complications (directly related to bowel action) and non-functional complications (not directly related to action of bowel, but occurring in the location of the bowel) will be included.

Field (based on PRISMA-P	Content
	Women with any of the following bowel complications will be considered: **Non-functional** • Mesh erosion presented as: fever, malaise, pelvic pain, mucous or bloody discharge per rectum • Bowel stricture • Bowel fistulation **Functional** • Obstructed defecation • Faecal incontinence
Eligibility criteria – intervention(s)/exposure(s)/prognostic factor(s)	For non-functional complications: • Mesh removal (vaginal or abdominal) • Resection • Re-anastomosis • Stoma For functional complications: • Laxatives and aperients • Lifestyle modifications: diet, exercise, weight loss • Biofeedback • Complex targeted laxatives: prucalopride, linaclotide • Rectal irrigation • Sacral nerve stimulation • Laparoscopic ventral mesh rectopexy • Stapled Transanal Resection of the Rectum (STARR) • Stoma/Antegrade Colonic Enema (ACE)
Eligibility criteria – comparator(s)/control or reference (gold) standard	Each management option against each other, separated according to the type of complication: non-functional or functional)
Outcomes and prioritisation	**Critical** • Reduction in bowel symptoms • Adverse events (immediate post-operative or peri-operative: ○ Severe bleeding requiring blood transfusion

Field (based on PRISMA-P	Content
	○ Unintentional internal organ injury • Health-related quality of life Justification: Bowel symptoms can be a significant problem in women undergoing mesh surgery, interfering with quality of life and functionality, employability, mental health and relationships. In addition, surgical interventions to remove mesh are associated with significant risks and morbidity, and is therefore crucial for healthcare practitioners to be able to counsel service users adequately. **Important** • Complications (more than 12 months): ○ Pain ○ Fistula ○ Infection ○ Wound complications ○ Mesh erosion or extrusion ○ Sexual dysfunction • Patient satisfaction • Repeat surgery for UI, POP or mesh complications • Recurrence of urinary incontinence or prolapse Complications will be stratified as follows: • Short-term: complications occurring after one year or less (≤ 1 year) • Medium-term: complications occurring after one year and up to five years (> 1 year and ≤ 5 years) • Long-term: complications occurring after 5 years (> 5 years)
Eligibility criteria – study design	For all outcomes SR of RCTs and RCTs will be considered. If lack of full-text evidence, conference abstracts of RCTs will be considered. If lack of RCT evidence, comparative cohort studies will be considered. For complications, RCTs will be considered. In the absence of RCT evidence, prospective and retrospective studies will be considered. In the absence of the prospective or retrospective data, case series will be considered.
Other inclusion exclusion criteria	No number restriction for RCT For case series, minimum 50 participants No date restriction

Field (based on PRISMA-P	Content

Proposed sensitivity/sub-group analysis, or meta-regression	Population subgroups:
	• Type of initial surgery: POP vs. SUI
	Intervention subgroups:
	• Type of surgical approach:
	  ○ laparoscopy vs. open
	  ○ Complete vs. partial mesh removal
	The committee will make special considerations for the following group when drafting their recommendations:
	• Older women
	• Women with physical disabilities
	• Women with cognitive impairment
	• Women who are considering future pregnancy

Selection process – duplicate screening/selection/analysis	Studies will be imported to the NGA STAR database for screening by one reviewer. A random sample of the references will be sifted by a second reviewer. This sample size will be 10% of the total, or 100 studies if the search identifies fewer than 1000 studies. All disagreements will be resolved by discussion between the two reviewers. The senior systematic reviewer or guideline lead will act as arbiter where necessary.
Data management (software)	Pairwise meta-analyses, if possible, will be performed using Cochrane Review Manager (RevMan5). 'GRADEpro' will be used to assess the quality of evidence for each outcome. NGA STAR software will be used for generating bibliographies/citations, study sifting, data extraction and recording quality assessment using checklists.
Information sources – databases and dates	A search strategy will be developed to include medical subject headings and free text terms based on the eligibility criteria. Medline In-Process, CCTR, CDSR, DARE, HTA and Embase databases will be searched The search will be limited to human studies and those conducted in the English language.
Identify if an update	This is a new area of the guideline.
Author contacts	Developer: The National Guideline Alliance https://www.nice.org.uk/guidance/indevelopment/gid-ng10035.
Highlight if amendment to previous protocol	For details please see section 4.5 of Developing NICE guidelines: the manual.
Search strategy – for one database	For details please see appendix B of the full guideline.
Data collection process – forms/duplicate	A standardised evidence table format will be used, and published as appendix D (clinical evidence tables) or H (economic evidence tables) of the full guideline.

Field (based on PRISMA-P	Content
Data items – define all variables to be collected	For details please see evidence tables in appendix D (clinical evidence tables) or H (economic evidence tables) of the full guideline.
Methods for assessing bias at outcome/study level	Standard study checklists were used to critically appraise individual studies. Appraisal of methodological quality will be conducted using the appropriate tool: • ROBIS (systematic reviews and meta-analyses), • Cochrane risk of bias tool (RCTs). • Cochrane risk of bias tool (Non-randomised studies) For further details please see section 6.2 of Developing NICE guidelines: the manual 2014 The risk of bias across all available evidence was evaluated for each outcome using the 'Grading of Recommendations Assessment, Development and Evaluation (GRADE) toolbox' developed by the international GRADE working group http://www.gradeworkinggroup.org/. Outcomes will be downgraded if the randomisation and/or concealment methods are unclear or inadequate. Outcomes will also be downgraded if there is considerable missing data (if there is a dropout of more than 20%, or if there is a difference of >20% between groups. Heterogeneity will be assessed using the i^2 statistic, outcomes will be downgraded once if $i^2 \geq 50\%$, twice if $i^2 \geq 80\%$. GRADE cannot be used for accurate assessment of bias for case series data and will not be used. Determining the quality of case series will include an assessment of bias, consecutive and comparative nature of series.
Criteria for quantitative synthesis	For details please see section 6.4 of Developing NICE guidelines: the manual 2014.
Methods for analysis – combining studies and exploring (in)consistency	For details please see the methods chapter of the full guideline.
Meta-bias assessment – publication bias, selective reporting bias	For details please see section 6.2 of Developing NICE guidelines: the manual 2014. If sufficient relevant RCT evidence is available, publication bias will be explored using RevMan software to examine funnel plots. Trial registries will be examined to identify missing evidence: Clinical trials.gov, NIHR Clinical Trials Gateway
Confidence in cumulative evidence	For details please see sections 6.4 and 9.1 of Developing NICE guidelines: the manual 2014.
Rationale/context – Current management	For details please see the introduction to the evidence review in the full guideline.
Describe contributions of authors and guarantor	A multidisciplinary committee developed the guideline. The committee was convened by the National Guideline Alliance by Dr Fergus Macbeth in line with section 3 of Developing NICE guidelines: the manual. Staff from the National Guideline Alliance undertook systematic literature searches, appraised the evidence, conducted meta-analysis and cost-effectiveness analysis where appropriate, and drafted the guideline in collaboration with the committee. For details please see the methods chapter of the full guideline.
Sources of funding/support	The National Guideline Alliance is funded by NICE and hosted by the Royal College of Obstetricians & Gynaecologists.

Field (based on PRISMA-P	Content
Name of sponsor	The National Guideline Alliance is funded by NICE and hosted by the Royal College of Obstetricians & Gynaecologists.
Roles of sponsor	NICE funds the National Guideline Alliance to develop guidelines for those working in the NHS, public health, and social care in England.
PROSPERO registration number	Not registered with PROSPERO.

Appendix B – Literature search strategies

Literature search strategies for review question: Management of vaginal complications and/or pain complications after mesh or mesh sling surgery

Database: Medline & Embase (Multifile)
Last searched on Embase Classic+Embase 1947 to 2017 November 29, Ovid MEDLINE(R) In-Process & Other Non-Indexed Citations and Ovid MEDLINE(R) 1946 to Present.

Date of last search: 29th November 2017.

#	Searches
1	exp Pelvic Organ Prolapse/ use ppez
2	exp pelvic organ prolapse/ use emczd
3	(pelvic$ adj3 organ$ adj3 prolaps$).tw.
4	(urinary adj3 bladder adj3 prolaps$).tw.
5	((vagin$ or urogenital$ or genit$ or uter$ or viscer$ or anterior$ or posterior$ or apical or pelvi$ or vault$ or urethr$ or bladder$) adj3 prolaps$).tw.
6	(splanchnoptos$ or visceroptos$).tw.
7	Rectocele/ use ppez
8	rectocele/ use emczd
9	(hernia$ adj3 (pelvi$ or vagin$ or urogenital$ or uter$ or bladder$ or urethr$ or viscer$)).tw.
10	(urethroc?ele$ or enteroc?ele$ or sigmoidoc?ele$ or proctoc?ele$ or rectoc?ele$ or cystoc?ele$ or rectoenteroc?ele$ or cystourethroc?ele$).tw.
11	or/1-10
12	Urinary Incontinence, Stress/ use ppez
13	Stress Incontinence/ use emczd
14	Mixed Incontinence/ use emczd
15	(urine adj2 (loss or leak$)).tw.
16	((stress$ or mix$ or effort$) adj5 incontinen$).tw.
17	SUI.tw.
18	or/12-17
19	Urinary Incontinence/ use ppez
20	urine incontinence/ use emczd
21	(urin$ adj5 incontinen$).tw.
22	UI.tw.
23	or/19-22
24	exp Surgical Mesh/ use ppez
25	exp surgical mesh/ use emczd
26	(mesh$ or non-mesh$ or nonmesh$).tw.
27	*"Prostheses and Implants"/ use ppez
28	*implant/ use emczd
29	*Biocompatible Materials/ use ppez
30	*biomaterial/ use emczd
31	((biolog$ or synthetic$) adj implant$).tw.
32	or/24-31
33	exp Estrogens/ use ppez
34	exp Estrogen Antagonists/ use ppez
35	"Estrogens, Conjugated (USP)"/ use ppez
36	Estradiol/ use ppez
37	Estriol/ use ppez
38	Estrone/ use ppez
39	exp estrogen/ use emczd
40	exp antiestrogen/ use emczd
41	conjugated estrogen/ use emczd
42	estradiol/ use emczd
43	estriol/ use emczd
44	estrone/ use emczd
45	(oestrogen$ or estrogen$ or oestradiol$ or estradiol$ or oestriol$ or estriol$ or oestron$ or estron$ or Vagiferm$ or estring$ or e-string$).tw.
46	33 or 34 or 35 or 36 or 37 or 38 or 39 or 40 or 41 or 42 or 43 or 44 or 45
47	Minimally Invasive Surgical Procedures/ use ppez
48	exp minimally invasive procedure/ use emczd
49	(minimally adj invasive adj3 (surg$ or resect$ or approach$ or technique$ or treatment$)).tw.
50	((mesh$ or tape$ or sling$ or TVT$) adj5 (remov$ or extract$ excis$ or revis$ or repair$ or resect$ or division$ or trim$)).tw.

#	Searches
51	(trim$ adj5 (mesh$ or tape$ or sling$ or TVT$ or flap$ or in-office$ or office$ or clinic$ or outpatient$ or vagin$ or extru$ or expos$ or erosion$)).tw.
52	(remov$ adj5 (mesh$ or tape$ or sling$ or TVT$ or flap$ or implant$ or prosthes$ or graft$)).tw.
53	(vagin$ adj3 excis$).tw.
54	((pus$ or absess$ or wound$) adj5 drain$).tw.
55	47 or 48 or 49 or 50 or 51 or 52 or 53 or 54
56	Anti-Bacterial Agents/ use ppez
57	antibiotic agent/ use emczd
58	(anti-biotic$ or antibiotic$).tw.
59	56 or 57 or 58
60	11 or 18
61	46 or 59
62	32 and 60 and 61
63	47 or 48 or 49 or 53
64	32 and 60 and 63
65	50 or 51 or 52 or 54
66	60 and 65
67	62 or 64 or 66
68	remove duplicates from 67
69	limit 68 to english language [general exclusions filter applied]

Database: Cochrane Library via Wiley Online

Date of last search: 29th November 2017.

#	Searches
#1	MeSH descriptor: [Pelvic Organ Prolapse] explode all trees
#2	(pelvic* near/3 organ* near/3 prolaps*):ti,ab,kw (Word variations have been searched)
#3	(urinary near/3 bladder near/3 prolaps*):ti,ab,kw (Word variations have been searched)
#4	((vagin* or urogenital* or genit* or uter* or viscer* or anterior* or posterior* or apical or pelvi* or vault* or urethr* or bladder*) near/3 prolaps*):ti,ab,kw (Word variations have been searched)
#5	(splanchnoptos* or visceroptos*):ti,ab,kw (Word variations have been searched)
#6	MeSH descriptor: [Rectocele] explode all trees
#7	(hernia* near/3 (pelvi* or vagin* or urogenital* or uter* or bladder* or urethr* or viscer*)):ti,ab,kw (Word variations have been searched)
#8	(urethrocele* or urethrocoele* or enterocele* or enterocoele* or sigmoidocoele* or sigmoidocele* or proctocele* or proctocoele* or rectocele* or rectocoele* or cystocele* or cystocoele* or rectoenterocele* or rectoenterocoele* or cystourethrocele* or cystourethrocoele*):ti,ab,kw (Word variations have been searched)
#9	#1 or #2 or #3 or #4 or #5 or #6 or #7 or #8
#10	MeSH descriptor: [Urinary Incontinence, Stress] this term only
#11	(urine near/2 (loss or leak*)):ti,ab,kw (Word variations have been searched)
#12	((stress* or mix* or effort*) near/5 incontinen*):ti,ab,kw (Word variations have been searched)
#13	SUI:ti,ab,kw (Word variations have been searched)
#14	#10 or #11 or #12 or #13
#15	MeSH descriptor: [Surgical Mesh] explode all trees
#16	(mesh* or non-mesh* or nonmesh*):ti,ab,kw (Word variations have been searched)
#17	MeSH descriptor: [Prostheses and Implants] explode all trees
#18	MeSH descriptor: [Biocompatible Materials] explode all trees
#19	((biolog* or synthetic*) next implant*):ti,ab,kw (Word variations have been searched)
#20	#15 or #16 or #17 or #18 or #19
#21	MeSH descriptor: [Estrogens] explode all trees
#22	MeSH descriptor: [Estrogen Antagonists] explode all trees
#23	MeSH descriptor: [Estrogens, Conjugated (USP)] explode all trees
#24	MeSH descriptor: [Estradiol] explode all trees
#25	MeSH descriptor: [Estriol] explode all trees
#26	MeSH descriptor: [Estrone] explode all trees
#27	(oestrogen* or estrogen* or oestradiol* or estradiol* or oestriol* or estriol* or oestron* or estron* or Vagiferm* or estring* or e-string*):ti,ab,kw (Word variations have been searched)
#28	MeSH descriptor: [Anti-Bacterial Agents] this term only
#29	(anti-biotic* or antibiotic*):ti,ab,kw (Word variations have been searched)
#30	MeSH descriptor: [Minimally Invasive Surgical Procedures] explode all trees
#31	(minimally next invasive near/3 (surg* or resect* or approach* or technique* or treatment*)):ti,ab,kw (Word variations have been searched)
#32	(vagin* near/3 excis*):ti,ab,kw (Word variations have been searched)
#33	#21 or #22 or #23 or #24 or #25 or #26 or #27 or #28 or #29 or #30 or #31 or #32
#34	((mesh* or tape* or sling* or TVT*) near/5 (remov* or extract* excis* or revis* or repair* or resect* or division* or trim*)):ti,ab,kw (Word variations have been searched)
#35	(trim* near/5 (mesh* or tape* or sling* or TVT* or flap* or in-office* or office* or clinic* or outpatient* or vagin* or extru* or expos* or erosion*)):ti,ab,kw (Word variations have been searched)
#36	(remov* near/5 (mesh* or tape* or sling* or TVT* or flap* or implant* or prosthes* or graft*)):ti,ab,kw (Word variations have been searched)
#37	((pus* or absess* or wound*) near/5 drain*):ti,ab,kw (Word variations have been searched)

#	Searches
#38	#34 or #35 or #36 or #37
#39	#9 or #14
#40	#20 and #33 and #39
#41	#38 and #39
#42	#40 or #41

Literature search strategy for review question: Management of sexual dysfunction and/or pain complications after mesh or mesh sling surgery

Database: Medline & Embase (Multifile)
Last searched on Embase Classic+Embase 1947 to 2017 November 20, Ovid MEDLINE(R) In-Process & Other Non-Indexed Citations and Ovid MEDLINE(R) 1946 to Present.

Date of last search: 20th November 2017.

#	Searches
1	exp Pelvic Organ Prolapse/ use ppez
2	exp pelvic organ prolapse/ use emczd
3	(pelvic$ adj3 organ$ adj3 prolaps$).tw.
4	(urinary adj3 bladder adj3 prolaps$).tw.
5	((vagin$ or urogenital$ or genit$ or uter$ or viscer$ or anterior$ or posterior$ or apical or pelvi$ or vault$ or urethr$ or bladder$) adj3 prolaps$).tw.
6	(splanchnoptos$ or visceroptos$).tw.
7	Rectocele/ use ppez
8	rectocele/ use emczd
9	(hernia$ adj3 (pelvi$ or vagin$ or urogenital$ or uter$ or bladder$ or urethr$ or viscer$)).tw.
10	(urethroc?ele$ or enteroc?ele$ or sigmoidoc?ele$ or proctoc?ele$ or rectoc?ele$ or cystoc?ele$ or rectoenteroc?ele$ or cystourethroc?ele$).tw.
11	or/1-10
12	Urinary Incontinence, Stress/ use ppez
13	Stress Incontinence/ use emczd
14	Mixed Incontinence/ use emczd
15	(urine adj2 (loss or leak$)).tw.
16	((stress$ or mix$ or effort$) adj5 incontinen$).tw.
17	SUI.tw.
18	or/12-17
19	Urinary Incontinence/ use ppez
20	urine incontinence/ use emczd
21	(urin$ adj5 incontinen$).tw.
22	UI.tw.
23	or/19-22
24	exp Surgical Mesh/ use ppez
25	exp surgical mesh/ use emczd
26	(mesh$ or non-mesh$ or nonmesh$).tw.
27	*"Prostheses and Implants"/ use ppez
28	*implant/ use emczd
29	*Biocompatible Materials/ use ppez
30	*biomaterial/ use emczd
31	((biolog$ or synthetic$) adj implant$).tw.
32	or/24-31
33	Minimally Invasive Surgical Procedures/ use ppez
34	exp minimally invasive procedure/ use emczd
35	(minimally adj invasive adj3 (surg$ or resect$ or approach$ or technique$ or treatment$)).tw.
36	((mesh$ or tape$ or sling$) adj3 (remov$ or excis$ or revis$ or repair$ or resect$ or division$)).tw.
37	urethrolysis$.tw.
38	(transurethral$ adj3 (excis$ or approach$ or technique$ or cystoscop$ or laser$)).tw.
39	((laparoscopic$ or robotic$ or laser$) adj3 (excis$ or approach$ or technique$)).tw.
40	(vagin$ adj3 excis$).tw.
41	((retropubic or suprapubic) adj3 dissect$).tw.
42	Natural Orifice Endoscopic Surgery/ use ppez
43	endoscopic surgery/ use emczd
44	scissors/ use emczd
45	((endoscop$ or cystoscop$ or hysteroscop$) adj3 (scissor$ or grasper$ or forcep$)).tw.
46	((complete$ or whole or wholly or partial$) adj3 excis$).tw.
47	exp Estrogens/ use ppez
48	exp Estrogen Antagonists/ use ppez
49	"Estrogens, Conjugated (USP)"/ use ppez
50	Estradiol/ use ppez
51	Estriol/ use ppez

#	Searches
52	Estrone/ use ppez
53	exp estrogen/ use emczd
54	exp antiestrogen/ use emczd
55	conjugated estrogen/ use emczd
56	estradiol/ use emczd
57	estriol/ use emczd
58	estrone/ use emczd
59	(oestrogen$ or estrogen$ or oestradiol$ or estradiol$ or oestriol$ or estriol$ or oestron$ or estron$ or Vagiferm$ or estring$ or e-string$).tw.
60	Pain Management/ use ppez
61	Anesthetics, Local/ use ppez
62	Analgesia/ use ppez
63	Counseling/ use ppez
64	exp Physical Therapy Modalities/ use ppez
65	local anesthetic agent/ use emczd
66	analgesia/ use emczd
67	counseling/ use emczd
68	exp physiotherapy/ use emczd
69	(pain adj5 (manag$ or therap$ or treatment$ or control$)).mp.
70	(anaesthetic$ or anesthetic$ or analges$).mp.
71	((psycho-sex$ or psychosex$ or sex$) adj5 counsel$).mp.
72	physiotherap$.mp.
73	exp Botulinum Toxins/ use ppez
74	exp botulinum toxin/ use emczd
75	exp botulinum toxin A/ use emczd
76	botulinum$.tw.
77	(botul$ adj2 tox$).tw.
78	(BTA or BTX or CNBTX or BoNT$ or BoTx).tw.
79	(botox or dysport or azzalure or oculinum or prosigne or purtox or vistabel or xeomin or bocouture or myobloc or rimabotulinum$ or abobotuli$ or onabotulinum$ or Neuronox or Meditoxin).tw.
80	exp Reconstructive Surgical Procedures/ use ppez
81	vagina reconstruction/ use emczd
82	(vagin$ adj5 reconstruct$).mp.
83	vaginoplast$.mp.
84	Dilatation/ use ppez
85	vaginal dilator/ use emczd
86	(vagin$ adj5 dilat$).mp.
87	33 or 34 or 35 or 36 or 37 or 38 or 39 or 40 or 41 or 42 or 43 or 44 or 45 or 46 or 47 or 48 or 49 or 50 or 51 or 52 or 53 or 54 or 55 or 56 or 57 or 58 or 59 or 60 or 61 or 62 or 63 or 64 or 65 or 66 or 67 or 68 or 69 or 70 or 71 or 72 or 73 or 74 or 75 or 76 or 77 or 78 or 79 or 80 or 81 or 82 or 83 or 84 or 85 or 86
88	Sexual Dysfunction, Physiological/ use ppez
89	Sexual Dysfunctions, Psychological/ use ppez
90	sexual dysfunction/ use emczd
91	Dyspareunia/ use ppez
92	dyspareunia/ use emczd
93	(sexual$ adj5 (dysfunct$ or problem$ or symptom$)).mp.
94	((sex$ or intercourse) adj5 pain$).mp.
95	dyspareun$.mp.
96	(vagin$ adj5 (dry$ or pain$)).mp.
97	88 or 89 or 90 or 91 or 92 or 93 or 94 or 95 or 96
98	11 and 87 and 97
99	18 and 87 and 97
100	23 and 32 and 87 and 97
101	11 and 32 and 97
102	18 and 32 and 97
103	98 or 99 or 100 or 101 or 102
104	remove duplicates from 103
105	limit 104 to english language [general exclusions filter applied]

Database: Cochrane Library via Wiley Online

Date of last search: 20th November 2017.

#	Searches
#1	MeSH descriptor: [Pelvic Organ Prolapse] explode all trees
#2	(pelvic* near/3 organ* near/3 prolaps*):ti,ab,kw (Word variations have been searched)
#3	(urinary near/3 bladder near/3 prolaps*):ti,ab,kw (Word variations have been searched)
#4	((vagin* or urogenital* or genit* or uter* or viscer* or anterior* or posterior* or apical or pelvi* or vault* or urethr* or bladder*) near/3 prolaps*):ti,ab,kw (Word variations have been searched)
#5	(splanchnoptos* or visceroptos*):ti,ab,kw (Word variations have been searched)
#6	MeSH descriptor: [Rectocele] explode all trees

#	Searches
#7	(hernia* near/3 (pelvi* or vagin* or urogenital* or uter* or bladder* or urethr* or viscer*)):ti,ab,kw (Word variations have been searched)
#8	(urethrocele* or urethrocoele* or enterocele* or enterocoele* or sigmoidocoele* or sigmoidocele* or proctocele* or proctocoele* or rectocele* or rectocoele* or cystocele* or cystocoele* or rectoenterocele* or rectoenterocoele* or cystourethrocele* or cystourethrocoele*):ti,ab,kw (Word variations have been searched)
#9	#1 or #2 or #3 or #4 or #5 or #6 or #7 or #8
#10	MeSH descriptor: [Urinary Incontinence, Stress] this term only
#11	(urine near/2 (loss or leak*)):ti,ab,kw (Word variations have been searched)
#12	((stress* or mix* or effort*) near/5 incontinen*):ti,ab,kw (Word variations have been searched)
#13	SUI:ti,ab,kw (Word variations have been searched)
#14	#10 or #11 or #12 or #13
#15	MeSH descriptor: [Urinary Incontinence] this term only
#16	(urin* near/5 incontinen*):ti,ab,kw (Word variations have been searched)
#17	UI:ti,ab,kw (Word variations have been searched)
#18	#15 or #16 or #17
#19	MeSH descriptor: [Surgical Mesh] explode all trees
#20	(mesh* or non-mesh* or nonmesh*):ti,ab,kw (Word variations have been searched)
#21	MeSH descriptor: [Prostheses and Implants] explode all trees
#22	MeSH descriptor: [Biocompatible Materials] explode all trees
#23	((biolog* or synthetic*) next implant*):ti,ab,kw (Word variations have been searched)
#24	#19 or #20 or #21 or #22 or #23
#25	MeSH descriptor: [Minimally Invasive Surgical Procedures] explode all trees
#26	(minimally next invasive near/3 (surg* or resect* or approach* or technique* or treatment*)):ti,ab,kw (Word variations have been searched)
#27	((mesh* or tape* or sling*) near/3 (remov* or excis* or revis* or repair* or resect* or division*)):ti,ab,kw (Word variations have been searched)
#28	urethrolysis*:ti,ab,kw (Word variations have been searched)
#29	(transurethral* near/3 (excis* or approach* or technique* or cystoscop* or laser*)):ti,ab,kw (Word variations have been searched)
#30	((laparoscopic* or robotic* or laser*) near/3 (excis* or approach* or technique*)):ti,ab,kw (Word variations have been searched)
#31	(vagin* near/3 excis*):ti,ab,kw (Word variations have been searched)
#32	((retropubic or suprapubic) near/3 dissect*):ti,ab,kw (Word variations have been searched)
#33	MeSH descriptor: [Natural Orifice Endoscopic Surgery] explode all trees
#34	((endoscop* or cystoscop* or hysteroscop*) near/3 (scissor* or grasper* or forcep*)):ti,ab,kw (Word variations have been searched)
#35	((complete* or whole or wholly or partial*) near/3 excis*):ti,ab,kw (Word variations have been searched)
#36	MeSH descriptor: [Estrogens] explode all trees
#37	MeSH descriptor: [Estrogen Antagonists] explode all trees
#38	MeSH descriptor: [Estrogens, Conjugated (USP)] explode all trees
#39	MeSH descriptor: [Estradiol] explode all trees
#40	MeSH descriptor: [Estriol] explode all trees
#41	MeSH descriptor: [Estrone] explode all trees
#42	(oestrogen* or estrogen* or oestradiol* or estradiol* or oestriol* or estriol* or oestron* or estron* or Vagiferm* or estring* or e-string*):ti,ab,kw (Word variations have been searched)
#43	MeSH descriptor: [Pain Management] this term only
#44	MeSH descriptor: [Anesthetics, Local] this term only
#45	MeSH descriptor: [Analgesia] this term only
#46	MeSH descriptor: [Counseling] this term only
#47	MeSH descriptor: [Physical Therapy Modalities] explode all trees
#48	(pain near/5 (manag* or therap* or treatment* or control*)):ti,ab,kw (Word variations have been searched)
#49	(anaesthetic* or anesthetic* or analges*):ti,ab,kw (Word variations have been searched)
#50	((psycho-sex* or psychosex* or sex*) near/5 counsel*):ti,ab,kw (Word variations have been searched)
#51	physiotherap*:ti,ab,kw (Word variations have been searched)
#52	MeSH descriptor: [Botulinum Toxins] explode all trees
#53	botulinum*:ti,ab,kw (Word variations have been searched)
#54	(botul* near/2 tox*):ti,ab,kw (Word variations have been searched)
#55	(BTA or BTX or CNBTX or BoNT* or BoTx):ti,ab,kw (Word variations have been searched)
#56	(botox or dysport or azzalure or oculinum or prosigne or purtox or vistabel or xeomin or bocouture or myobloc or rimabotulinum* or abobotuli* or onabotulinum* or Neuronox or Meditoxin):ti,ab,kw (Word variations have been searched)
#57	MeSH descriptor: [Reconstructive Surgical Procedures] explode all trees
#58	(vagin* near/5 reconstruct*):ti,ab,kw (Word variations have been searched)
#59	vaginoplast*:ti,ab,kw (Word variations have been searched)
#60	MeSH descriptor: [Dilatation] this term only
#61	(vagin* near/5 dilat*):ti,ab,kw (Word variations have been searched)
#62	#25 or #26 or #27 or #28 or #29 or #30 or #31 or #32 or #33 or #34 or #35 or #36 or #37 or #38 or #39 or #40 or #41 or #42 or #43 or #44 or #45 or #46 or #47 or #48 or #49 or #50 or #51 or 52 or #53 or #54 or #55 or #56 or #57 or #58 or #59 or #60 or #61
#63	MeSH descriptor: [Sexual Dysfunction, Physiological] this term only
#64	MeSH descriptor: [Sexual Dysfunctions, Psychological] this term only

#	Searches
#65	MeSH descriptor: [Dyspareunia] this term only
#66	(sexual* near/5 (dysfunct* or problem* or symptom*)):ti,ab,kw (Word variations have been searched)
#67	((sex* or intercourse) near/5 pain*):ti,ab,kw (Word variations have been searched)
#68	dyspareun*:ti,ab,kw (Word variations have been searched)
#69	(vagin* near/5 (dry* or pain*)):ti,ab,kw (Word variations have been searched)
#70	#63 or #64 or #65 or #66 or #67 or #68 or #69
#71	#9 and #62 and #70
#72	#14 and #62 and #70
#73	#18 and #24 and #62 and #70
#74	#9 and #24 and 70
#75	#14 and #24 and #70
#76	#71 or #72 or #73 or #74 or #75

Literature search strategy for review question: Management of urinary complications after mesh or mesh sling surgery

Database: Medline & Embase (Multifile)
Last searched on Embase Classic+Embase 1947 to 2017 September 19, Ovid MEDLINE(R) In-Process & Other Non-Indexed Citations and Ovid MEDLINE(R) 1946 to Present.

Date of last search: 20th September 2017.

#	Searches
1	exp Pelvic Organ Prolapse/ use ppez
2	exp pelvic organ prolapse/ use emczd
3	(pelvic$ adj3 organ$ adj3 prolaps$).tw.
4	(urinary adj3 bladder adj3 prolaps$).tw.
5	((vagin$ or urogenital$ or genit$ or uter$ or viscer$ or anterior$ or posterior$ or apical or pelvi$ or vault$ or urethr$ or bladder$) adj3 prolaps$).tw.
6	(splanchnoptos$ or visceroptos$).tw.
7	Rectocele/ use ppez
8	rectocele/ use emczd
9	(hernia$ adj3 (pelvi$ or vagin$ or urogenital$ or uter$ or bladder$ or urethr$ or viscer$)).tw.
10	(urethroc?ele$ or enteroc?ele$ or sigmoidoc?ele$ or proctoc?ele$ or rectoc?ele$ or cystoc?ele$ or rectoenteroc?ele$ or cystourethroc?ele$).tw.
11	or/1-10
12	Urinary Incontinence, Stress/ use ppez
13	Stress Incontinence/ use emczd
14	Mixed Incontinence/ use emczd
15	(urine adj2 (loss or leak$)).tw.
16	((stress$ or mix$ or effort$) adj5 incontinen$).tw.
17	SUI.tw.
18	or/12-17
19	Urinary Incontinence/ use ppez
20	urine incontinence/ use emczd
21	(urin$ adj5 incontinen$).tw.
22	UI.tw.
23	or/19-22
24	exp Surgical Mesh/ use ppez
25	exp surgical mesh/ use emczd
26	(mesh$ or non-mesh$ or nonmesh$).tw.
27	*"Prostheses and Implants"/ use ppez
28	*implant/ use emczd
29	*Biocompatible Materials/ use ppez
30	*biomaterial/ use emczd
31	((biolog$ or synthetic$) adj implant$).tw.
32	or/24-31
33	Minimally Invasive Surgical Procedures/ use ppez
34	exp minimally invasive procedure/ use emczd
35	(minimally adj invasive adj3 (surg$ or resect$ or approach$ or technique$ or treatment$)).tw.
36	((mesh$ or tape$ or sling$) adj3 (remov$ or excis$ or revis$ or repair$ or resect$ or division$)).tw.
37	urethrolysis$.tw.
38	(transurethral$ adj3 (excis$ or approach$ or technique$ or cystoscop$ or laser$)).tw.
39	((laparoscopic$ or robotic$ or laser$) adj3 (excis$ or approach$ or technique$)).tw.
40	(vagin$ adj3 excis$).tw.
41	((retropubic or suprapubic) adj3 dissect$).tw.
42	Natural Orifice Endoscopic Surgery/ use ppez

#	Searches
43	endoscopic surgery/ use emczd
44	scissors/ use emczd
45	((endoscop$ or cystoscop$ or hysteroscop$) adj3 (scissor$ or grasper$ or forcep$)).tw.
46	((complete$ or whole or wholly or partial$) adj3 excis$).tw.
47	or/33-46
48	11 and 32 and 47
49	18 and 32 and 47
50	23 and 32 and 47
51	48 or 49 or 50
52	remove duplicates from 51
53	limit 52 to english language [general exclusions filter applied]

Database: Cochrane Library via Wiley Online

Date of last search: 20th September 2017.

#	Searches
#1	MeSH descriptor: [Pelvic Organ Prolapse] explode all trees
#2	(pelvic* near/3 organ* near/3 prolaps*):ti,ab,kw (Word variations have been searched)
#3	(urinary near/3 bladder near/3 prolaps*):ti,ab,kw (Word variations have been searched)
#4	((vagin* or urogenital* or genit* or uter* or viscer* or anterior* or posterior* or apical or pelvi* or vault* or urethr* or bladder*) near/3 prolaps*):ti,ab,kw (Word variations have been searched)
#5	(splanchnoptos* or visceroptos*):ti,ab,kw (Word variations have been searched)
#6	MeSH descriptor: [Rectocele] explode all trees
#7	(hernia* near/3 (pelvi* or vagin* or urogenital* or uter* or bladder* or urethr* or viscer*)):ti,ab,kw (Word variations have been searched)
#8	(urethrocele* or urethrocoele* or enterocele* or enterocoele* or sigmoidocoele* or sigmoidocele* or proctocele* or proctocoele* or rectocele* or rectocoele* or cystocele* or cystocoele* or rectoenterocele* or rectoenterocoele* or cystourethrocele* or cystourethrocoele*):ti,ab,kw (Word variations have been searched)
#9	#1 or #2 or #3 or #4 or #5 or #6 or #7 or #8
#10	MeSH descriptor: [Urinary Incontinence, Stress] this term only
#11	(urine near/2 (loss or leak*)):ti,ab,kw (Word variations have been searched)
#12	((stress* or mix* or effort*) near/5 incontinen*):ti,ab,kw (Word variations have been searched)
#13	SUI:ti,ab,kw (Word variations have been searched)
#14	#10 or #11 or #12 or #13
#15	MeSH descriptor: [Urinary Incontinence] this term only
#16	(urin* near/5 incontinen*):ti,ab,kw (Word variations have been searched)
#17	UI:ti,ab,kw (Word variations have been searched)
#18	#15 or #16 or #17
#19	MeSH descriptor: [Surgical Mesh] explode all trees
#20	(mesh* or non-mesh* or nonmesh*):ti,ab,kw (Word variations have been searched)
#21	MeSH descriptor: [Prostheses and Implants] explode all trees
#22	MeSH descriptor: [Biocompatible Materials] explode all trees
#23	((biolog* or synthetic*) next implant*):ti,ab,kw (Word variations have been searched)
#24	#19 or #20 or #21 or #22 or #23
#25	MeSH descriptor: [Minimally Invasive Surgical Procedures] explode all trees
#26	(minimally next invasive near/3 (surg* or resect* or approach* or technique* or treatment*)):ti,ab,kw (Word variations have been searched)
#27	((mesh* or tape* or sling*) near/3 (remov* or excis* or revis* or repair* or resect* or division*)):ti,ab,kw (Word variations have been searched)
#28	urethrolysis*:ti,ab,kw (Word variations have been searched)
#29	(transurethral* near/3 (excis* or approach* or technique* or cystoscop* or laser*)):ti,ab,kw (Word variations have been searched)
#30	((laparoscopic* or robotic* or laser*) near/3 (excis* or approach* or technique*)):ti,ab,kw (Word variations have been searched)
#31	(vagin* near/3 excis*):ti,ab,kw (Word variations have been searched)
#32	((retropubic or suprapubic) near/3 dissect*):ti,ab,kw (Word variations have been searched)
#33	MeSH descriptor: [Natural Orifice Endoscopic Surgery] explode all trees
#34	((endoscop* or cystoscop* or hysteroscop*) near/3 (scissor* or grasper* or forcep*)):ti,ab,kw (Word variations have been searched)
#35	((complete* or whole or wholly or partial*) near/3 excis*):ti,ab,kw (Word variations have been searched)
#36	#25 or #26 or #27 or #28 or #29 or #30 or #31 or #32 or #33 or #34 or #35
#37	#9 and #24 and #36
#38	#14 and #24 and #36
#39	#18 and #24 and #36
#40	#37 or #38 or #39

Literature search strategy for review question: Management of bowel complications after mesh or mesh sling surgery

Database: Medline & Embase (Multifile)
Last searched on Embase Classic+Embase 1947 to 2018 March 23, Ovid MEDLINE(R) In-Process & Other Non-Indexed Citations and Ovid MEDLINE(R) 1946 to Present.

Date of last search: 26th March 2018.

#	Searches
1	exp Pelvic Organ Prolapse/ use ppez
2	exp pelvic organ prolapse/ use emczd
3	(pelvic$ adj3 organ$ adj3 prolaps$).tw.
4	(urinary adj3 bladder adj3 prolaps$).tw.
5	((vagin$ or urogenital$ or genit$ or uter$ or viscer$ or anterior$ or posterior$ or apical or pelvi$ or vault$ or urethr$ or bladder$) adj3 prolaps$).tw.
6	(splanchnoptos$ or visceroptos$).tw.
7	Rectocele/ use ppez
8	rectocele/ use emczd
9	(hernia$ adj3 (pelvi$ or vagin$ or urogenital$ or uter$ or bladder$ or urethr$ or viscer$)).tw.
10	(urethroc?ele$ or enteroc?ele$ or sigmoidoc?ele$ or proctoc?ele$ or rectoc?ele$ or cystoc?ele$ or rectoenteroc?ele$ or cystourethroc?ele$).tw.
11	or/1-10
12	Urinary Incontinence, Stress/ use ppez
13	Stress Incontinence/ use emczd
14	Mixed Incontinence/ use emczd
15	(urine adj2 (loss or leak$)).tw.
16	((stress$ or mix$ or effort$) adj5 incontinen$).tw.
17	SUI.tw.
18	or/12-17
19	exp Surgical Mesh/ use ppez
20	exp surgical mesh/ use emczd
21	(mesh$ or non-mesh$ or nonmesh$).tw.
22	*"Prostheses and Implants"/ use ppez
23	*implant/ use emczd
24	*Biocompatible Materials/ use ppez
25	*biomaterial/ use emczd
26	((biolog$ or synthetic$) adj implant$).tw.
27	or/19-26
28	Biofeedback, Psychology/ use ppez
29	biofeedback/ use emczd
30	biofeedback$.tw.
31	28 or 29 or 30
32	Therapeutic Irrigation/ use ppez
33	exp lavage/ use emczd
34	(irrigat$ or lavage$).tw.
35	32 or 33 or 34
36	Electric Stimulation Therapy/ use ppez
37	sacral nerve stimulation/ use emczd
38	(sacral adj3 (stimul$ or neuromodul$)).tw.
39	(SNS or SNM).tw.
40	36 or 37 or 38 or 39
41	exp Laxatives/ use ppez
42	exp Cathartics/ use ppez
43	exp laxative/ use emczd
44	(laxative$ or aperiant$ or cathartic$).tw.
45	prucalopride/ use emczd
46	linaclotide/ use emczd
47	(prucaloprid$ or reolor$ or resotran$).tw.
48	(linaclotid$ or linzess$).tw.
49	41 or 42 or 43 or 44 or 45 or 46 or 47 or 48
50	proctopexy/ use emczd
51	(rectopex$ or proctopex$).tw.
52	50 or 51
53	"stapled transanal rectal resection"/ use emczd
54	((trans-anal$ or transanal$) adj3 resect$).tw.
55	(STARR adj5 (staple$ or trans-anal$ or transanal$ or resect$ or rectum$)).tw.
56	53 or 54 or 55
57	Enema/ use ppez
58	Surgical Stomas/ use ppez

#	Searches
59	enema/ use emczd
60	stoma/ use emczd
61	((antegrad$ or colon$) adj3 enema$).tw.
62	(ACE adj5 (antegrad$ or colon$ or enema$ or stoma$)).tw.
63	(bowel adj3 washout$).tw.
64	57 or 58 or 59 or 60 or 61 or 62 or 63
65	exp Life Style/ use ppez
66	exp lifestyle/ use emczd
67	lifestyle modification/ use emczd
68	((lifestyle$ or life-style$) adj3 (advice$ or intervention$ or modif$ or change$)).tw.
69	Weight Loss/ use ppez
70	weight reduction/ use emczd
71	exp Diet Therapy/ use ppez
72	exp diet therapy/ use emczd
73	Weight Reduction Programs/ use ppez
74	weight loss program/ use emczd
75	(weight adj2 (los$ or reduc$)).tw.
76	((caloric or hypocaloric) adj2 (restrict* or diet*)).tw.
77	Dietary Fiber/ use ppez
78	dietary fiber/ use emczd
79	((fibre or fiber) adj3 (supplement$ or increase$ or intake$)).tw.
80	((high-fibre high-fiber or high fibre or high fiber or fibre-rich or fiber-rich or fibre rich or fiber rich) adj diet$).tw.
81	(stool adj3 softener$).tw.
82	(bowel adj3 (re-train$ or retrain$ or train$ or re-educat$ or reeducat$ or educat$)).tw.
83	"Activities of Daily Living"/ use ppez
84	Physical Exertion/ use ppez
85	exp Physical Endurance/ use ppez
86	daily life activity/ use emczd
87	exp physical activity/ use emczd
88	endurance/ use emczd
89	((heavy or repetitive) adj3 lift$).tw.
90	(activit$ adj3 (restrict$ or recommend$ or avoid$ or modif$ or change$)).tw.
91	Health Behavior/ use ppez
92	health behavior/ use emczd
93	exp Exercise/ use ppez
94	exp Sports/ use ppez
95	exp exercise/ use emczd
96	exp sport/ use emczd
97	((high adj impact) or (low adj impact)).tw.
98	(strong adj effort).tw.
99	((exercis$ or activit$) adj3 (advice$ or intervention$ or modif$ or change$)).tw.
100	65 or 66 or 67 or 68 or 69 or 70 or 71 or 72 or 73 or 74 or 75 or 76 or 77 or 78 or 79 or 80 or 81 or 82 or 83 or 84 or 85 or 86 or 87 or 88 or 89 or 90 or 91 or 92 or 93 or 94 or 95 or 96 or 97 or 98 or 99
101	Fecal Incontinence/ use ppez
102	Constipation/ use ppez
103	feces incontinence/ use emczd
104	defecation disorder/ use emczd
105	constipation/ use emczd
106	((fecal$ or feces$ or faeca$l or faeces$ or anal$ or anus$ or bowel$) adj3 incontinen$).mp.
107	(obstruct$ adj3 (defecat$ or defaecat$)).mp.
108	constipat$.mp.
109	101 or 102 or 103 or 104 or 105 or 106 or 107 or 108
110	((bowel$ or intestin$) adj3 (stricture$ or stenos$ or obstruct$ or fistul$)).tw.
111	(mesh$ adj3 (extru$ or expos$ or erosion$)).tw.
112	(repair$ or resect$ or re-anastomos$ or anastomos$ or stoma$).tw.
113	11 or 18
114	31 or 35 or 40 or 49 or 52 or 56 or 64 or 100
115	109 and 113 and 114
116	27 and 52
117	110 or 111
118	113 and 117
119	112 and 118
120	11 and 52
121	115 or 116 or 119 or 120
122	remove duplicates from 121
123	limit 122 to english language [general exclusions filter applied]

Database: Cochrane Library via Wiley Online

Date of last search: 26th March 2018.

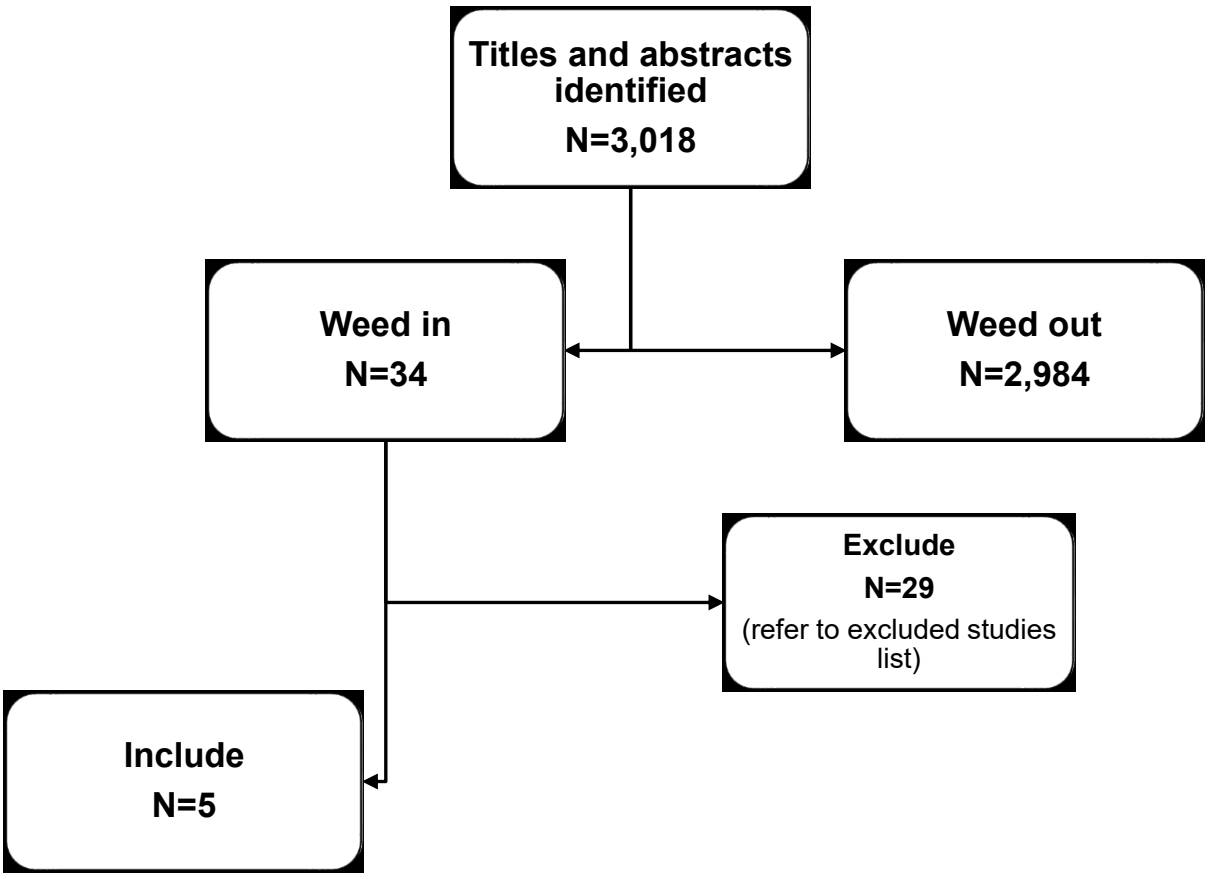
#	Searches
#1	MeSH descriptor: [Pelvic Organ Prolapse] explode all trees
#2	(pelvic* near/3 organ* near/3 prolaps*):ti,ab,kw (Word variations have been searched)
#3	(urinary near/3 bladder near/3 prolaps*):ti,ab,kw (Word variations have been searched)
#4	((vagin* or urogenital* or genit* or uter* or viscer* or anterior* or posterior* or apical or pelvi* or vault* or urethr* or bladder*) near/3 prolaps*):ti,ab,kw (Word variations have been searched)
#5	(splanchnoptos* or visceroptos*):ti,ab,kw (Word variations have been searched)
#6	MeSH descriptor: [Rectocele] explode all trees
#7	(hernia* near/3 (pelvi* or vagin* or urogenital* or uter* or bladder* or urethr* or viscer*)):ti,ab,kw (Word variations have been searched)
#8	(urethrocele* or urethrocoele* or enterocele* or enterocoele* or sigmoidocoele* or sigmoidocele* or proctocele* or proctocoele* or rectocele* or rectocoele* or cystocele* or cystocoele* or rectoenterocele* or rectoenterocoele* or cystourethrocele* or cystourethrocoele*):ti,ab,kw (Word variations have been searched)
#9	MeSH descriptor: [Urinary Incontinence, Stress] explode all trees
#10	((stress* or mix* or effort*) near/5 incontinen*):ti,ab,kw (Word variations have been searched)
#11	SUI:ti,ab,kw (Word variations have been searched)
#12	(urine near/2 (loss or leak*)):ti,ab,kw (Word variations have been searched)
#13	#1 or #2 or #3 or #4 or #5 or #6 or #7 or #8 or #9 or #10 or #11 or #12
#14	MeSH descriptor: [Surgical Mesh] explode all trees
#15	mesh*:ti,ab,kw (Word variations have been searched)
#16	MeSH descriptor: [Prostheses and Implants] this term only
#17	MeSH descriptor: [Biocompatible Materials] this term only
#18	((biolog* or synthetic*) next implant*):ti,ab,kw (Word variations have been searched)
#19	#14 or #15 or #16 or #17 or #18
#20	MeSH descriptor: [Biofeedback, Psychology] this term only
#21	biofeedback*:ti,ab,kw (Word variations have been searched)
#22	MeSH descriptor: [Therapeutic Irrigation] this term only
#23	(irrigat* or lavage*):ti,ab,kw (Word variations have been searched)
#24	MeSH descriptor: [Electric Stimulation Therapy] this term only
#25	(sacral near/3 (stimul* or neuromodul*)):ti,ab,kw (Word variations have been searched)
#26	(SNS or SNM):ti,ab,kw (Word variations have been searched)
#27	MeSH descriptor: [Laxatives] explode all trees
#28	MeSH descriptor: [Cathartics] explode all trees
#29	(laxative* or aperiant* or cathartic*):ti,ab,kw (Word variations have been searched)
#30	(prucaloprid* or reolor* or resotran* or linaclotid* or linzess*):ti,ab,kw (Word variations have been searched)
#31	((trans-anal* or transanal*) near/3 resect*):ti,ab,kw (Word variations have been searched)
#32	(STARR near/5 (staple* or trans-anal* or transanal* or resect* or rectum*)):ti,ab,kw (Word variations have been searched)
#33	MeSH descriptor: [Enema] this term only
#34	MeSH descriptor: [Surgical Stomas] this term only
#35	((antegrad* or colon*) near/3 enema*):ti,ab,kw (Word variations have been searched)
#36	(ACE near/5 (antegrad* or colon* or enema* or stoma*)):ti,ab,kw (Word variations have been searched)
#37	(bowel near/3 washout*):ti,ab,kw (Word variations have been searched)
#38	#20 or #21 or #22 or #23 or #24 or #25 or #26 or #27 or #28 or #29 or #30 or #31 or #32 or #33 or #34 or #35 or #36 or #37
#39	MeSH descriptor: [Life Style] explode all trees
#40	((lifestyle* or life-style*) near/3 (advice* or intervention* or modif* or change*)):ti,ab,kw (Word variations have been searched)
#41	MeSH descriptor: [Weight Loss] this term only
#42	MeSH descriptor: [Diet Therapy] explode all trees
#43	MeSH descriptor: [Weight Reduction Programs] this term only
#44	(weight near/2 (los* or reduc*)):ti,ab,kw (Word variations have been searched)
#45	((caloric or hypocaloric) near/2 (restrict* or diet*)):ti,ab,kw (Word variations have been searched)
#46	MeSH descriptor: [Dietary Fiber] this term only
#47	((fibre or fiber) near/3 (supplement* or increase* or intake*)):ti,ab,kw (Word variations have been searched)
#48	((high-fibre high-fiber or high fibre or high fiber or fibre-rich or fiber-rich or fibre rich or fiber rich) next diet*):ti,ab,kw (Word variations have been searched)
#49	(stool near/3 softener*):ti,ab,kw (Word variations have been searched)
#50	(bowel near/3 (re-train* or retrain* or train* or re-educat* or reeducat* or educat*)):ti,ab,kw (Word variations have been searched)
#51	MeSH descriptor: [Activities of Daily Living] this term only
#52	MeSH descriptor: [Physical Exertion] this term only
#53	MeSH descriptor: [Physical Endurance] explode all trees
#54	((heavy or repetitive) near/3 lift*):ti,ab,kw (Word variations have been searched)
#55	(activit* near/3 (restrict* or recommend* or avoid* or modif* or change*)):ti,ab,kw (Word variations have been searched)
#56	MeSH descriptor: [Health Behavior] this term only
#57	MeSH descriptor: [Exercise] explode all trees
#58	MeSH descriptor: [Sports] explode all trees
#59	((high next impact) or (low next impact)):ti,ab,kw (Word variations have been searched)
#60	(strong next effort):ti,ab,kw (Word variations have been searched)

#	Searches
#61	((exercise* or activit*) near/3 (advice* or intervention* or modif* or change*)):ti,ab,kw (Word variations have been searched)
#62	#39 or #40 or #41 or #42 or #43 or #44 or #45 or #46 or #47 or #48 or #49 or #50 or #51 or #52 or #53 or #54 or #55 or #56 or #57 or #58 or #59 or #60 or #61
#63	(rectopex* or proctopex*):ti,ab,kw (Word variations have been searched)
#64	MeSH descriptor: [Fecal Incontinence] this term only
#65	MeSH descriptor: [Constipation] this term only
#66	((fecal* or feces* or faeca*l or faeces* or anal* or anus* or bowel*) near/3 incontinen*):ti,ab,kw (Word variations have been searched)
#67	(obstruct* near/3 (defecat* or defaecat*)):ti,ab,kw (Word variations have been searched)
#68	constipat*:ti,ab,kw (Word variations have been searched)
#69	#64 or #65 or #66 or #67 or #68
#70	((bowel* or intestin*) near/3 (stricture* or stenos* or obstruct* or fistul*)):ti,ab,kw (Word variations have been searched)
#71	(mesh* near/3 (extru* or expos* or erosion*)):ti,ab,kw (Word variations have been searched)
#72	(repair* or resect* or re-anastomos* or anastomos* or stoma*):ti,ab,kw (Word variations have been searched)
#73	#38 or #62 or #63
#74	#13 and #69 and #73
#75	#19 and #63
#76	#1 or #2 or #3 or #4 or #5 or #6 or #7 or #8
#77	#63 and #76
#78	#70 or #71
#79	#13 and #72 and #78
#80	#74 or #75 or #77 or #79

Appendix C – Clinical evidence study selection

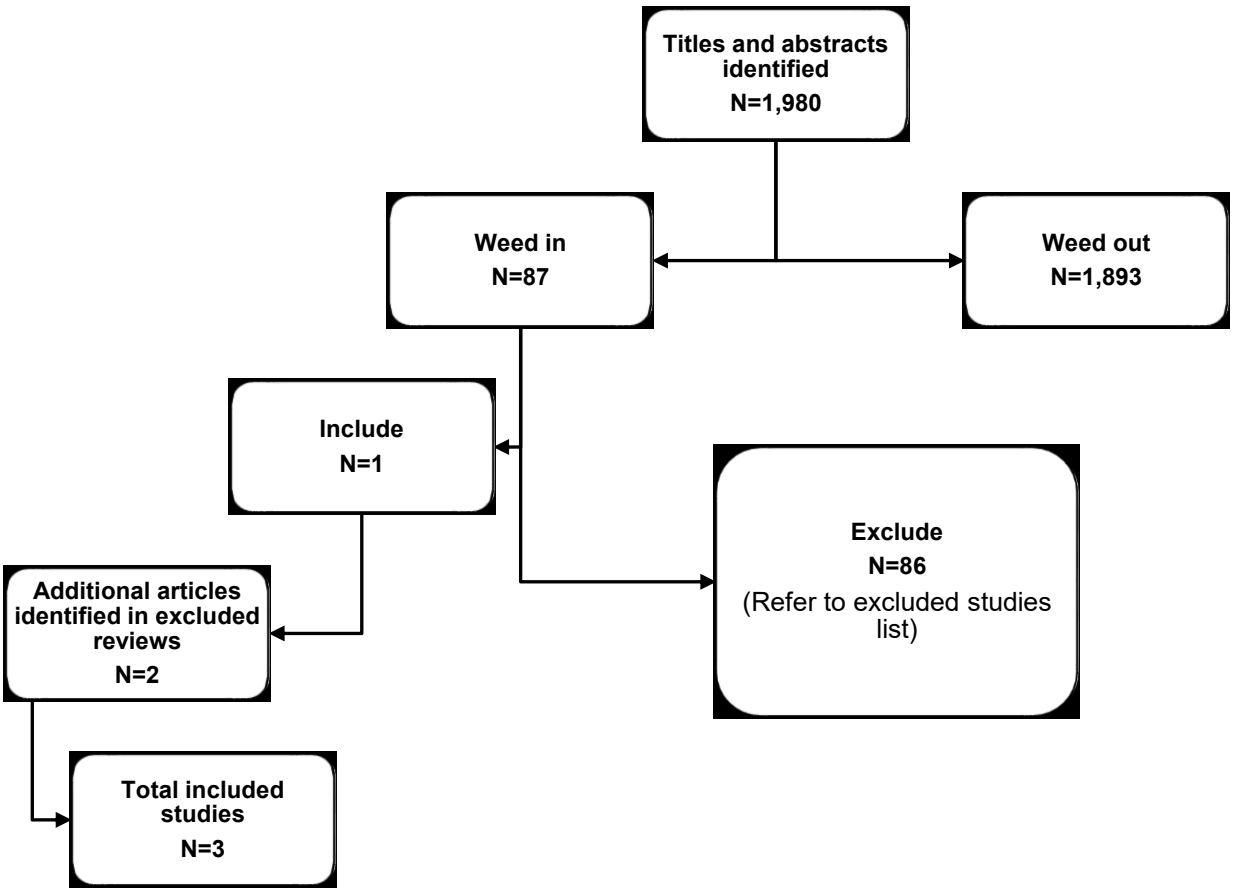
Clinical evidence study selection for review question: What are the most effective management options for vaginal complications (including exposure, extrusion, erosion and infection) after mesh surgery?

Figure 1: PRISMA flow diagram for review of management of vaginal complications after mesh or mesh sling surgery



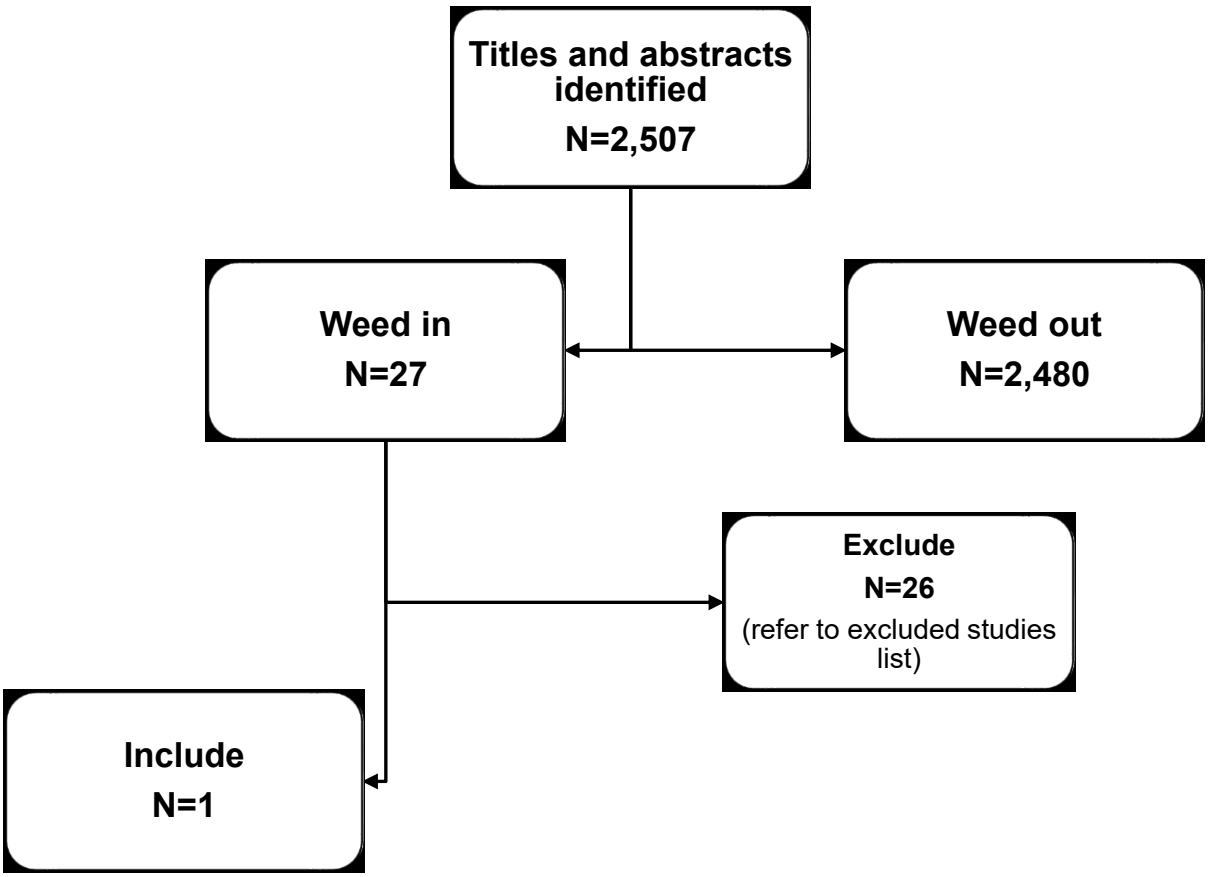
Clinical evidence study selection for review question: What are the most effective management options for sexual dysfunction and/or pain complications after mesh or mesh sling surgery

Figure 2: PRISMA flow diagram for review on management of sexual dysfunction and/or pain complications after mesh or mesh sling surgery



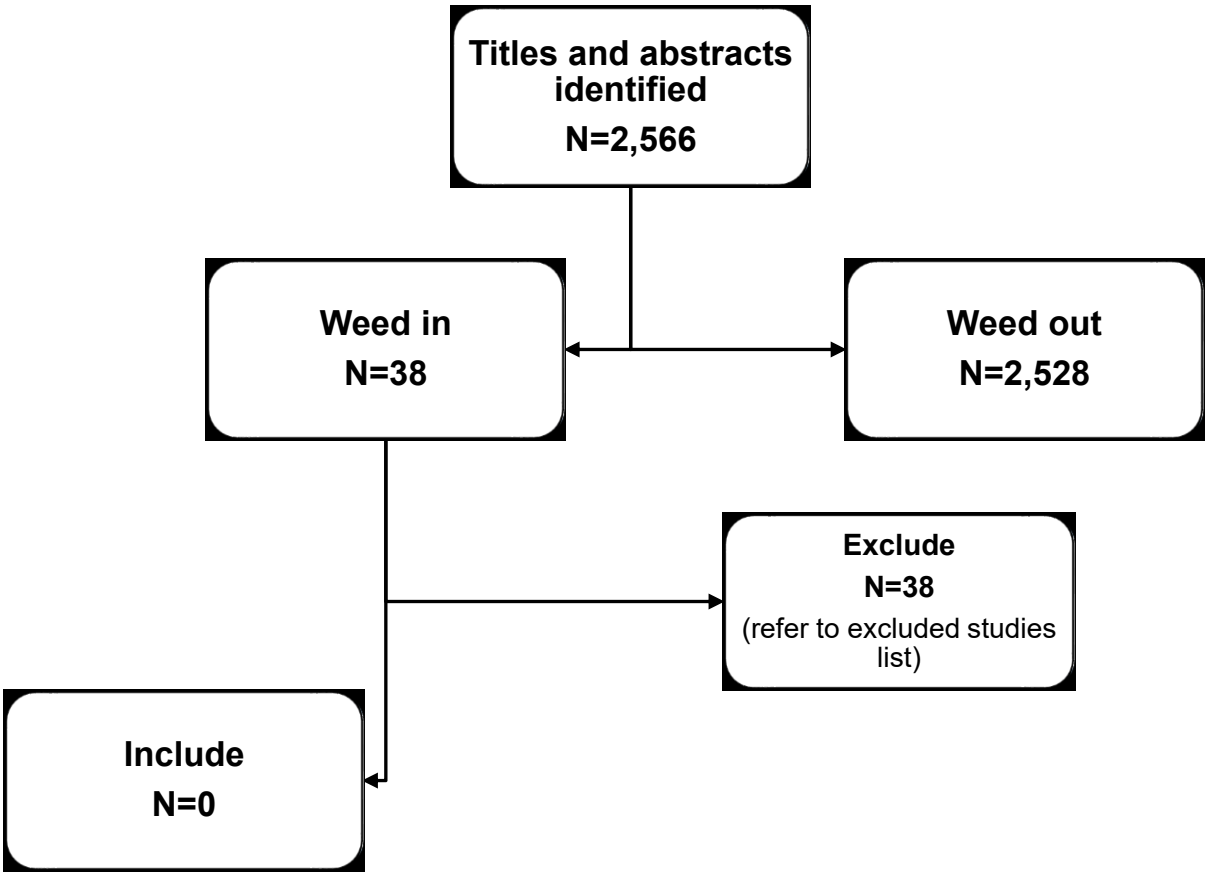
Clinical evidence study selection for review question: What are the most effective management options for urinary complications after mesh or mesh sling surgery

Figure 3: PRISMA flow diagram for review on management of urinary complications after mesh or mesh sling surgery



Clinical evidence study selection for review question: What are the most effective management options for bowel complications after mesh surgery?

Figure 4: PRISMA flow diagram for review on management of bowel complications after mesh or mesh sling surgery



Appendix D – Clinical evidence tables

Clinical evidence tables for review question: What are the most effective management options for vaginal complications (including exposure, extrusion, erosion and infection) after mesh surgery?

Table 25: Clinical evidence tables for management options for vaginal complications after mesh surgery

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Full citation Begley, J. S., Kupferman, S. P., Kuznetsov, D. D., Kobashi, K. C., Govier, F. E., McGonigle, K. F., Muntz, H. G., Incidence and management of abdominal sacrocolpopexy mesh erosions, American Journal of Obstetrics & Gynecology, 192, 1956-62, 2005 Ref Id 636976 Country/ies where the study was carried out USA Study type Case series Aim of the study	Sample size N=92 Characteristics Age ranged from 25-86 Autologous fascia, n=1; Cadaveric fascia, n=13; GoreTex mesh, n=33; Silicone-coated mesh (AMS Triangle), n=21; Polypropylene (Prolene Soft, Gynecare), n=24 Mean FU different sling types ranged from 9.8 to 29.3 months Inclusion criteria All women who received abdominal sacrocolpopexy at Virginia Mason Medical Centre, Seattle, WA between 1997 and 2003.	Interventions Partial or complete mesh removal	Details All patients received abdominal sacrocolpopexy and majority had also had prior surgery (88%) such as hysterectomy (79%) and colporrhaphy (30%). Majority of women (79%) also had concurrent surgery with sacrocolpopexy	Results 7 women experienced mesh erosion (3 in Gore-Tex group, 4 in silicone-coated mesh group), all of which had failed conservative treatment. All 3 women in GoreTex group had partial mesh removal with no reported complications. In silicone-coated mesh group, partial mesh removal failed in all 4 patients: 1 had partial removal surgery and subsequently experienced prolapse; 1 had partial then complete removal and subsequent persistence of mesh erosion but no POP recurrence; 1 had complete mesh removal and subsequent bowel	Limitations ROBINS-I assessment Overall serious risk of bias Confounding bias: Serious risk of bias Selection of participant's bias: Serious risk of bias Classification of interventions bias: Low risk of bias (not applicable as no comparator group) Deviations from intended interventions bias: Serious risk of bias Missing data bias: Low risk of bias Measurement of outcomes bias: Serious risk of bias Selection of the reported results bias:

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
To evaluate occurrence and management of mesh erosion in women who received abdominal sacrocolpopexy Study dates 11/1997 to 10/2003 Source of funding Not applicable	Exclusion criteria			obstruction; 1 had partial removal x 3 and complete removal, but no POP recurrence.	Low risk of bias (not applicable) Other information
Full citation Cheng, Y. W., Su, T. H., Wang, H., Huang, W. C., Lau, H. H., Risk factors and management of vaginal mesh erosion after pelvic organ prolapse surgery, Taiwanese Journal of Obstetrics & Gynecology, 56, 184-187, 2017 Ref Id 637369 Country/ies where the study was carried out Taiwan Study type Case series	Sample size n = 741 patients underwent vaginal mesh reinforced repair. n = 47 patients with mesh erosion n = 56 patients (including referrals) treated for mesh erosion (n = 20 treated conservatively vs. n =36 required surgical revision) Characteristics Age, y conservative treatment: 64.5 ± 11.1 (conservative treatment); 62.5 ± 11.2 (surgical revision)	Interventions n = 20 (36%) of women were treated conservatively n = 36 (64%) of women required surgical revision after failing 1-3 months of conservative management or after recurrent erosions after conservative treatment (second revision surgery n = 6 (17%)).	Details Outcomes: Recurrent erosions after surgical revision. Median follow up was 13 months (range 3-84 months)	Results Of the 56 women with vaginal mesh erosion, 20 were successfully treated by conservative management (i.e. mesh erosion spontaneously healed) and 36 required surgical revision after failing 1-3 months of conservative management or after recurrent erosions after conservative treatment. Recurrent erosions after surgical revision: 6/36 Repeat surgery for mesh complications: 6/36 All patients with more than two sites of erosion	Limitations ROBINS-I assessment Overall serious risk of bias Confounding bias: Serious risk of bias Selection of participant's bias: Serious risk of bias Classification of interventions bias: Low risk of bias (not applicable as no comparator group) Deviations from intended interventions bias: Serious risk of bias Missing data bias: Low risk of bias

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Aim of the study To identify the risk factors and optimal management for vaginal mesh erosion. Study dates 2004 to 2014 Source of funding None reported.	Parity, n = 3.5 ± 1.5 (conservative treatment); 3.5 ± 1.5 (surgical revision) Body mass index, kg/m2 23.9 ± 2.3 (conservative treatment); 25.4 ± 3.5 0.07 (surgical revision) All women underwent mesh-reinforced repair at the same tertiary medical centre. The mesh kits included Anterior/Posterior Elevate (AMS, Minnetinka, NM, USA), Prolift (Ethicon, Somerville, NJ, USA), Gynemesh (Ethicon), Apogee/Perogee (AMS), and Prosima (Ethicon). Mesh erosion defined as any visible vaginal mesh exposure identified on vaginal examination. Inclusion criteria Women who experienced mesh erosion after vaginal mesh repair for symptomatic pelvic			required surgical revision. Erosions smaller than 0.5 cm healed spontaneously under conservative treatment ($p<0.01$)	Measurement of outcomes bias: Serious risk of bias Selection of the reported results bias: Low risk of bias (not applicable) Other information No significant differences between patients who underwent successful conservative treatment or those who requited surgical revision with respect to age, parity, body mass index, menopausal status, mesh material, or site of mesh erosion. Once mesh erosion starts to occur, conservative treatment may be initially used for smaller erosions, however for larger, multiple erosions, surgical revision is recommended.

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	organ prolapse (POP) quantification stage II or higher POP. Exclusion criteria None stated.				
Full citation Domingo,S., Alama,P., Ruiz,N., Perales,A., Pellicer,A., Diagnosis, management and prognosis of vaginal erosion after transobturator suburethral tape procedure using a nonwoven thermally bonded polypropylene mesh, Journal of Urology, 173, 1627-1630, 2005 Ref Id 124251 Country/ies where the study was carried out Spain Study type Prospective cohort study Aim of the study	Sample size n = 65 women who underwent a transobturator suburethral tape procedure for stress urinary incontinence, 9 had mesh erosion Characteristics Age = 54 (range 40 to 77) 43 women had Uratape, and 21 had Obtape. 9 women presented with vaginal mesh erosion, 5 of which had vaginal pain (only or during intercourse) Inclusion criteria Women with urodynamic stress incontinence underwent a TOT procedure with a sling Uratape/Obtape (Mentor-Porges, Le Plessis-Robinson,	Interventions Partial or complete synthetic mesh removal Cystoscopy and vaginoscopy were performed when vaginal erosion was suspected or diagnosed. The mesh was completely removed or partially removed according to the medical criteria. n = 43 used Uratape and n = 21 used Obtape.	Details All women received intravenous prophylactic antibiotic therapy at the beginning of surgery (2 gm amoxicillinclavulanic acid). Complete mesh removal under spinal anaesthesia in operating room or partial removal of visible mesh in office as indicated. If partial removal unsuccessful, complete removal subsequently attempted. Outcomes: Recurrent SUI Follow up at 4 weeks and 1 year.	Results n = 9/65 were diagnosed with vaginal erosion (n = 5 in the Uratape group, n = 4 in the Obtape group) n = 8/9 underwent complete mesh removal, 2/8 reported recurrent SUI n =1/9 underwent partial mesh removal and reported no recurrent SUI	Limitations ROBINS-I assessment Overall serious risk of bias Confounding bias: High risk of bias Selection of participants bias: High risk of bias Classification of interventions bias: High risk of bias Deviations from intended interventions bias: Low risk of bias Missing data bias: Low risk of bias Measurement of outcomes bias: High risk of bias Selection of the reported results bias: Low risk of bias Other information

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
To examine the diagnosis, management and prognosis of vaginal mesh erosion using a thermally bonded nonwoven polypropylene mesh in a transobturator suburethral tape procedure for the surgical treatment of stress urinary incontinence in women. Study dates December 2002 to May 2004 Source of funding Not stated.	France) at the Department of Obstetrics and Gynaecology, Hospital Universitario, Valencia, Spain. Exclusion criteria				
Full citation Jambusaria, L. H, Heft, J, Reynolds, W. S, Dmochowski, R, Biller, D. H., Incontinence rates after midurethral sling revision for vaginal exposure or pain, American Journal of Obstetrics and	Sample size N=94 with primary indication of mesh exposure Characteristics Baseline characteristics for women who had primary indication of mesh exposure (n=94)	Interventions Intervention 1: Complete mesh removal Intervention 2: Partial mesh removal	Details Amount of midurethral sling removed not standardised between surgeons. 'Partial removal'=excision of part of sling causing pain; 'Complete removal'=excision of both sling arms (vaginally from one to the other pubic ramus). Women seen at 4-6	Results Results for women who had mesh removal for primary indication of vaginal mesh exposure Short-term outcomes at mean 5.9 weeks FU, n=94 (complete removal=58; partial=36) Postop SUI: 39 (41%); 30 (52%); 9 (25%)	Limitations ROBINS-I assessment Overall serious risk of bias Confounding bias: Serious risk of bias Selection of participant's bias: Serious risk of bias

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Gynecology, 215, 764.e1-764.e5, 2016 Ref Id 884446 Country/ies where the study was carried out USA Study type Retrospective cohort Aim of the study To assess post-operative stress outcomes after synthetic midurethral sling revision for mesh exposure or pain Study dates 05/2004-05/2014 Source of funding None reported	Mean age: 55.2 (12.1) Mean BMI: 29.5 (6.9) Parity: 2.1 (1.2) Preoperative SUI: 36 (38%) Preoperative pain: 76 (81%) Preoperative urgency: 45 (48%) Inclusion criteria Women who underwent vaginal synthetic midurethral sling revision, at Vanderbilt University Medical Centre, Nashville, TN, for primary indication of mesh exposure, pain or dyspareunia. Exclusion criteria Women who had indication of voiding dysfunction for mesh revision Women who previously had pubovaginal sling, bladder or urethral mesh erosion, concomitant incontinence surgery, or		weeks FU, 3 (long-term follow up), 6 and 12 months.	Postop pain: 15 (16%); 12 (21%); 3 (8%) Postop de novo urgency: 18 (19%); 12 (21%); 6 (17%) Long-term outcomes at mean 28.6 weeks FU, n=56 (complete removal=32; partial=243) Postop SUI: 27 (48%); 22 (69%); 5 (21%) Postop pain: 14 (23%); 11 (34%); 3 (13%) Postop de novo urgency: 12 (34%); 7 (38%); 6 (29%) Reoperation for SUI: 16 (17%); 14 (24%); 2 (6%) Results for women who had mesh removal for primary indication of mesh exposure and no preoperative SUI Short-term outcomes at mean 5.9 weeks FU, n=58 (complete removal=36; partial=22) Postop SUI: 18 (31%); 15 (42%); 3 (42%) Long-term outcomes at mean 28.6 weeks FU, n=31 (complete removal=17; partial=14)	Classification of interventions bias: Low risk of bias Deviations from intended interventions bias: Moderate risk of bias Missing data bias: Moderate risk of bias Measurement of outcomes bias: Serious risk of bias Selection of the reported results bias: Low risk of bias Other information

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	an abdominal revision procedure			Postop SUI: 11 (35%); 10 (59%); 1 (7%)	
Full citation Kohli, N., Walsh, P. M., Roat, T. W., Karram, M. M., Mesh erosion after abdominal sacrocolpopexy, Obstetrics and Gynecology, 92, 999-1004, 1998 Ref Id 639356 Country/ies where the study was carried out USA Study type Case series Aim of the study To review experience of women who had abdominal sacrocolpopexy and subsequent management of suture/mesh erosion	Sample size N=57 received sacrocolpopexy, 7 with subsequent mesh/suture erosion Characteristics Women with erosion (n=7) Age (y): 56.4 (10) BMI: 28 (7.4) Menopausal (%): 86 5 women had Marlex (CR Bard) mesh, 2 women had Mersilene (Ethicon) mesh. Inclusion criteria Women who had abdominal sacrocolpopexy during 8-year period for treatment of POP Exclusion criteria	Interventions Vaginal oestrogen cream or if unsuccessful, partial mesh removal	Details Of 7 patients with erosion, 2 had suture (Ethibond) erosion and 5 had mesh erosion. When erosion detected after 6-week postop visit, these patients received daily vaginal oestrogen cream and prescribed pelvic rest with 8 week FU. If persistent erosion after this time then partial mesh removal with 6-mo FU intervals to examine for infection, recurrent erosion and repeat prolapse. Average FU after mesh removal 12.6-mo (range 9-18).	Results Two women with suture erosion were successfully treated with vaginal oestrogen cream. Five women with mesh erosion, who failed conservative treatment, had partial mesh removal. (2 women also had vaginal advancement, whilst 1 also had colpocleisis). Adverse events: No perioperative or postoperative adverse events occurred Repeated mesh erosion at mean 12.6-mo FU: 0/5	Limitations ROBINS-I assessment Overall serious risk of bias Confounding bias: Serious risk of bias Selection of participant's bias: Serious risk of bias Classification of interventions bias: Low risk of bias (not applicable as no comparator group) Deviations from intended interventions bias: Serious risk of bias Missing data bias: Low risk of bias Measurement of outcomes bias: Serious risk of bias Selection of the reported results bias: Low risk of bias (not applicable)

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Study dates 8-year period, data not specified Source of funding Not reported					Other information

Clinical evidence tables for review question: What are the most effective management options for sexual dysfunction after mesh surgery?

Table 26: Clinical evidence tables for management options for sexual dysfunction after mesh surgery

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Full citation Danford, J. M., Osborn, D. J., Reynolds, W. S., Biller, D. H., Dmochowski, R. R., Postoperative pain outcomes after transvaginal mesh revision, International urogynecology journal, 26, 65-9, 2015 Ref Id 804522 Country/ies where the study was carried out USA Study type	Sample size N=233 Characteristics Mean age: 54 (range 23-89) Number with previous POP surgery: 66 (35%) Number with prior hysterectomy: 189/233 Number with chronic pelvic pain: 28/233 Inclusion criteria Women who underwent vaginal mesh excision, revision or urethrolysis, at Urology and Gynecology	Interventions Mesh excision or revision surgery	Details Eight different providers conducted all mesh surgery procedures in operating room. Methods varied from minimal revision to complete excision according to provider.	Results Patient reported improvement at most recent follow up, n=233 Pain improved/worsened/unchanged for whole sample: 169 (73%)/ 19 (8%)/ 45 (19%) Pain improved/worsened/unchanged for subgroup of women (n=131) with any mesh exposure: 101 (77%)/ 7(5%)/ 23 (18%) Pain improved/worsened/unchanged for subgroup of women (n=102) with no mesh exposure: 68 (67%)/ 12 (12%)/ 22 (21%) Pain improved/worsened/unchanged for	Limitations ROBINS-I assessment Overall serious risk of bias Confounding bias: Serious risk of bias Selection of participant's bias: Low risk of bias Classification of interventions bias: Low risk of bias (not applicable as

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Retrospective chart review (case series) Aim of the study To assess whether vaginal mesh revision or removal improves self-reported pain outcomes in women with primary indication of pelvic pain Study dates 01/2000 to 08/2012 Source of funding None reported	departments of Vanderbilt University, Nashville, TN, and who complained of pain before mesh revision or excision such that pain began or worsened after mesh placement, and pain deemed by surgery provider to be due to mesh placement. Exclusion criteria Women who did not complain of pain prior to mesh excision or revision surgery.			subgroup of women with vaginal mesh exposure/perforation (n=103): 78 (76%)/5 (5%)/ 20 (19%) Pain improved/worsened/unchanged for subgroup of women bladder mesh exposure/perforation (n=14): 11 (79%)/ 1 (7%)/ 2 (14%) Pain improved/worsened/unchanged for subgroup of women urethra mesh exposure/perforation (n=14): 12 (86%)/ 1 (7%)/ 1 (7%) Women with prior chronic pelvic pain less likely to experience improvement in pain symptoms: adjusted OR 0.28 (95% CI 0.12-0.66), p<0.01.	no comparator group) Deviations from intended interventions bias: Low risk of bias Missing data bias: Low risk of bias Measurement of outcomes bias: Serious risk of bias Selection of the reported results bias: Low risk of bias (not applicable) Other information
Full citation Hou, J. C., Alhalabi, F., Lemack, G. E., Zimmern, P. E., Outcome of transvaginal mesh and tape removed for pain only, The Journal of urology, 192, 856-60, 2014 Ref Id	Sample size N=123 Women with mesh removal, n=69 Women with tape removal, n=54 Characteristics Mean age (range): 52.8 (38-72)	Interventions Mesh or tape removal	Details Same standardised method of removal used for both mesh and tape removals. Pelvic pain assessed using VAS scale by nurse blinded to patient's type of mesh.	Results Pain status at ~36 months (range 31-42) follow up VAS score at last postoperative visit: 0.9 mesh; 1.5 tape Change in mean VAS pain score for mesh removal group was -7, p=0.00074 Change in VAS pain score for tape removal group was -3.8, p=0.0014	Limitations ROBINS-I assessment Overall serious risk of bias Confounding bias: Serious risk of bias Selection of participant’s

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
804523 Country/ies where the study was carried out USA Study type Prospective cohort Aim of the study To assess midterm outcomes of vaginal mesh and synthetic suburetheral tape removal for women with pain-related mesh complications Study dates 2005 to 2013 Source of funding None reported	Mean BMI: 28 (range 23-38) Mean months surgery to presentation: 31 (8-72) Mean age (range) of mesh removal subgroup: 49 (41-63) Mean age (range) of tape removal subgroup: 53 (38-72) Mean BMI (range) of mesh removal subgroup: 30 (23-38) Mean BMI (range) of tape removal subgroup: 27 (24-36) Mean VAS pain score of mesh removal subgroup: 7.9 (range 5-10) Mean VAS pain score of tape removal subgroup: 5.3 (range 4-8) No women had prior mesh or tape removal surgery and all had pain in more than one area. Location/type of pain (n mesh/tape): Vaginal pain 79% (54/43) Dyspareunia 21% (11/15) Lower abdominal pain 15% (11/8) Diffuse pain 14% (12/5)			Pelvic pain free (VAS scale=0): Mesh removal 46/69; Tape removal 44/54 Persistent pelvic pain (no VAS change): Mesh removal 11/69; Tape removal 3/54 Adverse events: Reported no intraoperative complications in either group	bias: Low risk of bias Classification of interventions bias: Low risk of bias Deviations from intended interventions bias: Low risk of bias Missing data bias: Low risk of bias Measurement of outcomes bias: Serious risk of bias Selection of the reported results bias: Low risk of bias (not applicable) Other information

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	Inclusion criteria Women who had mesh or tape removal surgery for persistent pain not associated with other mesh complications and at least 6-month follow up. Exclusion criteria Women who had mesh or tape removal surgery for pain associated with other mesh complications (e.g. mesh exposure, mesh erosion, recurrent urinary tract infections and urinary retention/obstruction).				
Full citation Jambusaria, L. H, Heft, J, Reynolds, W. S, Dmochowski, R, Biller, D. H., Incontinence rates after midurethral sling revision for vaginal exposure or pain, American Journal of Obstetrics and Gynecology, 215, 764.e1-764.e5, 2016 Ref Id 884446 Country/ies where the study was carried out USA Study type	Sample size N=151 women with primary indication of pain/dyspareunia N=94 with primary indication of mesh exposure Characteristics Baseline characteristics for women who had primary indication of pain/dyspareunia (n=151) Mean age: 51.3 (12.0) Mean BMI: 30.0 (6.5) Parity: 2.2 (1.1)	Interventions Intervention 1: Complete mesh removal Intervention 2: Partial mesh removal	Details Amount of midurethral sling removed not standardised between surgeons. 'Partial removal'=excision of part of sling causing pain; 'Complete removal'=excision of both sling arms (vaginally from one to the other pubic ramus). Women seen at 4-6 weeks FU, 3 (long-term follow up), 6 and 12 months.	Results Results for women who had mesh removal for primary indication of pain/dyspareunia Short-term outcomes at mean 6.4 weeks FU(Total=151; complete removal=126; partial removal=25) Postoperative SUI: 70 (47%); 62 (50%); 8 (32%) Postoperative pain: 41 (28%); 35 (28%); 6 (24%) Postoperative de novo urgency: 54 (36%); 49 (40%); 5 (20%) Long-term outcomes at mean 29.1 weeks FU, n=92 (complete removal=78; partial=14) Postoperative SUI: 55 (60%); 51 (65%); 4 (29%)	Limitations ROBINS-I assessment Overall serious risk of bias Confounding bias: Serious risk of bias Selection of participant's bias: Serious risk of bias Classification of interventions bias: Low risk of bias Deviations from intended

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Retrospective cohort Aim of the study To assess post-operative stress outcomes after synthetic midurethral sling revision for mesh exposure or pain Study dates 05/2004-05/2014 Source of funding None reported	Preoperative SUI: 66 (44%) Preoperative pain: 82 (55%) Preoperative urgency: 92 (61%) Baseline characteristics for women who had primary indication of mesh exposure (n=94) Mean age: 55.2 (12.1) Mean BMI: 29.5 (6.9) Parity: 2.1 (1.2) Preoperative SUI: 36 (38%) Preoperative pain: 76 (81%) Preoperative urgency: 45 (48%) Inclusion criteria Women who underwent vaginal synthetic midurethral sling revision, at Vanderbilt University Medical Centre, Nashville, TN, for primary indication of mesh exposure, pain or dyspareunia. Exclusion criteria Women who had indication of voiding dysfunction for mesh revision			Postoperative pain: 33 (36%); 30 (38%); 3 (21%) Postoperative de novo urgency: 36 (39); 32 (41%); 4 (29%) Repeat surgery for SUI: 31 (21%); 29(23%); 2 (8%) Results for women who had mesh removal for primary indication of pain/dyspareunia and no preoperative SUI Short-term outcomes at mean 5.9 weeks FU, n=84 (complete removal=70; partial=14) Postop SUI: 29 (35%); 26 (37%); 3 (21%) Long-term outcomes at mean 28.6 weeks FU, n=52 (reports complete removal=24; partial=9) Postop SUI: 26 (50%); 2 (? data reported incorrectly?); 24 (56%) Results for women who had mesh removal for primary indication of vaginal mesh exposure Short-term outcomes at mean 5.9 weeks FU, n=94 (complete removal=58; partial=36) Postop SUI: 39 (41%); 30 (52%); 9 (25%) Postop pain: 15 (16%); 12 (21%); 3 (8%) Postop de novo urgency: 18 (19%); 12 (21%); 6 (17%) Long-term outcomes at mean 28.6 weeks FU, n=56 (complete removal=32; partial=243)	interventions bias: Moderate risk of bias Missing data bias: Moderate risk of bias Measurement of outcomes bias: Serious risk of bias Selection of the reported results bias: Low risk of bias Other information

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	Women who previously had pubovaginal sling, bladder or urethral mesh erosion, concomitant incontinence surgery, or an abdominal revision procedure			Postop SUI: 27 (48%); 22 (69%); 5 (21%) Postop pain: 14 (23%); 11 (34%); 3 (13%) Postop de novo urgency: 12 (34%); 7 (38%); 6 (29%) Reoperation for SUI: 16 (17%); 14 (24%); 2 (6%) Results for women who had mesh removal for primary indication of mesh exposure and no preoperative SUI Short-term outcomes at mean 5.9 weeks FU, n=58 (complete removal=36; partial=22) Postop SUI: 18 (31%); 15 (42%); 3 (42%) Long-term outcomes at mean 28.6 weeks FU, n=31 (complete removal=17; partial=14) Postop SUI: 11 (35%); 10 (59%); 1 (7%)	

Clinical evidence tables for evidence review: What are the most effective management options for urinary complications after mesh surgery?

Table 27: Clinical evidence tables for management options for pain after mesh surgery

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Full citation Crescenze, I. M., Abraham, N., Li, J., Goldman, H. B., Vasavada, S., Urgency Incontinence before and after Revision of a Synthetic Mid Urethral Sling, Journal of Urology, 196, 478-483, 2016 Ref Id 741816 Country/ies where the study was carried out USA Study type Case series Aim of the study To evaluate urgency urinary incontinence outcomes after revision of synthetic mid urethral sling Study dates February 2005 to June 2013 Source of funding Not reported	Sample size 107 Characteristics Median age = 56 years Median BMI = 24kgm2 Symptoms before revision included recurrent UTIs (39%), Retention, requiring catheterization (22.6%), obstructive voiding symptoms (89.7%) and SUI (28%) Inclusion criteria Patients with synthetic mid urethral sling and new or worsening voiding or storage symptoms, presumed to be associated with sling placement Exclusion criteria Women with a biological sling, pain, prior sling revision or sling excision for extrusion or perforation.	Interventions Removal or revision of sling for stress incontinence, urethrolysis, transvaginal, secondary, open (including cyctourethroscopy)	Details Electronic medical records were reviewed	Results Resolution of obstructive voiding symptoms = 78.9% Resolution of need for catheterisation = 95.8% Resolution of recurrent UTI = 65.8% SUI = 57% De novo SUI = 35.5%	Limitations ROBINS-I assessment Overall serious risk of bias Confounding bias: Serious risk of bias Selection of participant's bias: Low risk of bias Classification of interventions bias: Not applicable as no comparison Deviations from intended interventions bias: Serious risk of bias Missing data bias: Low risk of bias Measurement of outcomes bias: Serious risk of bias Selection of the reported results bias: Low risk of bias Other information

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	Women undergoing complete urethrolysis, urethral reconstruction, sling replacement at sling revision Less than one month follow up Presence of neurogenic DO				

Clinical evidence tables for evidence review: What are the most effective management options for urinary complications after mesh surgery?

Table 28: Clinical evidence table for general management of mesh complications after mesh or mesh sling surgery

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Full citation Abbott, S., Unger, C. A., Evans, J. M., Jallad, K., Mishra, K., Karram, M. M., Iglesia, C. B., Rardin, C. R., Barber, M. D., Evaluation and management of complications from synthetic mesh after pelvic reconstructive surgery: a multicenter study, American Journal of Obstetrics & Gynecology, 210, 163.e1-8, 2014 Ref Id 542551	Sample size N=347 Characteristics Age: 56.6 (12.7) Mean Parity: 2.6 (1.24) BMI: 28.4 (5.3) Index surgery: Sacrocolpopexy only 5% Sacrocolpopexy + Synthetic sling 2% Synthetic sling only 50% TVM only 21% TVM + Synthetic sling 22% Reasons for referral Any lower gastrointestinal tract symptom 6%	Interventions Various (Complete mesh removal 27%; Partial mesh removal 51%; Recurrent POP treatment 23%; Recurrent incontinence treatment 15%; Release of mesh arms 18%; Other 20%)	Details All staff at various sites were trained to use standardised data abstraction procedures on current procedural terminology and ICD-9 codes.	Results Repeat surgery 72/347	Limitations ROBINS-I assessment Overall serious risk of bias Confounding bias: Serious risk of bias Selection of participant's bias: risk of bias Classification of interventions bias: risk of bias Deviations from intended interventions bias: risk of bias

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Country/ies where the study was carried out USA Study type Case series Aim of the study To describe evaluation and management of mesh-related complications in women who have had mesh surgery for POP and/or SUI Study dates 01/2006 to 12/2012 Source of funding Supported by Foundation for Female Health Awareness, The Christ Hospital, Cincinnati, OH.	Any vaginal symptom 46% Dyspareunia 30% Localised infection 11% Lower urinary tract symptoms 49% Mesh erosion/exposure/extrusion 43% Pain 36% Recurrent or de novo prolapse 14% Recurrent or de novo incontinence 25% Inclusion criteria Women who had POP and/or SUI surgery using synthetic mesh (midurethral slings, transvaginal mesh, sacrocolpopexy, or combination of these) on or after 01/01/2006 at 4 US tertiary referral centres and who had visited one of the centres for evaluation and/or management of mesh-related complication by 31/12/2012. Exclusion criteria				Missing data bias: risk of bias Measurement of outcomes bias: risk of bias Selection of the reported results bias: risk of bias Other information
Full citation Cardenas-Trowers, O. O, Malekzadeh, P, Nix,	Sample size N=83	Interventions Mesh removal surgery for vaginal	Details All of the mesh removal surgeries	Results Adverse events	Limitations ROBINS-I assessment

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
D. E, Hatch, K. D., Vaginal Mesh Removal Outcomes: Eight Years of Experience at an Academic Hospital, Female Pelvic Medicine & Reconstructive Surgery, 20, 20, 2017 Ref Id 884436 Country/ies where the study was carried out USA Study type Case series Aim of the study Evaluation and subsequent surgical management of for vaginal mesh complications Study dates February 2005 - November 2015. Source of funding	Characteristics Age (y) = 56 (11) BMI = 29 (6) Parity (median) = 3 (range 0-6) Reason for surgery: vaginal pain, n=52; dyspareunia, n=46; pelvic pain, n=42; mesh erosion, n=36; UI, n=34; vaginal bleeding, n=24; vaginal discharge, n=16; urinary retention, n=13; voiding dysfunction, n=11; rectal pain, n=10; UTI, n=9; abdominal pain, n=5; leg pain, n=5; buttock pain, n=3. Inclusion criteria Mesh removal surgery that occurred before January 2016 Exclusion criteria None reported	mesh complications	were performed by a surgeon who has fellowship training in gynecologic oncology and has performed urogynecologic procedures for more than 10 years. FU 4-6 weeks.	Internal organ injury = 3/83 (urethra, bladder and bowel) Rectovaginal fistula = 1/83 Complications > 12 months UI = 12/50 New-onset urge incontinence = 15/50 Urinary retention = 2/50 Dyspareunia = 8/50 Pain = 15/50 (6 pelvic, 3 rectal, 5 vaginal, 1 leg) Infection = 2/50 Repeat surgery = 29/83	Overall serious risk of bias Confounding bias: low risk of bias Selection of participant's bias: low risk of bias Classification of interventions bias: low risk of bias Deviations from intended interventions bias: moderate risk of bias (nature of data means intervention may be amended per case to suit individual needs enhancing its effectiveness) Missing data bias: low risk of bias Measurement of outcomes bias: serious risk of bias Selection of the reported results bias: low risk of bias

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
					Other information
Full citation Crosby, E. C, Abernethy, M, Berger, M. B, DeLancey, J. O, Fenner, D. E, Morgan, D. M., Symptom resolution after operative management of complications from transvaginal mesh, Obstetrics & GynecologyObstet Gynecol, 123, 134-9, 2014 Ref Id 884439 Country/ies where the study was carried out USA Study type Case series Aim of the study To describe outcomes of vaginal mesh removal Study dates 01/2008 to 04/2012 Source of funding None reported	Sample size N=90 Characteristics Mean age: 58 (11) Mean BMI: 29.5 (11) Parity: 3 (0-10) Number with previous POP surgery: 79 Number with previous incontinence surgery: 11 Prior mesh revision (Total/1/2/≥3): 39/28/8/3 Concomitant hysterectomy/prolapse repair/anti-incontinence surgery: 5 (6%)/50 (56%)/9 (10%) Presenting signs/symptoms for mesh removal, n (%) Pelvic or vaginal pain: 58 (64%) Mesh exposure: 56 (62%) [includes vaginal bleeding/discharge, n=26; pain/dyspareunia, n=20] Bulge sensation: 27 (30%) Dyspareunia: 43 (48%) Recurrent infection: 8 (9%) SUI: 25 (28%) Rectovaginal fistula: 3 (3%)	Interventions Partial or complete mesh removal	Details Patients had variety of mesh removed (synthetic and biological). When pain or dyspareunia was indication for removal (or patient wanted complete removal), maximum amount of mesh removed. When mesh exposure was indication, only part of mesh involved in exposure was removed. Concomitant surgery (prolapse repair or anti-incontinence procedure) performed if needed.	Results Resolution of symptoms: All presenting symptoms: 43/84 (51%) Mesh erosion/exposure: 53/56 (95%) Pain symptoms: 30/58 (51%) Dyspareunia: 13/43 (30%) Note: not clear how resolution and persistence assessed. Improvement in pain (% little or no improvement/moderate improvement/significant improvement or complete resolution): 16/20/64 Little or no improvement in pain in women with preoperative chronic pain (e.g. history of chronic pelvic pain, endometriosis): 6/16 (37%) Little or no improvement in pain in women with preoperative (but not chronic) pain: 5/39 (13%) Significant improvement in pain, total vs. partial mesh removal (%): 58.1 vs. 70.1 (number that had each not reported) Repeat surgery: 7/84	Limitations ROBINS-I assessment Overall serious risk of bias Confounding bias: Serious risk of bias Selection of participant's bias: Serious risk of bias Classification of interventions bias: Not applicable as no comparison Deviations from intended interventions bias: Low risk of bias Missing data bias: Low risk of bias Measurement of outcomes bias: Serious risk of bias Selection of the reported results bias: Low risk of bias

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	Defecatory dysfunction: 32 (25%) Inclusion criteria Women undergoing vaginal mesh removal for POP by urogynaecologist at University of Michigan, as identified by CPT codes, from 01/2008 to 04/2012 Exclusion criteria Women who only had midduretheral sling removed or sacrocolpopexy graft				Other information
Full citation Fabian, G, Kociszewski, J, Kuszka, A, Fabian, M, Grothey, S, Zwierzchowska, A, Majkusiak, W, Barcz, E., Vaginal excision of the sub-urethral sling: analysis of indications, safety and outcome, Archives of Medical Science, 11, 982-8, 2015 Ref Id 884442 Country/ies where the study was carried out Germany	Sample size N=100 Characteristics Age, mean (y) = 61.5 (38-83) Reason for referral: OAB, n=64; Persistent SUI, n=59; Pain (inc. dyspareunia), n=40; Urinary retention, n=40; Mesh erosion, n=25 Inclusion criteria Not reported Exclusion criteria	Interventions Transvaginal tape excision	Details Types of synthetic sling included various retropubic and transobturator slings. Before the procedure, the pelvic floor was examined via ultrasound placed in the vaginal introitus to locate the tape. Urethrocystoscopy was used to exclude bladder or urethra perforation. A dilator was used to help locate the	Results Complications > 12 months SUI: 83/100 Dyspareunia: 1/100 Resolution of symptoms SUI: 2/59 Pain: 39/40	Limitations ROBINS-I assessment Overall serious risk of bias Confounding bias: low risk of bias Selection of participant's bias: low risk of bias Classification of interventions bias: low risk of bias Deviations from intended interventions

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Study type Case series Aim of the study To analyse the indications, technique and effects of transvaginal tape excision. Study dates January 2010 - December 2012 Source of funding Not reported	Not reported		tape and to pull the sling into tension after which the tape was incised at its central part. The tape was then removed and the procedure repeated for the other side.		bias: low risk of bias Missing data bias: low risk of bias Measurement of outcomes bias: serious risk of bias Selection of the reported results bias: low risk of bias Other information
Full citation George, A, Mattingly, M, Woodman, P, Hale, D., Recurrence of prolapse after transvaginal mesh excision, Female Pelvic Medicine & Reconstructive Surgery, 19, 202-5, 2013 Ref Id 884443 Country/ies where the study was carried out USA Study type Case series	Sample size n = 71 patients underwent vaginal mesh removal (n=45 patients had partial excision and n = 26 had total mesh excision)2013 Characteristics Mean age 57.4 (10.2); Body mass index, mean (SD) 30.9 (13.2); Parity, mean (SD) 2.5 (1.2) Menopausal (%): 84.5 Concomitant native tissue repair: 27 (38%) 17/71 patients had a history of mesh removal.	Interventions Partial or complete mesh removal	Details Anatomical outcomes were evaluated using the POP quantification system (POP-Q). Recurrence of prolapse was defined as stage II or higher-stage prolapse on the POP-Q system, and/or vaginal bulge symptoms, and/or reoperation for prolapse, and/or postoperative use	Results Adverse events - bladder injury: 1/71 (cystomy) Complications: 2 hematomas, 1 bowel obstruction Recurrent prolapse: 11/71 Repeat surgery: 0/71 Sexually active: 29/44 at baseline, 33/44 at FU, p=0.313 Dyspareunia: 25/42 at baseline, 15/42 at FU, p=0.034 (QoL) Median PFDI score at baseline and FU (n=19): 23 (range 0-60); 8 (range 0-35), p=0.004 (QoL) Median PFIQ score at baseline and FU (n=20): 10 (0-56); 1.5 (0-19), p=0.002	Limitations ROBINS-I assessment Overall serious risk of bias Confounding bias: Serious risk of bias Selection of participant's bias: Serious risk of bias Classification of interventions bias: Not applicable Deviations from intended

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Aim of the study To evaluate anatomical and functional outcomes preoperatively and postoperatively in patients undergoing mesh excision. Study dates 01/2005 to 01/2009 Source of funding Not reported	9/43 patients who underwent partial mesh removal and 11/26 patients who had complete mesh removal had evidence of preoperative POP. Graft materials removed: Soft pro (56.3%), Prolift (21.1%), Apogee/Perigee (2.8%), Pinnacle (2.8%), Uphold (1.4%), and IVS Tunneler (1.4%) Indications for mesh removal: mesh extrusion/exposure 56%, vaginal bleeding/discharge 16%, pelvic pain 16%, dyspareunia 12% Inclusion criteria Both referred and internal patients at a tertiary referral centre were included if they were undergoing transvaginal mesh excision for mesh-related complications. Exclusion criteria Patients were excluded if they did not follow up after mesh removal or patients who underwent concomitant mesh excision and mesh		of a pessary for prolapse reduction. Patients with mesh extrusion or erosion generally underwent a partial removal. Patients with chronic pain directly linked to the graft (i.e. mesh contraction) underwent a complete mesh excision which comprised of complete removal of mesh situated underneath the vaginal epithelium. After mesh removal, concomitant native tissue prolapse repair was performed. Mean FU after mesh removal=38.7 weeks		interventions bias: Moderate risk of bias Missing data bias: Moderate risk of bias Measurement of outcomes bias: Serious risk of bias Selection of the reported results bias: Low risk of bias Other information

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	replacement. Women who had preoperative stage II or higher-stage prolapse and patients who underwent midurethral sling excision were excluded from the analysis.				
Full citation Hokenstad, E. D, El-Nashar, S. A, Blandon, R. E, Occhino, J. A, Trabuco, E. C, Gebhart, J. B, Klingele, C. J., Health-related quality of life and outcomes after surgical treatment of complications from vaginally placed mesh, Female Pelvic Medicine & Reconstructive Surgery, 21, 176-80, 2015 Ref Id 884444 Country/ies where the study was carried out USA Study type Retrospective cohort Aim of the study To report health related quality of life outcomes after surgical excision of vaginally placed mesh.	Sample size n=68, (39 = complete mesh excision, 29 = partial mesh excision) 41 completed follow up survey (24 complete excision 17 partial excision) Characteristics Mean age: 56 years (SD 11.8) Mean BMI: 28.8kg/m2 (SD 5.3) Parity 3 (range, 0-7) Initial mesh used included mesh augmentation (n=10) and mesh kits (n=58) Vaginal discharge/bleeding: 35 (51%) Dyspareunia or de novo pain: 56 (82%) Urinary urgency and/or UUI: 21 (31%) Faecal urgency and/or incontinence: 10 (15%)	Interventions Intervention 1: Partial mesh removal Control: Complete mesh removal	Details Removal of entire mesh attempted; for those with mesh kits, this included removal of the arms of the implant. Procedures were carried out by urogynecology-attending physicians. 39/68 women had complete mesh removal (24 of 41 responders to survey), 29/68 had partial mesh removal	Results Data for Partial (n=17) vs. complete (n=24) mesh removal Adverse events: 4 patients required blood transfusions Dyspareunia (in those who attempted intercourse): 11/14; 15/19 Improvement: 7/17; 15/24 ('very much' or 'much' better on PGII) SF-12 mental: 36.61 (8.15); 45.53 (8.92) SF-12 physical: 48.71 (13.81); 47.15 (10.0) PFDI-SF 20: 67.58 (43.43); 95.53 (63.45) [total score composed of scales below] POPDI-6: 28.68 (21.29); 31.60 (24.79) CRADI-8: 22.98 (16.97); 25.91 (21.93) UDI-6: 16.80 (13.40); 38.02 (26.40)	Limitations ROBINS-I assessment Overall serious risk of bias Confounding bias: Serious risk of bias Selection of participant's bias: Serious risk of bias Classification of interventions bias: Serious risk of bias Deviations from intended interventions bias: Moderate risk of bias Missing data bias: Low risk of bias Measurement of outcomes bias: Serious risk of bias

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Study dates 01/2003 to 12/2011 Source of funding Supported by departmental funds	Mesh kits initially inserted: 23 (40%) Prolift, 13 (22%) Avaulta, 8 (14%) IVS, 8 (14%) Perigee, 2 (3%) Pinnacle, 1 (2%) Perigee and Apogee, 2 (3%) Elevate, and 1 (2%) Prosima. Inclusion criteria Women who had surgery at the Mayo Clinic, Rochester for complications related to vaginally placed mesh, used in the treatment of POP. Exclusion criteria Previous sacrocolpopexy using mesh, previous Burch procedure, had an abdominal mesh hernia, or previous placement of midurethral sling for stress UI using mesh (unless performed concomitantly with the placement of vaginal mesh for POP)				Selection of the reported results bias: Low risk of bias Other information
Full citation Jeffery, S.T, Nieuwoudt, A., Beyond the complications: medium-term anatomical, sexual and functional outcomes following removal of trocar-guided	Sample size N=21 had surgery for mesh complication Characteristics Mean age = 61.7 years (SD = 11.9, range 43-84).	Interventions Mesh removal and other interventions (mesh removal, n = 18; vaginal revision, n = 6; anterior Biodesign (Cook medical)	Details Main aim of removal surgery for mesh complications was to release tension on mesh-scar tissue complex in	Results Reports no adverse events Mesh erosion at 6-wk FU: 0/5 Urgency at baseline, and 6-wk:1/21, 2/20 Dyspareunia at baseline, 6-weeks, 6-mo, 12-mo and 24-mo FU: 12/21, 0/20, 1/15, 0/6, 0/3	Limitations ROBINS-I assessment Overall serious risk of bias Confounding bias: Serious risk of bias

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
transvaginal mesh. A retrospective cohort study, International Urogynecology Journal, 23, 1391-1396, 2012 Ref Id 884447 Country/ies where the study was carried out Netherlands Study type Case series Aim of the study To assess the anatomical, sexual and functional outcomes of women undergoing surgical intervention for complications of the trocar-guided transvaginal mesh (TVM) procedure. Study dates Not reported Source of funding Reports no funding received	Mean interval between primary and repeat surgery was 30 months (range 4-57, SD = 15.7). All women included had an anterior trocar-guided transvaginal mesh (TVM) operation. Reasons for referral: Erosion, n=5 Dyspareunia, n=12 Apareunia, n=2 Prolapse, n=9 Pain, n=10 Pain, dyspareunia, or both, n=18 (85%) Inclusion criteria Women who underwent a re-intervention operation following the development of a complication of the TVM procedure. All TVM procedures performed in a district hospital in the Netherlands. Exclusion criteria	TVM graft, n=19; hysterectomy, n=5	order to relieve pain. Additional procedures after mesh removal performed to mitigate risk of recurrence. Follow up at 6 weeks, 6 months, 1 and 2 years.	Apareunia at baseline, 6-wk 6-mo, 12-mo and 24-mo FU: 2/21, 0/20, 0/15, 0/6, 0/3 Sexually active at baseline, 6-wk, 6-mo and 12-mo FU: 14/21, 2/20, 7/15, 4/6 Resolution of dyspareunia at 6-mo: 6/7 Pain at baseline, 6-wk and 6-mo FU: 10/21, 2/20, 1/15 Repeat surgery at ≤12-mo: 3/20 Prolapse symptoms at 6-wk, 6-mo, 12-mo and 24-mo FU: 0/20, 0/15, 0/6, 0/3 Recurrence of POP at 6-wks, 6-mo and 12-mo: 2/20, 4/15, 3/6	Selection of participant's bias: Serious risk of bias Classification of interventions bias: Low risk of bias Deviations from intended interventions bias: Low risk of bias Missing data bias: Serious risk of bias Measurement of outcomes bias: Serious risk of bias Selection of the reported results bias: Low risk of bias Other information
Full citation Lee, D, Dillon, B, Lemack, G, Gomelsky, A, Zimmern, P.,	Sample size N=58	Interventions Vaginal mesh removal	Details The patients underwent maximal excision	Results Repeat surgery (patients who needed repeat surgery after surgery in the current study): 17/58	Limitations ROBINS-I assessment

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Transvaginal mesh kits--how serious are the complications and are they reversible?, Urology, 81, 43-8, 2013 Ref Id 884449 Country/ies where the study was carried out USA Study type Case series Aim of the study To present a review of experiences in the surgical management of complications after TM placement from 2 tertiary referral centres with a specific emphasis on the follow-up data to determine how frequently these complications are “serious” and/or “reversible.” Study dates January 2006 - March 2011 Source of funding Not reported	Characteristics Age, mean (y) = 54.6 (32-80) Reason for surgery: vaginal discharge, n= 12; dyspareunia, n= 42; pelvic pain, n= 26; MUI n=17; UUI n=11; voiding dysfunction n=9/; recurrent UTI n=9; SUI n=5 mesh exposure n=43; fistula n=1; infection n=5. Previous mesh revision surgery: 36% Inclusion criteria Not reported Exclusion criteria Not reported		of mesh material (defined as excision of all synthetic mesh material to the most lateral most extension) and adjunct procedures, depending on the clinical indication and intraoperative findings or complications. mean FU=13 months	Adverse events - bladder injury: 0/58 Resolution of pain: 23/37 Resolution of dyspareunia: 6/11	Overall serious risk of bias Confounding bias: low risk of bias Selection of participant’s bias: low risk of bias Classification of interventions bias: low risk of bias Deviations from intended interventions bias: low risk of bias Missing data bias: low risk of bias Measurement of outcomes bias: serious risk of bias Selection of the reported results bias: low 1risk of bias Other information

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Full citation Marcus-Braun, N, von Theobald, P., Mesh removal following transvaginal mesh placement: a case series of 104 operations, International Urogynecology Journal, 21, 423-30, 2010 Ref Id 884450 Country/ies where the study was carried out France Study type Case series Aim of the study To evaluate intra and post-operative complications and outcomes of mesh removal procedures Study dates 01/2004 to 12/2008 Source of funding Not reported	Sample size N=83 women who transvaginal mesh type 1 removal 104 operations were conducted (17 participants had more than one operation): 28 were recto-vaginal mesh removal 42 were vesico-vaginal mesh removal 37 were sub-urethral sling removal Characteristics Mean age=62 years (range 34-84) Reason for mesh removal Mesh erosion, n=44 Infection, n=30 Granuloma, n=10 Pain, n=9 Incomplete voiding, n=17 Initial mesh surgery: Triple operation for POP with prostheses, n=31; cystocele mesh, n=16; IVS posterior ± rectocele mesh, n= 11; TVT/ retropubic IVS, n=13; TOT/TVT-O 21; laparoscopic Burch operation with mesh, n=1; Uretex, n=1; Pelvicol, n=1;	Interventions Various interventions (partial or complete mesh removal, sling resection, laparoscopy)	Details Number of operations: Partial mesh removal, n=14; complete mesh removal, n=61; sling resection, n=15; laparoscopy, n=5; other, n=9	Results Adverse events - bladder injury: 1/83 Complications: 10/83 (including 3 with fever) Repeat surgery for SUI or POP 17/83 (SUI, 10/83; POP 7/83) Recurrent SUI or POP: 22/83 (SUI, 14/83 ; POP, 8/83)	Limitations ROBINS-I assessment Overall serious risk of bias Confounding bias: Serious risk of bias Selection of participant's bias: Serious risk of bias Classification of interventions bias: Low risk of bias Deviations from intended interventions bias: Low risk of bias Missing data bias: Low risk of bias Measurement of outcomes bias: Serious risk of bias Selection of the reported results bias: Low risk of bias Other information

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	Concomitant vaginal hysterectomy, n=6 Inclusion criteria All patients who had surgical mesh removal at the University Hospital of Caen Exclusion criteria				
Full citation Misrai,V, Roupret,M, Xylinas,E, Cour,F, Vaessen,C, Haertig,A, Richard,F, Chartier-Kastler,E., Surgical resection for suburethral sling complications after treatment for stress urinary incontinence, Journal of Urology, 181, 2198-2202, 2009 Ref Id 884435 Country/ies where the study was carried out France Study type Case series Aim of the study To review data on all women referred to our institution between 2001 and 2007 for suburethral	Sample size N=75 Characteristics Age (y) = 60.7 (28-78) BMI, median = 27 (23-31) Reasons for surgery: mesh erosion, n=24; BOO, n=29; chronic pelvic pain, n=12; de novo urgency, n=9. Inclusion criteria All women referred between 2001 and 2007 to the department for suburethral tape related complications. Exclusion criteria Not reported.	Interventions Complete or partial mesh removal.	Details Which procedure was undertaken was decided on a case-by-case basis	Results Incontinence (partial removal): 18/27 Incontinence (complete removal): 21/31 SUI: 18/75 UUI: 10/75	Limitations ROBINS-I assessment lots of different categories of patients, confusing table, make sure numbers add-up Overall serious risk of bias Confounding bias: low risk of bias Selection of participant's bias: low risk of bias Classification of interventions bias: low risk of bias Deviations from intended interventions bias: risk of bias

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
tape related complications and on those who had the tape surgically removed. Study dates 2001 - 2007 Source of funding Not reported					Missing data bias: low risk of bias Measurement of outcomes bias: serious risk of bias Selection of the reported results bias: low risk of bias Other information
Full citation Parden, A. M, Tang, Y, Szychowski, J, Richter, H. E., Characterization of Lower Urinary Tract Symptoms Before and After Midurethral Sling Revision, Journal of Minimally Invasive Gynecology, 23, 979-985, 2016 Ref Id 884451 Country/ies where the study was carried out USA Study type Case series Aim of the study	Sample size N=69 Characteristics Age, mean (y) = 54.0 (11.4) Reason for surgery: Vaginal erosion, n=28; leg, groin, pelvic, vaginal pain, n=27; dyspareunia, n=23; recurrent urinary tract infections, n=9; voiding dysfunction, n=20; UI, n=9. Inclusion criteria Exclusion criteria	Interventions Partial or complete mesh excision.	Details Complete excision was defined as total resection of the MUS from pubic ramus to pubic ramus. Partial excision was any surgery that did not completely remove the suburethral portion of the MUS.	Results FU, mean (months, SD): 22.2 (14.0) Pain resolution: 25/69 Dyspareunia: 31/69 Number of patients who are satisfied: 44/64 PGI-I urinary score (satisfied patients): 3.0 (1.6) PGI-I urinary score (not satisfied patients): 5.0 (1.3) PGI-I vaginal score (satisfied patients): 2.6 (1.1) PGI-I vaginal score (not satisfied patients): 5.0 (1.4) Urine leakage before surgery (satisfied patients): 32/44 Urine leakage after surgery (satisfied patients): 34/44 Urine leakage before surgery (not satisfied patients): 13/20	Limitations ROBINS-I assessment Overall serious risk of bias Confounding bias: low risk of bias Selection of participant's bias: low risk of bias Classification of interventions bias: low risk of bias Deviations from intended interventions bias: serious risk of bias

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
To characterize outcomes in women undergoing surgical revision of a midurethral sling and characterize factors associated with satisfaction of revision. Study dates January 2010 - December 2013 Source of funding Not reported				Urine leakage after surgery (not satisfied patients): 19/20 Satisfaction (older vs. younger patients, higher number favours younger; adjusted OR): 0.95 (95% CI 0.90-0.99)	Missing data bias: low risk of bias Measurement of outcomes bias: serious risk of bias Selection of the reported results bias: low risk of bias Other information
Full citation Pickett, S. D, Barenberg, B, Quiroz, L. H, Shobeiri, S. A, O'Leary, D. E., The significant morbidity of removing pelvic mesh from multiple vaginal compartments, Obstetrics and Gynecology, 125, 1418-1422, 2015 Ref Id 884452 Country/ies where the study was carried out USA Study type Case series	Sample size N=374 Characteristics Age, mean (y) = 55.2 (11.8) BMI, mean = 29.1 (6.8) Parity, median = 2 (IQR 0 - 3) Reason for surgery: exposure, n=210; dyspareunia, n=223; pain other than dyspareunia, n=247; voiding dysfunction, n=154 Inclusion criteria Women who had single compartment or multi compartment mesh removal	Interventions Mesh removal	Details For this study, we define “vaginal compartment” as periurethral (meaning the vaginal space exposed for complete removal of a midurethral sling), anterior, posterior (meaning the anterior or posterior dissection exposed to remove anterior or posteriorly place), and apical.	Results Mean FU, months: 7.58 (9.4) Transfusion (single compartment): 3/326 Transfusion (multiple compartment): 4/48 Adverse events Bladder injury (single compartment): 5/326 Bladder injury (multiple compartment): 1/48 Urethra injury (single compartment): 1/326 Urethra injury (multiple compartment): 0/48 Rectum injury (single compartment): 1/326 Rectum injury (multiple compartment): 1/48	Limitations ROBINS-I assessment Overall serious risk of bias Confounding bias: low risk of bias Selection of participant’s bias: low risk of bias Classification of interventions bias: low risk of bias Deviations from intended interventions bias: moderate risk of bias

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Aim of the study To investigate perioperative complications of mesh removal performed in the operating room from a single-site, tertiary care centre with a large volume of referrals for mesh removal and to compare the morbidity associated with single-compartment mesh removal compared with removal from multiple vaginal compartments. Study dates 1st January 2008 - 30th April 2014 Source of funding Not reported	Exclusion criteria Not reported				Missing data bias: low risk of bias Measurement of outcomes bias: serious risk of bias Selection of the reported results bias: low risk of bias Other information
Full citation Rac, G, Greiman, A, Rabley, A, Tipton, T. J, Chiles, L. R, Freilich, D. A, Rames, R, Cox, L, Koski, M, Rovner, E. S., Analysis of Complications of Pelvic Mesh Excision Surgery Using the Clavien-Dindo Classification System,	Sample size N=277 Characteristics Age, mean (y) = 57.2 (12.0) BMI, mean = 29.5 (6.4) Reason for surgery: bladder outlet obstruction/urinary retention, n=153; vaginal extrusion, n=92; lower urinary tract symptoms: 44;	Interventions Partial or complete mesh removal	Details	Results FU, mean (months, SD): 14.1 (14.8) Urinary and minor complications not requiring surgical intervention (grouped: de novo SUI, persistent SUI, urinary retention, haematoma): 40/277 Infections (yeast and UTI): 37/277 Repeat surgery: 38/277 Complications (grouped)	Limitations ROBINS-I assessment Overall serious risk of bias Confounding bias: low risk of bias Selection of participant's bias: low risk of bias

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Journal of Urology, 19, 19, 2017 Ref Id 884453 Country/ies where the study was carried out USA Study type Case series Aim of the study To describe and categorize complications using the Clavien-Dindo classification system in patients who underwent vaginal mesh excision surgery. Study dates 2007 - 2015 Source of funding Not reported	erosion into bladder or urethra, n=42. Inclusion criteria Exclusion criteria			Mesh initially placed for combined SUI and POP: 32/53 Mesh initially placed for combined SUI alone: 80/189 Mesh initially placed for combined POP alone: 19/35	Classification of interventions bias: low risk of bias Deviations from intended interventions bias: low risk of bias Missing data bias: low risk of bias Measurement of outcomes bias: serious risk of bias Selection of the reported results bias: low risk of bias Other information
Full citation Ramart, P, Ackerman, A. L, Cohen, S. A, Kim, J. H, Raz, S., The Risk of Recurrent Urinary Incontinence Requiring Surgery After Suburethral Sling Removal for Mesh	Sample size N=117 Characteristics Whole sample data below (combined retropubic and transobturator group data) Age: 56.34 (10.7)	Interventions Mesh division, partial or complete mesh removal.	Details Study compares outcomes for removal of retropubic to transobturator synthetic slings.	Results FU (months): > 3 Repeat surgery: 43/117	Limitations ROBINS-I assessment Overall serious risk of bias Confounding bias: low risk of bias

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Complications, Urology, 106, 203-209, 2017 Ref Id 884454 Country/ies where the study was carried out USA Study type Retrospective cohort Aim of the study To examine the risk of recurrent stress urinary incontinence (SUI) within 1 year after suburethral sling mesh removal or excision. Study dates January 2000 - December 2013 Source of funding One author received funding from Pfizer.	BMI: 28.4 (5.5) kg/m2 Reasons for referral Irritation 72% Urge incontinence 33% Bladder outlet obstruction 56% Urinary retention 14% UTI 38% Dyspareunia 47% Hispareunia 7% Suprapubic pain 22% Pelvic pain 32% Groin pain 22% Leg pain 17% Vagina mesh exposure 31% Urinary tract mesh exposure 8% Inclusion criteria None of these patients had concurrent or subsequent placement of a synthetic graft for prolapse or additional anti-incontinence procedures at the time of implantation. Exclusion criteria Women with a diagnosed vesicovaginal fistula or who had undergone prior pelvic radiation or vaginal mesh revision or excision.				Selection of participant's bias: low risk of bias Classification of interventions bias: low risk of bias Deviations from intended interventions bias: low risk of bias Missing data bias: low risk of bias Measurement of outcomes bias: serious risk of bias Selection of the reported results bias: low risk of bias Other information

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	Women complaining of SUI. Concurrent anti-incontinence procedure at the time of mesh removal.				
Full citation Renezeder,K, Skala,C.E, Albrich,S, Koelbl,H, Naumann,G., Complications following the use of alloplastic materials in urogynecological surgery, European Journal of Obstetrics, Gynecology, and Reproductive Biology, 158, 354-357, 2011 Ref Id 884455 Country/ies where the study was carried out Germany Study type Case series Aim of the study To evaluate symptoms after a mesh revision procedure Study dates 01/2005 to 12/2008 Source of funding	Sample size N=118 Characteristics Mean age: 59years (range 34-85) Previous slingplasty: 91 Previous mesh POP surgery: 25 Previous slingplasty and mesh POP surgery: 2 Mesh type included TVT=72, TOT-Obtape=11, Monarc TOT=2, MiniArc=3 and various other brands. Prior mesh complications surgery: 42 (35.6%) Reasons for referral/mesh complication surgery De novo urgency, n=55 (46.6%) Pain (including dyspareunia), n=49 (41.5%) Recurrent UTI and post-void residual urine>100 cm3, n=46 (39%) Recurrent vaginal bleeding, n=11 (9.3%) Mesh erosion, n=44 (37.3%)	Interventions Various interventions (mesh removal, patch covering etc.)	Details Partial removal, n=77; complete removal via laparotomy, n=15; Tissue patch covering, n=21; bone stabilisation, n=1; Excision of granulation tissue, n=4	Results De novo urgency at baseline and 8-wk FU: 55/118, 25/40 Pain (inc. dyspareunia) at baseline and 8-wk FU: 49/118, 9/40 Recurrent UTI/post-void urine at baseline and 8-wk FU: 46/118, 3/40 Vaginal bleeding at baseline and 8-wk FU: 11/118, 2/40 Mesh erosion at baseline and 8-wk FU: 44/118, 1/40 Infection at baseline and 8-wk FU: 19/118, 0/40 Fistula at baseline and 8-wk FU: 2/118, 0/40 Recurrence of POP at 8-wk FU: 0/40	Limitations ROBINS-I assessment Overall serious risk of bias Confounding bias: Serious risk of bias Selection of participant's bias: Serious risk of bias Classification of interventions bias: Low risk of bias Deviations from intended interventions bias: Low risk of bias Missing data bias: Low risk of bias Measurement of outcomes bias: Serious risk of bias Selection of the reported results

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Not reported	Other infection (local to large abscess): 19 (16.1%) Vesico-vaginal fistula, n=2 (1.7%) 71.4% women had both pain and either mesh erosion or infection symptoms. Inclusion criteria Women referred for surgery of mesh complications following pelvic surgery with vaginally-inserted alloplastic materials, including pain, urgency, vaginal bleeding, infections, mesh erosion and vesico-vaginal fistulas Exclusion criteria				bias: Serious risk of bias Other information
Full citation Shaw, J, Wohlrab, K, Rardin, C., Recurrence of stress urinary incontinence after midurethral sling revision: A retrospective cohort study, Female Pelvic Medicine and Reconstructive Surgery, 23, 184-187, 2017 Ref Id 884456 Country/ies where the study was carried out	Sample size N=102 patients underwent revision of midurethral sling. Mesh revision (division of sling), n=45; Partial or complete mesh removal, n=57 Characteristics Mean age = 53 years Mean BMI = 29.31kgm2 Mean Parity = 2 Primary indication for revision included voiding	Interventions Mesh revision, partial or complete mesh removal	Details Revision was carried out under general or regional anaesthesia according to the surgeon's discretion. Division consisted of separation of sling from the urethra enough to permit transection in the midline or lateral urethra; excision consisted of partial	Results Data for sling division vs. sling excision Recurrent SUI: 6//34; 32/48 Repeat surgery for recurrent SUI: 2/45; 16/57	Limitations ROBINS-I assessment Overall serious risk of bias Confounding bias: Serious risk of bias Selection of participant's bias: Serious risk of bias Classification of interventions

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
USA Study type Retrospective cohort Aim of the study To determine the relative risk of reoperation for stress urinary incontinence recurrence after midurethral sling division or excision Study dates 10/2004 to 10/2014 Source of funding Not reported	dysfunction (n=50), mesh erosion/exposure/infection (n=43) and pain (n=9) Concomitant surgery during initial mesh surgery: hysterectomy/pelvic reconstruction, n=55; Sling only, n=43; Unknown, n=4 Inclusion criteria Women who had undergone surgical revision of a midurethral sling by the Division of Urogynecology at the Women & Infants' Hospital. Patients identified by the Current Procedural Terminology code for removal/revision of the sling (57287) Exclusion criteria Revision of non-Type 1 mesh		or complete removal of sling. Mean FU division group=30 (range 24-36) months; mean FU of excision group=13 (range 1.5-48) months.		bias: Serious risk of bias Deviations from intended interventions bias: Moderate risk of bias Missing data bias: Low risk of bias Measurement of outcomes bias: Serious risk of bias Selection of the reported results bias: Low risk of bias Other information
Full citation Skala, C. E, Renezeder, K, Albrich, S, Puhl, A, Laterza, R. M, Naumann, G, Koelbl, H., Mesh complications following prolapse surgery: Management and outcome, European Journal of Obstetrics Gynecology and	Sample size n = 54 patients with surgical revision n = 9 underwent partial excision of the mesh and covering of the tissue patch, in order to resolve small erosions.	Interventions Surgical revision and/or partial or complete mesh removal	Details Mean time between mesh implantation and post mesh surgery was 27.2 months (range 2 to 120 days). Partial mesh excision and vaginal edges trimmed where	Results Resolution of all symptoms 25/47 at 3 months no longer experienced any complaints. Resolution of pain 18/27 Resolution of erosion 25/30 Resolution of dyspareunia 5/9 Resolution of urgency 7/11; resolution of other urinary symptoms 4/6	Limitations ROBINS-I assessment Overall serious risk of bias Confounding bias: Serious risk of bias Selection of participant's bias:

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Reproductive Biology, 159, 453-456, 2011 Ref Id 884457 Country/ies where the study was carried out Germany Study type Case series Aim of the study To describe the complications, management and outcomes associated with the use of alloplastic materials (transvaginal mesh kits) for prolapse surgery Study dates 02/2006 to 11/2010 Source of funding Reports that no financial support received	Characteristics Average age 59.4 (range 33-82 years) Reasons for admission (majority of patients had >1 complaint): Mesh erosion (all over 1cm), n=30 Vaginal and pelvic pain since mesh placement, n=36 (provoked, spontaneous or during physical activity, n=27; dyspareunia, n=9) Vaginal discharge, n=26 Vaginal bleeding, n=8 Infection (all local), n=18 Urgency, n=11 High post void residual volume/obstruction, n=6 Constipation and dyschezia, n=7 Recurrent prolapse, n=4 Mesh kits used: Apogee (n = 1), Perigee (AMS Minnetonka, MN, USA); n = 10), Avaulta (n = 1), Pelvicol (Bard, Covington, CA; n = 1), Prolift (n = 10), Vipro (Ethicon, Inc, Sommerville, NJ, USA; n = 1), Seratom (Serag Wiessner KG, Naila, Germany; n = 9), posterior IVS (IVS Tunneller; Tyco Healthcare, Norwalk, CT; n		erosion and excessive granulation tissue formation occurred. Vaginal revision with significant revision was performed in cases of extensive erosion or several areas of erosion, infection and vaginal pain. An extensive excision of the mesh was performed via laparotomy in cases of persistent erosion on the vaginal apex and of pelvic pain. Follow up occurred 3-mo after mesh complication surgery.	Recurrent POP 2/48	Serious risk of bias Classification of interventions bias: Low risk of bias Deviations from intended interventions bias: Low risk of bias Missing data bias: Low risk of bias Measurement of outcomes bias: Serious risk of bias Selection of the reported results bias: Low risk of bias Other information

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	= 3), unnamed polypropylene meshes and unknown meshes (n = 16). 11 patients had already had mesh revision surgery. n = 9/54 underwent a partial excision of the mesh and covering of the tissue patch to resolve small erosions. n = 49/54 cases a vaginal revision with partial mesh removal was performed. n = 10/54 patients, a laparotomy was used to remove the alloplastic material as far as possible. n = 11/54 underwent a second revision due to persistent complaints. n = 5/11 underwent a laparotomy n = 4/ 11 underwent vaginal revision with partial mesh removal n = 9/11 underwent an extensive vaginal revision Inclusion criteria Women presenting with mesh complications associated with transvaginal mesh kits to urogynaecological referral unit at Mainz University				

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	Hospital from Feb 2006 to Nov 2010. Exclusion criteria				
Full citation Warembourg, S, Labaki, M, de Tayrac, R, Costa, P, Fatton, B., Reoperations for mesh-related complications after pelvic organ prolapse repair: 8-year experience at a tertiary referral center, International Urogynecology Journal, Jan-13, 2017 Ref Id 884458 Country/ies where the study was carried out France Study type Case series Aim of the study To report the rate and type of reoperation for mesh-related complications after pelvic organ prolapse surgery in an urogynecological referral	Sample size N=67 Characteristics Age, mean (y) = 61.8 (35-84) BMI = 25.1 (14.2-44.4) Reasons for surgery: vaginal exposure, n=33; symptomatic mesh contraction, n=14; pelvic abscess, n=8; bladder extrusion, n=4; medically refractory neuropathic pain, n=3; fistula, n=4; uretral kinking, n=2; rectal extrusion, n=1. Inclusion criteria All patients were informed about the study by letter, including an opt-out form to return to us if they did not wish to participate. Not returning the opt-out form was therefore equivalent to agreeing to inclusion in the study. Exclusion criteria	Interventions Complete or partial excision.	Details If symptoms were associated with a well-circumscribed portion of the transvaginal or sacrocolpopexy mesh, the first-line treatment was partial mesh excision via the vaginal route where possible. Total mesh excision was carried out if partial excision failed and for larger exposures, severe symptoms, or abscesses. If transvaginal mesh excision was impossible or for rectopexy-related complications or abscesses involving a SCP mesh, an abdominal, preferably laparoscopic,	Results FU, mean (months): 41 (95% CI 34.4-47.7) resolution of all symptoms 53/67 Patient reported improvement (improvement): 8/67 Repeat surgery: 11/67 Repeat surgery>=2 reoperations: 3/11	Limitations ROBINS-I assessment Overall serious risk of bias Confounding bias: low risk of bias Selection of participant's bias: low risk of bias Classification of interventions bias: low risk of bias Deviations from intended interventions bias: low risk of bias Missing data bias: low risk of bias Measurement of outcomes bias: serious risk of bias Selection of the reported results bias: low risk of bias

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
center over a period of 8 years. Study dates September 2006 - September 2014 Source of funding	Reoperations for prolapse recurrence or de novo stress urinary incontinence. Reoperations for early complications attributable to the procedure (hematoma, urinary tract injury, gastrointestinal injury, early occlusion) were excluded.		approach was used. Fistulae were treated by complete removal of the mesh together with fistula repair. Concomitant procedures were performed for some patients during surgery for mesh-related complications including native tissue prolapse repair or transection or removal of a suburethral sling (SUS). The outcome "Repeat surgery" is the first surgery after the primary mesh insertion procedure. "Repeat surgery+1" is the second surgery after the primary mesh insertion procedure.		Other information

Clinical evidence tables for evidence review: What are the most effective management options for bowel symptoms after mesh surgery?

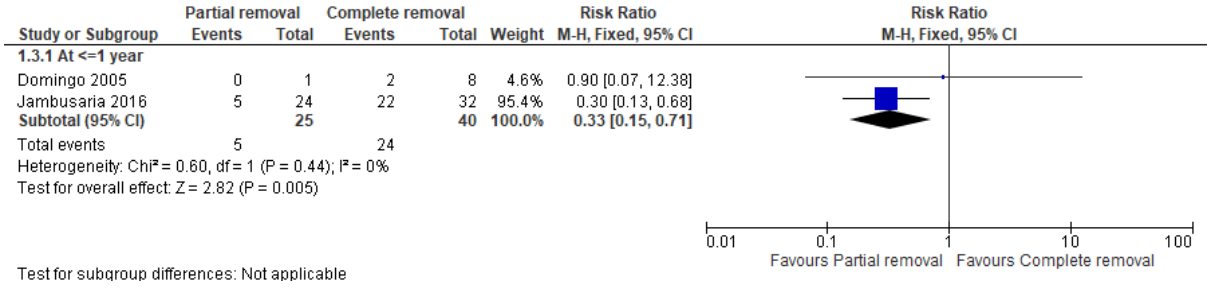
There were no studies identified for this review, therefore there are no evidence tables for this review question.

Appendix E – Forest plots

Forest plots for review question: What are the most effective management options for vaginal complications (including exposure, extrusion, erosion and infection) after mesh surgery?

Partial mesh removal versus complete mesh removal

Figure 7: Recurrent SUI at 12-mo follow up



Forest plots for review question: what are the most effective management options for sexual dysfunction and/or pain complications after mesh or mesh sling surgery?

It was not possible to conduct meta-analysis as no comparative studies were identified for this review question. Therefore no forest plots are included in this appendix.

Forest plots for review question: what are the most effective management options for urinary complications after mesh or mesh sling surgery

It was not possible to conduct meta-analysis as no comparative studies were identified for this review question. Therefore no forest plots are included in this appendix.

Forest plots for review question: What are the most effective management options for bowel complications after mesh or mesh sling surgery

No comparative studies were identified for this review question. Therefore no forest plots are included in this appendix.

General management of mesh complications after mesh or mesh sling surgery

It was not possible to conduct meta-analysis as only 1 comparative cohort study was identified for this review. Therefore no forest plots are included in this appendix.

Appendix F – GRADE tables

Full GRADE tables for the comparisons examined appear below.

Note that the GRADE tables for the review questions on the management of sexual dysfunction and the management of pain are combined as the relevant studies did not allow a delineation of outcomes for each mesh complication.

Full GRADE tables for the comparisons examined in the section on the general management of mesh complications, for which there is no protocol, are also available

GRADE tables for review question: What are the most effective management options for vaginal complications after mesh surgery?

Table 29: Evidence profile for partial mesh sling removal versus complete mesh sling removal in women with vaginal complications

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Partial mesh removal	Complete mesh removal	Relative (95% CI)	Absolute		
Pain - At mean 5.9 weeks FU (follow-up mean 5.9 weeks)												
1	observational studies	serious[1]	no serious inconsistency	no serious indirectness	very serious[2]	none	3/36 (8.3%)	12/58 (20.7%)	RR 0.4 (0.12 to 1.33)	124 fewer per 1000 (from 182 fewer to 68 more)	⊕OOO VERY LOW	IMPORTANT
Pain - At mean 28.6 weeks FU (follow-up mean 28.6 weeks)												
1	observational studies	serious[1]	no serious inconsistency	no serious indirectness	very serious[2]	none	3/24 (12.5%)	11/32 (34.4%)	RR 0.36 (0.11 to 1.16)	220 fewer per 1000 (from 306 fewer to 55 more)	⊕OOO VERY LOW	IMPORTANT
De novo urgency - At mean 5.9 weeks FU (follow-up mean 5.9 weeks)												
1	observational studies	serious[1]	no serious inconsistency	no serious indirectness	very serious[2]	none	6/36 (16.7%)	12/58 (20.7%)	RR 0.81 (0.33 to 1.96)	39 fewer per 1000 (from 139 fewer to 199 more)	⊕OOO VERY LOW	IMPORTANT

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Partial mesh removal	Complete mesh removal	Relative (95% CI)	Absolute		
De novo urgency - At mean 28.6 weeks FU (follow-up mean 28.6 weeks)												
1	observational studies	serious[1]	no serious inconsistency	no serious indirectness	very serious[2]	none	7/24 (29.2%)	12/32 (37.5%)	RR 0.78 (0.36 to 1.68)	83 fewer per 1000 (from 240 fewer to 255 more)	⊕OOO VERY LOW	IMPORTANT
Recurrent SUI - At <=1 year (follow-up 1 years)												
2	observational studies	serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	5/25 (20%)	24/40 (60%)	RR 0.33 (0.15 to 0.71)	402 fewer per 1000 (from 174 fewer to 510 fewer)	⊕OOO VERY LOW	IMPORTANT
Repeat surgery - At mean 28.6 weeks FU (follow-up mean 28.6 weeks)												
1	observational studies	serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	2/24 (8.3%)	14/32 (43.8%)	RR 0.19 (0.05 to 0.76)	354 fewer per 1000 (from 105 fewer to 416 fewer)	⊕OOO VERY LOW	IMPORTANT

1 Overall serious risk of bias (serious risk of bias regarding confounding, selection of participants, classification of interventions, and measurement of outcomes).
2 95% CI crosses 2 default MIDs for dichotomous outcomes (0.8 and 1.25).

GRADE tables for review question: What are the most effective management options for sexual dysfunction after mesh surgery? And GRADE tables for review question: What are the most effective management options for pain after mesh surgery?

Table 30: Clinical evidence profile for partial mesh sling removal versus complete mesh sling removal in women with sexual dysfunction and/or pain complications

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Partial mesh removal	Complete mesh removal	Relative (95% CI)	Absolute		
Repeat SUI surgery - At mean 29 weeks FU (follow-up mean 29 weeks)												
1	observational studies	serious[1]	no serious inconsistency	no serious indirectness	very serious[2]	none	29/78 (37.2%)	2/14 (14.3%)	RR 2.6 (0.7 to 9.7)	229 more per 1000 (from 43 fewer to 1000 more)	⊕OOO VERY LOW	IMPORTANT
Postoperative Pain - At mean 6.4 weeks FU (follow-up mean 6.4 weeks)												
1	observational studies	serious[1]	no serious inconsistency	no serious indirectness	very serious[2]	none	6/25 (24%)	35/126 (27.8%)	RR 0.86 (0.41 to 1.83)	39 fewer per 1000 (from 164 fewer to 231 more)	⊕OOO VERY LOW	IMPORTANT
Postoperative Pain - At mean 29 weeks FU (follow-up mean 29 weeks)												
1	observational studies	serious[1]	no serious inconsistency	no serious indirectness	very serious[2]	none	3/14 (21.4%)	30/78 (38.5%)	RR 0.56 (0.2 to 1.58)	169 fewer per 1000 (from 308 fewer to 223 more)	⊕OOO VERY LOW	IMPORTANT
Postoperative SUI - At mean 6.4 weeks FU (follow-up mean 6.4 weeks)												
1	observational studies	serious[1]	no serious inconsistency	no serious indirectness	[3]	none	8/25 (32%)	62/126 (49.2%)	RR 0.65 (0.36 to 1.18)	172 fewer per 1000 (from 315 fewer to 89 more)	⊕OOO VERY LOW	IMPORTANT
Postoperative SUI - At 29 weeks FU (follow-up mean 29 weeks)												
1	observational studies	serious[1]	no serious inconsistency	no serious indirectness	serious[3]	none	4/14 (28.6%)	51/78 (65.4%)	RR 0.44 (0.19 to 1.02)	366 fewer per 1000 (from 530 fewer to 13 more)	⊕OOO VERY LOW	IMPORTANT
Postoperative urge incontinence - At mean 6.4 weeks FU (follow-up mean 6.4 weeks)												

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Partial mesh removal	Complete mesh removal	Relative (95% CI)	Absolute		
1	observational studies	serious[1]	no serious inconsistency	no serious indirectness	serious[3]	none	5/25 (20%)	49/126 (38.9%)	RR 0.51 (0.23 to 1.16)	191 fewer per 1000 (from 299 fewer to 62 more)	⊕OOO VERY LOW	IMPORTANT
Postoperative urge incontinence - At mean 29 weeks FU (follow-up mean 29 weeks)												
1	observational studies	serious[1]	no serious inconsistency	no serious indirectness	very serious[2]	none	4/14 (28.6%)	32/78 (41%)	RR 0.7 (0.29 to 1.66)	123 fewer per 1000 (from 291 fewer to 271 more)	⊕OOO VERY LOW	IMPORTANT

1 Overall serious risk of bias (serious risk of bias regarding confounding, selection of participants, classification of interventions, and measurement of outcomes).
2 95% CI crosses 2 default MIDs for dichotomous outcomes (0.8 and 1.25).
3 95% CI crosses 1 default MID for dichotomous outcomes (0.8 or 1.25).

Table 31: Clinical evidence profile for mesh removal versus mesh sling removal in women with sexual dysfunction and/or pain complications

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Mesh removal	Mesh sling removal	Relative (95% CI)	Absolute		
Resolution of pain complications (follow-up mean 3 years; assessed with: Visual analogue scale score of 0)												
1	observational studies	serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	46/69 (66.7%)	44/54 (81.5%)	RR 0.82 (0.66 to 1.01)	147 fewer per 1000 (from 277 fewer to 8 more)	⊕OOO VERY LOW	IMPORTANT
Persistent pelvic pain (follow-up mean 3 years; assessed with: No change on visual analogue scale)												

1	observational studies	serious[1]	no serious inconsistency	no serious indirectness	serious[2]	none	11/69 (15.9%)	3/54 (5.6%)	RR 2.87 (0.84 to 9.78)	104 more per 1000 (from 9 fewer to 488 more)	⊕OOO VERY LOW	IMPORTANT

1 Overall serious risk of bias (serious risk of bias regarding confounding, and measurement of outcomes).
2 95% CI crosses 1 default MID for dichotomous outcomes (0.8 or 1.25).

GRADE tables for review question: What are the most effective management options for urinary complications after mesh surgery?

No studies were identified which were applicable to this review question.

GRADE tables for review question: What are the most effective management options for bowel symptoms after mesh surgery?

No studies were identified which were applicable to this review question.

GRADE tables for general management of mesh complications after mesh or mesh sling surgery

Table 32: Clinical evidence profile for partial mesh removal versus complete mesh removal in women with mesh complications

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Partial mesh removal	Complete mesh removal	Relative (95% CI)	Absolute		
Improvement (follow-up 4-14 years)												
1	observational studies	serious[1]	no serious inconsistency	no serious indirectness	very serious[2]	none	7/17 (41.2%)	15/24 (62.5%)	RR 0.66 (0.34 to 1.26)	212 fewer per 1000 (from 412 fewer to 162 more)	⊕OOO VERY LOW	IMPORTANT
SF-12 - Mental component (follow-up 4-14 years; measured with: Medical Outcomes Study Short Form Survey Instrument; Better indicated by higher values)												
1	observational studies	serious[1]	no serious inconsistency	no serious indirectness	serious[3,4]	none	17	24	-	MD 8.92 lower (14.19 to 3.65 lower)	⊕OOO VERY LOW	IMPORTANT

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Partial mesh removal	Complete mesh removal	Relative (95% CI)	Absolute		
SF-12 - Physical component (follow-up 4-14 years; measured with: Medical Outcomes Study Short Form Survey Instrument; Better indicated by higher values)												
1	observational studies	serious[1]	no serious inconsistency	no serious indirectness	very serious[4,5]	none	17	24	-	MD 0.56 higher (7.13 lower to 8.25 higher)	⊕OOO VERY LOW	IMPORTANT
PFDI-SF 20 (follow-up 4-14 years; measured with: Pelvic Floor Distress Inventory Short Form; Better indicated by lower values)												
1	observational studies	serious[1]	no serious inconsistency	no serious indirectness	serious[3,4]	none	17	24	-	MD 27.95 lower (60.67 lower to 4.77 higher)	⊕OOO VERY LOW	IMPORTANT
Dyspareunia (follow-up 4-14 years)												
1	observational studies	serious[1]	no serious inconsistency	no serious indirectness	very serious[2]	none	11/14 (78.6%)	15/19 (78.9%)	RR 1 (0.7 to 1.42)	0 fewer per 1000 (from 237 fewer to 332 more)	⊕OOO VERY LOW	IMPORTANT

1 Overall serious risk of bias (serious risk regarding confounding, selection of participants, classifications of interventions, and measurement of outcomes; moderate risk of bias regarding deviations from intended interventions).
2 95% CI crosses 2 default MIDs for dichotomous outcomes (0.8 and 1.25).
3 95% CI crosses 1 MID for this outcome.
4 MIDs, calculated as 0.5 times the SD of the complete removal group at baseline, for the following outcomes are: +/- 4.89 for SF-12 mental component; +/- 5.05 for SF-12 physical component; +/- 31.73 for PFDI-SF 20.
5 95% CI crosses 2 MIDs for this outcome.

Table 33: Clinical evidence profile for mesh division versus mesh removal in women with mesh complications

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Mesh division	Mesh removal	Relative (95% CI)	Absolute		
SUI recurrence (follow-up 1.5-48 months)												

1	observational studies	serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	6/45 (13.3%)	32/57 (56.1%)	RR 0.24 (0.11 to 0.52)	427 fewer per 1000 (from 269 fewer to 500 fewer)	⊕OOO VERY LOW	IMPORTANT
Repeat SUI surgery (follow-up 1.5-48 months)												
1	observational studies	serious[1]	no serious inconsistency	no serious indirectness	no serious imprecision	none	2/45 (4.4%)	16/57 (28.1%)	RR 0.16 (0.04 to 0.65)	236 fewer per 1000 (from 98 fewer to 269 fewer)	⊕OOO VERY LOW	IMPORTANT

1 Overall serious risk of bias (serious risk of bias regarding confounding, selection of participants, classification of interventions, and measurement of outcomes; moderate risk of bias regarding deviations from intended interventions).

Table 34: Clinical evidence profile for transobturator mesh sling removal versus retropubic mesh sling removal in women with mesh complications

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	**Design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**General - Transobturator**	**Retropubic mesh removal**	**Relative (95% CI)**	**Absolute**		
Repeat SUI surgery (follow-up 3 months)												
1	observational studies	serious[1]	no serious inconsistency	no serious indirectness	very serious[2]	none	16/47 (34%)	27/70 (38.6%)	RR 0.88 (0.54 to 1.45)	46 fewer per 1000 (from 177 fewer to 174 more)	⊕OOO VERY LOW	IMPORTANT

1 Overall serious of bias (serious risk of bias regarding confounding, classification of interventions, deviations from intended interventions, and measurement of outcomes).
2 95% CI crosses 2 default MIDs for dichotomous outcomes (0.8 and 1.25).

Appendix G – Economic evidence study selection

Economic evidence study selection for review question: What are the most effective management options for vaginal complications (including exposure, extrusion, erosion and infection) after mesh surgery?

One global search was conducted for this review question. See supplementary material D for further information.

Economic evidence study selection for review question: What are the most effective management options for sexual dysfunction after mesh surgery?

One global search was conducted for this review question. See supplementary material D for further information.

Economic evidence study selection for review question: What are the most effective management options for pain after mesh surgery?

One global search was conducted for this review question. See supplementary material D for further information.

Economic evidence study selection for review question: What are the most effective management options for urinary complications after mesh surgery?

One global search was conducted for this review question. See supplementary material D for further information.

Economic evidence study selection for review question: What are the most effective management options for bowel symptoms after mesh surgery?

One global search was conducted for this review question. See supplementary material D for further information.

Appendix H – Economic evidence tables

Economic evidence tables for review question: What are the most effective management options for vaginal complications (including exposure, extrusion, erosion and infection) after mesh surgery?

No economic evidence was identified which was applicable to this review question.

Economic evidence tables for review question: What are the most effective management options for sexual dysfunction after mesh surgery?

No economic evidence was identified which was applicable to this review question.

Economic evidence tables for review question: What are the most effective management options for pain after mesh surgery?

No economic evidence was identified which was applicable to this review question.

Economic evidence tables for review question: What are the most effective management options for urinary complications after mesh surgery?

No economic evidence was identified which was applicable to this review question.

Economic evidence tables for review question: What are the most effective management options for bowel symptoms after mesh surgery?

No economic evidence was identified which was applicable to this review question.

Appendix I – Economic evidence profiles

Economic evidence profiles for review question: What are the most effective management options for vaginal complications (including exposure, extrusion, erosion and infection) after mesh surgery?

No economic evidence was identified which was applicable to this review question.

Economic evidence profiles for review question: What are the most effective management options for sexual dysfunction after mesh surgery?

No economic evidence was identified which was applicable to this review question.

Economic evidence profiles for review question: What are the most effective management options for pain after mesh surgery?

No economic evidence was identified which was applicable to this review question.

Economic evidence profiles for review question: What are the most effective management options for urinary complications after mesh surgery?

No economic evidence was identified which was applicable to this review question.

Economic evidence profiles for review question: What are the most effective management options for bowel symptoms after mesh surgery?

No economic evidence was identified which was applicable to this review question.

Appendix J – Economic analysis

Economic analysis for review question: What are the most effective management options for vaginal complications (including exposure, extrusion, erosion and infection) after mesh surgery?

No economic analysis was conducted for this review question.

Economic analysis for review question: What are the most effective management options for sexual dysfunction after mesh surgery?

No economic analysis was conducted for this review question.

Economic analysis for review question: What are the most effective management options for pain after mesh surgery?

No economic analysis was conducted for this review question.

Economic analysis for review question: What are the most effective management options for urinary complications after mesh surgery?

No economic analysis was conducted for this review question.

Economic analysis for review question: What are the most effective management options for bowel symptoms after mesh surgery?

No economic analysis was conducted for this review question.

Appendix K – Excluded studies

Excluded studies for review question: What are the most effective management options for vaginal complications (including exposure, extrusion, erosion and infection) after mesh surgery?

Clinical studies

Table 35: Excluded clinical studies with reasons for exclusion

Excluded studies - management for vaginal complications (including exposure, extrusion, erosion and infection) after mesh surgery?	
Study	Reason for Exclusion
Bajory,Z., Fekete,Z., Kiraly,I., Szalay,I., Pajor,L., Consecutive vesicovaginal fistula for transobturator sling perforations and successful repairs with skin flap, Neurourology and Urodynamics, 30, 1530-1532, 2011	Only 3 patients, no relevant mesh complication
Borie, F., Coste, T., Bigourdan, J. M., Guillon, F., Incidence and surgical treatment of synthetic mesh-related infectious complications after laparoscopic ventral rectopexy, Techniques in Coloproctology, 20, 759-765, 2016	Population type does not meet the inclusion criteria: Women treated for anal incontinence.
Crosby, E. C., Abernethy, M., Berger, M. B., DeLancey, J. O., Fenner, D. E., Morgan, D. M., Symptom resolution after operative management of complications from transvaginal mesh, Obstetrics & Gynecology Obstet Gynecol, 123, 134-9, 2014	Population type does not meet the inclusion criteria: Women referred for surgery due to pain.
Deval,B., Haab,F., Management of the complications of the synthetic slings, Current Opinion in Urology, 16, 240-243, 2006	Narrative review.
Fabian, G., Kociszewski, J., Kuszka, A., Fabian, M., Grothey, S., Zwierzchowska, A., Majkusiak, W., Barcz, E., Vaginal excision of the sub-urethral sling: analysis of indications, safety and outcome, Archives of Medical Science, 11, 982-8, 2015	Participants referred for various mesh complications
George, A., Mattingly, M., Woodman, P., Hale, D., Recurrence of prolapse after transvaginal mesh excision, Female Pelvic Medicine & Reconstructive SurgeryFemale pelvic med, 19, 202-5, 2013	Participants referred for various mesh complications
Hogewoning, C. R., Elzevier, H. W., Pelger, R. C., Hogewoning, C. J., Results of collagen sling placement following the partial removal of	No relevant intervention

Excluded studies - management for vaginal complications (including exposure, extrusion, erosion and infection) after mesh surgery?	
a synthetic midurethral sling, International Journal of Gynaecology & ObstetricsInt J Gynaecol Obstet, 134, 286-9, 2016	
Hokenstad, E. D., El-Nashar, S. A., Blandon, R. E., Occhino, J. A., Trabuco, E. C., Gebhart, J. B., Klingele, C. J., Health-related quality of life and outcomes after surgical treatment of complications from vaginally placed mesh, Female Pelvic Medicine & Reconstructive SurgeryFemale pelvic med, 21, 176-80, 2015	Participants referred for various mesh complications
Illiano, E., Sarti, E., Mancini, V., Carrieri, G., Cormio, L., Orcidi, D., Palleschi, G., Costantini, E., Wait and see: Is it a possible option in asymptomatic patients with mesh exposure?, Neurourology and urodynamics, 36, S15-S16, 2017	Conference abstract.
Ismail, S., Chartier-Kastler, E., Bitker, M. O., Roupret, M., Phe, V., Removal of synthetic tapes and meshes: Surgical indications and outcomes, European Urology, Supplements, 16 (3), e1727-e1728, 2017	Conference abstract.
Jeffery, S.T., Nieuwoudt, A., Beyond the complications: medium-term anatomical, sexual and functional outcomes following removal of trocar-guided transvaginal mesh. A retrospective cohort study, International Urogynecology Journal, 23, 1391-1396, 2012	Participants referred for various mesh complications
Kowalik, C. R., Lakeman, M. M., Oryszczyn, J. E., Roovers, J. P., Reviewing Patients Following Mesh Repair; The Benefits, Gynecologic & Obstetric Investigation Gynecol Obstet Invest, 29, 29, 2016	No relevant outcomes
Lee, D., Dillon, B., Lemack, G., Gomelsky, A., Zimmern, P., Transvaginal mesh kits--how "serious" are the complications and are they reversible?, Urology, 81, 43-8, 2013	Participants referred for various mesh complications
Marcus-Braun, N., von Theobald, P., Mesh removal following transvaginal mesh placement: a case series of 104 operations, International Urogynecology Journal, 21, 423-30, 2010	Participants referred for various mesh complications
Miklos, J. R., Chinthakanan, O., Moore, R. D., Karp, D. R., Nogueiras, G. M., Davila, G. W., Indications and Complications Associated with the Removal of 506 Pieces of Vaginal Mesh Used in Pelvic Floor Reconstruction: A Multicenter Study, Surgical Technology International, 29, 185-189, 2016	Participants referred for various mesh complications

Excluded studies - management for vaginal complications (including exposure, extrusion, erosion and infection) after mesh surgery?	
Miklos, J. R., Chinthakanan, O., Moore, R. D., Mitchell, G. K., Favors, S., Karp, D. R., Northington, G. M., Nogueiras, G. M., Davila, G. W., The IUGA/ICS classification of synthetic mesh complications in female pelvic floor reconstructive surgery: a multicenter study, International Urogynecology Journal and Pelvic Floor Dysfunction, 27, 933-938, 2016	No relevant outcomes reported
Milani, R., Frigerio, M., Palmieri, S., Manodoro, S., Transvaginal mesh removal with native-tissue repair for mesh shrinkage and recurrent uterovaginal prolapse following vaginal mesh-augmented surgery, International Journal of Gynecology and Obstetrics, 139, 105-106, 2017	Narrative report.
Milose, J. C., Sharp, K. M., He, C., Stoffel, J., Clemens, J. Q., Cameron, A. P., Success of autologous pubovaginal sling after failed synthetic mid urethral sling, Journal of Urology, 193, 916-20, 2015	No relevant intervention
Misrai,V., Roupret,M., Xylinas,E., Cour,F., Vaessen,C., Haertig,A., Richard,F., Chartier-Kastler,E., Surgical resection for suburethral sling complications after treatment for stress urinary incontinence, Journal of Urology, 181, 2198-2202, 2009	Participants referred for various mesh complications
Neuman, M., Tension-free vaginal tape bladder penetration and long-lasting transvesical prolene material, Journal of Pelvic Medicine and Surgery, 10, 307-309, 2004	Outcomes reported for women with bladder perforation by mesh
Rac, G., Greiman, A., Rabley, A., Tipton, T. J., Chiles, L. R., Freilich, D. A., Rames, R., Cox, L., Koski, M., Rovner, E. S., Analysis of Complications of Pelvic Mesh Excision Surgery Using the Clavien-Dindo Classification System, Journal of Urology, 19, 19, 2017	Participants referred for various mesh complications
Ren,Y., Hong,L., Xu,E.X., Qi,X.Y., Mesh erosion after pelvic reconstructive surgeries, Saudi Medical Journal, 31, 180-184, 2010	No relevant outcomes
Renezeder,K., Skala,C.E., Albrich,S., Koelbl,H., Naumann,G., Complications following the use of alloplastic materials in urogynecological surgery, European Journal of Obstetrics, Gynecology, and Reproductive Biology, 158, 354-357, 2011	Participants referred for various mesh complications
Skala, C. E., Renezeder, K., Albrich, S., Puhl, A., Laterza, R. M., Naumann, G., Koelbl, H., Mesh complications following prolapse surgery: Management and outcome, European Journal of Obstetrics Gynecology and Reproductive Biology, 159, 453-456, 2011	Participants referred for various mesh complications

Excluded studies - management for vaginal complications (including exposure, extrusion, erosion and infection) after mesh surgery?	
Skoczylas, L. C., Shepherd, J. P., Smith, K. J., Lowder, J. L., Managing mesh exposure following vaginal prolapse repair: A decision analysis comparing conservative versus surgical treatment, International Urogynecology Journal and Pelvic Floor Dysfunction, 24, 119-125, 2013	Modelling paper with narrative review.
Stanford, E. J., Mattox, T. F., Pugh, C. J., Outcomes and Complications of Transvaginal and Abdominal Custom-shaped Light-weight Polypropylene Mesh Used in Repair of Pelvic Organ Prolapse, Journal of Minimally Invasive Gynecology, 18, 64-67, 2011	No relevant intervention
Stepanian, A. A., Miklos, J. R., Moore, R. D., Mattox, T. F., Risk of mesh extrusion and other mesh-related complications after laparoscopic sacral colpopexy with or without concurrent laparoscopic-assisted vaginal hysterectomy: experience of 402 patients, Journal of minimally invasive gynecology, 15, 188-96, 2008	No relevant intervention
Vaish, S. S., Wolter, C. E., Management of Complications Related to Mesh Use Within the Female Pelvis, Current Bladder Dysfunction Reports, 1-6, 2010	Narrative paper.
Warembourg, S., Labaki, M., de Tayrac, R., Costa, P., Fatton, B., Reoperations for mesh-related complications after pelvic organ prolapse repair: 8-year experience at a tertiary referral center, International Urogynecology Journal, 1-13, 2017	Participants referred for various mesh complications

Economic studies

No economic evidence was identified for this review. See supplementary material D for further information.

Excluded studies for review question: What are the most effective management options for sexual dysfunction after mesh surgery? And excluded studies for review question: What are the most effective management options for pain after mesh surgery?

Clinical studies

Table 36: Excluded studies with reasons for exclusion

Excluded studies - What are the most effective management options for sexual dysfunction after mesh surgery? And What are the most effective management options for pain after mesh surgery?	
Study	Reason for Exclusion
Abbott, J., The Use of Botulinum Toxin in the Pelvic Floor for Women with Chronic Pelvic Pain-A New Answer to Old Problems?, Journal of minimally invasive gynecology, 16, 130-135, 2009	No additional relevant articles identified
Abbott, S., Unger, C. A., Evans, J. M., Jallad, K., Mishra, K., Karram, M. M., Iglesia, C. B., Rardin, C. R., Barber, M. D., Evaluation and management of complications from synthetic mesh after pelvic reconstructive surgery: a multicenter study, American Journal of Obstetrics & Gynecology, 210, 163.e1-8, 2014	No relevant articles identified
Abdel-Fattah, M., Sivanesan, K., Ramsay, I., Pringle, S., Bjornsson, S., How common are tape erosions? A comparison of two versions of the transobturator tension-free vaginal tape procedure, BJU International, 98, 594-8, 2006	Less than 50 women in sample (n=16)
Abed, H., Rahn, D. D., Lowenstein, L., Balk, E. M., Clemons, J. L., Rogers, R. G., Systematic Review Group of the Society of Gynecologic, Surgeons, Incidence and management of graft erosion, wound granulation, and dyspareunia following vaginal prolapse repair with graft materials: a systematic review, International Urogynecology Journal, 22, 789-98, 2011	Aggregation of data from studies not reported relative to pain nor sexual dysfunction complications.
Achtari, C., Dwyer, P. L., Sexual function and pelvic floor disorders, Best Practice and Research: Clinical Obstetrics and Gynaecology, 19, 993-1008, 2005	Not systematic review/no additional relevant articles identified
Adel, E., Shapiro, R. E., Clemmer, M. J., Zaslau, S., Urethrolysis in the management of post-operative complications of mid-urethral slings, Female Pelvic Medicine and Reconstructive Surgery, 23 (5 Supplement 1), S127-S128, 2017	Conference abstract; less than 75 women in sample
Agnew, G., Dwyer, P. L., Rosamilia, A., Lim, Y., Edwards, G., Lee, J. K., Functional outcomes following surgical management of pain, exposure or extrusion following a suburethral tape insertion for urinary stress incontinence, International Urogynecology Journal, 25, 235-9, 2014	Less than 50 women in sample (n=47); women, who had various complications, all had mesh revision
Albertazzi,P., Sharma,S., Urogenital effects of selective estrogen receptor modulators: A systematic review, Climacteric, 8, 214-220, 2005	No additional relevant articles identified
Ammembal, M. K., Radley, S. C., Complications of polypropylene mesh in prolapse surgery, Obstetrics, Gynaecology and Reproductive Medicine, 20, 359-363, 2010	Not systematic review/no additional relevant articles identified

Excluded studies - What are the most effective management options for sexual dysfunction after mesh surgery? And What are the most effective management options for pain after mesh surgery?	
Anonymous,, Management of Mesh and Graft Complications in Gynecologic Surgery, Female Pelvic Medicine & Reconstructive Surgery Female pelvic med, 23, 171-176, 2017	American College of Obstetricians and Gynaecologists and the American Urogynecologic Society opinion article
Arsene, E., Giraudet, G., Lucot, J. P., Rubod, C., Cosson, M., Sacral colpopexy: long-term mesh complications requiring reoperation(s), International Urogynecology Journal and Pelvic Floor Dysfunction, 26, 353-358, 2014	Less than 50 women in sample (n=27), majority of which had vaginal mesh erosion
Bachmann, G., The estradiol vaginal ring - A study of existing clinical data, Maturitas, 22, S21-S29, 1995	No additional relevant articles identified
Baessler, K., Maher, C. F., Mesh augmentation during pelvic-floor reconstructive surgery: Risks and benefits, Current Opinion in Obstetrics and Gynecology, 18, 560-566, 2006	Not systematic review/no additional relevant articles identified
Baessler, K., Wildt, B., Tunn, R., Prevalence, Management, and Prevention of Mesh Complications After Use in the Posterior Vaginal Compartment, Seminars in Colon and Rectal Surgery, 20, 139-146, 2009	No relevant studies identified
Baessler,K., Hewson,A.D., Tunn,R., Schuessler,B., Maher,C.F., Severe mesh complications following intravaginal slingplasty, Obstetrics and Gynecology, 106, 713-716, 2005	Less than 50 women in sample (n=19), all of whom had various complications
Ballagh,S.A., Vaginal hormone therapy for urogenital and menopausal symptoms, Seminars in Reproductive Medicine, 23, 126-140, 2005	No additional relevant articles identified
Barber, M. D., Surgical techniques for removing problematic mesh, Clinical Obstetrics & Gynecology Clin Obstet Gynecol, 56, 289-302, 2013	Not systematic review/no additional relevant articles identified
Barski, D., Deng, D. Y., Management of Mesh Complications after SUI and POP Repair: Review and Analysis of the Current Literature, BioMed Research International, 2015, 831285, 2015	No relevant studies identified
Basu, M., Gorti, M., Onifade, R., Franco, A., Fynes, M., Doumouchtsis, S. K., Continence outcomes following partial excision of vaginal mesh exposure after mid-urethral tape insertion, European Journal of Obstetrics, Gynecology, & Reproductive Biology, 167, 114-7, 2013	Less than 50 women in sample (n=41); women, who had various complications, all had vaginal mesh exposure
Bekarma, H., Granitsiotis, P., The one-year experience of tape and mesh removal at a urological tertiary referral centre, Journal of Clinical Urology, 10, 336-339, 2017	Less than 50 women in sample (n=25); women, who had various complications, all had mesh removal
Bertolasi,L., Frasson,E., Graziottin,A., Botulinum toxin treatment of pelvic floor disorders and genital pain in women, Current Women's Health Reviews, 4, 180-187, 2008	Article not available
Bhide, A. A., Puccini, F., Khullar, V., Elneil, S., Alessandro Digesu, G., Botulinum neurotoxin type A injection of the pelvic floor muscle in pain due to spasticity: A review of the current literature, International Urogynecology Journal, 24, 1429-1434, 2013	No additional relevant articles identified

Excluded studies - What are the most effective management options for sexual dysfunction after mesh surgery? And What are the most effective management options for pain after mesh surgery?	
Blaivas, J. G., Sandhu, J., Urethral reconstruction after erosion of slings in women, Current Opinion in Urology, 14, 335-8, 2004	Not systematic review/no additional relevant articles identified
Bouman, M. B., van Zeijl, M. C. T., Buncamper, M. E., Meijerink, W. J. H. J., van Bodegraven, A. A., Mullender, M. G., Intestinal vaginoplasty revisited: A review of surgical techniques, complications, and sexual function, Journal of sexual medicine, 11, 1835-1847, 2014	No additional relevant articles identified
Brown, E. T., Cohn, J., Kaufman, M., Dmochowski, R., Reynolds, W. S., Evaluation and Management of Mid-Urethral Sling Complications, Current Bladder Dysfunction Reports, 11, 160-168, 2016	Included Danford 2015 and Hou 2014, no other relevant articles identified
Cardenas-Trowers, O. O., Malekzadeh, P., Nix, D. E., Hatch, K. D., Vaginal Mesh Removal Outcomes: Eight Years of Experience at an Academic Hospital, Female Pelvic Medicine & Reconstructive Surgery Female pelvic med, 20, 20, 2017	All women had mesh removal (n=83) and variety of complications; Data not reported according to type of complication
Chen, J., Sweet, G., Shindel, A., Urinary disorders and female sexual function, Current Urology Reports, 14, 298-308, 2013	No additional relevant articles identified
Chermansky,C.J., Winters,J.C., Complications of vaginal mesh surgery, Current Opinion in Urology, 22, 287-291, 2012	Not systematic review/no additional relevant articles identified
Clemens, J. Q., Delancey, J. O., Faerber, G. J., Westney, O. L., McGuire, E. J., Urinary tract erosions after synthetic pubovaginal slings: Diagnosis and management strategy, Urology, 56, 589-594, 2000	Less than 50 women in sample (n=14); women, who had variety of complications, all had mesh erosion
Cohen, S. A., Goldman, H. B., Mesh Perforation into a Viscus in the Setting of Pelvic Floor Surgery-Presentation and Management, Current Urology Reports, 17 (9) (no pagination), 2016	Not systematic review/no additional relevant articles identified
Cornu, J. N., Peyrat, L., Haab, F., Update in management of vaginal mesh erosion, Current Urology Reports, 14, 471-5, 2013	Not systematic review
Costantini, E., Zucchi, A., Lazzeri, M., Del Zingaro, M., Vianello, A., Porena, M., Managing mesh erosion after abdominal pelvic organ prolapse repair: ten years' experience in a single center, Urologia Internationalis, 86, 419-23, 2011	Less than 50 women in sample (n=12); women had variety of complications
Crosby, E. C., Abernethy, M., Berger, M. B., DeLancey, J. O., Fenner, D. E., Morgan, D. M., Symptom resolution after operative management of complications from transvaginal mesh, Obstetrics & Gynecology Obstet Gynecol, 123, 134-9, 2014	Participants referred for various mesh complications
Deffieux, X., Tayrac, R., Huel, C., Bottero, J., Gervaise, A., Bonnet, K., Frydman, R., Fernandez, H., Vaginal mesh erosion after transvaginal repair of cystocele using Gynemesh or Gynemesh-Soft in 138 women: A comparative study, International Urogynecology Journal, 18, 73-79, 2007	Less than 50 women in sample (n=27); all women had vaginal mesh erosion, with only 12 sexually active women across both mesh groups before treatment
Deval,B., Haab,F., Management of the complications of the synthetic slings, Current Opinion in Urology, 16, 240-243, 2006	Not systematic review/no additional relevant articles identified

Excluded studies - What are the most effective management options for sexual dysfunction after mesh surgery? And What are the most effective management options for pain after mesh surgery?	
Doumouchtsis, S. K., Boama, V., Gorti, M., Tosson, S., Fynes, M. M., Prospective evaluation of combined local bupivacaine and steroid injections for the management of chronic vaginal and perineal pain, Archives of Gynecology & Obstetrics Arch Gynecol Obstet, 284, 681-5, 2011	Less than 50 women in mixed sample of women feeling pain after either childbirth or gynaecological surgery; only 10 women had prior such surgery
Duckett, J., Morley, R., Monga, A., Hillard, T., Robinson, D., Mesh removal after vaginal surgery: what happens in the UK?, International Urogynecology Journal, 28, 989-992, 2017	Survey of UK surgeons/No relevant articles identified
Duckett,J.R., Jain,S., Groin pain after a tension-free vaginal tape or similar suburethral sling: management strategies, BJU International, 95, 95-97, 2005	Less than 50 women in sample (n=5); all had groin pain
Eder,S.E., Ospemifene: a novel selective estrogen receptor modulator for treatment of dyspareunia, Women's health, 10, 499-503, 2014	Overview of research on ospemifene/no relevant articles identified
Espuna, M., Puig, M., Carmona, F., De novo dyspareunia after pelvic organ prolapse surgery, Gynecological Surgery, 7, 217-225, 2010	Not systematic review/no additional relevant articles identified
Fabian, G., Kociszewski, J., Kuszka, A., Fabian, M., Grothey, S., Zwierzchowska, A., Majkusiak, W., Barcz, E., Vaginal excision of the sub-urethral sling: analysis of indications, safety and outcome, Archives of Medical Science, 11, 982-8, 2015	All women had sling removal (n=100); only 40 had some form of pain (including dyspareunia, pain on walking etc.)
Falagas, M. E., Velakoulis, S., Iavazzo, C., Athanasiou, S., Mesh-related infections after pelvic organ prolapse repair surgery, European Journal of Obstetrics, Gynecology, & Reproductive Biology, 134, 147-56, 2007	No additional relevant articles identified
Feiner, B., Maher, C., Vaginal mesh contraction: definition, clinical presentation, and management, Obstetrics & Gynecology Obstet Gynecol, 115, 325-30, 2010	Less than 50 women in sample; all 17 women had vaginal pain, 14 of which had dyspareunia
Forde, J. C., Davis, N. F., Creagh, T. A., Evaluation of Presenting Symptoms and Long-Term Outcomes of Patients Requiring Excision of a Transobturator Tape (TOT), Irish Medical Journal, 108, 270-2, 2015	Less than 50 women in sample (n=16); all had mesh excision, 9 of which had dyspareunia
Gilchrist,A.S., Rovner,E.S., Managing complications of slings, Current Opinion in Urology, 21, 291-296, 2011	Not systematic review/no additional relevant articles identified
Giri,S.K., Sil,D., Narasimhulu,G., Flood,H.D., Skehan,M., Drumm,J., Management of Vaginal Extrusion After Tension-Free Vaginal Tape Procedure for Urodynamic Stress Incontinence, Urology, 69, 1077-1080, 2007	Less than 50 women in sample; only 5 had vaginal mesh extrusion and variety of complications.
Hokenstad, E. D., El-Nashar, S. A., Blandon, R. E., Occhino, J. A., Trabuco, E. C., Gebhart, J. B., Klingele, C. J., Health-related quality of life and outcomes after surgical treatment of complications from vaginally placed mesh, Female Pelvic Medicine & Reconstructive SurgeryFemale pelvic med, 21, 176-80, 2015	Less than 50 women in sample (n=41); all had mesh repair, only 29 of them were sexually active
Javadian, P., O'Leary, D., Vaginally Placed Meshes: A Review of Their Complications, Risk Factors, and Management, Current Obstetrics and Gynecology Reports, 4, 96-101, 2015	Not systematic review/no additional relevant articles identified

Excluded studies - What are the most effective management options for sexual dysfunction after mesh surgery? And What are the most effective management options for pain after mesh surgery?	
Jeffery, S.T., Nieuwoudt, A., Beyond the complications: medium-term anatomical, sexual and functional outcomes following removal of trocar-guided transvaginal mesh. A retrospective cohort study, International Urogynecology Journal, 23, 1391-1396, 2012	Less than 50 women in sample (n=21); all had mesh removal
Jha, S, Ammenbal, M, Metwally, M, Impact of incontinence surgery on sexual function: a systematic review and meta-analysis (Provisional abstract), Journal of Sexual Medicine, 9, 34-43, 2012	No relevant articles identified
Karram, M., Brown, E. T., Avoiding and Managing Complications of Synthetic Midurethral Slings, Current Bladder Dysfunction Reports, 10, 64-70, 2015	Non-systematic review of surgical techniques/no additional relevant articles identified
Kobashi,K.C., Dmochowski,R., Mee,S.L., Mostwin,J., Nitti,V.W., Zimmern,P.E., Leach,G.E., Erosion of woven polyester pubovaginal sling, Journal of Urology, 162, 2070-2072, 1999	Less than 50 women in sample (n=34); all had synthetic sling removal
Kuhn,A., Burkhard,F., Eggemann,C., Mueller,M.D., Sexual function after suburethral sling removal for dyspareunia, Surgical Endoscopy, 23, 765-768, 2009	Less than 50 women in sample (n=18); all had de novo dyspareunia and sling removal
Kuhn,A., Eggeman,C., Burkhard,F., Mueller,M.D., Correction of erosion after suburethral sling insertion for stress incontinence: results and related sexual function, European Urology, 56, 371-376, 2009	Less than 50 women in sample (n=21); all had mesh erosion and mesh removal
Lee, D., Bacsu, C., Dillon, B., Zimmern, P. E., Complications Following the Insertion of Two Synthetic Mid-urethral Slings and Subsequent Removal, LUTS: Lower Urinary Tract Symptoms., 2017	Less than 50 women in sample (n=21); variety of complications, all had mesh removal
Lee, D., Bacsu, C., Zimmern, P. E., Meshology: A fast-growing field involving mesh and/or tape removal procedures and their outcomes, Expert Review of Medical Devices, 12, 201-216, 2015	Non-systematic review of surgical techniques/no additional relevant articles identified
Lee, D., Chang, J., Zimmern, P. E., Iatrogenic Pelvic Pain: Surgical and Mesh Complications, Physical Medicine and Rehabilitation Clinics of North America, 28, 603-619, 2017	No other relevant articles identified; Danford et al. 2015, n=233 reports on improvement in women with pain complications after mesh surgery who underwent revision but does not use validated scale
Lee, D., Dillon, B., Lemack, G., Gomelsky, A., Zimmern, P., Transvaginal mesh kits--how "serious" are the complications and are they reversible?, Urology, 81, 43-8, 2013	Less than 50 women in sample with pain or sexual dysfunction (n=58); all had mesh removal and most had multiple complications (dyspareunia, n=42; pelvic pain, n=26)
Lee, D., Zimmern, P. E., Management of complications of mesh surgery, Current Opinion in Urology, 25, 284-291, 2015	Non-systematic review of surgical techniques/no additional relevant articles identified
Lim,Y.N., Muller,R., Corstiaans,A., Hitchins,S., Barry,C., Rane,A., A long-term review of posterior colporrhaphy with Vypro 2 mesh, International Urogynecology Journal, 18, 1053-1057, 2007	Less than 75 women in sample (n=53); all women had posterior colporrhaphy. No relevant outcomes reported

Excluded studies - What are the most effective management options for sexual dysfunction after mesh surgery? And What are the most effective management options for pain after mesh surgery?	
Lo, T. S., Tan, Y. L., Cortes, E. F., Wu, P. Y., Pue, L. B., Al-Kharabsheh, A., Clinical outcomes of mesh exposure/extrusion: presentation, timing and management, Australian & New Zealand Journal of Obstetrics & GynaecologyAust N Z J Obstet Gynaecol, 55, 284-90, 2015	Less than 50 women in sample (n=40); all had mesh exposure/extrusion and variety of complications
MacDonald, S., Terlecki, R., Costantini, E., Badlani, G., Complications of Transvaginal Mesh for Pelvic Organ Prolapse and Stress Urinary Incontinence: Tips for Prevention, Recognition, and Management, European Urology Focus, 2, 260-267, 2016	Article not available
Marks,B.K., Goldman,H.B., Controversies in the management of mesh-based complications: a urology perspective, Urologic Clinics of North America, 39, 419-428, 2012	Non-systematic review of surgical techniques/no additional relevant articles identified
Miklos, J. R., Chinthakanan, O., Moore, R. D., Karp, D. R., Nogueiras, G. M., Davila, G. W., Indications and Complications Associated with the Removal of 506 Pieces of Vaginal Mesh Used in Pelvic Floor Reconstruction: A Multicenter Study, Surgical Technology International, 29, 185-189, 2016	All women had mesh removal (n=445). No relevant outcomes reported.
Mock, S., Reynolds, W. S., Dmochowski, R. R., Trans-vaginal mesh revision: A comprehensive review on etiologies and management strategies with emphasis on postoperative pain outcomes, LUTS: Lower Urinary Tract Symptoms, 6, 69-75, 2014	Non-systematic review of surgical techniques/no additional relevant articles identified
Moore, R. D., Miklos, J. R., Chinthakanan, O., Vaginal reconstruction/rejuvenation: is there data to support improved sexual function? An update and review of the literature, Surgical Technology International Surg Technol Int, 25, 179-90, 2014	Non-systematic review of surgical techniques/no additional relevant articles identified
Morrissey, D., El-Khawand, D., Ginzburg, N., Wehbe, S., O'Hare, P., 3rd, Whitmore, K., Botulinum Toxin A Injections Into Pelvic Floor Muscles Under Electromyographic Guidance for Women With Refractory High-Tone Pelvic Floor Dysfunction: A 6-Month Prospective Pilot Study, Female pelvic medicine & reconstructive surgery, 21, 277-82, 2015	Less than 50 women in sample (n=28); no further details provided of type of dysfunction
Muffly, T. M., Barber, M. D., Insertion and removal of vaginal mesh for pelvic organ prolapse, Clinical Obstetrics and Gynecology, 53, 99-114, 2010	Non-systematic review of surgical techniques/no additional relevant articles identified
Nappi,R.E., Davis,S.R., The use of hormone therapy for the maintenance of urogynecological and sexual health post WHI, Climacteric, 15, 267-274, 2012	Non-systematic review of surgical techniques/no additional relevant articles identified
Parden, A. M., Tang, Y., Szychowski, J., Richter, H. E., Characterization of Lower Urinary Tract Symptoms Before and After Midurethral Sling Revision, Journal of Minimally Invasive Gynecology, 23, 979-985, 2016	Less than 75 women in sample (n=69); all had mesh surgery with 35% (n=24) having dyspareunia and 42% (n=29) having some other form of pain. Reporting of data for women with dyspareunia or pain inadequate/unclear
Pickett, S. D., Barenberg, B., Quiroz, L. H., Shobeiri, S. A., O'Leary, D. E., The significant morbidity of removing pelvic mesh from multiple vaginal compartments, Obstetrics and gynecology, 125, 1418-1422, 2015	All women (n=374) had mesh removal for variety of complications (57% had dyspareunia [n=223], 63% [n=247] had other form of pain). No relevant

Excluded studies - What are the most effective management options for sexual dysfunction after mesh surgery? And What are the most effective management options for pain after mesh surgery?	
	outcomes specific for management sexual dysfunction nor pain reported
Rac, G., Greiman, A., Rabley, A., Tipton, T. J., Chiles, L. R., Freilich, D. A., Rames, R., Cox, L., Koski, M., Rovner, E. S., Analysis of Complications of Pelvic Mesh Excision Surgery Using the Clavien-Dindo Classification System, Journal of Urology, 19, 19, 2017	All women had mesh removal (n=277) but no details provided of indication for this surgery
Ramart, P., Ackerman, A. L., Cohen, S. A., Kim, J. H., Raz, S., The Risk of Recurrent Urinary Incontinence Requiring Surgery After Suburethral Sling Removal for Mesh Complications, Urology, 106, 203-209, 2017	All women in both mesh groups (retropubic vs. transobturator) had mesh removal; in whole sample, 46% (n=54) had dyspareunia, 6% (n=7) had hispareunia, and between 5-35% had some form of other pain. Outcomes not reported relative to specific complications of sexual dysfunction nor pain
Reisenauer, C., Viereck, V., Mesh-related complications in urogynecology - A multidisciplinary challenge, Acta Obstetricia et Gynecologica Scandinavica, 91, 869-872, 2012	Less than 50 women in sample; Case report of 11 women
Ridgeway, B., Walters, M. D., Paraiso, M. F., Barber, M. D., McAchran, S. E., Goldman, H. B., Jelovsek, J. E., Early experience with mesh excision for adverse outcomes after transvaginal mesh placement using prolapse kits, American Journal of Obstetrics & Gynecology 199, 703.e1-7, 2008	Less than 50 women in sample (n=19); all women had mesh excision with only 32% (n=6) having dyspareunia and 32% (n=6) having some other form of pain
Rigaud, J., Pothin, P., Labat, J. J., Riant, T., Guerineau, M., Normand, L. L., Glemain, P., Robert, R., Bouchot, O., Functional results after tape removal for chronic pelvic pain following tension-free vaginal tape or transobturator tape, Journal of urology, 184, 610-615, 2010	Less than 50 women in sample (n=32); all had chronic or perineal pain and had sling removal
Sinha,D., Thomson,A.J., Botulinum toxin for pelvic pain in women, Women's Health, 4, 173-181, 2008	No additional relevant articles identified
Skala, C. E., Renezeder, K., Albrich, S., Puhl, A., Laterza, R. M., Naumann, G., Koelbl, H., Mesh complications following prolapse surgery: Management and outcome, European Journal of Obstetrics Gynecology and Reproductive Biology, 159, 453-456, 2011	Less than 50 women in sample with pain or sexual dysfunction (n=54); all had mesh revision with only 17% (n=9) having dyspareunia and 50% (n=27) having other form of pain
Skala,C., Renezeder,K., Albrich,S., Puhl,A., Laterza,R.M., Naumann,G., Koelbl,H., The IUGA/ICS classification of complications of prosthesis and graft insertion: a comparative experience in incontinence and prolapse surgery, International Urogynecology Journal, 22, 1429-1435, 2011	Less than 50 women in sample with pain or sexual dysfunction: In prolapse group (n=54), 17% (n=9) had dyspareunia and 50% (n=27) had other form of pain. In incontinence surgery group, <1% (n=9) had dyspareunia and 26% (n=32) had some other form of pain. No relevant outcomes reported.

Excluded studies - What are the most effective management options for sexual dysfunction after mesh surgery? And What are the most effective management options for pain after mesh surgery?	
Warembourg, S., Labaki, M., de Tayrac, R., Costa, P., Fatton, B., Reoperations for mesh-related complications after pelvic organ prolapse repair: 8-year experience at a tertiary referral center, International Urogynecology Journal, 1-13, 2017	Less than 75 women in sample with pain or sexual dysfunction (n=67); variety of complications with 33% having pain and 23% dyspareunia
Willy Davila, G., Jijon, A., Managing vaginal mesh exposure/erosions, Current Opinion in Obstetrics and Gynecology, 24, 343-348, 2012	Non-systematic review of surgical techniques/no additional relevant articles identified
Wiltz, A. L., Reynolds, W. S., Jayram, G., Fedunok, P. A., Bales, G. T., Management of vaginal synthetic graft extrusion following surgery for stress urinary incontinence and prolapse, Current Urology, 3, 82-86, 2009	Less than 50 women in sample (n=27); all had mesh removal with only 14 % (n=4) having pain or dyspareunia
Wohlrab,K.J., Erekson,E.A., Myers,D.L., Postoperative erosions of the Mersilene suburethral sling mesh for antiincontinence surgery, International Urogynecology Journal, 20, 417-420, 2009	Less than 50 women in sample with pain or sexual dysfunction (n=62); all had revision/excision of Mersilene sling with only 13% (n=8) having pain or dyspareunia
Wolff, G. F., Winters, J. C., Krlin, R. M., Mesh Excision: Is Total Mesh Excision Necessary?, Current Urology Reports, 17, 34, 2016	Non-systematic review of surgical techniques/no additional relevant articles identified
Zambon, J. P., Badlani, G. H., Vaginal Mesh Exposure Presentation, Evaluation, and Management, Current Urology Reports, 17 (9) (no pagination), 2016	Non-systematic review of surgical techniques/no additional relevant articles identified
Zoorob, D., Karram, M., Management of Mesh Complications and Vaginal Constriction. A Urogynecology Perspective, Urologic Clinics of North America, 39, 413-418, 2012	Non-systematic review of surgical techniques/no additional relevant articles identified

Economic studies

No economic evidence was identified for this review. See supplementary material D for further information.

Excluded studies for review question: What are the most effective management options for urinary complications after mesh surgery?

Clinical studies

Table 37: Excluded clinical studies with reasons for exclusion

Excluded studies - What are the most effective management options for urinary complications after mesh surgery?	
Study	Reason for Exclusion
Barski, D., Deng, D. Y., Management of Mesh Complications after SUI and POP Repair: Review and Analysis of the Current Literature, BioMed Research International, 2015, 831285, 2015	Narrative review
Cardenas-Trowers, O. O., Malekzadeh, P., Nix, D. E., Hatch, K. D., Vaginal Mesh Removal Outcomes: Eight Years of Experience at an Academic Hospital, Female Pelvic Medicine & Reconstructive Surgery Female pelvic med, 20, 20, 2017	Revision surgery due to pain
Coskun, B., Lavelle, R. S., Alhalabi, F., Lemack, G., Zimmern, P. E., Urodynamics for incontinence after midurethral sling removal, Neurourology & Urodynamics, 35, 939-943, 2016	UDS not mesh complication management
Crosby, E. C., Abernethy, M., Berger, M. B., DeLancey, J. O., Fenner, D. E., Morgan, D. M., Symptom resolution after operative management of complications from transvaginal mesh, Obstetrics & Gynecology Obstet Gynecol, 123, 134-9, 2014	Referred due to pain only outcome presented relates to improvement in pain
Dasgupta,J., Goddard,J.C., Mayne,C.J., Tincello,D.G., The management of voiding dysfunction following mid urethral tape insertion, British Journal of Medical and Surgical Urology, 4, 31-35, 2011	Examining TVT surgery not management of complications
Duckett,J.R.A., Jain,S., Groin pain after a tension-free vaginal tape or similar suburethral sling: Management strategies, BJU International, 95, 95-97, 2005	less than 20 participants
Dunn Jr, J. S., Bent, A. E., Ellerkman, R., Nihira, M. A., Melick, C. F., Voiding dysfunction after surgery for stress incontinence: Literature review and survey results, International Urogynecology Journal, 15, 25-31, 2004	Review paper and survey of surgeons.
Fabian, G., Kociszewski, J., Kuszka, A., Fabian, M., Grothey, S., Zwierzchowska, A., Majkusiak, W., Barcz, E., Vaginal excision of the sub-urethral sling: analysis of indications, safety and outcome, Archives of Medical Science, 11, 982-8, 2015	Outcomes not presented to extract Referred for OAB (and other reasons)
George, A., Mattingly, M., Woodman, P., Hale, D., Recurrence of prolapse after transvaginal mesh excision, Female Pelvic Medicine & Reconstructive SurgeryFemale pelvic med, 19, 202-5, 2013	Relevant outcomes not presented in paper
Hammett,J., Peters,A., Trowbridge,E., Hullfish,K., Short-term surgical outcomes and characteristics of patients with mesh complications from pelvic organ prolapse and stress urinary incontinence surgery, International Urogynecology Journal and Pelvic Floor Dysfunction, 25, 465-470, 2014	Women referred due to pain Outcomes not relevant

Excluded studies - What are the most effective management options for urinary complications after mesh surgery?	
Hokenstad, E. D., El-Nashar, S. A., Blandon, R. E., Occhino, J. A., Trabuco, E. C., Gebhart, J. B., Klingele, C. J., Health-related quality of life and outcomes after surgical treatment of complications from vaginally placed mesh, Female Pelvic Medicine & Reconstructive SurgeryFemale pelvic med, 21, 176-80, 2015	Sample referred for various mesh complications
Jambusaria, L. H., Heft, J., Reynolds, W. S., Dmochowski, R., Biller, D. H., Incontinence rates after midurethral sling revision for vaginal exposure or pain, American Journal of Obstetrics and Gynecology, 215, 764.e1-764.e5, 2016	Revision surgery due to pain or mesh exposure
Kohli, N., Walsh, P. M., Roat, T. W., Karram, M. M., Mesh erosion after abdominal sacrocolpopexy, Obstetrics and Gynecology, 92, 999-1004, 1998	No complication data, just numbers of erosion/extrusion
Lee, D., Bacsu, C., Zimmern, P. E., Meshology: A fast-growing field involving mesh and/or tape removal procedures and their outcomes, Expert Review of Medical Devices, 12, 201-216, 2015	Narrative literature review
Lee, D., Dillon, B., Lemack, G., Gomelsky, A., Zimmern, P., Transvaginal mesh kits - How "serious" are the complications and are they reversible?, Urology, 81, 43-48, 2013	Outcomes not relevant
Lee, D., Zimmern, P. E., Management of complications of mesh surgery, Current Opinion in Urology, 25, 284-291, 2015	Narrative literature reveiw
Marcus-Braun,N., Theobald,P.V., Mesh removal following transvaginal mesh placement: A case series of 104 operations, International urogynecology journal and pelvic floor dysfunction, 21, 423-430, 2010	Sample referred for various mesh complications
Miklos, J. R., Chinthakanan, O., Moore, R. D., Karp, D. R., Nogueiras, G. M., Davila, G. W., Indications and Complications Associated with the Removal of 506 Pieces of Vaginal Mesh Used in Pelvic Floor Reconstruction: A Multicenter Study, Surgical Technology International, 29, 185-189, 2016	Only presents data on type of mesh removal, no complication data
Misrai,V., Roupret,M., Xylinas,E., Cour,F., Vaessen,C., Haertig,A., Richard,F., Chartier-Kastler,E., Surgical resection for suburethral sling complications after treatment for stress urinary incontinence, Journal of Urology, 181, 2198-2202, 2009	Review of sling surgery, no relevant articles
Pickett, S. D., Barenberg, B., Quiroz, L. H., Shobeiri, S. A., O'Leary, D. E., The significant morbidity of removing pelvic mesh from multiple vaginal compartments, Obstetrics and gynecology, 125, 1418-1422, 2015	No outcomes of interest reported
Rac, G., Greiman, A., Rabley, A., Tipton, T. J., Chiles, L. R., Freilich, D. A., Rames, R., Cox, L., Koski, M., Rovner, E. S., Analysis of Complications of Pelvic Mesh Excision Surgery Using the Clavien-Dindo Classification System, Journal of Urology, 19, 19, 2017	No outcomes reported of relevance
Ramart, P., Ackerman, A. L., Cohen, S. A., Kim, J. H., Raz, S., The Risk of Recurrent Urinary Incontinence Requiring Surgery After Suburethral Sling Removal for Mesh Complications, Urology, 106, 203-209, 2017	Referred for pain not UI Relevant outcomes not reported

Excluded studies - What are the most effective management options for urinary complications after mesh surgery?	
Ren,Y., Hong,L., Xu,E.X., Qi,X.Y., Mesh erosion after pelvic reconstructive surgeries, Saudi Medical Journal, 31, 180-184, 2010	Study on pop surgery, not surgery for complications
Renezeder,K., Skala,C.E., Albrich,S., Koelbl,H., Naumann,G., Complications following the use of alloplastic materials in urogynecological surgery, European Journal of Obstetrics, Gynecology, and Reproductive Biology, 158, 354-357, 2011	Sample referred for various mesh complications
Shaw, J., Wohlrab, K., Rardin, C., Recurrence of stress urinary incontinence after midurethral sling revision: A retrospective cohort study, Female Pelvic Medicine and Reconstructive Surgery, 23, 184-187, 2017	Sample referred for various mesh complications
Singla, N., Aggarwal, H., Foster, J., Alhalabi, F., Lemack, G. E., Zimmern, P. E., Management of Urinary Incontinence Following Suburethral Sling Removal, Journal of Urology, 198, 644-649, 2017	Referred due to pain

Economic studies

No economic evidence was identified for this review. See supplementary material D for further information.

Excluded studies for review question: What are the most effective management options for bowel symptoms after mesh surgery?

Clinical studies

Table 38: Excluded clinical studies with reasons for exclusion

Excluded studies - What are the most effective management options for bowel symptoms after mesh surgery?	
Study	Reason for Exclusion
Arunachalam, D., Hale, D. S., Heit, M. H., Posterior Compartment Surgery Provides No Differential Benefit for Defecatory Symptoms before or after Concomitant Mesh-Augmented Apical Suspension, Female Pelvic Medicine and Reconstructive Surgery, 24, 183-187, 2018	Irrelevant intervention.
Aungst,M.J., Friedman,E.B., von Pechmann,W.S., Horbach,N.S., Welgoss,J.A., De novo stress incontinence and pelvic muscle symptoms after transvaginal mesh repair, American Journal of Obstetrics and Gynecology, 201, 73-77, 2009	No relevant outcomes.
Badrek-Al Amoudi, A. H., Greenslade, G. L., Dixon, A. R., How to deal with complications after laparoscopic ventral mesh rectopexy: lessons learnt from a tertiary referral centre, Colorectal Disease, 15, 707-12, 2013	Irrelevant outcomes.

Excluded studies - What are the most effective management options for bowel symptoms after mesh surgery?	
Barski, D., Deng, D. Y., Management of Mesh Complications after SUI and POP Repair: Review and Analysis of the Current Literature, BioMed Research International, 2015, 831285, 2015	Irrelevant population.
Choi, J. M., Nguyen, V., Khavari, R., Reeves, K., Snyder, M., Fletcher, S. G., Complex rectovaginal fistulas after pelvic organ prolapse repair with synthetic mesh: a multidisciplinary approach to evaluation and management, Female Pelvic Medicine & Reconstructive SurgeryFemale pelvic med, 18, 366-71, 2012	Too few participants.
Costantini, E., Zucchi, A., Lazzeri, M., Del Zingaro, M., Vianello, A., Porena, M., Managing mesh erosion after abdominal pelvic organ prolapse repair: ten years' experience in a single center, Urologia Internationalis, 86, 419-23, 2011	Too few participants.
De Tayrac, R., Geryaise, A., Chauveand, A., Fernandez, H., Tension-free polypropylene mesh for vaginal repair of anterior vaginal wall prolapse, Journal of Reproductive Medicine for the Obstetrician and Gynecologist, 50, 75-80, 2005	Irrelevant population.
Dubuisson, J., Eperon, I., Dallenbach, P., Dubuisson, J. B., Laparoscopic repair of vaginal vault prolapse by lateral suspension with mesh, Archives of Gynecology & ObstetricsArch Gynecol Obstet, 287, 307-12, 2013	Irrelevant population. Irrelevant intervention.
Ellerkmann, M., Goldstein, D., Hoskey, K., Robotic-assisted laparoscopic intravesical resection of a polypropylene retropubic mid-urethral sling, Journal of minimally invasive gynecology, 22 (3 Supplement), S59, 2015	Too few participants.
Fatton, B., Dwyer, P. L., Achtari, C., Tan, P. K., Bilateral extraperitoneal uterosacral vaginal vault suspension: a 2-year follow-up longitudinal case series of 123 patients, International Urogynecology Journal, 20, 427-34, 2009	Irrelevant population
Faucheron, J. L., Voirin, D., Riboud, R., Waroquet, P. A., Noel, J., Laparoscopic anterior rectopexy to the promontory for full-thickness rectal prolapse in 175 consecutive patients: short- and long-term follow-up, Diseases of the Colon & RectumDis Colon Rectum, 55, 660-5, 2012	Too few participants. Irrelevant population.
Fengler,S.A., Pearl,R.K., Prasad,M.L., Orsay,C.P., Cintron,J.R., Hambrick,E., Abcarian,H., Management of recurrent rectal prolapse, Diseases of the Colon and Rectum, 40, 832-834, 1997	Too few participants.
Greiman,A., Kielb,S., Revisions of mid urethral slings can be accomplished in the office, Journal of Urology, 188, 190-193, 2012	Too few participants.
Herschorn, S., Urethrovaginal fistula repair-long-term outcomes, Neurourology and urodynamics, 36, S85, 2017	Irrelevant intervention.
Hubb, A., Sink, N. J., Wood, S. C., Veronikis, D. K., Vaginal mesh explants: An analysis of implant type, patient symptomatology, and previous mesh revisions, Female Pelvic Medicine and Reconstructive Surgery, 22 (5 Supplement 1), S143-S144, 2016	Irrelevant population.

Excluded studies - What are the most effective management options for bowel symptoms after mesh surgery?	
Hurtado, E. A., Appell, R. A., Management of complications arising from transvaginal mesh kit procedures: a tertiary referral center's experience, International Urogynecology Journal, 20, 11-7, 2009	Too few participants.
Jarrett, M. E., Matzel, K. E., Stosser, M., Baeten, C. G., Kamm, M. A., Sacral nerve stimulation for fecal incontinence following surgery for rectal prolapse repair: a multicenter study, Diseases of the Colon & Rectum, 48, 1243-8, 2005	Too few participants.
Kowalik, C. R., Lakeman, M. M. E., Oryszczyn, J. E., Roovers, J. P. W. R., Reviewing Patients Following Mesh Repair; The Benefits, Gynecologic and Obstetric Investigation, 82, 575-581, 2017	Irrelevant population.
Lee, C. H., Ku, J. Y., Lee, K., Lee, J. Z., Shin, D. G., Clinical Application of a Transurethral Holmium Laser Excision of Exposed Polypropylene Mesh at Lower Urinary Tract: Single Surgeon Experience with Long-term Follow-up, Female Pelvic Medicine and Reconstructive Surgery, 24, 26-31, 2018	Irrelevant population.
Lee, D., Bacsu, C., Zimmern, P. E., Meshology: A fast-growing field involving mesh and/or tape removal procedures and their outcomes, Expert Review of Medical Devices, 12, 201-216, 2015	Irrelevant population.
MacDonald, S., Terlecki, R., Costantini, E., Badlani, G., Complications of Transvaginal Mesh for Pelvic Organ Prolapse and Stress Urinary Incontinence: Tips for Prevention, Recognition, and Management, European Urology Focus, 2, 260-267, 2016	Irrelevant population.
Mathew, M. J., Parmar, A. K., Reddy, P. K., Mesh erosion after laparoscopic posterior rectopexy: A rare complication, Journal of Minimal Access Surgery, 10, 40-1, 2014	Too few participants.
McCoy, O., Vaughan, T., Nickles, S. W., Ashley, M., MacLachlan, L. S., Ginsberg, D., Rovner, E., Outcomes of Autologous Fascia Pubovaginal Sling for Patients with Transvaginal Mesh Related Complications Requiring Mesh Removal, Journal of Urology, 196, 484-9, 2016	Irrelevant population.
Medendorp, A., Chaudhry, Z., Oliver, J., Wood, L., Kim, J. H., Baxter, Z., Raz, S., Autologous fascia sacrocolpopexy after complete removal of sacrocolpopexy mesh, Journal of urology, 197 (4 Supplement 1), e355-e356, 2017	Too few participants.
Nazemi, T. M., Kobashi, K. C., Complications of grafts used in female pelvic floor reconstruction: Mesh erosion and extrusion, Indian Journal of UrologyIndian J, 23, 153-60, 2007	Irrelevant population.
Nguyen, J. N., Burchette, R. J., Outcome after anterior vaginal prolapse repair: a randomized controlled trial, Obstetrics & Gynecology, 111, 891-8, 2008	Irrelevant population. Irrelevant intervention.
Ow, L. L., Lim, Y. N., Dwyer, P. L., Karmakar, D., Murray, C., Thomas, E., Rosamilia, A., Native tissue repair or transvaginal mesh for recurrent vaginal prolapse: what are the long-term outcomes?, International Urogynecology Journal, 27, 1313-20, 2016	Irrelevant population. Irrelevant intervention.
Quiroz, L. H., Gutman, R. E., Fagan, M. J., Cundiff, G. W., Partial colpocleisis for the treatment of sacrocolpopexy mesh erosions.[Erratum appears in Int Urogynecol J Pelvic Floor Dysfunct. 2008 Feb;19(2):307], International Urogynecology Journal, 19, 261-6, 2008	Irrelevant population.

Excluded studies - What are the most effective management options for bowel symptoms after mesh surgery?	
Robert-Yap, J., Zufferey, G., Rosen, H., Lechner, M., Wunderlich, M., Roche, B., Sacral nerve modulation in the treatment of fecal incontinence following repair of rectal prolapse, Diseases of the Colon & RectumDis Colon Rectum, 53, 428-31, 2010	Too few participants.
Ross, A. H., Thomson, J. P., Management of infection after prosthetic abdominal rectopexy (Wells' procedure), British Journal of SurgeryBr J Surg, 76, 610-2, 1989	Too few participants.
Schultz, I., Mellgren, A., Dolk, A., Johansson, C., Holmstrom, B., Long-term results and functional outcome after Ripstein rectopexy, Diseases of the Colon & RectumDis Colon Rectum, 43, 35-43, 2000	Irrelevant intervention.
Setti Carraro, P., Nicholls, R. J., Postanal repair for faecal incontinence persisting after rectopexy, British Journal of Surgery, 81, 305-7, 1994	Too few participants.
Shah, H. N., Badlani, G. H., Mesh complications in female pelvic floor reconstructive surgery and their management: A systematic review, Indian Journal of Urology, 28, 129-53, 2012	Irrelevant population.
Skala, C. E., Renezeder, K., Albrich, S., Puhl, A., Laterza, R. M., Naumann, G., Koelbl, H., Mesh complications following prolapse surgery: Management and outcome, European Journal of Obstetrics Gynecology and Reproductive Biology, 159, 453-456, 2011	Too few participants. Irrelevant population.
Toz, E., Sahin, C., Apaydin, N., Ozcan, A., Taner, C. E., Functional outcomes of polypropylene midurethral sling resection for treatment of mesh exposure/extrusion: Does it lead to a relapse of incontinence?, Ginekologia Polska, 86, 531-6, 2015	Too few participants. Irrelevant population.
Tranchart, H., Valverde, A., Goasguen, N., Gravie, J. F., Mosnier, H., Conservative treatment of intrarectal mesh migration after ventral laparoscopic rectopexy for rectal prolapse, International Journal of Colorectal Disease, 28, 1563-6, 2013	Too few participants.
Warembourg, S., Labaki, M., de Tayrac, R., Costa, P., Fatton, B., Reoperations for mesh-related complications after pelvic organ prolapse repair: 8-year experience at a tertiary referral center, International Urogynecology Journal, 1-13, 2017	Small proportion of cohort had bowel complications.
Zambon, J. P., Badlani, G. H., Vaginal Mesh Exposure Presentation, Evaluation, and Management, Current Urology Reports, 17 (9) (no pagination), 2016	Irrelevant population.

Economic studies

No economic evidence was identified for this review. See supplementary material D for further information.

General management of mesh complications after mesh or mesh sling surgery

See list of excluded studies for individual complications reviews.

Appendix L – Research recommendations

Research recommendations for the review questions:

- What are the most effective management options for vaginal complications (including exposure, extrusion, erosion and infection) after mesh surgery?
- What are the most effective management options for sexual dysfunction after mesh surgery?
- What are the most effective management options for pain after mesh surgery?
- What are the most effective management options for urinary complications after mesh surgery?
- What are the most effective management options for bowel symptoms after mesh surgery?

What is the effectiveness of pain management for women who present with chronic pain 3 months after mesh surgery for stress urinary incontinence or pelvic organ prolapse?

Why is this important?

Chronic pain and sexual dysfunction after mesh surgery can be debilitating and have a severe impact on a woman's quality of life. The committee was aware that there was very little evidence to support recommendations about the most appropriate management options for sexual dysfunction after mesh surgery or the most effective management options for women presenting with chronic pain 3 months after mesh surgery. Women are also requesting to have mesh removed in the expectation that it will improve their pain but there is insufficient evidence to guide women and their clinicians on the likelihood of pain improvement or resolution after mesh removal. In order to manage the sexual dysfunction and chronic pain most effectively for this group of patients research needs to be undertaken comparing the different management options currently practised.

Table 39: Research recommendation rationale

Research question	What is the effectiveness of pain management in women presenting with chronic pain 3 months after mesh surgery?
Importance to 'patients' or the population	There is insufficient evidence to guide women and their clinicians on the likelihood of pain improvement or resolution after mesh removal and there are significant risks associated with mesh removal surgery
Relevance to NICE guidance	This is an important area of the guideline for which no evidence was found
Relevance to the NHS	Chronic pain and sexual dysfunction after mesh surgery can be debilitating and have a severe impact on a woman's quality of life. The outcome would be that women can be offered the most effective treatment in a timely manner, if they present with new or persistent symptoms
National priorities	High
Current evidence base	Poor
Equality	

Table 40: Research recommendation modified PICO table v1

Criterion	Explanation
Population	Women presenting with pain after mesh surgery (high priority).
Intervention	Surgical removal alone.

Criterion	Explanation
Comparator	Specialist pain management or specialist pain management then surgery if pain fails to resolve after conservative management
Outcome	Pain improvement, quality of life, secondary complications from surgery.
Study design	RCT level, if feasible. (Can be cross-over) e.g. Nothing then surgery + pain management then surgery (to see how many with pain management went on to have surgery). Pain management = meds, CBT, specialist pain management.
Timeframe	18 months
Additional information	None

Table 41: Research recommendation modified PICO table v2 (deprioritised)

Criterion	Explanation
Population	Women presenting with pain after mesh surgery.
Intervention	Surgery to complete mesh removal. Complete mesh removal
Comparator	Partial mesh removal.
Outcome	Pain improvement, quality of life
Study design	RCT. Could be crossover if partial removal the goes on to have complete removal?
Timeframe	18 months
Additional information	None

Table 42: Research recommendation modified PICO table v3 (deprioritised)

Criterion	Explanation
Population	Women presenting with dyspareunia after mesh surgery.
Intervention	Mesh removal.
Comparator	Vaginal oestrogen, vaginal dilators and/or psychosexual counselling
Outcome	Improvement in dyspareunia, quality of life
Study design	RCT although could be crossover if vaginal oestrogen goes on to have mesh removal
Timeframe	18 months
Additional information	None

Table 43: Research recommendation modified PICO table v4 (deprioritised)

Criterion	Explanation
Population	Women presenting with pain after mesh surgery.
Intervention	Physiotherapy or talking therapy.
Comparator	Pain medicines.
Outcome	Improvement in pain, quality of life.
Study design	RCT
Timeframe	18 months
Additional information	None