National Institute for Health and Care Excellence

Final

Colorectal cancer (update)

[C9] Effectiveness of stenting for acute large bowel obstruction

NICE guideline NG151

Evidence reviews

January 2020

Final

Developed by the National Guideline Alliance part of the Royal College of Obstetricians and Gynaecologists

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Effectiveness of stenting compared with emergency surgery for acute large bowel obstruction

This evidence review supports recommendations 1.3.15 to 1.3.16.

Review question

What is the effectiveness of stenting compared with emergency surgery for suspected colorectal cancer causing acute large bowel obstruction?

Introduction

Patients presenting with suspected malignant colonic obstruction typically have two treatment options – emergency surgery, which is associated with a number of different complications, including high morbidity and mortality and a high rate of stoma formation; or stenting, which involves placing a hollow, self-expanding, flexible metal tube in the large bowel to keep it open. The use of colonic stents as a bridge to surgery has the potential to convert a bowel obstruction from an emergency condition to an elective situation, yet controversy remains as to whether this treatment option is superior to traditional emergency surgical options. Therefore the aim of this review is to determine the effectiveness of stenting compared with emergency surgery for suspected colorectal cancer causing acute large bowel obstruction.

Summary of the protocol

Please see Table 1 for a summary of the population, intervention, comparison and outcome (PICO) characteristics of this review.

Table 1: Summary of the protocol (PICO table)

Population	Adults with acute large bowel obstruction caused by colorectal cancer or suspected colorectal cancer Subgroups: • patients treated with curative intent • patients treated with palliative intent • right versus left sided • metastatic versus non-metastatic cancer
Intervention	Stenting followed by planned bowel resection or palliative care
Comparison	• Emergency bowel surgery (resection, bypass or stoma) • Best supportive care alone
Outcomes	**Critical** • Clinically successful bowel decompression (defined by author) • 30-day mortality • Disease-free survival **Important** • Overall survival • Length of hospital stay • Treatment-related morbidity

	○ Anastomotic leak ○ Perforation rate ○ Surgical site infection ○ Stoma rate ○ Stent failure (intervention group only) • Overall quality of life

TNM: cancer classification system, standing for tumour, nodal and metastasis stages

For further details see the review protocol in appendix A.

Methods and process

This evidence review was developed using the methods and process described in Developing NICE guidelines: the manual 2014. Methods specific to this review question are described in the review protocol in appendix A.

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

Thirteen RCTs were included in this review (Alcantara 2011; Cheung 2009; Dutch Stent-In-1 trial [Van Hooft 2008]; Dutch Stent-In-2 trial [Van Hooft 2011]; ESCO trial [Arezzo 2017]; Fiori 2004; Ghazal 2013; Ho 2012; Pirlet 2011; Xinopoulos 2004; Young 2015) and 2 follow up studies Cheung 2009 [Tung 2013]; Dutch Stent-In-2 trial [Sloothaak 2014]).

The included studies are summarised in Table 2.

Four trials (Dutch Stent-In-1 trial [Van Hooft 2008]; Fiori 2004; Xinopoulos 2004; Young 2015) compared stent placement with palliative intent to palliative surgery. Seven trials (Alcantara 2011; Cheung 2009; Dutch Stent-In-2 trial [Van Hooft 2011]; ESCO trial [Arezzo 2017]; Ghazal 2013; Ho 2012; Pirlet 2011) compared stent as a bridge to surgery (SBTS) with emergency surgery.

See the literature search strategy in appendix B and study selection flow chart in appendix C.

Expert evidence

The included studies had low numbers of participants and none was carried out in the UK. Three of these trials were stopped early due to excess treatment related adverse events which led some trialists to question the role of stenting in patients due to receive curative surgery. The CReST trial is a UK phase III randomised trial and is larger than any of the trials published to date. The results from CReST were not published within the timeline of the guideline, however results were available and were presented to the guideline committee by one of the CReST trialists as expert witness evidence.

See the summary of expert evidence in appendix M.

Excluded studies

Studies not included in this review with reasons for their exclusions are provided in appendix K.

1 Summary of clinical studies included in the evidence review

2 Summaries of the studies that were included in this review are presented in Table 2.

3 **Table 2: Summary of included studies**

Study	Population	Interventions	Outcome	Comments
RCTs in patients treated with palliative intent				
Dutch Stent-In-1 trial (Van Hooft 2008) RCT The Netherlands	N= 21 patients over the age of 18 years with incurable, left-sided colorectal cancer with a tumour that was localised between the splenic flexure and the proximal rectum (distal margin at least 10 cm from the anal verge).	Palliative stenting versus palliative surgery	• 30-day mortality • Hospital stay	Terminated early due to high number of serious adverse events in the treatment arm
Fiori 2004 RCT Italy	N= 22 patients with advanced unresectable disease, peritoneal carcinomatosis and/or multiple parenchymatous metastatic disease.	Palliative stenting versus colostomy	• Clinically successful bowel decompression • 30-day mortality • Hospital stay • Technically successful stent placement	N/A
Xinopoulos 2004 RCT Greece	N= 30 patients with partial inoperable malignant colonic obstruction	Palliative stenting versus colostomy	• Technically successful stent placement	N/A
Young 2015 RCT Australia	N= 52 patients ≥18 years who presented with a malignant large bowel obstruction, deemed not curable by surgical intervention	Palliative stenting versus emergency surgery	• Clinically successful bowel decompression • 30-day mortality • Overall survival • Hospital stay • Anastomotic leak • Surgical site infection • Stoma rate • Technically successful stent placement	N/A
RCTs in patients treated with curative intent				
Alcantara 2011 RCT Spain	N= 28 patients over 18 years of age and a diagnosis of complete intestinal obstruction due to tumour in the left colon using an abdominal CT scan	SBTS versus emergency surgery	• 30-day mortality • Hospital stay • Anastomotic leak • Surgical site infection	Suspended early due to excess morbidity in emergency surgery group

Study	Population	Interventions	Outcome	Comments
			• Technically successful stent placement	
Cheung 2009; Tung 2013 RCT China	N= 48 patients aged >18 years presenting with clinical features of left colonic obstruction found between the splenic flexure and rectosigmoid junction	SBTS versus emergency surgery	• Clinically successful bowel decompression • 30-day mortality • Disease-free survival • Overall survival • Hospital stay • Anastomotic leak • Surgical site infection • Stoma rate • Technically successful stent placement	N/A
Dutch stent-In-2 trial (Van Hooft 2011; Sloothaak 2014) RCT The Netherlands	N= 98 patients aged ≥18 years, had clinical signs of severe left-sided, colonic obstruction that had existed for less than 1 week, and had dilation of the colon on either plain abdominal radiograph, with typical abnormalities on a gastrografin enema study, or contrast-enhanced CT scan.	SBTS versus emergency surgery	• Clinically successful bowel decompression • 30-day mortality • Disease-free survival • Overall survival • Anastomotic leak • Perforation rate • Surgical site infection • Stoma rate • Technically successful stent placement	N/A
ESCO trial (Arezzo 2017) RCT Italy	N= 115 patients with acute, symptomatic malignant left-sided large-bowel obstruction localised between the splenic flexure and 15 cm from the anal margin, as diagnosed by CT examination in the emergency room	SBTS versus emergency surgery	• Clinically successful bowel decompression • 30-day mortality • Progression-free survival • Overall survival • Hospital stay • Anastomotic leak • Perforation rate • Surgical site infection • Stoma rate	N/A

Study	Population	Interventions	Outcome	Comments
			• Technically successful stent placement • Stent failure	
Ghazal 2013 RCT Egypt	N= 60 patients with acute left colonic obstruction confirmed by CT scan of the abdomen	SBTS versus emergency surgery	• Hospital stay • Anastomotic leak • Surgical site infection • Technically successful stent placement	N/A
Ho 2012 RCT China	N= 60 patients presenting with acute left colonic obstruction confirmed by a computed tomography of the abdomen	SBTS versus emergency surgery	• Clinically successful bowel decompression • 30-day mortality • Hospital stay • Anastomotic leak • Surgical site infection • Stoma rate • Technically successful stent placement • Stent failure	N/A
Pirlet 2011 RCT France	N= 60 patients >18 years, fit for both emergency surgery and colonic stenting, and presenting with obstructive symptoms, dilation of the colon, and typical abnormalities confirmed by water-soluble contrast enema, CT scan, or findings at colonoscopy suggesting left-sided malignant obstruction. Tumour located between (including) the splenic flexure and the rectosigmoid junction	SBTS versus emergency surgery	• Clinically successful bowel decompression • 30-day mortality • Hospital stay • Anastomotic leak • Perforation rate • Stoma rate • Technically successful stent placement	Suspended early due to bowel perforation in the treatment arm

CT: computed tomography; N: number; N/A: not applicable; RCT: randomised controlled trial; SBTS: stenting as a bridge to surgery

See the full evidence tables in appendix D and the forest plots in appendix E.

Quality assessment of clinical outcomes included in the evidence review

See the clinical evidence profiles in appendix F.

Economic evidence

Included studies

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

Excluded studies

A global search of economic evidence was undertaken for all review questions in this guideline. See Supplement 2 for further information.

Economic model

No economic modelling was undertaken for this review because the committee agreed that other topics were higher priorities for economic evaluation.

Evidence statements

Clinical evidence statements

Comparison 1: Stenting followed by planned bowel resection or palliative care versus emergency surgery

Critical outcomes

Clinically successful bowel decompression, defined by author (stent arm only)

Palliative intent

- Very low quality evidence from 2 RCTs (N=37) showed that clinically successful bowel decompression was achieved in 84% of patients with acute large bowel obstruction undergoing stenting.

Curative intent

- Very low quality evidence from 5 RCTs (N=177) showed that clinically successful bowel decompression was achieved in 69% of patients with acute large bowel obstruction undergoing SBTS.

30-day mortality

Palliative intent

- Very low quality evidence from 3 RCTs (N=95) showed no clinically important difference in 30-day mortality between receiving stenting compared to emergency surgery for patients with acute large bowel obstruction.

Curative intent

- Very low quality evidence from 5 RCTs (N=340) showed no clinically important difference in 30-day mortality between receiving SBTS compared to emergency surgery for patients with acute large bowel obstruction.

Disease-free survival

Palliative intent

Not applicable.

Curative intent

- Low quality evidence from 2 RCTs (N=106) showed no clinically important difference disease-free survival at 4 to 5 years follow-up between those receiving SBTS and those receiving emergency surgery for patients with acute large bowel obstruction.
- Moderate quality evidence from 1 RCT (N=115) showed no clinically important difference in 3-year progression-free survival between receiving SBTS compared to emergency surgery for patients with acute large bowel obstruction.

Important outcomes

Overall survival

Palliative intent

- Low quality evidence from 1 RCT (N=52) showed no clinically important difference in 1-year overall survival between receiving stenting compared to emergency surgery for patients with acute large bowel obstruction.

Curative intent

- Moderate quality evidence from 1 RCT (N=48) showed no clinically important difference in 5-year overall survival between receiving SBTS compared to emergency surgery for patients with acute large bowel obstruction.
- Low quality evidence from 1 RCT (N=58) showed no clinically important difference in 4-year overall survival between receiving SBTS compared to emergency surgery for patients with acute large bowel obstruction.
- Moderate quality evidence from 1 RCT (N=115) showed no clinically important difference in 3-year overall survival between receiving SBTS compared to emergency surgery for patients with acute large bowel obstruction.

Length of hospital stay

Palliative intent

- Evidence from 2 RCTs (low risk of bias, N=74) showed a clinically important decrease in length of hospital stay (4-5 days less) between receiving stenting compared to emergency surgery for patients with acute large bowel obstruction. However, evidence from 1 RCT (unclear risk of bias, N=21) showed no clinically important decrease in length of hospital stay between receiving stenting compared to emergency surgery for patients with acute large bowel obstruction.

Curative intent

- Evidence from 2 RCTs (low risk of bias, N=175) showed a clinically important decrease in length of hospital stay (1-2 days less) between receiving SBTS compared to emergency surgery for patients with acute large bowel obstruction. However, evidence from 4 RCTs (high risk of bias, N=196) showed no clinically important decrease in length of hospital stay between receiving SBTS compared to emergency surgery for patients with acute large bowel obstruction.

Anastomotic leak

Palliative intent

- Low quality evidence from 1 RCT (N=52) showed no clinically important difference in anastomotic leak between receiving stenting compared to emergency surgery for patients with acute large bowel obstruction.

Curative intent

- Very low quality evidence from 7 RCTs (N=447) showed no clinically important difference in anastomotic leak between receiving SBTS compared to emergency surgery for patients with acute large bowel obstruction.

Perforation rate (stent arm only)

Palliative intent

No evidence was identified for this outcome in this subgroup.

Curative intent

- Moderate quality evidence from 3 RCTs (N=133) showed that bowel perforation was experienced in 10% of patients with acute large bowel obstruction undergoing SBTS.

Surgical site infection

Palliative intent

- Low quality evidence from 1 RCT (N=52) showed no clinically important difference in surgical site infection between receiving stenting compared to emergency surgery for patients with acute large bowel obstruction.

Curative intent

- Very low quality evidence from 6 RCTs (N=387) showed a clinically important decrease in surgical site infection between receiving SBTS compared to emergency surgery for patients with acute large bowel obstruction.

Stoma rate

Palliative intent

- Low quality evidence from 1 RCT (N=52) showed a clinically important decrease in stoma rate post-procedure between receiving stenting compared to emergency surgery for patients with acute large bowel obstruction.

Curative intent

- Moderate quality evidence from 4 RCTs (N=312) showed a clinically important decrease in stoma rate post-procedure between receiving SBTS compared to emergency surgery for patients with acute large bowel obstruction.
- Moderate quality evidence from 4 RCTs (N=300) showed a clinically important decrease in stoma rate at last follow-up between receiving SBTS compared to emergency surgery for patients with acute large bowel obstruction.

Technically successful stent placement (stent arm only)

Palliative intent

- Very low quality evidence from 3 RCTs (N=52) showed that technical success was achieved in 86% of patients with acute large bowel obstruction undergoing stenting.

Curative intent

- Very low quality evidence from 5 RCTs (N=222) showed that technical success was achieved in 69% of patients with acute large bowel obstruction undergoing SBTS.

Stent failure (stent arm only)

Curative intent

- Low quality evidence from 2 RCTs (N=76) showed that stent failure was experienced in 18% of patients with acute large bowel obstruction undergoing SBTS.

Overall quality of life

Palliative intent

- Low quality evidence from 1 RCT (N=52) showed that while quality of life (measured using EQ-5D) decreased from baseline to 1-year follow-up in both arms, the change was clinically importantly less between receiving SBTS compared to emergency surgery for patients with acute large bowel obstruction.

Curative intent

- Low quality evidence from 1 RCT (N=98) showed a clinically important increase in quality of life (measured using EORTC-C30 QL2 subscale) from baseline to 6-months between receiving SBTS compared to emergency surgery for patients with acute large bowel obstruction.

Comparison 2: Stenting followed by palliative care versus best supportive care alone

No evidence was identified to inform this comparison.

Expert evidence statements

Comparison 1: Stenting followed by planned bowel resection or palliative care versus emergency surgery

Critical outcomes

Clinically successful bowel decompression, defined by author (stent arm only)

Palliative or curative intent

- Moderate quality expert evidence indicated clinically successful bowel decompression rates of 82% with stenting.

30-day mortality

Palliative intent

There was no expert evidence on this outcome for this subgroup.

Curative intent

- Moderate quality expert evidence indicated no clinically important difference in the 30-day mortality of patients receiving SBTS compared to emergency surgery for acute large bowel obstruction.

Disease-free survival

There was no expert evidence on this outcome.

Important outcomes

Overall survival

Palliative intent

There was no expert evidence on this outcome for this subgroup.

Curative intent

- Moderate quality expert evidence indicated no clinically important difference in the overall survival (at 3 years follow-up) of patients receiving SBTS compared to emergency surgery for acute large bowel obstruction.

Length of hospital stay

Palliative intent

- Moderate quality expert evidence indicated no clinically important difference in the length of hospital stay for patients receiving SBTS compared to emergency surgery for acute large bowel obstruction.

Curative intent

- Moderate quality expert evidence indicated no clinically important difference in the length of hospital stay for patients receiving SBTS compared to emergency surgery for acute large bowel obstruction.

Anastomotic leak

There was no expert evidence on this outcome.

Perforation rate (stent arm only)

Palliative or curative intent

- Moderate quality expert evidence indicated that around 5% of patients receiving SBTS experienced perforation, this rate was relatively low compared to previously published trials.

Surgical site infection

There was no expert evidence on this outcome.

Stoma rate

Palliative intent

There was no expert evidence on this outcome for this subgroup.

Curative intent

- Moderate quality expert evidence indicated a clinically important reduction in stoma rates for patients receiving SBTS compared to emergency surgery for acute large bowel obstruction.

Stent failure (stent arm only)

There was no expert evidence on this outcome.

Overall quality of life

There was no expert evidence on this outcome.

Economic evidence statements

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

The committee's discussion of the evidence

Interpreting the evidence

The outcomes that matter most

Clinically successful bowel decompression, as defined by the author, was considered a critical outcome as it identifies the clinical success rate of stent placement compared to

emergency surgery. 30-day mortality was also a critical outcome as it indicates the technical success rate of stent deployment. Disease-free survival was a critical outcome for decision making because disease progression suggests ineffective management of the cancer and bowel obstruction, potentially requiring further treatment and affecting overall survival, which was considered an important outcome.

Length of hospital stay and treatment-related morbidity (including anastomotic leak, perforation rate, surgical site infection, stoma rate and stent failure) were considered important outcomes because they are indicators of technical success of the stent. Quality of life was an important outcome because of the impact that different treatment options can have on patients' functioning and the potential long term adverse effects.

The quality of the evidence

Evidence was available for the comparison of stenting followed by planned bowel resection or palliative care versus emergency surgery. Evidence was available for all of the outcomes. No evidence was available for the comparison of stenting followed by palliative care versus best supportive care alone. The quality of the clinical evidence was assessed using GRADE and varied very low to moderate quality.

The quality was downgraded due to lack of blinding in all trials, and inconsistency or imprecision for some outcomes. Although median length of hospital stay was reported by several studies but it was not possible to pool these results using meta-analysis.

An expert witness presented unpublished results of the CReST trial which provided expert evidence for the comparison of stenting followed by planned bowel resection or palliative care versus emergency surgery. This evidence was assessed using GRADE as moderate quality due to imprecision resulting from the sample size of the trial.

Benefits and harms

The recommendations were based on evidence of reduced stoma rates in patients presenting with acute left-sided large bowel obstruction treated with stents compared with those receiving emergency surgery. There was no evidence of a difference in overall or disease-free survival. Potential harms of stenting included perforation, stent failure or failure to achieve technical success and these patients would then require surgery. The committee agreed that stenting was successful for most patients and so the benefits outweighed the harms. This balance was less clear cut for patients to be treated with curative intent who would go on to receive surgery at some point, and for this group the committee recommended both stenting and emergency surgery as options.

The committee also discussed that stenting allows time to fully assess the patient and stabilise any comorbidities before proceeding with further surgery.

The yet to be published results of the CReST trial were consistent with the published evidence and supported the recommendation for stenting as an option for those suitable for potentially curative resection.

Ideally, the decision about whether to offer stenting or emergency surgery should be taken after discussion with relevant specialists (for example colorectal specialist), however, their unavailability should not delay the timely treatment in an emergency situation.

Cost effectiveness and resource use

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

These recommendations will lead to an increase in stenting as it is not currently established practice for patients with left-sided large bowel obstruction being treated with palliative intent.

It may also require that patients are transferred to other centres to receive stenting. Stenting however allows patients to be assessed and become stable before surgery reducing operative morbidity and preventing expensive surgery in those individuals where it would not be appropriate. Expert evidence from the CReST trial also highlighted there was a lower rate of stoma. All these would reduce downstream costs and improve quality of life.

References

Alcantara 2011

Alcantara M, Serra-Aracil X, Falco J, et al. (2011) Prospective, controlled, randomized study of intraoperative colonic lavage versus stent placement in obstructive left-sided colonic cancer. World Journal of Surgery 35(8): 1904-1910

Cheung 2009

Cheung H, Chung C, Tsang W, et al. (2009) Endolaparoscopic approach vs conventional open surgery in the treatment of obstructing left-sided colon cancer: a randomized controlled trial. Archives of Surgery 144(12): 1127-32

Tung K, Cheung H, Ng L, et al. (2013) Endo-laparoscopic approach versus conventional open surgery in the treatment of obstructing left-sided colon cancer: long-term follow-up of a randomized trial. Asian journal of Endoscopic Surgery 6(2): 78-81

Dutch Stent-In-1 trial

van Hooft J, Fockens P, Marinelli A, et al. (2008) Early closure of a multicenter randomized clinical trial of endoscopic stenting versus surgery for stage IV left-sided colorectal cancer. Endoscopy 40(3): 184-191

Dutch Stent-In-2 trial

Sloothaak D, van den Berg M Dijkgraaf M, et al. (2014) Oncological outcome of malignant colonic obstruction in the Dutch Stent-In 2 trial. British Journal of Surgery 101(13): 1751-1757 2014

van Hooft J, Bemelman W, Oldenburg B, et al. (2011) Colonic stenting versus emergency surgery for acute left-sided malignant colonic obstruction: A multicentre randomised trial. Lancet Oncology 12(4): 344-352

ESCO trial

Arezzo A, Balague C, Targarona E, et al. (2017) Colonic stenting as a bridge to surgery versus emergency surgery for malignant colonic obstruction: results of a multicentre randomised controlled trial (ESCO trial). Surgical Endoscopy and Other Interventional Techniques 31(8): 3297-3305

Fiori 2004

Fiori E, Lamazza A, De Cesare A, et al. (2004) Palliative management of malignant rectosigmoidal obstruction. Colostomy vs. endoscopic stenting. A randomized prospective trial. Anticancer Research 24(1): 265-268

Ghazal 2013

Ghazal A, El-Shazly W, Bessa S, et al. (2013) Colonic Endolumenal Stenting Devices and Elective Surgery Versus Emergency Subtotal/Total Colectomy in the Management of Malignant Obstructed Left Colon Carcinoma. Journal of Gastrointestinal Surgery 17(6): 1123-1129

Ho 2012

Ho K, Quah H, Lim J, et al. (2011) Emergency preoperative stenting versus surgery for acute left-sided malignant colonic obstruction: a multicenter randomized controlled trial. Surgical Endoscopy 25(6): 1814-1821

Xinopoulos 2004

Xinopoulos D, Dimitroulopoulos D, Theodosopoulos T, et al. (2004) Stenting or stoma creation for patients with inoperable malignant colonic obstructions? Results of a study and cost-effectiveness analysis. Surgical Endoscopy 18(3): 421-426

Young 2015

Young C, De-Loyde K, Young J, (2015) Improving Quality of Life for People with Incurable Large-Bowel Obstruction: Randomized Control Trial of Colonic Stent Insertion. Diseases of the Colon and Rectum 58(9): 838-49

Appendices

Appendix A – Review protocol

Review protocol for review question: What is the effectiveness of stenting compared with emergency surgery for suspected colorectal cancer causing acute large bowel obstruction?

Table 3: Review protocol for pharmacological treatments for spasticity

Field (based on PRISMA-P)	Content
Review question	What is the effectiveness of stenting compared with emergency surgery for suspected colorectal cancer causing acute large bowel obstruction?
Type of review question	Intervention
Objective of the review	To determine the effectiveness of stenting compared with emergency surgery for suspected colorectal cancer causing acute large bowel obstruction.
Eligibility criteria – population/disease/condition/issue/domain	Adults with acute large bowel obstruction caused by colorectal cancer or suspected colorectal cancer Subgroups: • patients treated with curative intent • patients treated with palliative intent • right versus left sided • metastatic versus non-metastatic cancer
Eligibility criteria – intervention(s)	• Stenting followed by planned bowel resection or palliative care
Eligibility criteria – comparator(s)	• Emergency bowel surgery (resection, bypass or stoma) • Best supportive care alone
Outcomes and prioritisation	**Critical outcomes:** • Clinically successful bowel decompression (defined by author) (MID: statistical significance) • 30-day mortality (MID: statistical significance) • Disease-free survival [for the curable group only] (MID: statistical significance) **Important outcomes:** • Overall survival (MID: statistical significance) • Length of hospital stay (MID: statistical significance) • Treatment-related morbidity (MID: statistical significance) ○ Anastomotic leak ○ Perforation rate ○ Surgical site infection ○ Stoma rate ○ Stent failure (intervention group only)

Field (based on PRISMA-P)	Content
	• Overall quality of life measured using validated scales (MID: published MIDs from literature) Quality of life MIDs from the literature: • EORTC QLQ-C30: 5 points* • EORTC QLQ-CR29: 5 points* • EORTC QLQ-CR38: 5 points* • EQ-5D: 0.09 using FACT-G quintiles • FACT-C: 5 points* • FACT-G: 5 points* • SF-12: > 3.77 for the mental component summary (MCS) and > 3.29 for the physical component summary (PCS) of the Short Form SF-12 (SF-12) • SF-36: > 7.1 for the physical functioning scale, > 4.9 for the bodily pain scale, and > 7.2 for the physical component summary *Confirmed with guideline committee.
Eligibility criteria – study design	• Systematic reviews of RCTs • RCTs If RCT evidence for any of the comparisons is not available systematic reviews of cohort studies and cohort studies will be considered.
Other inclusion exclusion criteria	Inclusion: • English-language • Published full text papers • All settings will be considered that consider medications and treatments available in the UK • Studies published post-2000 Studies published 2000 onwards will be considered for this review question because the guideline committee considered that evidence prior to 2000 would not be relevant any longer because the use of stents did not take place prior to this date.
Proposed sensitivity/sub-group analysis, or meta-regression	For observational studies, multivariate analysis should adjust for the following characteristics: • Patient characteristics: Age, comorbidities, performance status • Tumour characteristics: Location of tumour, severity of bowel obstruction • Hospital characteristics: Caseload, tertiary versus secondary In case of high heterogeneity, the following factors will be considered: • Treatment characteristics: Type of stent used
Selection process – duplicate screening/selection/analysis	Sifting, data extraction, appraisal of methodological quality and GRADE assessment will be performed by the systematic reviewer. Resolution of any disputes will be with the senior systematic reviewer and the Topic

Field (based on PRISMA-P)	Content
	Advisor. Quality control will be performed by the senior systematic reviewer.
Data management (software)	Pairwise meta-analyses 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 study sifting, data extraction, recording quality assessment using checklists and generating bibliographies/citations.
Information sources – databases and dates	Potential sources to be searched (to be confirmed by Information Scientist): 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: post-2000
Identify if an update	Not an update
Author contacts	https://www.nice.org.uk/guidance/indevelopment/gid-ng10060 Developer: NGA
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.
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).
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).
Methods for assessing bias at outcome/study level	Standard study checklists were used to critically appraise individual studies. For details please see section 6.2 of Developing NICE guidelines: the manual **Appraisal of methodological quality:** The methodological quality of each study will be assessed using an appropriate checklist: • ROBIS for systematic reviews • Cochrane risk of bias tool for RCTs • ROBINS-I for non-randomised studies The quality of the evidence for an outcome (i.e. across studies) will be assessed using GRADE.

Field (based on PRISMA-P)	Content
	The risk of bias across all available evidence was evaluated for each outcome using an adaptation of the 'Grading of Recommendations Assessment, Development and Evaluation (GRADE) toolbox' developed by the international GRADE working group http://www.gradeworkinggroup.org/
Criteria for quantitative synthesis (where suitable)	For details please see section 6.4 of Developing NICE guidelines: the manual
Methods for analysis – combining studies and exploring (in)consistency	**Synthesis of data:** Pairwise meta-analysis of randomised trials will be conducted where appropriate. When meta-analysing continuous data, final and change scores will be pooled if baselines are comparable. If any studies report both, the method used in the majority of studies will be analysed. **Minimally important differences**: The guideline committee identified statistically significant differences as appropriate indicators for clinical significance for all outcomes except for quality of life for which published MIDs from literature will be used (see outcomes section for more information).
Meta-bias assessment – publication bias, selective reporting bias	For details please see section 6.2 of Developing NICE guidelines: the manual. If sufficient relevant RCT evidence is available, publication bias will be explored using RevMan software to examine funnel plots.
Assessment of confidence in cumulative evidence	For details please see sections 6.4 and 9.1 of Developing NICE guidelines: the manual
Rationale/context – Current management	For details please see the introduction to the evidence review.
Describe contributions of authors and guarantor	A multidisciplinary committee developed the guideline. The committee was convened by The National Guideline Alliance and chaired by Peter Hoskin 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 Supplement 1: methods.
Sources of funding/support	The National Guideline Alliance is funded by NICE and hosted by the Royal College of Obstetricians and 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 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

CCTR: Cochrane Central Register of Controlled Trials; CDSR: Cochrane Database of Systematic Reviews; DARE: Database of Abstracts of Reviews of Effects; EQ-5D: EuroQol five dimensions questionnaire; EORTC QLQ-C30: European Organisation for Research and Treatment of Cancer Quality of Life Questionnaire Core 30 Items; EORTC QLQ-CR29: European Organisation for Research and Treatment of Cancer Quality of Life Questionnaire colorectal cancer module (29 items); EORTC QLQ-CR38: European Organisation for Research and Treatment of Cancer Quality of Life Questionnaire colorectal cancer module (38 items); FACT-C: Functional Assessment of Cancer Therapy questionnaire (colorectal cancer); FACT-G: Functional Assessment of Cancer Therapy questionnaire (general); GRADE: Grading of Recommendations Assessment, Development and Evaluation; HTA: Health Technology Assessment; MID: minimal important difference; MRI: magnetic resonance imaging; NGA: National Guideline Alliance; NHS: National health service; NICE: National Institute for Health and Care Excellence; PRISMA-P: Preferred Reporting Items for Systematic Reviews and Meta-Analysis Protocols; PROSPERO: International Prospective Register for Systematic Reviews; RCT: randomised controlled trial; RCT: randomised controlled trial; ROBINS-I: Risk of Bias in Non-randomised Studies – of Interventions; ROBIS: risk of bias in systematic reviews; SD: standard deviation

1 Appendix B – Literature search strategies

2 Literature search strategies for review question: What is the effectiveness of 3 stenting compared with emergency surgery for suspected colorectal cancer 4 causing acute large bowel obstruction?

5 Databases: Embase/Medline

6 Last searched on: 10/01/2019

#	Search
1	(exp colorectal cancer/ or exp colon tumor/ or exp rectum tumor/) use emez
2	exp colorectal neoplasms/ use ppez
3	((colorect* or colo rect* or colon or colonic or rectal or rectum) adj3 (adenocarcinoma* or cancer* or carcinoma* or malignan* or neoplas* or oncolog* or tumo?r*)).tw.
4	or/1-3
5	intestine obstruction/ use emez
6	colon obstruction/ use emez
7	exp intestinal obstruction/ use ppez
8	((bowel or colon or colonic or gastrointestin* or intestine or intestinal) adj4 (obstruct* or block* or occlusion)).tw.
9	((adenocarcinoma* or cancer* or carcinoma* or malignan* or neoplas* or oncolog* or tumo?r*) adj4 obstruct*).tw.
10	or/5-9
11	stent/ use emez
12	stents/ use ppez
13	stent*.tw.
14	or/11-13
15	4 and 10 and 14
16	remove duplicates from 15
17	limit 16 to (yr="2000 - current" and english language)
18	Letter/ use ppez
19	letter.pt. or letter/ use emez
20	note.pt.
21	editorial.pt.
22	Editorial/ use ppez
23	News/ use ppez
24	exp Historical Article/ use ppez
25	Anecdotes as Topic/ use ppez
26	Comment/ use ppez
27	Case Report/ use ppez
28	case report/ or case study/ use emez
29	(letter or comment*).ti.
30	or/18-29
31	randomized controlled trial/ use ppez
32	randomized controlled trial/ use emez
33	random*.ti,ab.
34	or/31-33
35	30 not 34
36	animals/ not humans/ use ppez
37	animal/ not human/ use emez
38	nonhuman/ use emez
39	exp Animals, Laboratory/ use ppez
40	exp Animal Experimentation/ use ppez
41	exp Animal Experiment/ use emez
42	exp Experimental Animal/ use emez

#	Search
43	exp Models, Animal/ use ppez
44	animal model/ use emez
45	exp Rodentia/ use ppez
46	exp Rodent/ use emez
47	(rat or rats or mouse or mice).ti.
48	or/35-47
49	17 not 48

1 **Database: Cochrane Library**

2 Last searched on: 10/01/2019

#	Search
1	MeSH descriptor: [Colorectal Neoplasms] explode all trees
2	((colorect* or colo rect* or colon or colonic or rectal or rectum) near/3 (adenocarcinoma* or cancer* or carcinoma* or malignan* or neoplas* or oncolog* or tumo*r*)):ti,ab,kw
3	#1 or #2
4	MeSH descriptor: [Intestinal Obstruction] explode all trees
5	((bowel or colon or colonic or gastrointestin* or intestine or intestinal) near/3 (obstruct* or block* or occlusion)):ti,ab,kw
6	((adenocarcinoma* or cancer* or carcinoma* or malignan* or neoplas* or oncolog* or tumo*r*) near/3 obstruct*):ti,ab,kw
7	#4 or #5 or #6
8	MeSH descriptor: [Stents] this term only
9	(stent*):ti,ab,kw
10	#8 or #9
11	#3 and #7 and #10 with Cochrane Library publication date Between Jan 2000 and Jan 2019

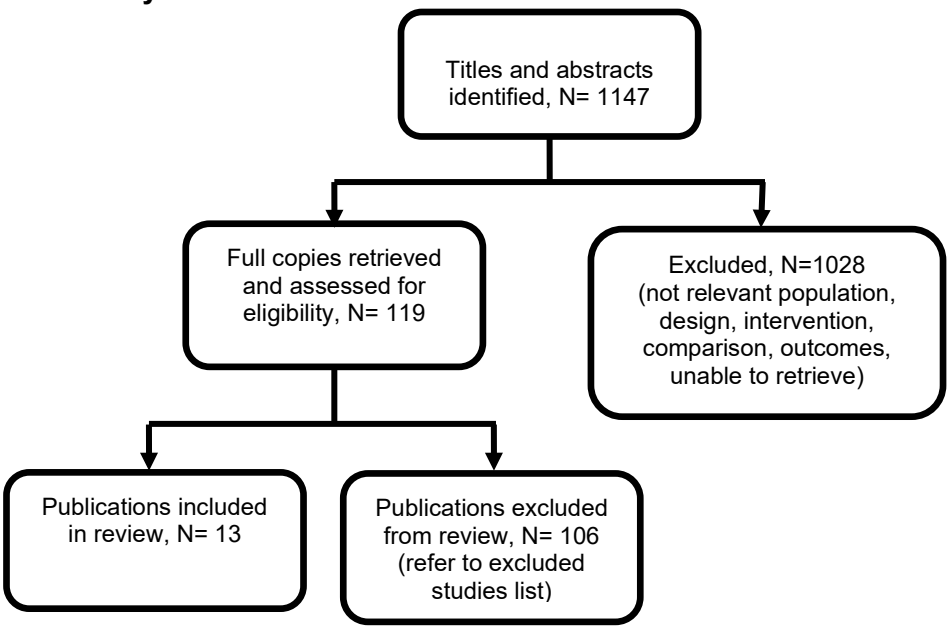
3

4

Appendix C – Clinical evidence study selection

Clinical study selection for: What is the effectiveness of stenting compared with emergency surgery for suspected colorectal cancer causing acute large bowel obstruction?

Figure 1: Study selection flow chart



Appendix D – Clinical evidence tables

Clinical evidence tables for review question: What is the effectiveness of stenting compared with emergency surgery for suspected colorectal cancer causing acute large bowel obstruction?

Table 4: Clinical evidence tables

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Full citation Alcantara, M., Serra-Aracil, X., Falco, J., Mora, L., Bombardo, J., Navarro, S., Prospective, controlled, randomized study of intraoperative colonic lavage versus stent placement in obstructive left-sided colonic cancer, World Journal of Surgery, 35, 1904-1910, 2011 **Ref Id** 833326 **Country/ies where the study was carried out** Spain **Study type**	**Sample size** n= 28 n stent as bridge to surgery (SBTS)= 15 n emergency surgery (ES)= 13 **Characteristics** SBTS, n= 15 Age, years, mean (SD)= 71.9 (8.96) Male, sex, n=5 Duration of obstruction, days, median (IQR)=4 (4) Site of tumour, n Splenic flexure=2 Descending colon=1 Sigmoid colon=11 Rectosigmoid junction=0 Rectum 1/3 sup=1 ASA, n I-II=5 III=8 IV=2	**Interventions** Stent as a bridge to surgery: "In case of complications during stent placement (i.e., perforation or technically impossible to place), emergency surgery was performed. The success of the procedure was defined as the clinical appearance of intestinal transit and the disappearance of the obstruction on abdominal radiography. In the case of stent migration, attempts were made to reinsert it. If successful, this was recorded as a complication but the intervention was still considered as scheduled, as indicated in the protocol. In the case of hemorrhage, conservative treatment was used. The surgery was scheduled for 5-7 days after stent placement."	**Details** Randomisation: Via sealed envelope Blinding: Not possible Outcomes: Complications due to the placement of the stent, surgical time, total and postoperative hospital stay, pathology study of the resection, surgical site infection (superficial, deep, and organ-space), anastomotic dehiscence, postoperative complications (seroma, ileus, evisceration), postoperative reintervention and disease free survival (oncologic relapse) Follow-up: Subsequent controls were performed at surgery outpatient units after 6, 12, 18, 24, 48, and 60 months. Data analysis: "The quantitative variables were described using means and standard deviation when the distribution was considered normal; otherwise, the values of the median, interquartile interval, and range were used. The intention-to-treat analysis included all randomized patients. The per-protocol analysis included all patients receiving stent and scheduled surgery in the stent group and all patients in the emergency surgery group. The statistical analysis of the quantitative variables, with independent groups, was performed with the Student t-test, parametric test, or the nonparametric Mann–Whitney U test. In the statistical analysis of the categorical variables,	**Results** Disease-free survival, event is relapse SBTS= 8/15 ES= 2/13 Kaplan-Meier log-rank test= 0.055 Hospital mortality, n/N SBTS=0/15 ES=1/13 Hospital days, median (IQR) SBTS= 13 (3) ES= 10 (10) p-value= 0.105 Anastomotic leak, n/N SBTS=0/15 ES=4/13 Global-Surgical Site Infection, n/N SBTS=2/15 ES=6/13 Technical success, n SBTS= 15/15	**Limitations** Cochrane risk of bias tool **Selection bias** Random sequence generation: unclear risk (sequence generation not reported) Allocation concealment: unclear risk (not reported) **Performance bias** Blinding of participants and personnel: low risk (not possible, but unlikely to affect performance on objective outcomes) **Detection bias** Blinding of outcome assessment: low risk (not possible, but unlikely to affect assessment of objective outcomes) **Attrition bias** Incomplete outcome data: low risk (intention to treat analysis and per protocol analysis used) **Reporting bias** Selective reporting: low risk (primary outcome points were reported) **Other bias** High risk of bias: Due to the high rate of anastomotic leak in the emergency surgery group, the study was terminated early (n

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
RCT **Aim of the study** The aim of the study was to assess the short-term results and long-term outcomes of patients who underwent stent placement as a bridge to surgery compared to intraoperatice colonic lavage with primary anastomosis. **Study dates** February 2004 to December 2006 **Source of funding** Parc Tauli Foundation	ES, n= 13 Age, years, mean (SD)=71.15 (9) Male, sex, n=7 Duration of obstruction, days, median (IQR)=4 (3) Site of tumour, n Splenic flexure=4 Descending colon=2 Sigmoid colon=4 Rectosigmoid junction=3 Rectum 1/3 sup=0 ASA, n I-II=1 III=9 IV=3 **Inclusion criteria** Over 18 years of age and a diagnosis of complete intestinal obstruction due to tumor in the left colon using an abdominal CT scan **Exclusion criteria**	Emergency surgery: intraoperative colonic lavage (IOCL) with primary anastomosis	Pearson's X^2 test was used. The appearance of oncologic relapse during follow-up, identified either clinically or by CT, was analyzed with the Kaplan-Meier estimation method and the log-rank test. The results of the statistical tests are given for a p value less than 0.05."		included in ITT analysis was 28, but the n originally calculated for statistical power was 42). Interim safety analyses and protocol to terminate early were not pre-specified. **Other information**

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	"Unresectable lesion (intraoperative), severe ischemia or cecal perforation, fecal or advanced purulent peritonitis, hemodynamic instability during surgery, immuno-depressed state (corticoids, chemotherapy, HIV, major surgery in the previous 2 months), and septic shock."				
Full citation Arezzo, A., Balague, C., Targarona, E., Borghi, F., Giraudo, G., Ghezzo, L., Arroyo, A., Sola-Vera, J., De Paolis, P., Bossotti, M., Bannone, E., Forcignano, E., Bonino, M. A., Passera, R., Morino, M., Colonic stenting as a bridge to surgery versus emergency surgery	**Sample size** n= 115 n SBTS= 56 n ES= 59 **Characteristics** SBTS, n=56 Male sex, n= 28 Age, years, mean (range)= 72 (43-90) ASA, n I=12 II=27 III=14 IV=3	**Interventions** Stenting as bridge to surgery (SBTS)= "SEMS placement was performed using a colonoscope with a 4.2-mm operative channel. A hydrophilic guide contained in a five Fr catheter was advanced across the neoplastic stenosis under radiographic control. The catheter was inserted through the stenosis and water-soluble contrast liquid injected above the stenosis to evaluate the	**Details** Randomisation: Centralised web-based data base Blinding: Blinded via unchangeable number-generating software programme Outcomes: Primary outcome - overall morbidity (surgery-related complications within 60 days of surgery). Secondary outcomes - technical success (correct stent placement under radiographic and endoscopic vision), clinical success (resolution of occlusive symptoms by gas and faeces passage), hospital stay (length of hospital stay in days between admission to and discharge from hospital), postoperative complications (any local or systemic complications observed during hospital stay), overall survival (the time from accrual to	**Results** Clinical success in stented patients= 44/56 30-day mortality, n SBTS= 1/56 ES=0/59 Progression-free survival at 3 years, event is progression, relapse or death from any cause SBTS= 17/56 ES= 12/59 Hazard ratio p-value = 0.893 Overall survival at 3 years, event is death from any cause SBTS= 18/56 ES= 16/59	**Limitations** Cochrane risk of bias tool **Selection bias** Random sequence generation: low risk Allocation concealment: low risk **Performance bias** Blinding of participants and personnel: low risk (not possible, but unlikely to affect performance on objective outcomes) **Detection bias** Blinding of outcome assessment: low risk (not possible, but unlikely to affect assessment of objective outcomes) **Attrition bias**

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
for malignant colonic obstruction: results of a multicentre randomised controlled trial (ESCO trial), Surgical Endoscopy and Other Interventional Techniques, 31, 3297-3305, 2017 **Ref Id** 789257 **Country/ies where the study was carried out** Italy **Study type** ESCO trial - Multi-centre RCT **Aim of the study** The aim of the study is to compare morbidity rates after colonic stenting as a bridge to surgery and after emergency surgery to evaluate the efficacy and safety of the two strategies in the management of malignant, left-	ES, n=59 Male sex, n=32 Age, years, mean (range)=71 (44-94) ASA, n I=11 II=28 III=16 IV=4 **Inclusion criteria** "Acute, symptomatic malignant left-sided large-bowel obstruction localised between the splenic flexure and 15 cm from the anal margin, as diagnosed by computed tomography (CT) examination in the emergency room. The main clinical complaint was failure to pass gas and faeces." **Exclusion criteria**	length of the stenosis under fluoroscopic vision. A super stiff guide wire was left in place while the five Fr catheter was retracted. Stents were positioned so as to exceed 1–2 cm from each side of the stenosis. No tumour or stent dilatation was performed... If symptom relief was achieved with stenting, elective surgery was scheduled depending on the patient's clinical conditions and included laparoscopic or laparotomic bowel resection, with or without creation of a protective stoma, according to surgeons' preferences and intra-operative findings." Emergency surgery (ES)= "Surgeons could decide between simple enterostomy and bowel resection based on their experience, the patient's clinical condition, and intra-operative findings." Types of surgery= Hartmann's procedure, subtotal colectomy, washout and anastomosis, colostomy, left colectomy, sigmoidectomy, anterior resection	death from any cause), progression free survival (time from accrual to progression/relapse/death from any cause). Follow up: 60 days for complication outcomes, 3 years for survival data Data analysis: "Fisher's exact test was performed to evaluate the association between any categorical variable and the treatment arm (SBTS/ES), while the Mann–Whitney test was used for continuous variables. OS and PFS curves were estimated by the Kaplan–Meier method and compared using the log-rank test. In both cases, patients still alive were censored at the date of last contact. All reported p values were obtained using a two-sided exact method at the conventional 5% significance level."	Hazard ratio p-value= 0.998 Hospital stay, days, median (range) SBTS= 10 (7-13) ES= 11 (8-15) p= 0.039 During hospital stay Anastomotic leak, n SBTS= 3/56 ES= 2/59 Perforation in stented patients= 5/56 Wound infection, n SBTS= 4/56 ES= 7/59 Stoma immediately after intervention, n SBTS= 11/56 ES= 23/59 Stoma at end of follow up, n SBTS=9/56 ES=15/59 Stent failure (requiring emergency surgery)= 6/56 Technical success in stented patients= 49/56	Incomplete outcome data: low risk (intention to treat analysis used) **Reporting bias** Selective reporting: low risk (primary outcome points were reported) **Other bias** **Other information**

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
sided large bowel obstruction. **Study dates** 1 March 2008 to 16 November 2015 **Source of funding** European Association for Endoscopic Surgery	"Bowel perforation as diagnosed by clinical exploration and complementary studies, associated conditions contraindicating general anaesthesia and/or haemodynamic instability, impossibility to obtain valid informed consent or refusal by the patient, distant metastases as diagnosed by CT scan at the time of diagnosis"				
Full citation Cheung, H. Y., Chung, C. C., Tsang, W. W., Wong, J. C., Yau, K. K., Li, M. K., Endolaparoscopic approach vs conventional open surgery in the treatment of obstructing left-sided colon cancer: a randomized	**Sample size** n= 48 n stenting as a bridge to surgery (SBTS)= 24 n emergency open surgery (ES)= 24 **Characteristics** SBTS, n=24 Male sex, n= 12	**Interventions** SBTS= "Patients with SEMSs were placed under endoscopic and fluoroscopic guidance by a dedicated endoscopist within 6 hours of the contrast study. more than 1 stent was placed if required. Abdominal radiography was performed the next day following stenting. Preoperative workup for cancer	**Details** Randomsiation: Computer-generated randomisation Allocation: Not reported Outcomes: Primary outcome: successful 1-stage operation. Secondary outcomes: cumulative operative time (sum of the time of all the operations required for a patient); cumulative blood loss; conversion rate; postoperative pain score and analgesic requirement; cumulative length of hospital stay (total number of days spent in the hospital); operative mortality (deaths that occured within 30 days postoperatively); postoperative complications, including	**Results** Technical success in SBTS group= 20/24 Clinical success in SBTS group= 20/24 Hospital stay, day, median (range) SBTS= 13.5 (7-29) ES= 14 (7-55) p-value= 0.7 (Mann-Whitney U test) Anastomotic leak, n SBTS= 0/24 ES= 2/24 Wound infection, n	**Limitations** **Cochrane risk of bias tool** **Selection bias** Random sequence generation: low risk (computer generated) Allocation concealment: unclear risk (not reported) **Performance bias** Blinding of participants and personnel: low risk (not possible, but unlikely to affect performance on objective outcomes) **Detection bias** Blinding of outcome assessment: low risk (not possible, but unlikely

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
controlled trial, Archives of Surgery, 144, 1127-32, 2009 **Ref Id** 860874 **Country/ies where the study was carried out** China **Study type** RCT **Aim of the study** The aim of the study was to compare self-expanding metal stents with emergency open surgery for the treatment of obstructing left-sided colon cancer. **Study dates** January 2002 to May 2005 **Source of funding** None reported	Age, years, median (range)= 68.5 (27-86) Staging, n I=0 II=7 III=8 IV=9 ES, n=24 Male sex, n=14 Age, years, median (range)=64.5 (39-68) Staging, n I=1 II=7 III=13 IV=3 **Inclusion criteria** Consecutive adult patients (aged >18 years) presentingwith clinical features of left colonic obstruction found between the splenic flexure and rectosigmoid junction. **Exclusion criteria** Considered unfit for operative treatment, had a	staging was carried out, and patients were readmitted for elective laparoscopic- assisted colectomy within 2 weeks after placement of the SEMS. The operation was performed in a standardized manner. The resected specimen with the stent in situ was delivered through a protected muscle-splitting left iliac fossa or Pfannenstiel incision. The anastomosis was constructed intracorporeally using a circular stapler. A loop ileostomy was constructed if the surgeons considered them appropriate. Conversion was defined as extension of the incision to complete the procedure safely for reasons other than specimen retrieval. Patients who had failed decompression by the SEMS underwent emergency open surgery on the same day; operative management was the same as that in the open surgery group." ES= "The Hartmann procedure, primary anastomosis after either subtotal, or total colectomy or segmental	anastomotic leak (clinical or radiological evidence of leakage from the anastomosis); and rates of permanent stoma creation (permanent stoma rates). Follow up: prior to discharge Statistical analysis: "Analysis was performed with the X^2 test, Fisher exact test, t test, or Mann-WhitneyUtest where appropriate. P—— .05 was considered significant. Patients were analyses according to the intention-to-treat principle."	SBTS= 2/24 ES= 8/24 Permanent stoma, n SBTS= 0/24 ES= 6/24	to affect assessment of objective outcomes) **Attrition bias** Incomplete outcome data: low risk (intention to treat analysis and per protocol analysis used) **Reporting bias** Selective reporting: low risk (primary outcome points were reported) **Other bias** **Other information**

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	previous laparotomy, had a clinically palpable tumor on abdominal examination.	colectomy with on-table lavage was performed according to the intraoperative findings and the operators' judgment. A defunctioning stoma was constructed if the surgeons considered it appropriate."			
Full citation Fiori, E., Lamazza, A., De Cesare, A., Bononi, M., Volpino, P., Schillaci, A., Cavallaro, A., Cangemi, V., Palliative management of malignant rectosigmoidal obstruction. Colostomy vs. endoscopic stenting. A randomized prospective trial, Anticancer research, 24, 265-268, 2004 **Ref Id** 954359 **Country/ies where the study was carried out**	**Sample size** n= 22 n palliative stent= 11 n colostomy= 11 **Characteristics** Palliative stent, n=11 Male sex, n= 6 Age, mean= 77.2 (3.3) ASA, n I=4 II=6 III=1 Site of obstruction, n Rectum= 7 Sigmoid colon= 4 Palliative stent, n=11 Male sex, n=7 Age, mean (SD)= 76 (4.6) Site of obstruction, n Rectum= 7 Sigmoid colon= 4	**Interventions** Palliative stent= "A self-expanding metallic stent measuring 9-12 cm in length, was passed through the stricture, with distal inner above the proximal tumor margin. The length of the stent was 9 cm in 8 patients and 12 cm in 3 patients. The guidewire was inserted through the channel of the endoscope and its position was confirmed by fluoroscopy. The insertion and deployment of the stent were checked by both endoscopic and fluoroscopic guidance." Colostomy= "Preoperative mechanical bowel preparation could be achieved without complications. A right transverse colostomy was made under general	**Details** Randomsiation: random-number table Allocation: not reported Outcomes: mean operative time, morbidity and mortality rate, canalization of the gastrointestinal tract, restoration of oral intake, median hospital stay. Follow up: prior to discharge Statistical analysis: "The Student's t-test and Fischer's exact test were used when appropriate. All values are expressed as mean±standard deviation of the mean. A p value < 0.05 was set as significant."	**Results** Technical success in palliative stent arm= 11/11 Clinical success in palliative stent arm= 11/11 30-day mortality, n Palliative stent= 0/11 Colostomy= 0/11 Hospital stay, days, median Palliative stent= 2.6 Colostomy= 8.1 p-value < 0.0001	**Limitations** **Cochrane risk of bias tool** **Selection bias** Random sequence generation: unclear risk (random number tables used) Allocation concealment: unclear risk (not reported) **Performance bias** Blinding of participants and personnel: low risk (not possible, but unlikely to affect performance on objective outcomes) **Detection bias** Blinding of outcome assessment: low risk (not possible, but unlikely to affect assessment of objective outcomes) **Attrition bias** Incomplete outcome data: low risk (intention to treat analysis and per protocol analysis used) **Reporting bias** Selective reporting: high risk (morbidity outcome not pre-defined) **Other bias** **Other information**

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Italy **Study type** RCT **Aim of the study** The aim of the study was to compare endoscopic stenting with palliative colostomy. **Study dates** January 2001 to May 2003 **Source of funding** Not reported	ASA, n I=5 II=5 III=1 **Inclusion criteria** Patients with advanced unresectable disease, peritoneal carcinomatosis and/or multiple parenchymatous metastatic disease. **Exclusion criteria** Not reported	anaesthesia. All patients were not given oral feedings before stoma opening."			
Full citation Ghazal, A. H. A., El-Shazly, W. G., Bessa, S. S., El-Riwini, M. T., Hussein, A. M., Colonic Endolumenal Stenting Devices and Elective Surgery Versus Emergency Subtotal/Total Colectomy in the Management of	**Sample size** n= 60 Emergency stenting followed by elective resection (ESER)= 30 Total abdominal colectomy and ileorectal anastomosis (TACIR)= 30 **Characteristics**	**Interventions** ESER= "Upfront endoscopic placement, under fluoroscopic guidance, of a colonic stent across the obstruction according to the standard technique described elsewhere. Following successful stent placement, the patient was admitted to a general surgical ward, received a colonic purge, and subsequently	**Details** Randomisation: Pseudorandom number generator Allocation concealment: Individual assignments concealed in sequentially numbered sealed envelopes that were opened in order when assignments were made Outcomes: Postoperative complications, hospital stay Follow up: 3-monthly basis in first post-op year, 6-monthly basis in the first 2 post-op years, annually thereafter Data analysis: "The Mann–Whitney U test and the Student's t test were used for	**Results** Technical success in ESER group= 29/30 Hospital stay, days, median ESER= 13 TACIR= 8 p= 0.102 Anastomotic leak, n ESER= 0/29 TACIR= 1/30 Wound infection, n ESER= 1/29 TACIR= 9/30	**Limitations** Cochrane risk of bias tool **Selection bias** Random sequence generation: low risk Allocation concealment: low risk **Performance bias** Blinding of participants and personnel: low risk (not possible, but unlikely to affect performance on objective outcomes) **Detection bias** Blinding of outcome assessment: low risk (not possible to blind, but

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Malignant Obstructed Left Colon Carcinoma, Journal of gastrointestinal surgery, 17, 1123-1129, 2013 **Ref Id** 954389 **Country/ies where the study was carried out** Egypt **Study type** RCT **Aim of the study** The aim of the study was to compare stenting for relief of colonic obstruction followed by elective colectomy to total abdominal colectomy and ileorectal anastomosis for management of acute obstructed carcinoma of the left colon. **Study dates**	ESER, n=30 Age, years, median (range)= 52 (37-68) Male sex, n= 12 Location of tumour, n Rectosigmoid=12 Sigmoid colon=14 Descending colon=4 Synchonous tumour=0 TNM stage I=6 II=19 III=5 TACIR, n=30 Age, years, median (range)=51 (35-66) Male sex, n=11 Location of tumour, n Rectosigmoid=10 Sigmoid colon=17 Descending colon=3 Synchonous tumour=1 TNM stage I=7 II=19 III=4 **Inclusion criteria** "Patients presenting with	underwent elective tumor resection and primary anastomosis within 7–10 days of stent placement. Resection options included either a left hemicolectomy or an anterior resection. Full colonoscopy to exclude synchronous lesionsn was attempted in all patients prior to start of surgery." TACIR= "Total abdominal colectomy and ileorectal anastomosis was performed for every patient regardless of age or gender. Laparotomy was performed through a midline incision. The site and nature of left colon obstruction was confirmed, and when necessary, obstructed large bowel was decompressed by insertion of a needle attached to a suction apparatus."	continuous variables. The chi-squared and the Fisher's exact test were used for categorical variables. All P values were two-sided. A P<0.05 was considered statistically significant."		unlikely to affect outcome assessment) **Attrition bias** Incomplete outcome data: unclear risk (intention to treat analysis not used, 1 patient excluded from analysis) **Reporting bias** Selective reporting: low risk (primary outcome points were reported) **Other bias** **Other information**

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
January 2009 to May 2012 **Source of funding** Not reported	acute left colonic obstruction confirmed by a computed tomography of the abdomen." **Exclusion criteria** "Patients with distal rectal cancer less than 8 cm from the anal verge, patients with signs of peritonitis, and the presence of metastatic disease and/or carcinomatosis."				
Full citation Ho, K. S., Quah, H. M., Lim, J. F., Tang, C. L., Eu, K. W., Endoscopic stenting and elective surgery versus emergency surgery for left-sided malignant colonic obstruction: a prospective randomized trial, International Journal of Colorectal Disease, 27, 355-62, 2012	**Sample size** n= 39 n stenting as a bridge to surgery (SBTS)= 20 n emergency surgery (ES)= 19 **Characteristics** SBTS, n=20 Age, years, median (range)=68 (51-85) Male sex, n=13	**Interventions** Stenting= "Gentle flexible sigmoidoscopy after a rectal enema was performed to confirm the diagnosis of left-sided colonic cancer. The stenosing lesion was stented by a combined endoscopic and fluoroscopic approach performed by or supervised by a consultant colorectal surgeon. Using a double-channel therapeutic endoscope, a guide wire was introduced across	**Details** Randomisation: Computer-generated code Allocation: Sequentially numbered, opaque, sealed envelopes Outcomes: Technical success (successful SEMS placement and deployment), clinical success (colonic decompression within 96 h after successful placement of the stent, with passage of stools and resolution of nausea and vomiting, and confirmed on plain abdominal radiograph). Primary outcome: 60 days postoperative complication rates (any event leading to hospital readmission or prolonging current hospital stay). Secondary outcomes: type of surgery performed, bowel preservation, presence of a stoma, postoperative bowel function, length of	**Results** Clinical success in SBTS= 14/20 30-day mortality, n SBTS= 0/20 ES= 3/19 Hospital stay, median (range) SBTS= 6 (4-28) ES= 8 (6-39) p-value= 0.028 Anastomotic leak, n SBTS=1/20 ES= 0/19 Wound infection, n SBTS= 3/20 ES= 4/19	**Limitations** Cochrane risk of bias tool **Selection bias** Random sequence generation: low risk Allocation concealment: low risk **Performance bias** Blinding of participants and personnel: low risk (not possible, but unlikely to affect performance on objective outcomes) **Detection bias** Blinding of outcome assessment: low risk (not possible to blind, but unlikely to affect outcome assessment) **Attrition bias**

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Ref Id 627052 **Country/ies where the study was carried out** Singapore **Study type** RCT **Aim of the study** The aim of the study was assess the role of colonic stenting as a bridge to surgery in acutely obstructed left-sided colon cancer. **Study dates** October 2004 to February 2008 **Source of funding** Not reported	Location of tumour, n Rectosigmoid colon=5 Sigmoid colon=10 Descending colon=3 Splenic flexure=2 Stage of tumour, n II=7 III=10 IV= 3 ES, n=19 Age, years, median (range)= 65 (49-84) Male sex, n=9 Location of tumour, n Rectosigmoid colon=3 Sigmoid colon=8 Descending colon=6 Splenic flexure=2 Stage of tumour, n II=6 III=5 IV= 7 **Inclusion criteria** "Acute intestinal obstruction secondary to left-	the stenosis and beyond the obstruction; subsequently, water-soluble contrast was injected via a catheter over the guide wire to confirm the intraluminal placement of the guide wire as well as to assess the length of the stenosis. The SEMS was inserted through the endoscope over the guide wire and deployed in place...Patients who had successful stenting and decompression were discharged and readmitted for elective surgery. Elective surgery should preferably take place about 1 to 2 weeks after stenting. Standard preoperative bowel preparation, prophylactic low-molecular-weight heparin, and intravenous antibiotics were administrated as per usual in elective surgery." ES= "As soon as the operating theaters were available after initial stabilization. In both elective and emergency cases, tumor resection followed standard oncologic principles. Surgical options at the discretion of the individual consultant	hospital stay, length of stay in critical care, and hospitalization costs. Follow up: 60 days Statistical analysis: "Mann–Whitney U test for continuous variables and the chi-squared test or Fisher's exact test for categorical variables. Two-sided statistical significance was accepted at the 5% level. Intention to treat analysis was used"	Defunctioning stoma after intervention, n SBTS= 2/20 ES= 6/19 Stoma at the end of 1 year follow up, n SBTS= 1/20 ES= 2/19 Stent failure in SBTS= 6/20 Technical success in SBTS= 14/20	Incomplete outcome data: low risk (intention to treat analysis used) **Reporting bias** Selective reporting: low risk (primary outcome points were reported) **Other bias** **Other information**

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	sided colonic cancer" **Exclusion criteria** "Distal rectal cancers <8 cm from the anal verge, signs of peritonitis suggestive of bowel perforation or sepsis demanding urgent surgery"	colorectal surgeon included resection and primary anastomosis, Hartmann's procedure, subtotal or total colectomy, diverting stoma formation, and laparoscopic colectomy."			
Full citation Pirlet, I. A., Slim, K., Kwiatkowski, F., Michot, F., Millat, B. L., Emergency preoperative stenting versus surgery for acute left-sided malignant colonic obstruction: a multicenter randomized controlled trial, Surgical endoscopy, 25, 1814-1821, 2011 **Ref Id** 954720	**Sample size** n= 60 n stenting as a bridge to surgey (SBTS)= 30 n emergency surgery (ES)= 30 **Characteristics** SBTS, n= 30 Age, years, mean (SD)= 70.4 (10.3) Male sex, n=16 Tumour location Rectosigmoid, n= 8 Sigmoid colon, n=15	**Interventions** SBTS= "After the level of obstruction had been confirmed with a water-soluble contrast enema, the SEMS was placed along a guidewire through the lesion under radiologic or endoscopic guidance, as available at each center. Dilation of the obstructive lesion before the stent placement was forbidden. When the SEMS did not cover the entire length of the lesion, a second overlapping stent was placed. A further water-	**Details** Randomisation: computer-generated lists Allocation: Not reported Outcomes: Primary outcome: stoma. Secondary outcome: in-hospital mortality, stent-related morbidity (i.e., bowel perforation), surgical morbidity including both wound complications (hematoma, infections, dehiscence) and intra-abdominal complications (peritonitis, abscess, hemoperitoneum, anastomotic leak), extraabdominal morbidity (pulmonary infection, urinary infection, venous thromboembolism, cardiovascular or neurologic complications), and need for reoperation for whatever reason. Follow up: prior to discharge Statistical analysis: "The chi-square test was used to compare stoma and other qualitative variables (including the center effect)	**Results** Clinical success, n SBTS= 12/30 ES= 16/30 In-hospital mortality, n SBTS= 3/30 ES= 1/30 Hospital stay, days, median (range) SBTS= 23 (9-67) ES= 17 (7-126) p-value= 0.13 Anastomotic leak, n SBTS= 2/30 ES= 2/30 Stoma immediately after intervention, n SBTS= 13/30 ES= 17/30	**Limitations** Cochrane risk of bias tool **Selection bias** Random sequence generation: low risk Allocation concealment: unclear risk (not reported) **Performance bias** Blinding of participants and personnel: low risk (not possible, but unlikely to affect performance on objective outcomes) **Detection bias** Blinding of outcome assessment: low risk (not possible to blind, but unlikely to affect outcome assessment) **Attrition bias** Incomplete outcome data: low risk (intention to treat analysis used)

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Country/ies where the study was carried out France **Study type** Multi-centre RCT **Aim of the study** The aim of the study was to compare the outcomes of emergency colonic self-expanding metallic stent (SEMS) as a bridge to surgery to emergency surgery alone. **Study dates** December 2002 to October 2006 **Source of funding** Not reported	Descending colon=6 Splenic flexure=0 Not available=1 SBTS, n= 30 Age, years, mean (SD)=74.7 (11.3) Male sex, n=13 Tumour location Rectosigmoid, n=7 Sigmoid colon, n=18 Descending colon=2 Splenic flexure=3 Not available=0 **Inclusion criteria** "Older than 18 years, fit for both emergency surgery and colonic stenting, and presenting with obstructive symptoms, dilation of the colon, and typical abnormalities confirmed by water-soluble contrast enema, computed tomography (CT) scan, or findings at colonoscopy suggesting left-sided malignant	soluble contrast enema was performed to authenticate the accurate positioning of the stent and its efficacy in decompressing the colon. Candidates for elective surgery, after clinical success ofthe procedure, had to undergo surgery within the same hospitalization period. In this group, urgent unplanned surgery was indicated in case of technical failure of stenting, iatrogenic morbidity of SEMS (bowel perforation), or clinical failure, defined as a lack of bowel decompression within the first 3 post-procedure days." ES= "Emergency surgery was performed through laparotomy. Because there is no formal consensus about the gold standard treatment in this setting, the choice of the procedure performed was left to the discretion of the surgeon."	between groups. For quantitative variables, intergroup comparisons used the Student t-test or the Kruskal-Wallis H test depending on normality of distributions, equality of variances, or both. All p values less than or equal to 0.05 were considered statistically significant." Analyses were performed on an intention-to-treat basis.	Perforation in SBTS group= 2/30 Technical success in SBTS group= 14/30	**Reporting bias** Selective reporting: low risk (primary outcome points were reported) **Other bias** Low risk: Study protocol defined that the trial should be discontinued if major side effect events related to stenting were observed by the study monitor. "In the inclusion period, two bowel perforations occurred during the stenting procedures, in addition to one perforation in a nonrandomized patient. These major side effects, associated with the unexpected high rate of technical failures, led the steering committee to interrupt the trial after 65 patient inclusions." **Other information**

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	obstruction. Eligibility for the study required that the primary tumor be located between (including) the splenic flexure and the rectosigmoid junction." **Exclusion criteria** "Presenting with obstruction located proximal to the splenic flexure or distal to the rectosigmoid junction who had symptoms suggesting bowel perforation (particularly a cecal diameter exceeding 12 cm), other septic symptoms, abdominal tenderness, spontaneous pneumoperitoneum, adjacent small bowel involvement, or stage 4 tumors. Patients younger				

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	than 18 years, pregnant, unfit for either strategy, or lacking informed consent also were not eligible for the study."				
Full citation Sloothaak, D. A., van den Berg, M. W., Dijkgraaf, M. G., Fockens, P., Tanis, P. J., van Hooft, J. E., Bemelman, W. A., Oncological outcome of malignant colonic obstruction in the Dutch Stent-In 2 trial, British journal of surgery, 101, 1751-1757, 2014 **Ref Id** 954813 **Country/ies where the study was carried out** **Study type** Follow up study of Dutch Stent-in-2 trial (Van Hooft 2011)	**Sample size** For study details please see Dutch Stent-in-2 trial **Characteristics** **Inclusion criteria** **Exclusion criteria**	**Interventions**	**Details** Follow up protocol: "In the Dutch Stent-In 2 trial, patients were initially followed for at least 6 months after randomization. Prospectively collected patient demographics, treatment characteristics and pathology reports were complemented retrospectively with data on adjuvant treatment, recurrence (locoregional recurrence or distant metastasis) and survival. Information was obtained from hospital medical records and general practitioners. The total follow-up was calculated from the date of randomization in the Stent-In 2 trial" Outcomes: overall and locoregional disease recurrence (intestinal, regional lymph node or peritoneal recurrence), disease-free survival (DFS, the time between resection of the primary tumour and the diagnosis of disease recurrence or death from any cause), disease-specific survival (DSS, the time to cancer-specific death) and overall survival (time to death from any cause) after 4 years. Statistical analysis: "Data were analysed based on the on-treatment principle. Continuous data are presented as median (i.q.r.) and were compared using the Mann–Whitney U test. For dichotomous outcomes, the stent and emergency surgery groups were compared by means of $\chi 2$ or Fisher's	**Results** 4-year DFS, event is diagnosis of disease recurrence or death from any cause SBTS= 13/26 ES= 9/32 Log rank test, p-value= 0.061 4-year OS, event is death from any cause SBTS= 10/26 ES= 10/32 Log-rank test, p-value= 0.468	**Limitations** **Cochrane risk of bias tool** Incomplete outcome data: High risk of bias (69% attrition from the original trial due to patients being excluded due to benign disease, palliative treatment, and 1 withdrawal) For all other domains please see Dutch Stent-in-2 trial (Van Hooft 2011) **Other information**

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Aim of the study **Study dates** **Source of funding**			exact test. The Kaplan–Meier method was used for survival analysis, with comparison between stent and emergency surgery groups using the log rank test."		
Full citation Tung, K. L., Cheung, H. Y., Ng, L. W., Chung, C. C., Li, M. K., Endo-laparoscopic approach versus conventional open surgery in the treatment of obstructing left-sided colon cancer: long-term follow-up of a randomized trial, Asian journal of endoscopic surgery, 6, 78-81, 2013 **Ref Id** 828879 **Country/ies where the study was carried out** **Study type** Follow up study of Cheung 2009	**Sample size** For study details please see Cheung 2009 **Characteristics** **Inclusion criteria** **Exclusion criteria**	**Interventions**	**Details** Follow up protocol: All patients were followed up at 3-month intervals for the first 3 years, semi-annually in the subsequent 2 years, and yearly from then on. Surveillance colonoscopy was performed 1 year after surgery and every 3 years thereafter if the first colonoscopy was normal; colonoscopy was performed more frequently if the patient's condition indicated otherwise. Outcomes: Rates of curative surgery (no gross macroscopic tumor present clinically or radiologically at the end of surgery), disease recurrence (clinically or radiologically proven recurrence, supported by histological tissue diagnosis whenever possible), overall survival (the time from the date of surgery or SEMS insertion to the date of death or most recent follow-up).	**Results** 5-year disease-free survival, n SBTS= 9/24 ES= 7/24 Log rank test, p= 0.63 5-year overall survival, n SBTS= 12/24 ES= 16/24 Log rank test, p= 0.076	**Limitations** **Other information**

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Aim of the study **Study dates** **Source of funding**					
Full citation Van Hooft, J. E., Bemelman, W. A., Oldenburg, B., Marinelli, A. W., Holzik, M. F. L., Grubben, M. J., Sprangers, M. A., Dijkgraaf, M. G., Fockens, P., Colonic stenting versus emergency surgery for acute left-sided malignant colonic obstruction: A multicentre randomised trial, The Lancet Oncology, 12, 344-352, 2011 **Ref Id** 954893 **Country/ies where the study was carried out**	**Sample size** n= 98 n stenting as a bridge to surgery (SBTS)=47 n emergency surgery (ES)= 51 **Characteristics** SBTS, n=47 Age, years, mean (SD)=70.4 (11.9) Male sex, n=24 ASA classification, n Unknown=1 1=16 2=24 3=6 Severity of obstruction, n Unknown=1 Incomplete=13 Complete=33 ES, n=51 Age, years, mean (SD)=71.4 (9.7)	**Interventions** SBTS: "If a standard colonoscope or sigmoidoscope could traverse the lesion or the lesion seemed to be benign, stent placement was not done. Dilation of the obstructive lesion before stent placement was forbidden. If stent placement failed or symptoms of colonic obstruction did not resolve within 3 days, patients were treated surgically. Candidates for elective surgery were preferably operated on 5–14 days after inclusion, and no later than 4 weeks after inclusion." ES: "In the emergency surgery group, patients were operated on according to conventional standards. In case of a primary	**Details** Randomisation: computer generated lists Allocation: random number lists were stored centrally on a server at the Academic Medical Centre and were accessible to the local investigator through a web application. When an eligible patient gave informed consent, the local investigator called the principal investigator who accessed the randomised allocation and reported this to the local investigator. Outcomes: Primary outcome: quality of life (QL2 subscale of the EORTC QLQ-C30) at 6-months. Secondary outcomes: mortality (procedure-related mortality within 30 days after intervention and as overall mortality during follow up), morbidity (any event leading to hospital admission or extending hospital stay), stoma rate. Follow up: 6 months. "Morbidity and mortality in the experimental group (colonic stenting) was reported to the data safety monitoring committee (DSMC) on short notice. An interim analysis was scheduled for after the first 60 treated patients completed 30 days of follow-up. No formal stopping rule was formulated beforehand." Statistical analysis: "Quality-of-life scores from available assessments during follow-up	**Results** Technical success in SBTS group= 33/47 Clinical success in SBTS group= 33/47 30-day mortality, n SBTS= 5/47 ES= 5/51 Anastomotic leak, n SBTS= 5/47 ES= 1/51 Perforation (guidewire or stent-related) in SBTS group= 6/47 Wound infection, n SBTS= 2/47 ES= 1/51 Stoma rates Directly after initial intervention, n SBTS= 24/47 ES= 38/51 At latest follow up, n SBTS= 27/47 ES= 34/51 Global health status, QL2 subscale of the EORTC QLQ-C30 (higher scores indicate higher QoL),	**Limitations** **Cochrane risk of bias tool** **Selection bias** Random sequence generation: low risk Allocation concealment: low risk **Performance bias** Blinding of participants and personnel: unclear risk (not possible, potential for bias in subjective quality of life outcomes; unlikely to affect performance on objective outcomes) **Detection bias** Blinding of outcome assessment: unclear risk (not possible, potential for bias in assessment of subjective quality of life outcomes; unlikely to affect assessment of objective outcomes) **Attrition bias** Incomplete outcome data: low risk (intention to treat analysis used) **Reporting bias** Selective reporting: low risk (primary outcome points were reported) **Other bias**

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
The Netherlands **Study type** Multi-centre RCT **Aim of the study** The aim of the study was to compare colonic stenting to emergency surgery for patients with acute malignant colonic obstruction. **Study dates** 9 March 2007 to 27 August 2009. The trial was discontinued prematurely in March 2010 in accordance with advice from the Data Safety Monitoring Board due to interim analyses of the first 60, and then 90 patients, which revealed an increased risk of 30-day mortality for the stent group compared to the emergency surgery group.	Male sex, n=27 ASA classification, n Unknown=1 1=17 2=27 3=6 Severity of obstruction, n Unknown=1 Incomplete=14 Complete=36 **Inclusion criteria** "Aged 18 years or older, had clinical signs of severe colonic obstruction that had existed for less than 1 week, and had dilation of the colon on either plain abdominal radiograph, with typical abnormalities on a gastrografin enema study, or contrast-enhanced CT scan. The imaging modalities had to be compatible with a total or subtotal malignant colonic obstruction, and	colostomy, restoration of bowel continuity was attempted within 3-6 months."	were averaged per patient, and weighted by the length of the preceding period between planned measurements. Missing follow-up data were regarded as missing at random. Unless otherwise stated, differences in (weighted) quality-of-life scores between the emergency surgery and colonic stenting groups were assessed for statistical significance by analysis of covariance to adjust for baseline scores. Differences in procedure-related mortality (at 30 days), overall mortality, morbidity, and stoma rates were assessed by the χ^2 test. Differences in survival were assessed by the Kaplan-Meier log-rank test. All reported p values are two-sided and were judged to be significant at less than 0.05. In accordance with the intention-to-treat principle, patients not treated according to their random assignment, irrespective of the reason, were neither crossed over nor excluded."	SBTS, n= 36 Baseline= 34.0 (23.2) 6 month follow up= 63.0 (23.8) ES, n=39 Baseline= 42.5 (28.0) 6 month follow up= 61.4 (21.9) Between-group difference= -4.7 (-14.8 to 5.5), p=0.36 *Value for emergency surgery during follow-up minus colonic stenting during follow-up, based on estimated marginal means with baseline values as covariates	**Other information**

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Source of funding No funding received	obstruction had to be located in the left side of the colon (descending colon, sigmoid, or rectum)." **Exclusion criteria** "Signs of peritonitis, perforation, fever, sepsis, or other serious complications demanding urgent surgery; physical status of class 4 or 5 according to the American Society of Anesthesiologists; obstruction caused by a non-colonic malignancy or a benign disease; distal tumour margin of less than 10 cm from the anal verge; or inability to complete self-report quality-of-life questionnaires."				
Full citation	**Sample size** n= 21	**Interventions** Palliative stent: Patients were treated with the	**Details** Randomisation: computerised randomisation performed centrally in the AMC Amsterdam	**Results** 30-day mortality, n Palliative stent= 2/11	**Limitations** **Cochrane risk of bias tool** **Selection bias**

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
van Hooft, J. E., Fockens, P., Marinelli, A. W., Timmer, R., van Berkel, A. M., Bossuyt, P. M., Bemelman, W. A., Early closure of a multicenter randomized clinical trial of endoscopic stenting versus surgery for stage IV left-sided colorectal cancer, Endoscopy, 40, 184-191, 2008 **Ref Id** 954895 **Country/ies where the study was carried out** The Netherlands **Study type** Multi-centre RCT **Aim of the study** The aim of the study was to compare endoluminal stenting with surgical treatment for patients with stage IV colorectal cancer with	n palliative stenting= 11 n palliative surgery= 10 **Characteristics** Palliative stenting, n=11 Age, years, mean (SD), range=61.5 (12.9), 42-88 Male sex, n=4 Site of obstruction, n Rectosigmoid=7 Descending colon=4 Site of metastases, n Lung=6 Liver=11 Bone=1 Lymphatic=3 Others=1 WHO performance score, n WHO 0=3 WHO 1=2 WHO 2=5 WHO 3=1 Palliative surgery, n=10 Age, years, mean (SD), range=67.8 (12.3), 46-81 Male sex, n=7 Site of obstruction, n Rectosigmoid=9	recently introduced WallFlex colonic stent. After preparation of the distal colon with an enema, the colonoscope was introduced up to the site of the obstruction. In cases where the colonoscope was not able to pass, a double-lumen catheter with a guide wire and contrastwas used to pass the stenosis. The length of the stenosis was then assessed fluoroscopically. A stent was chosen which was at least 3 cm longer than the stenosis (1.5 cm at either end). The selected stent was advanced through the endoscope over a guide wire until it passed the proximal end of the stricture; after this the stent was deployed under continuous radiographic control. If the stent did not cover the entire length of the tumor, a second overlapping stent was placed. The correct position of the stent was confirmed using fluoroscopy. The stenosis was not dilated before or directly after stent placement.	Allocation: Not reported Outcomes: Primary outcome: composite outcome of mortality, morbidity and function health status (WHO performance score). Secondary outcomes: effectiveness of palliation (longterm relief of obstructive symptoms), quality of life (EORTC QLQ-C30 version 3, EQ-5D, EQ-VAS), adverse events, costs, and procedural morbidity and mortality. "Serious adverse events were defined as events leading to surgical re-intervention, or events requiring patient admission to the intensive care unit (ICU) for more than 48 hours or causing death. Mild adverse events were events that led to hospital admission or prolonged hospital but which did not fulfil the criteria for severe adverse events." Follow up: death or 1 year after inclusion. An interim analysis was planned after inclusion of 100 patients. Statistical analysis: All analyses were performed on an intention−to−treat principle and included all randomized patients. Statistical significance in all analyses was set at P < 0.05.	Palliative surgery= 0/10 Hospital stay, days, median (IQR) Palliative stent= 12 (0-11.5) Palliative surgery= 11 (5.75-16.75) p-value= 0.46 Perforation < 30 days after stent placement= 2/10 Perforation ≥ 30 days after stent placement= 4/10 Technical success in stent group= 9/10* *One patient did not develop imminent obstruction and did not undergo colonic stenting	Random sequence generation: unclear risk (sequence generation not reported) Allocation concealment: unclear risk (not reported) **Performance bias** Blinding of participants and personnel: low risk (not possible, but unlikely to affect performance on objective outcomes) **Detection bias** Blinding of outcome assessment: low risk (not possible, but unlikely to affect assessment of objective outcomes) **Attrition bias** Incomplete outcome data: low risk (intention to treat analysis and per protocol analysis used) **Reporting bias** Selective reporting: low risk (primary outcome points were reported) **Other bias** An independent data and safety monitoring committee monitored the safety of the participants. **Other information**

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
imminent obstruction. **Study dates** December 2004 to January 2006. "In January 2006 inclusion was discontinued because of an unusually high number of serious adverse events in the nonsurgical arm ± a possible stent−related perforation had occurred in three of the nine stented patients. After carefully studying all the serious adverse events, the safety monitoring committee advised us to close the study prematurely, from 8 March 2006. The Medical Ethics Committee of the coordinating center approved this closure and all participating hospitals and patients were informed."	Descending colon=1 Site of metastases, n Lung=2 Liver=10 Bone=1 Lymphatic= 0 Others=0 WHO performance score, n WHO 0=3 WHO 1=5 WHO 2=2 WHO 3=0 **Inclusion criteria** Men and women over the age of 18 years with incurable, left-sided colorectal cancer who presented at one of the 29 participating Dutch hospitals...Patients with incurable left−sided colorectal cancer were eligible if the tumor was localized between the splenic flexure and the proximal rectum (distal margin at least 10	Palliative surgery: "The decision on whether a palliative resection or fecal diversion was performed (open or laparoscopic) was made at the discretion of the surgeon. Bowel preparation and preoperative prophylactic antibiotics were given according to the local hospital guidelines. Patients received a regular diet as soon as possible." All patients were offered palliative chemotherapy, which was started as soon as possible after surgical resection or after inclusion in the nonsurgical arm, the regimen at the discretion of the oncologist.			

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Source of funding Governmental subvention (ZonMW) for overhead costs	cm from the anal verge). **Exclusion criteria** Ileus, a Karnofsky performance status (KPS) of less than 50% or an American Society of Anesthesiologists (ASA) class of IV or V.				
Full citation Xinopoulos, D., Dimitroulopoulos, D., Theodosopoulos, T., Tsamakidis, K., Bitsakou, G., Plataniotis, G., Gontikakis, M., Kontis, M., Paraskevas, I., Vassilobpoulos, P., et al.,, Stenting or stoma creation for patients with inoperable malignant colonic obstructions? Results of a study and cost-effectiveness analysis, Surgical endoscopy, 18, 421-426, 2004	**Sample size** n= 30 n palliative stent = 15 n colostomy= 15 **Characteristics** Characteristics not reported separately by treatment group Male sex, n= 16 Age, years, mean (range)= 72.4 (64-87) Primary, n Colorectal= 24 Ovarian= 6 Site of obstruction, n Rectosigmoid colon= 18	**Interventions** Palliative stent= "To obviate any exacerbation of the intestinal obstruction, no oral bowel preparation was performed. All patients were given colonic cleansing. Sedatives (midazolam) and analgesics (pethidine) were administered intravenously. Provide visualization of the distal and proximal end of the stenosis. In all cases, dilation with Savary-Gillard dilators was performed over a stiff-angled metallic guidewire, and the stenosis was dilated to 20 mm under image-intensifier control. After dilation, with the	**Details** Randomisation: Not reported Blinding: double blinded, method not reported Outcomes: 1 year overall survival, hospital stay, technical success Follow up: 1 year for survival data, prior to hospital discharge for other outcomes Statistical analysis: Summary statistics of the baseline characterization are given as mean values. Survival distribution curves are compared by log-rank test. The level of statistical significance was set at 0.05.	**Results** Overall survival at 60 weeks Palliative stent= 0/15 Colostomy= 0/15 Log-rank test= not statistically significant Technical success in palliative stent group= 14/15	**Limitations** Cochrane risk of bias tool **Selection bias** Random sequence generation: unclear risk (not reported) Allocation concealment: unclear risk (stated that it was double blinded, but did not report method) **Performance bias** Blinding of participants and personnel: low risk (method for double blinding not reported, but lack of blinding unlikely to affect assessment of objective outcomes) **Detection bias** Blinding of outcome assessment: low risk (method for double blinding not reported, but lack of blinding unlikely to affect assessment of objective outcomes) **Attrition bias**

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Ref Id 954936 **Country/ies where the study was carried out** Greece **Study type** RCT **Aim of the study** The aim of the study was to compare self-expanding metallic stents (SEMS) with stoma creation for inoperable malignant colonic obstructions. **Study dates** March 1998 to April 2002 **Source of funding** Not reported	Sigmoid colon= 12 Confirmed multiple metastases in the liver, lungs, bones or brain= 19 Unable to undergo surgery due to serious hemodynamic or pulmonary instability= 11 **Inclusion criteria** Patients with partial inoperable malignant colonic obstruction **Exclusion criteria** Not reported	guidewire in place, the endoscope was reinserted beside it to the distal margin of the lesion. The lesion's length was defined endoscopically, and the upper and lower margins were marked under fluoroscopic guidance with external radiopaque markers. Through the working channel of the colonoscope and over the guidewire, a compressed uncovered metallic endoprosthesis delivery system (length, 8 cm; diameter, 20–22 mm) (Wallstent; Microvasive, Boston Scientific, Galway, Ireland) was introduced and passed beyond the lesion. Under fluoroscopic and endoscopic control, the stent was then deployed with the patient in the supine position. Colostomy= "A nonfunctional stoma was created through a midline incision with the patient under general anesthesia. In all cases, we created an end-sigimoid colostomy proximal to the stenosis and a mucous-technique fistula of the distal colon."			Incomplete outcome data: unclear risk (method for managing attrition not reported) **Reporting bias** Selective reporting: high risk (outcomes of interest not stated in Methods) **Other bias** 6/30 (20%) patients had primary ovarian cancer, study did not provide details on which groups these patients were in or do subgroup analyses **Other information**

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Full citation Young, C. J., De-Loyde, K. J., Young, J. M., Solomon, M. J., Chew, E. H., Byrne, C. M., Salkeld, G., Faragher, I. G., Improving Quality of Life for People with Incurable Large-Bowel Obstruction: Randomized Control Trial of Colonic Stent Insertion, Diseases of the Colon & RectumDis Colon Rectum, 58, 838-49, 2015 **Ref Id** 860416 **Country/ies where the study was carried out** Australia **Study type** Multi-centre RCT **Aim of the study** The aim of the study was to compare stent insertion with	**Sample size** n= 52 n stent = 26 n surgery= 26 **Characteristics** Stent, n=26 Age, years, mean (SD), range=66 (11), 41-83 Male sex, n=17 Pathology, n Primary colorectal cancer=19 Recurrent colorectal cancer=1 Primary noncolorectal cancer=3 Recurrent noncolorectal cancer=3 ASA grade, n I/II=17 III=7 Site of obstruction, n Rectum=5 Rectosigmoid=9 Sigmoid=8 Descending colon=2 Splenic flexure=1 Transverse colon=0 Hepatic flexure=1 Ascending colon=0	**Interventions** Stent= "received a self-expanding metallic stent placed through the obstructing lesion by the use of a combined endoscopic and fluoroscopic approach. All stents inserted were uncovered stents. Patients who were not successfully stented underwent surgical intervention deemed appropriate by the operating surgeon. Data for these patients were analyzed in the stent group according to intention-to-treat principles." Surgery= "had surgery to decompress their obstruction by a technique determined appropriate by the operating surgeon and the pathology encountered. Although it was expected that the vast majority of patients undergoing surgery would require a stoma, a stoma was not enforced as the only option. This was to ensure that the control group reflected what the surgery would truly be, whether with stoma, resection, or anastomosis, when stent	**Details** Randomisation: computer-generated permuted block randomization schedule, completed by the study coordinator Allocation: "It was not possible to blind surgeons and patients to the procedure; however, all subjective outcome assessments were performed by a blinded investigator." Outcomes: Primary outcome: Quality of life (differences between groups in EQ-5D index change scores). Secondary outcomes: overall survival (survival at 12 months postprocedure), 30-day mortality (death from any cause up to 30 days after the procedure), rates of permanent stoma formation, procedure time, anesthetic time, postprocedure stay, days spent in the intensive care unit and high dependency unit, time to first flatus and first bowel movement, time to start of a normal diet, early postprocedure complication rate, 12-month complication rate, length of stay, disease-related readmission, and differences in QLQ CR-29 scales. Follow up: 12-months Statistical analysis: All data were analyzed on an intention-to-treat basis. The level of significance for all tests was $p < 0.05$. Continuous data were analyzed by using an independent T test or nonparametric tests where appropriate. EQ-5D index change scores and QLQ CR29 data were compared between treatment groups. Categorical data were analyzed using the $\chi 2$ and Fisher exact tests (FET). Mean and medians are reported alongside the SD, interquartile range, or 95% CIs, where appropriate. Kaplan-Meier analysis was used to describe time-to-event data. Overall survival was measured from the date of surgery or stent procedure to the	**Results** 1-year overall survival, event is death from any cause Stent= 17/26 Surgery= 19/26 Log-rank test= 0.61 Technical success in stent group= 19/26 Clinical success in successfully stented group= 19/19 30-day mortality, n Stent= 2/26 Surgery= 4/26 Postprocedure stay, days, median (95% CI)* Stent= 7 (3-12) Surgery= 11 (8-17) p-value= 0.03 *Assessed as the number of days spent in the hospital for the procedure Anastomotic leak, n Stent= 0/26 Surgery= 0/26 Wound infection, n Stent= 0/26 Surgery= 1/26 Stoma, n Stent= 7/26 Surgery= 24/26 Quality of life, mean EQ-5D change score from baseline to 1 year Stent= -0.328 Surgery= -0.561	**Limitations** Cochrane risk of bias tool **Selection bias** Random sequence generation: low risk Allocation concealment: unclear risk (not reported) **Performance bias** Blinding of participants and personnel: unclear risk (method for double blinding not reported, lack of blinding could potentially affect patients' performance on subjective outcomes i.e. Quality of Life; unlikely to affect objective outcomes) **Detection bias** Blinding of outcome assessment: low risk (not possible to blind, but subjective outcomes assessed by blinded investigator; lack of blinding unlikely to affect assessment of objective outcomes) **Attrition bias** Incomplete outcome data: low risk (intention to treat analysis used) **Reporting bias** Selective reporting: low risk (primary outcome points were reported) **Other bias** **Other information**

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
surgical decompression for quality of life and survival. **Study dates** September 2006 to November 2011 **Source of funding** No funding received	Metastasis, n Liver=19 Lung=7 Peritoneal=8 Retroperitoneal=1 Bone=0 Brain=1 Surgery, n=26 Age, years, mean (SD), range=67 (14), 35-86 Male sex, n=18 Pathology, n Primary colorectal cancer=20 Recurrent colorectal cancer=0 Primary noncolorectal cancer=2 Recurrent noncolorectal cancer=4 ASA grade, n I/II=11 III=14 Site of obstruction, n Rectum=6 Rectosigmoid=5 Sigmoid=12 Descending colon=1 Splenic flexure=1 Transverse colon=0 Hepatic flexure=0 Ascending colon=1 Metastasis, n Liver=21	insertion was not an option."	date of last follow-up, or the date of death. The log-rank test was used to determine statistical significance between survival curves. Median survival and 6- and 12-month survival are reported alongside a SE.		

Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	Lung=8 Peritoneal=11 Retroperitoneal=1 Bone=1 Brain=0 **Inclusion criteria** "Patients ≥18 years who presented between September 2006 and November 2011 with a malignant LBO, deemed not curable by surgical intervention (assessed in a multidisciplinary team meeting where possible because of the emergency nature of cases)" **Exclusion criteria** "ASA grade IV or V, required urgent laparotomy because of perforation or ischemia of the bowel, had evidence of synchronous and				

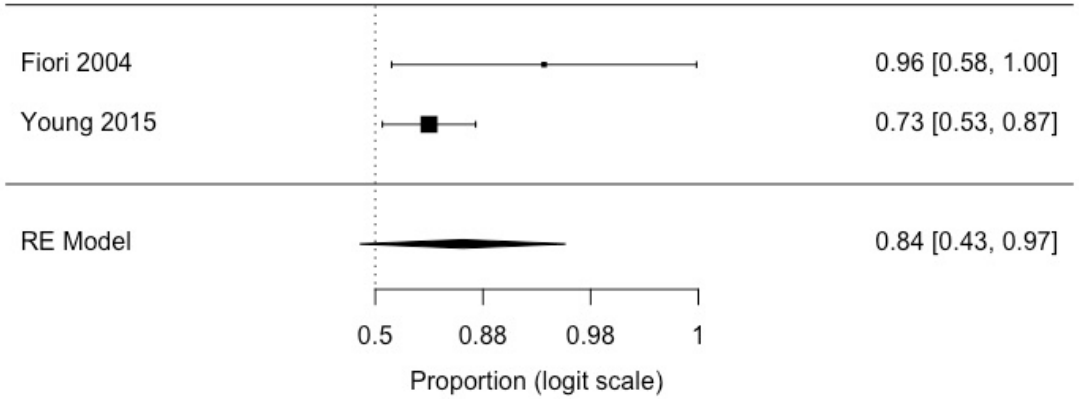
Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
	separate sites of small and LBO, or were cognitively impaired or unable to give informed consent."				

ASA: American Society of Anesthesiologists; CT: computed tomography; DFS: disease free survival; DSS: disease specific survival; ES: emergency surgery; ESER: emergency stenting followed by elective resection; EORTC QLQ-C30: European Organisation for Research and Treatment of Cancer Quality of Life Questionnaire Core 30 Items; EORTC QLQ-CR29: European Organisation for Research and Treatment of Cancer Quality of Life Questionnaire colorectal cancer module (29 items); EORTC QLQ-CR38: European Organisation for Research and Treatment of Cancer Quality of Life Questionnaire colorectal cancer module (38 items); EQ-VAS: EuroQol visual analogue scale; EQ-5D: HIV: human immunodeficiency virus; ITT: intention to treat; IQR: interquartile range; LBO: large bowel obstruction; OS: overall survival; PFS: progression free survival; SBTS: stenting as a bridge to surgery; SD: standard deviation: SEMS: self-expanding metallic stent; TACIR: total abdominal colectomy and ileorectal anastomosis

Appendix E – Forest plots

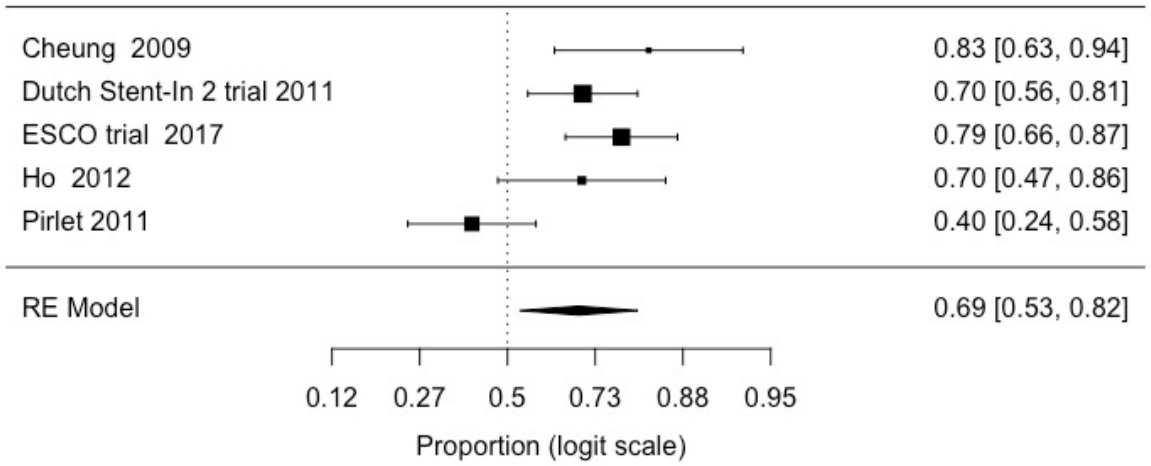
Forest plots for review question: What is the effectiveness of stenting compared with emergency surgery for suspected colorectal cancer causing acute large bowel obstruction?

Figure 2: Comparison 1: Stenting followed by planned bowel resection or palliative care versus emergency surgery - clinically successful bowel decompression - Palliative intent, stent arm only



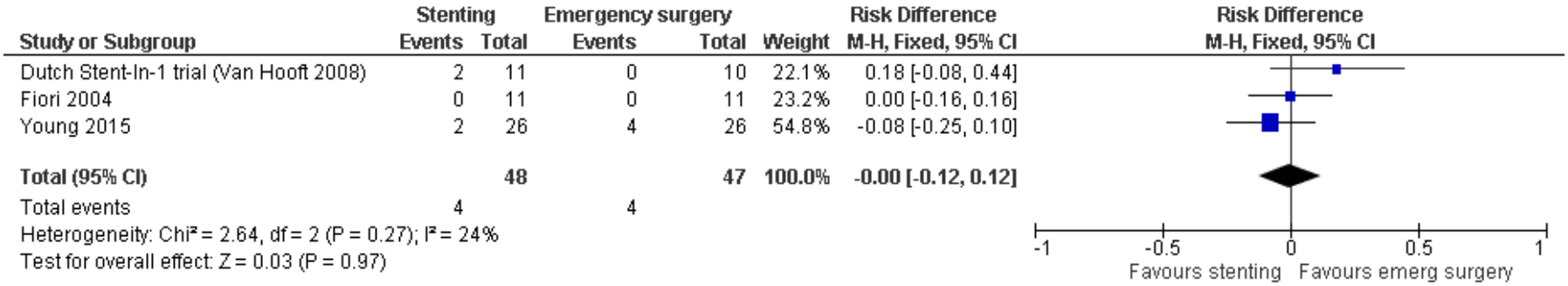
RE: random effect

Figure 3: Comparison 1: Stenting followed by planned bowel resection or palliative care versus emergency surgery - clinically successful bowel decompression – curative intent, stent arm only



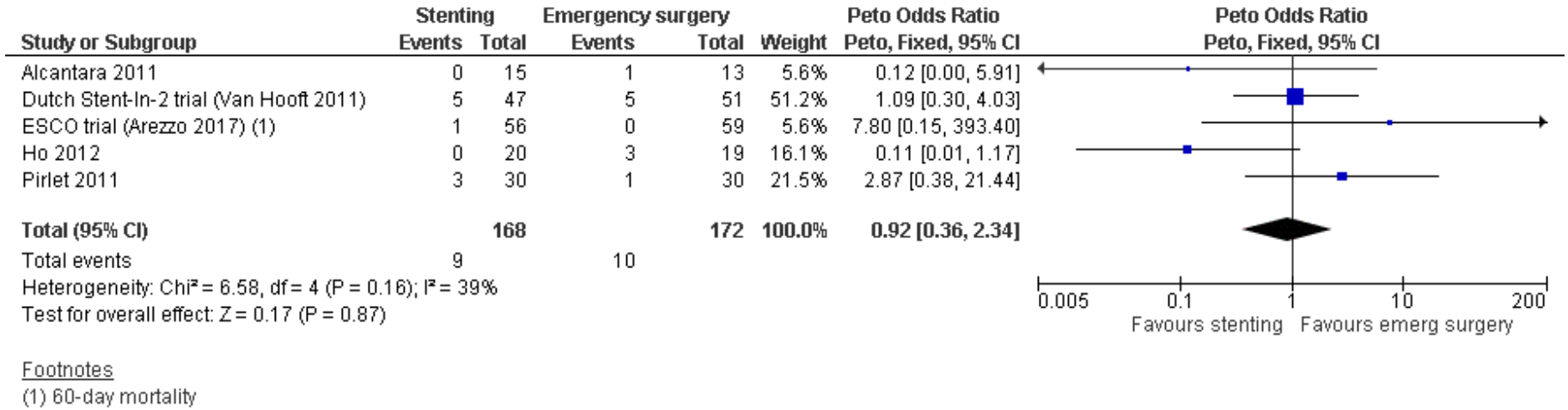
RE: random effect

Figure 4: Comparison 1: Stenting followed by planned bowel resection or palliative care versus emergency surgery - 30-day mortality – Palliative intent



CI: confidence interval; M-H: Mantel-Haenszel

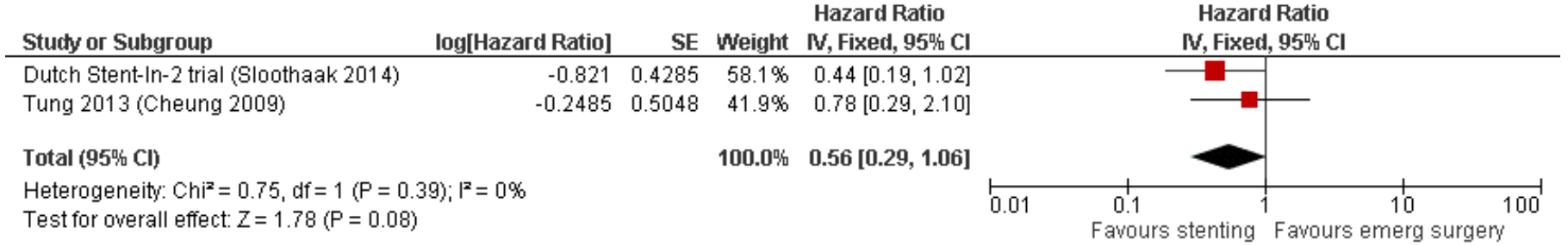
Figure 5: Comparison 1: Stenting followed by planned bowel resection or palliative care versus emergency surgery - 30-day mortality – Curative intent



Footnotes
(1) 60-day mortality

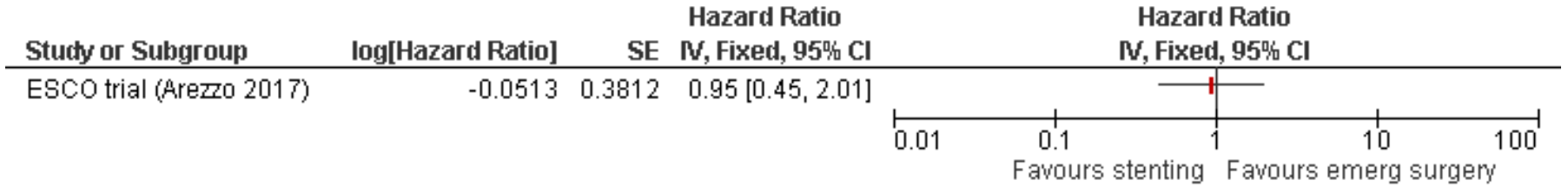
CI: confidence interval; M-H: Mantel-Haenszel

Figure 6: Comparison 1: Stenting followed by planned bowel resection or palliative care versus emergency surgery – disease free survival (follow up 4 to 5 years) – curative intent



CI: confidence interval; IV: inverse variance

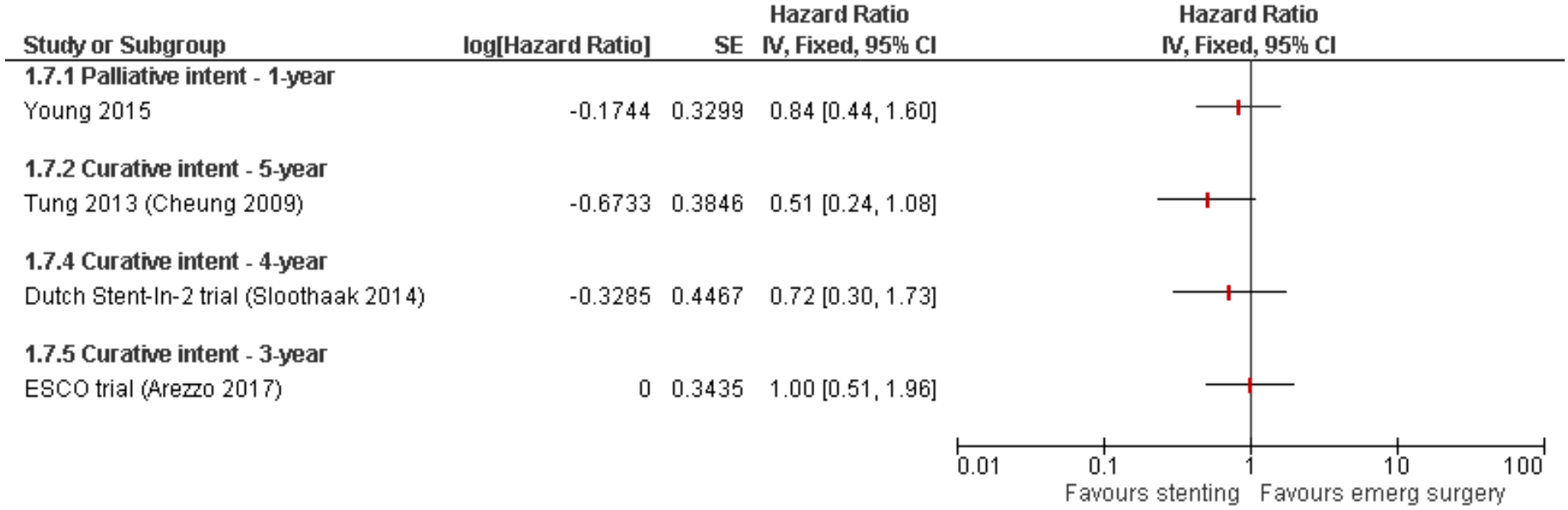
Figure 7: Comparison 1: Stenting followed by planned bowel resection or palliative care versus emergency surgery - progression free survival (follow–up 3 years) – Curative intent



CI: confidence interval; IV: inverse variance; SE: standard error

1

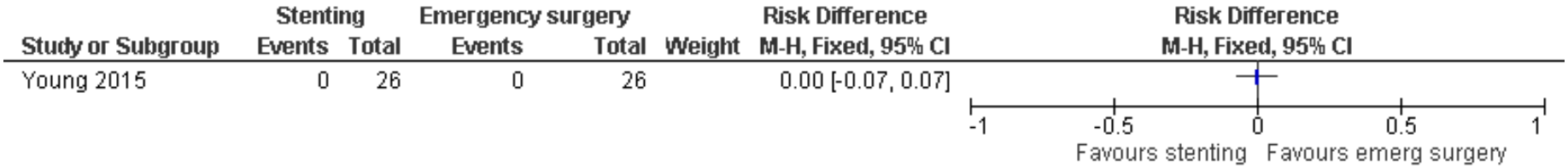
Figure 8: Comparison 1: Stenting followed by planned bowel resection or palliative care versus emergency surgery – overall survival – follow-up 1 to 5 years



CI: confidence interval; IV: inverse variance; SE: standard error

1

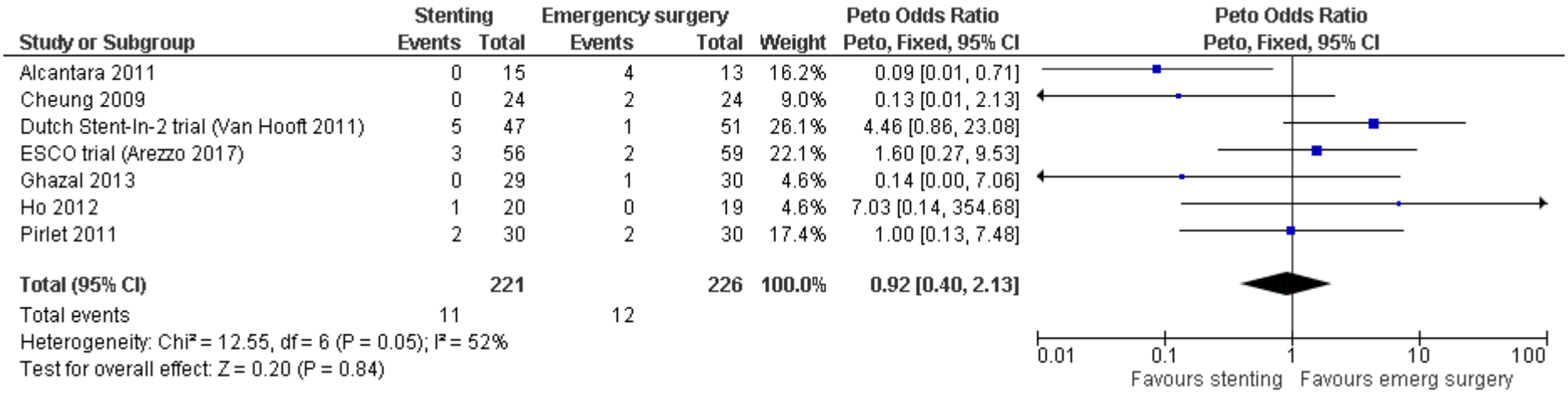
Figure 9: Comparison 1: Stenting followed by planned bowel resection or palliative care versus emergency surgery - Anastomotic leak – palliative intent



CI: confidence interval; M-H: Mantel-Haenszel

2

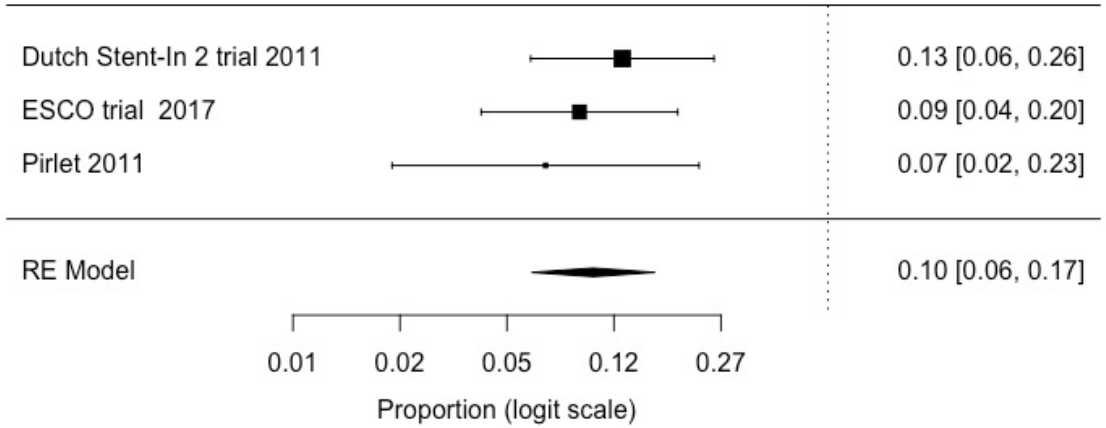
Figure 10: Comparison 1: Stenting followed by planned bowel resection or palliative care versus emergency surgery - Anastomotic leak – curative intent



CI: confidence interval

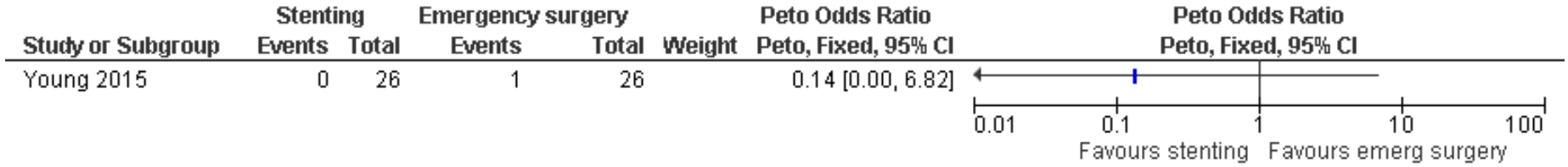
3

Figure 11: Comparison 1: Stenting followed by planned bowel resection or palliative care versus emergency surgery - Perforation rate - Curative intent, stent arm only



RE: random effect

Figure 12: Comparison 1: Stenting followed by planned bowel resection or palliative care versus emergency surgery - surgical site infection – palliative intent

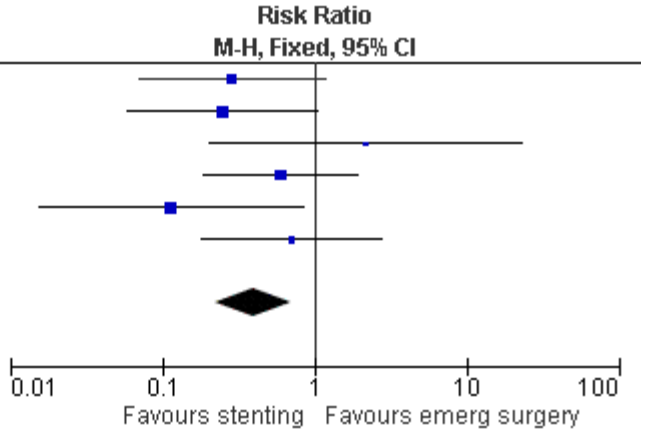


CI: confidence interval;

Figure 13: Comparison 1: Stenting followed by planned bowel resection or palliative care versus emergency surgery - surgical site infection – curative intent

Study or Subgroup	Stenting Events	Stenting Total	Emergency surgery Events	Emergency surgery Total	Weight	Risk Ratio M-H, Fixed, 95% CI
Alcantara 2011	2	15	6	13	18.3%	0.29 [0.07, 1.19]
Cheung 2009	2	24	8	24	22.8%	0.25 [0.06, 1.06]
Dutch Stent-In-2 trial (Van Hooft 2011)	2	47	1	51	2.7%	2.17 [0.20, 23.16]
ESCO trial (Arezzo 2017)	4	56	7	59	19.4%	0.60 [0.19, 1.95]
Ghazal 2013	1	29	9	30	25.2%	0.11 [0.02, 0.85]
Ho 2012	3	20	4	19	11.7%	0.71 [0.18, 2.77]
Total (95% CI)		**191**		**196**	**100.0%**	**0.40 [0.22, 0.71]**
Total events	14		35			

Heterogeneity: Chi² = 5.23, df = 5 (P = 0.39); I² = 4%
Test for overall effect: Z = 3.12 (P = 0.002)

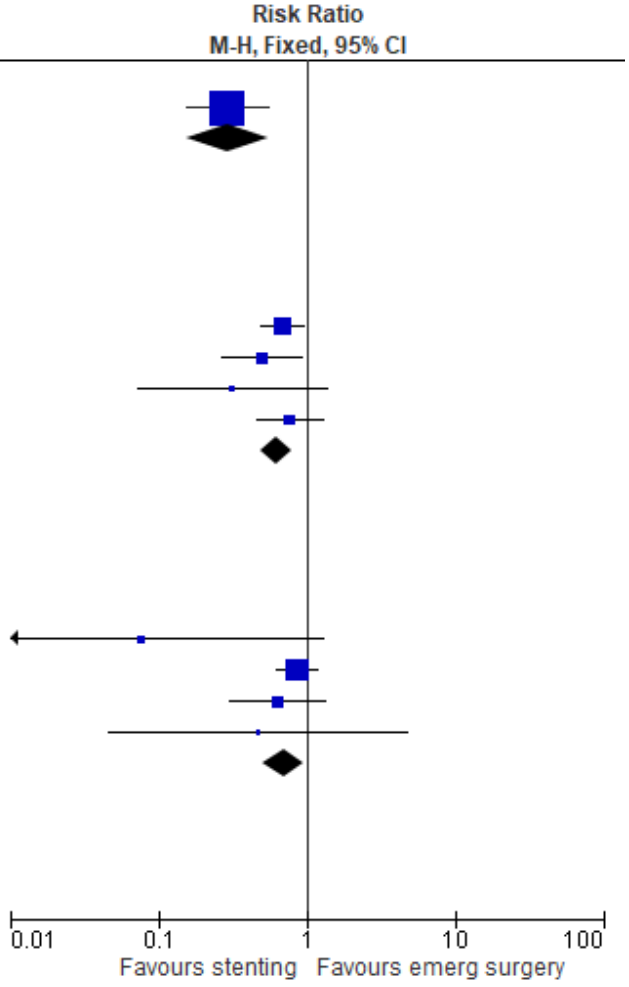


CI: confidence interval; M-H: Mantel-Haenszel

1

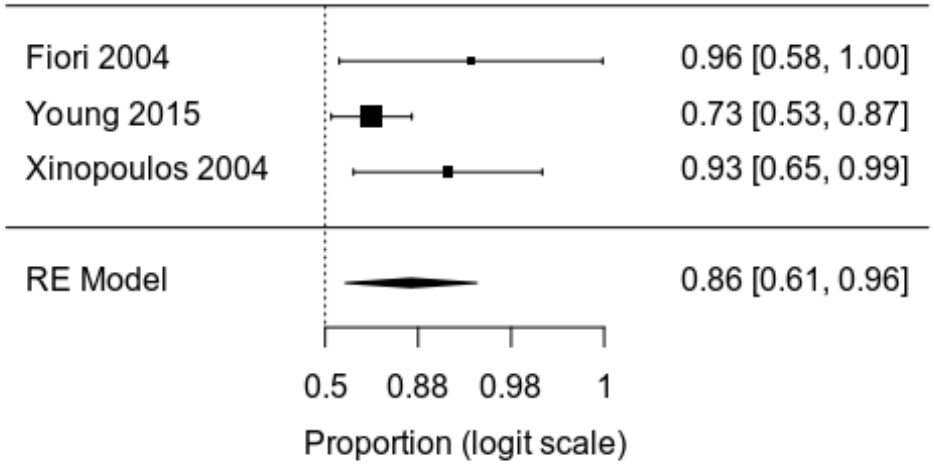
Figure 14: Comparison 1: Stenting followed by planned bowel resection or palliative care versus emergency surgery - stoma rate

Study or Subgroup	Stenting Events	Stenting Total	Emergency surgery Events	Emergency surgery Total	Weight	Risk Ratio M-H, Fixed, 95% CI
1.11.1 Palliative intent - Postprocedure						
Young 2015	7	26	24	26	100.0%	0.29 [0.15, 0.55]
Subtotal (95% CI)		**26**		**26**	**100.0%**	**0.29 [0.15, 0.55]**
Total events	7		24			
Heterogeneity: Not applicable						
Test for overall effect: Z = 3.76 (P = 0.0002)						
1.11.2 Curative intent - Postprocedure						
Dutch Stent-In-2 trial (Van Hooft 2011)	24	47	38	51	44.4%	0.69 [0.50, 0.95]
ESCO trial (Arezzo 2017)	11	56	23	59	27.3%	0.50 [0.27, 0.94]
Ho 2012	2	20	6	19	7.5%	0.32 [0.07, 1.38]
Pirlet 2011	13	30	17	30	20.7%	0.76 [0.46, 1.28]
Subtotal (95% CI)		**153**		**159**	**100.0%**	**0.62 [0.48, 0.81]**
Total events	50		84			
Heterogeneity: Chi² = 2.19, df = 3 (P = 0.53); I² = 0%						
Test for overall effect: Z = 3.60 (P = 0.0003)						
1.11.3 Curative intent - At last follow up						
Cheung 2009	0	24	6	24	11.7%	0.08 [0.00, 1.29]
Dutch Stent-In-2 trial (Van Hooft 2011)	27	47	34	51	58.5%	0.86 [0.63, 1.18]
ESCO trial (Arezzo 2017)	9	56	15	59	26.2%	0.63 [0.30, 1.33]
Ho 2012	1	20	2	19	3.7%	0.47 [0.05, 4.82]
Subtotal (95% CI)		**147**		**153**	**100.0%**	**0.70 [0.51, 0.94]**
Total events	37		57			
Heterogeneity: Chi² = 4.29, df = 3 (P = 0.23); I² = 30%						
Test for overall effect: Z = 2.33 (P = 0.02)						



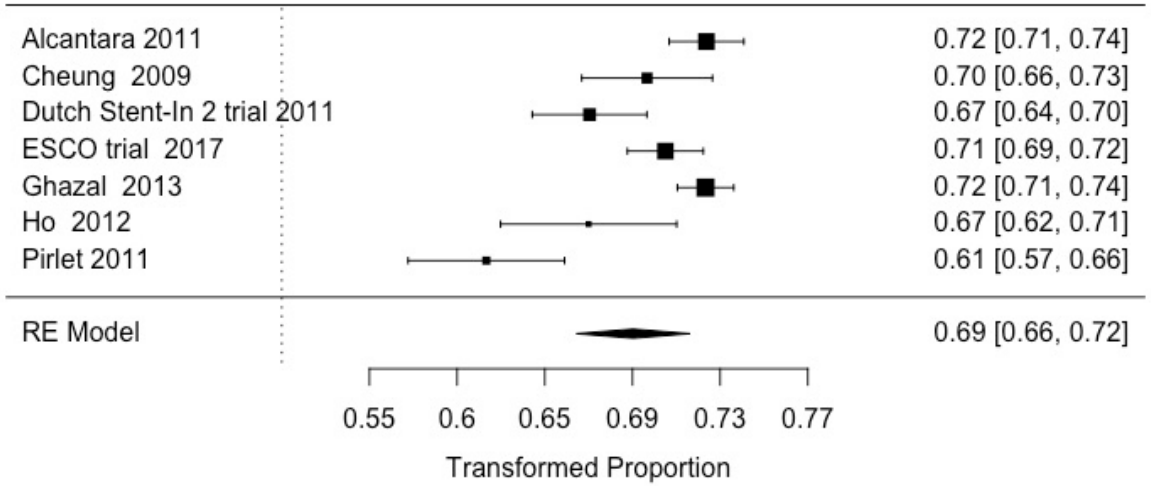
CI: confidence interval; M-H: Mantel-Haenszel

Figure 15: Comparison 1: Stenting followed by planned bowel resection or palliative care versus emergency surgery - technical success – Palliative intent, stent arm only



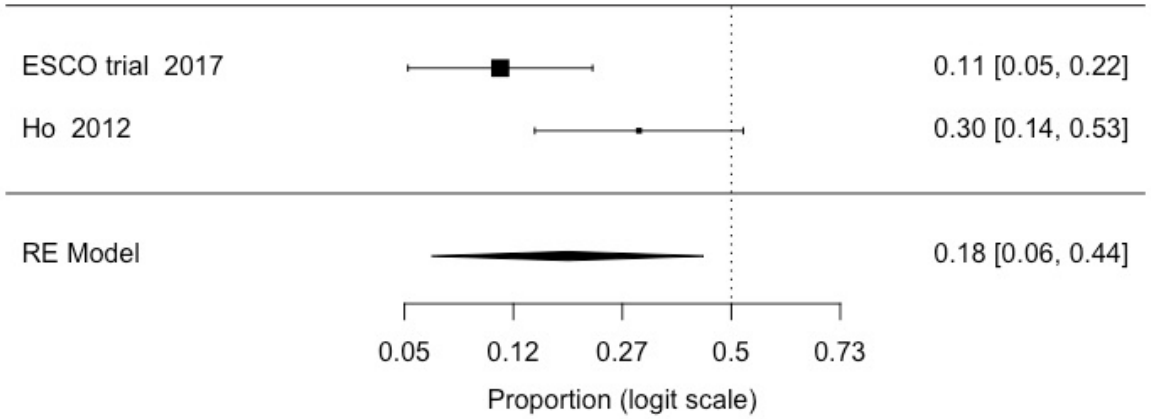
RE: random effect

Figure 16: Comparison 1: Stenting followed by planned bowel resection or palliative care versus emergency surgery – technical success – Curative intent, stent arm only



RE: random effect

Figure 17: Comparison 1: Stenting followed by planned bowel resection or palliative care versus emergency surgery - stent failure – Curative intent, stent arm only



1 *RE: random effect*

1 Appendix F – GRADE tables

2 GRADE tables for review question: What is the effectiveness of stenting compared with emergency surgery for suspected 3 colorectal cancer causing acute large bowel obstruction?

4 **Table 5: Comparison 1: Stenting followed by planned bowel resection or palliative care versus emergency surgery**

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Stenting + planned bowel resection or palliative care	Emergency bowel surgery	Relative (95% CI)	Absolute		
Clinically successful bowel decompression, stent arm only - Palliative intent												
2	randomised trials	no serious risk of bias	serious inconsistency[1]	serious[2]	serious[3]	none	30/37 (81.1%)	-	Risk 0.84 (0.43 to 0.97)	840 per 1000 (from 430 to 970)	VERY LOW	CRITICAL
Clinically successful bowel decompression, stent arm only - Curative intent												
5	randomised trials	very serious[4,5]	serious inconsistency[1]	no serious indirectness	serious[3]	none	123/177 (69.5%)	-	Risk 0.69 (0.53 to 0.82)	690 per 1000 (from 530 to 820)	VERY LOW	CRITICAL
30-day mortality - Palliative intent												
3	randomised trials	serious[4]	serious inconsistency[1]	serious[2]	serious[3]	none	4/48 (8.3%)	4/47 (8.5%)	RD -0.00 (-0.12 to 0.12)	0 more per 1000 (from 120 fewer to 120 more)	VERY LOW	CRITICAL
30-day mortality - Curative intent												

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Stenting + planned bowel resection or palliative care	Emergency bowel surgery	Relative (95% CI)	Absolute		
5	randomised trials	very serious[4,5]	no serious inconsistency	no serious indirectness	serious[3]	none	9/168 (5.4%)	10/172 (5.8%)	Peto OR 0.92 (0.36 to 2.34)	4 fewer per 1000 (from 34 fewer to 63 more)	VERY LOW	CRITICAL
Disease free survival, event is disease recurrence or death from any cause (follow-up 4 to 5 years) - Curative intent												
2	randomised trials	serious[6]	no serious inconsistency	no serious indirectness	serious[3]	none	22/50 (44%)	16/56 (29%)	HR 0.56 (0.29 to 1.06)	At 4 years ES 28.1%[b], SBTS 57.2% (27.4% to 78.6%)	LOW	CRITICAL
3-year progression free survival, event is disease recurrence or relapse or death from any cause – Curative intent												
1	randomised trials	no serious risk of bias	no serious inconsistency	no serious indirectness	serious[3]	none	17/56 (30%)	12/59 (20%)	HR 0.95 (0.45 to 2.01)	At 3 years ES 20.3%[c], SBTS 22% (4.2% to 48.8%)	MODERATE	CRITICAL
1-year overall survival, event is death from any cause - Palliative intent												
1	randomised trials	no serious risk of bias	no serious inconsistency	serious[2]	serious[3]	none	17/26 (65%)	19/26 (73%)	HR 0.84 (0.44 to 1.6)	At 1 year ES 73.1%[d], stenting 76.8% (60.5%	LOW	IMPORTANT

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Stenting + planned bowel resection or palliative care	Emergency bowel surgery	Relative (95% CI)	Absolute		
										to 87.1%)		
5-year overall survival, event is death from any cause - Curative intent												
1	randomised trials	no serious risk of bias	no serious inconsistency	no serious indirectness	serious[3]	none	12/24	16/24	HR 0.51 (0.24 to 1.08)	At 5 years ES 67%[a], SBTS 81.5% (64.9% to 90.8%)	MODERATE	IMPORTANT
4-year overall survival, event is death from any cause - Curative intent												
1	randomised trials	serious[6]	no serious inconsistency	no serious indirectness	serious[3]	none	10/26	10/32	HR 0.72 (0.3 to 1.73)	At 4 years ES 31.3%[b], SBTS 43.3% (13.4% to 70%)	LOW	IMPORTANT
3-year overall survival, event is death from any cause - Curative intent												
1	randomised trials	no serious risk of bias	no serious inconsistency	no serious indirectness	serious[3]	none	18/56	16/59	HR 1.00 (0.51 to 1.96)	At 3 years ES 27.1%[c], SBTS 27.2% (7.7% to 51.4%)	MODERATE	IMPORTANT

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Stenting + planned bowel resection or palliative care	Emergency bowel surgery	Relative (95% CI)	Absolute		
Hospital stay - Palliative intent - Fiori 2004												
1	randomised trials	serious[4]	no serious inconsistency	no serious indirectness	serious[3]	none	N=15 Median= 2.6	N=13 Median= 8.1	p<0.0001	-	not assessable[6]	IMPORTANT
Hospital stay - Palliative intent - Dutch Stent-In-1 trial (Van Hooft 2008)												
1	randomised trials	serious[4]	no serious inconsistency	no serious indirectness	serious[3]	none	N=11 Median=12 Range=7-19	N=10 Median=11 Range=6.25-17.25	p=0.46	-	not assessable[6]	IMPORTANT
Hospital stay - Palliative intent - Young 2015												
1	randomised trials	no serious risk of bias	no serious inconsistency	serious[2]	serious[3]	none	N=26 Median=7 Range=3-12	N=26 Median=11 Range=8-17	p=0.03	-	not assessable[6]	IMPORTANT
Hospital stay - Curative intent - Alcantara 2011												
1	randomised trials	very serious[4,5]	no serious inconsistency	no serious indirectness	serious[3]	none	N=15 Median=13	N=13 Median=10	p=0.105	-	not assessable[6]	IMPORTANT
Hospital stay - Curative intent - Cheung 2009												
1	randomised trials	no serious risk of bias	no serious inconsistency	no serious indirectness	serious[3]	none	N=24 Median=13.5 Range=7-29	N=24 Median=14 Range=7-55	p=0.7	-	not assessable[6]	IMPORTANT
Hospital stay - Curative intent - ESCO trial (Arezzo 2017)												
1	randomised trials	no serious risk of bias	no serious inconsistency	no serious indirectness	serious[3]	none	N=56 Median=10 Range=7-13	N=59 Median=11 Range=8-15	-	-	not assessable[6]	IMPORTANT
Hospital stay - Curative intent - Ghazal 2013												
1	randomised trials	serious[4]	no serious inconsistency	no serious indirectness	serious[3]	none	N=30 Median=13	N=30 Median=8	p=0.102	-	not assessable[6]	IMPORTANT

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Stenting + planned bowel resection or palliative care	Emergency bowel surgery	Relative (95% CI)	Absolute		
Hospital stay - Curative intent - Ho 2012												
1	randomised trials	no serious risk of bias	no serious inconsistency	no serious indirectness	serious[3]	none	N=20 Median=6 Range=4-28	N=19 Median=8 Range=6-39	p=0.028	-	not assessable[6]	IMPORTANT
Hospital stay - Curative intent - Pirlet 2011												
1	randomised trials	no serious risk of bias	no serious inconsistency	no serious indirectness	serious[3]	none	N=30 Median=23 Range=9-67	N=30 Median=17 (7-126)	p=0.13	-	not assessable[6]	IMPORTANT
Anastomotic leak - Palliative intent												
1	randomised trials	no serious risk of bias	no serious inconsistency	serious[2]	serious[3]	none	0/26 (0%)	0/26 (0%)	RD 0.00 (-0.07 to 0.07)	0 more per 1000 (from 7 fewer to 7 more)	LOW	IMPORTANT
Anastomotic leak - Curative intent												
7	randomised trials	very serious[4,5]	no serious inconsistency	no serious indirectness	serious[3]	none	11/221 (5%)	12/226 (5.3%)	Peto OR 0.92 (0.40 to 2.13)	4 fewer per 1000 (from 29 fewer to 49 more)	VERY LOW	IMPORTANT
Perforation rate, stent arm only - Curative intent												
3	randomised trials	no serious risk of bias	no serious inconsistency	no serious indirectness	serious[3]	none	13/133 (9.8%)	-	Risk 0.10 (0.06 to 0.17)	100 per 1000 (from 60 to 170)	MODERATE	IMPORTANT
Surgical site infection - Palliative intent												
1	randomised trials	no serious	no serious inconsistency	serious[2]	serious[3]	none	0/26 (0%)	1/26 (3.8%)	Peto OR 0.14	33 fewer per 1000	LOW	IMPORTANT

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Stenting + planned bowel resection or palliative care	Emergency bowel surgery	Relative (95% CI)	Absolute		
		risk of bias							(0.00 to 6.82)[7]	(from 38 fewer to 176 more)		
Surgical site infection - Curative intent												
6	randomised trials	very serious[4,5]	no serious inconsistency	no serious indirectness	serious[3]	none	14/191 (7.3%)	35/196 (17.9%)	RR 0.4 (0.22 to 0.71)	107 fewer per 1000 (from 52 fewer to 139 fewer)	VERY LOW	IMPORTANT
Stoma rate - Palliative intent - Postprocedure												
1	randomised trials	no serious risk of bias	no serious inconsistency	serious[2]	serious[3]	none	7/26 (26.9%)	24/26 (92.3%)	RR 0.29 (0.15 to 0.55)	655 fewer per 1000 (from 415 fewer to 785 fewer)	LOW	IMPORTANT
Stoma rate - Curative intent - Postprocedure												
4	randomised trials	no serious risk of bias	no serious inconsistency	no serious indirectness	serious[3]	none	50/153 (32.7%)	84/159 (52.8%)	RR 0.62 (0.48 to 0.81)	201 fewer per 1000 (from 100 fewer to 275 fewer)	MODERATE	IMPORTANT

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Stenting + planned bowel resection or palliative care	Emergency bowel surgery	Relative (95% CI)	Absolute		
Stoma rate - Curative intent - At last follow up												
4	randomised trials	no serious risk of bias	no serious inconsistency	no serious indirectness	serious[3]	none	37/147 (25.2%)	57/153 (37.3%)	RR 0.70 (0.51 to 0.94)	112 fewer per 1000 (from 22 fewer to 183 fewer)	MODERATE	IMPORTANT
Technically successful stent placement, stent arm only - Palliative intent												
3	randomised trials	serious[4]	serious inconsistency[1]	serious[2]	serious[3]	none	44/52 (84.6%)	-	Risk 0.86 (0.61 to 0.96)	860 per 1000 (from 610 to 960)	VERY LOW	IMPORTANT
Technically successful stent placement, stent arm only - Curative intent												
5	randomised trials	very serious[4,5]	serious inconsistency[1]	no serious indirectness	serious[3]	none	174/222 (78.4%)	-	Risk 0.69 (0.66 to 0.72)	690 per 1000 (from 660 to 720)	VERY LOW	IMPORTANT
Stent failure, stent arm only - Curative intent												
2	randomised trials	no serious risk of bias	serious inconsistency[1]	no serious indirectness	serious[3]	none	12/76 (15.8%)	-	Risk 0.18 (0.06 to 0.44)	180 per 1000 (from 60 to 440)	LOW	IMPORTANT
Quality of life - Palliative intent - EQ-5D change score, change from baseline to 1 year (Better indicated by lower values)												
1	randomised trials	no serious risk of bias	no serious inconsistency	serious[2]	serious[3]	none	26	26	-	MD 0.26 higher (0.05 to	LOW	IMPORTANT

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Stenting + planned bowel resection or palliative care	Emergency bowel surgery	Relative (95% CI)	Absolute		
										0.47 higher)		
Quality of life - Curative intent - EORTC-C30 QL2 subscale, change from baseline to 6-months (Better indicated by lower values)												
1	randomised trials	serious[9]	no serious inconsistency	no serious indirectness	serious[3]	none	36	39	-	MD 10.1 higher (1.87 to 18.33 higher)	LOW	IMPORTANT

CI: confidence interval; EQ-5D: EuroQol five dimensions questionnaire: ES: emergency surgery; HR: hazard ratio; MD: mean difference: N: number; OR: odds ratio; RD: risk difference; RR: relative risk; SBTS: stenting as a bridge to surgery

1 Quality of evidence downgraded by 1 due to moderate-high heterogeneity (I2 > 40%)

2 Quality of evidence downgraded by 1 due to indirectness of the study population - 6/30 (20%) patients had ovarian cancer (Xinopoulos 2004); 12/52 (23%) patients had non-colorectal cancer primaries (Young 2015)

3 Quality of evidence downgraded by 1 because of imprecision of the effect estimate (< 300 events for dichotomous outcomes or < 400 patients for continuous outcomes)

4 Quality of evidence downgraded by 1 due to failure to report random sequence generation procedure, unclear how attrition was managed, outcomes not pre-specified (Alcantara 2011; Dutch Stent-In-1 trial (Van Hooft 2008); Fiori 2004; Ghazal 2013; Xinopoulos 2004)

5 Quality of evidence downgraded by 1 because interim safety analyses and termination procedure not determined a priori (Alcantara 2011)

6 Quality of evidence downgraded by 1 due to 69% attrition from original sample (Dutch Stent-In-2-Trial [Sloothaak 2014])

7 Peto OR used due to zero events in one arm

8 Not calculable because of 0 events in both arms

9 Quality of evidence downgraded by 1 because lack of blinding could have affected quality of life outcomes (Dutch Stent-In-2 trial [Van Hooft 2011])

a The absolute risk at 5 years in the control group taken from Cheung 2009 (Tung 2013)

b The absolute risk at 4 years in the control group taken from the Dutch Stent-In-2 trial (Sloothaak 2014)

c The absolute risk at 3 years in the control group taken from the ESCO trial (Arezzo 2017)

d The absolute risk at 1 year in the control group taken from the Young 2015

Appendix G – Economic evidence study selection

Economic evidence study selection for review question: What is the effectiveness of stenting compared with emergency surgery for suspected colorectal cancer causing acute large bowel obstruction?

A global search of economic evidence was undertaken for all review questions in this guideline. See Supplement 2 for further information.

Appendix H – Economic evidence tables

Economic evidence tables for review question: What is the effectiveness of stenting compared with emergency surgery for suspected colorectal cancer causing acute large bowel obstruction?

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

Appendix I – Economic evidence profiles

Economic evidence profiles for review question: What is the effectiveness of stenting compared with emergency surgery for suspected colorectal cancer causing acute large bowel obstruction?

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

Appendix J – Economic analysis

Economic evidence analysis for review question: What is the effectiveness of stenting compared with emergency surgery for suspected colorectal cancer causing acute large bowel obstruction?

No economic analysis was conducted for this review question.

1 Appendix K – Excluded studies

2 Excluded clinical studies for review question: What is the effectiveness of 3 stenting compared with emergency surgery for suspected colorectal cancer 4 causing acute large bowel obstruction?

5 **Table 6: Excluded studies and reasons for their exclusion**

Study	Reason for exclusion
Abelson, J. S., Yeo, H. L., Mao, J., Milsom, J. W., Sedrakyan, A., Long-term postprocedural outcomes of palliative emergency stenting vs stoma in malignant large-bowel obstruction, JAMA Surgery, 152, 429-435, 2017	Cohort study; RCT evidence available
Ahn, H. J., Kim, S. W., Lee, S. W., Lim, C. H., Kim, J. S., Cho, Y. K., Park, J. M., Lee, I. S., Choi, M. G., Long-term outcomes of palliation for unresectable colorectal cancer obstruction in patients with good performance status: endoscopic stent versus surgery, Surgical endoscopy and other interventional techniques, 30, 4765-4775, 2016	Cohort study; RCT evidence available
Allaix, M. E., Arezzo, A., Balague, C., Targarona, E. M., Morino, M., Esco trial: colonic stent versus emergency surgery in malignant colonic occlusion, an interim report, European surgical research., 45, 210â□□211, 2010	Conference abstract
Allievi, N., Ceresoli, M., Fugazzola, P., Montori, G., Coccolini, F., Ansaloni, L., Endoscopic Stenting as Bridge to Surgery versus Emergency Resection for Left-Sided Malignant Colorectal Obstruction: An Updated Meta-Analysis, International journal of surgical oncology, 2017, 2863272, 2017	A systematic review, included studies checked for relevance. All studies individually included in review
Amelung, F. J., Burghgraef, T. A., Tanis, P. J., van Hooft, J. E., ter Borg, F., Siersema, P. D., Bemelman, W. A., Consten, E. C. J., Critical appraisal of oncological safety of stent as bridge to surgery in left-sided obstructing colon cancer; a systematic review and meta-analysis, Critical Reviews in Oncology/Hematology, 131, 66-75, 2018	A systematic review, included studies checked for relevance.
Amelung, F. J., de Beaufort, H. W. L., Siersema, P. D., Verheijen, P. M., Consten, E. C. J., Emergency resection versus bridge to surgery with stenting in patients with acute right-sided colonic obstruction: a systematic review focusing on mortality and morbidity rates, International journal of colorectal disease, 30, 1147-1155, 2015	A systematic review, included studies checked for relevance.
Amelung, F. J., Draaisma, W. A., Consten, E. C. J., Siersema, P. D., ter Borg, F., Self-expandable metal stent placement versus emergency resection for malignant proximal colon obstructions, Surgical Endoscopy and Other Interventional Techniques, 31, 4532-4541, 2017	Prospective cohort study; RCT evidence available
Amelung, F. J., Draaisma, W. A., Consten, E. C. J., Siersema, P. D., Ter Borg, F. J., A case-matched comparative study of self-expandable metal stent placement and emergency resection in the management of proximal colonic obstructions, Surgical Endoscopy and Other Interventional Techniques, 31 (2 Supplement 1), S362, 2017	Conference abstract
Amelung, F. J., ter Borg, F., Consten, E. C. J., Siersema, P. D., Draaisma, W. A., Deviating colostomy construction versus stent placement as bridge to surgery for malignant left-sided colonic obstruction, Surgical endoscopy and other interventional techniques, 30, 5345â□□5355, 2016	Prospective cohort study; RCT evidence available
Angenete, E., Asplund, D., Bergstrom, M., Park, P. O., Stenting for colorectal cancer obstruction compared to surgery-a study of	Prospective cohort study; RCT evidence available

Study	Reason for exclusion
consecutive patients in a single institution, International journal of colorectal disease, 27, 665â□□670, 2012	
Arezzo, A., Passera, R., Lo Secco, G., Verra, M., Bonino, M. A., Targarona, E., Morino, M., Stent as bridge to surgery for left-sided malignant colonic obstruction reduces adverse events and stoma rate compared with emergency surgery: results of a systematic review and meta-analysis of randomized controlled trials, Gastrointestinal endoscopy, 86, 416-426, 2017	A systematic review, included studies checked for relevance.
Atukorale, Y. N., Church, J. L., Hoggan, B. L., Lambert, R. S., Gurgacz, S. L., Goodall, S., Maddern, G. J., Self-Expanding Metallic Stents for the Management of Emergency Malignant Large Bowel Obstruction: a Systematic Review, Journal of gastrointestinal surgery : official journal of the Society for Surgery of the Alimentary Tract, 20, 455-462, 2016	A systematic review, included studies checked for relevance.
Baik, S. H., Kim, N. K., Cho, H. W., Lee, K. Y., Sohn, S. K., Cho, C. H., Kim, T. I., Kim, W. H., Clinical outcomes of metallic stent insertion for obstructive colorectal cancer, Hepato-Gastroenterology, 53, 183-187, 2006	Prospective cohort study; RCT evidence available
Bergstrom, M., Stolt, R., Cikota, P., Ahlen, R., Park, P. O., Inflammatory response to acute treatment of colonic obstruction due to colorectal malignancy, comparing colonic stenting and surgery, Surgical endoscopy and other interventional techniques, 32 (1 Supplement 1), S207, 2018	Conference abstract; retrospective cohort study
Breitenstein, S., Rickenbacher, A., Berdajs, D., Puhan, M., Clavien, P. A., Demartines, N., Systematic evaluation of surgical strategies for acute malignant left-sided colonic obstruction, British journal of surgery, 94, 1451-1460, 2007	A systematic review, included studies checked for relevance.
Carne, P. W. G., Frye, J. N. R., Robertson, G. M., Frizelle, F. A., Stents or open operation for palliation of colorectal cancer: A retrospective, cohort study of perioperative outcome and long-term survival, Diseases of the colon and rectum, 47, 1455-1461, 2004	Retrospective cohort study; RCT evidence available
Cennamo, V., Luigiano, C., Coccolini, F., Fabbri, C., Bassi, M., De Caro, G., Ceroni, L., Maimone, A., Ravelli, P., Ansaloni, L., Meta-analysis of randomized trials comparing endoscopic stenting and surgical decompression for colorectal cancer obstruction, International journal of colorectal disease, 28, 855-863, 2013	A systematic review, included studies checked for relevance.
Cennamo, V., Luigiano, C., Manes, G., Zagari, R. M., Ansaloni, L., Fabbri, C., Ceroni, L., Catena, F., Pinna, A. D., Fuccio, L., et al.,, Colorectal stenting as a bridge to surgery reduces morbidity and mortality in left-sided malignant obstruction: a predictive risk score-based comparative study, Digestive and liver disease, 44, 508â□□514, 2012	Prospective cohort study; RCT evidence available
Ceresoli, M., Allievi, N., Coccolini, F., Montori, G., Fugazzola, P., Pisano, M., Sartelli, M., Catena, F., Ansaloni, L., Long-term oncologic outcomes of stent as a bridge to surgery versus emergency surgery in malignant left side colonic obstructions: A meta-analysis, Journal of Gastrointestinal Oncology, 8, 867-876, 2017	A systematic review, included studies checked for relevance.
Choi, J. M., Lee, C., Han, Y. M., Lee, M., Choi, Y. H., Jang, D. K., Im, J. P., Kim, S. G., Kim, J. S., Jung, H. C., Long-term oncologic outcomes of endoscopic stenting as a bridge to surgery for malignant colonic obstruction: Comparison with emergency surgery, Surgical Endoscopy and Other Interventional Techniques, 28, 2649-2655, 2014	Prospective cohort study; RCT evidence available

Study	Reason for exclusion
Cirocchi, R., Farinella, E., Trastulli, S., Desiderio, J., Listorti, C., Boselli, C., Parisi, A., Noya, G., Sagar, J., Safety and efficacy of endoscopic colonic stenting as a bridge to surgery in the management of intestinal obstruction due to left colon and rectal cancer: a systematic review and meta-analysis, Surgical OncologySurg Oncol, 22, 14-21, 2013	A systematic review, included studies checked for relevance.
Consolo, P., Giacobbe, G., Cintolo, M., Tortora, A., Fama, F., Gioffre-Florio, M., Pallio, S., Colonic acute malignant obstructions: Effectiveness of self-expanding metallic stent as bridge to surgery, Turkish Journal of Gastroenterology, 28, 40-45, 2017	Retrospective cohort study; RCT evidence available
Crespi-Mir, A., Romero-Marcos, J. M., de la Llave-Serralvo, A., Dolz-Abadia, C., Cifuentes-Rodenas, J. A., Impact on surgical and oncological results of the use of colonic stents as a bridge to surgery for potentially curable occlusive colorectal neoplasms, Cirugia espanola, 96, 419-428, 2018	Retrospective cohort study; RCT evidence available
Cui, J., Zhang, J. L., Wang, S., Sun, Z. Q., Jiang, X. L., A preliminary study of stenting followed by laparoscopic surgery for obstructing left-sided colon cancer, Zhonghua wei chang wai ke za zhi [Chinese journal of gastrointestinal surgery], 14, 40â□□43, 2011	Article in Chinese
Currie, A., Christmas, C., Aldean, H., Mobasheri, M., Bloom, I. T. M., Systematic review of self-expanding stents in the management of benign colorectal obstruction, Colorectal Disease, 16, 239-245, 2014	A systematic review, included studies checked for relevance.
Dastur, J. K., Forshaw, M. J., Modarai, B., Solkar, M. M., Raymond, T., Parker, M. C., Comparison of short-and long-term outcomes following either insertion of self-expanding metallic stents or emergency surgery in malignant large bowel obstruction, Techniques in Coloproctology, 12, 51-55, 2008	Retrospective cohort study; RCT evidence available
De Ceglie, A., Filiberti, R., Baron, T. H., Ceppi, M., Conio, M., A meta-analysis of endoscopic stenting as bridge to surgery versus emergency surgery for left-sided colorectal cancer obstruction, Critical Reviews in Oncology/Hematology, 88, 387-403, 2013	A systematic review, included studies checked for relevance.
Faragher, I. G., Chaitowitz, I. M., Stupart, D. A., Long-term results of palliative stenting or surgery for incurable obstructing colon cancer, Colorectal disease, 10, 668-672, 2008	Retrospective cohort study; RCT evidence available
Finlayson, A., Hulme-Moir, M., Palliative colonic stenting: a safe alternative to surgery in stage IV colorectal cancer, ANZ Journal of Surgery, 86, 773-777, 2016	Retrospective cohort study; RCT evidence available
Fiori, E., Lamazza, A., Schillaci, A., Femia, S., Demasi, E., Decesare, A., Sterpetti, A. V., Palliative management for patients with subacute obstruction and stage IV unresectable rectosigmoid cancer: Colostomy versus endoscopic stenting: Final results of a prospective randomized trial, American Journal of Surgery, 204, 321-326, 2012	Follow up study of Fiori 2004 (included in review), outcomes not relevant
Flor-Lorente, B., Báguena, G., Frasson, M., García-Granero, A., Cervantes, A., Sanchiz, V., Peña, A., Espí, A., Esclapez, P., García-Granero, E., Self-expanding metallic stent as a bridge to surgery in the treatment of left colon cancer obstruction: cost-benefit analysis and oncologic results, Cirugia espanola, 95, 143â□□151, 2017	Prospective cohort study; RCT evidence available
Foo, C. C., Poon, S. H. T., Chiu, R. H. Y., Lam, W. Y., Cheung, L. C., Law, W. L., Is bridge to surgery stenting a safe alternative to emergency surgery in malignant colonic obstruction: a meta-analysis of randomized control trials, Surgical Endoscopy., 2018	A systematic review, included studies checked for relevance.
Formisano, V., Di Muria, A., Connola, G., Cione, G., Falco, L., De Angelis, C. P., Angrisani, L., Our experience in the management of obstructing colorectal cancer, Annali italiani di chirurgia, 85, 563-568, 2014	Article in Italian

Study	Reason for exclusion
Frago, R., Ramirez, E., Millan, M., Kreisler, E., Del Valle, E., Biondo, S., Current management of acute malignant large bowel obstruction: A systematic review, American journal of surgery, 207, 127-138, 2014	A systematic review, included studies checked for relevance.
Gianotti, L., Tamini, N., Nespoli, L., Rota, M., Bolzonaro, E., Frego, R., Redaelli, A., Antolini, L., Ardito, A., Nespoli, A., Dinelli, M., A prospective evaluation of short-term and long-term results from colonic stenting for palliation or as a bridge to elective operation versus immediate surgery for large-bowel obstruction, Surgical endoscopy, 27, 832-42, 2013	Prospective cohort study; RCT evidence available
Gibor, U., Perry, Z. H., Tirosh, D., Netz, U., Rosental, A., Fich, A., Man, S., Ariad, S., Kirshtein, B., Comparison of the long-term oncological outcomes of stent as a bridge to surgery and surgery alone in malignant colonic obstruction, Israel Medical Association Journal, 19, 736-740, 2017	Retrospective cohort study; RCT evidence available
Gorissen, K. J., Tuynman, J. B., Fryer, E., Wang, L., Uberoi, R., Jones, O. M., Cunningham, C., Lindsey, I., Local recurrence after stenting for obstructing left-sided colonic cancer, British journal of surgery, 100, 1805-1809, 2013	Prospective cohort study; RCT evidence available
Guo, M. G., Feng, Y., Liu, J. Z., Zheng, Q., Di, J. Z., Wang, Y., Fan, Y. B., Huang, X. Y., Factors associated with mortality risk for malignant colonic obstruction in elderly patients, BMC Gastroenterology, 14 (1) (no pagination), 2014	Retrospective cohort study; RCT evidence available
Guo, M. G., Feng, Y., Zheng, Q., Di, J. Z., Wang, Y., Fan, Y. B., Huang, X. Y., Comparison of self-expanding metal stents and urgent surgery for left-sided malignant colonic obstruction in elderly patients, Digestive Diseases and Sciences, 56, 2706-2710, 2011	Retrospective cohort study; RCT evidence available
Han, J. P., Hong, S. J., Kim, S. H., Choi, J. H., Jung, H. J., Cho, Y. H., Ko, B. M., Lee, M. S., Palliative self-expandable metal stents for acute malignant colorectal obstruction: Clinical outcomes and risk factors for complications, Scandinavian Journal of Gastroenterology, 49, 967-973, 2014	Prospective cohort study; comparison not relevant, both arms received stents; RCT evidence available
Hanabata, N., Sasaki, Y., Kanazawa, K., Igarashi, S., Hasui, K., Shimaya, K., Numao, H., Munakata, M., Fukuda, S., A comparative study on efficacy of chemotherapy after endoscopic colonic stenting vs. That after colonic surgery in the management of obstructive colorectal cancer, United European Gastroenterology Journal, 5 (5 Supplement 1), A557, 2017	Conference abstract
Haraguchi, N., Ikeda, M., Miyake, M., Yamada, T., Sakakibara, Y., Mita, E., Doki, Y., Mori, M., Sekimoto, M., Colonic stenting as a bridge to surgery for obstructive colorectal cancer: advantages and disadvantages, Surgery Today, 46, 1310-1317, 2016	Prospective cohort study; RCT evidence available
Horesh, N., Dux, J. Y., Nadler, M., Lang, A., Zmora, O., Shacham-Shmueli, E., Gutman, M., Shapiro, R., Stenting in malignant colonic obstruction-is it a real therapeutic option?, International journal of colorectal disease, 31, 131-135, 2016	Retrospective cohort study; RCT evidence available
Huang, X., Lv, B., Zhang, S., Meng, L., Preoperative Colonic Stents Versus Emergency Surgery for Acute Left-Sided Malignant Colonic Obstruction: A Meta-analysis, Journal of gastrointestinal surgery, 18, 584-591, 2014	A systematic review, included studies checked for relevance.
Kang, S. I., Oh, H. K., Yoo, J. S., Ahn, S., Kim, M. H., Son, I. T., Kim, D. W., Kang, S. B., Park, Y. S., Yoon, C. J., Shin, R., Heo, S. C., Lee, I. T., Youk, E. G., Kim, M. J., Chang, T. Y., Park, S. C., Sohn, D. K., Oh, J. H., Park, J. W., Ryoo, S. B., Jeong, S. Y., Park, K. J., Oncologic outcomes of preoperative stent insertion first versus	Retrospective cohort study; RCT evidence available

Study	Reason for exclusion
immediate surgery for obstructing left-sided colorectal cancer, Surgical Oncology, 27, 216-224, 2018	
Karoui, M., Charachon, A., Delbaldo, C., Loriau, J., Laurent, A., Sobhani, I., Tran Van Nhieu, J., Delchier, J. C., Fagniez, P. L., Piedbois, P., Cherqui, D., Stents for palliation of obstructive metastatic colon cancer: Impact on management and chemotherapy administration, Archives of Surgery, 142, 619-623, 2007	Retrospective cohort study; RCT evidence available
Karoui, M., Soprani, A., Charachon, A., Delbaldo, C., Vigano, L., Luciani, A., Cherqui, D., Primary chemotherapy with or without colonic stent for management of irresectable stage IV colorectal cancer, European Journal of Surgical Oncology, 36, 58-64, 2010	Prospective cohort study; RCT evidence available
Kavanagh, D. O., Nolan, B., Judge, C., Hyland, J. M. P., Mulcahy, H. E., O'Connell, P. R., Winter, D. C., Doherty, G. A., A comparative study of short- and medium-term outcomes comparing emergent surgery and stenting as a bridge to surgery in patients with acute malignant colonic obstruction, Diseases of the colon and rectum, 56, 433-440, 2013	Retrospective cohort study; RCT evidence available
Khot, U. P., Wenk Lang, A., Murali, K., Parker, M. C., Systematic review of the efficacy and safety of colorectal stents, British journal of surgery, 89, 1096-1102, 2002	A systematic review, included studies checked for relevance.
Kim, H. H., Kim, H. K., Cho, S. H., Huh, J. W., Rhyu, S. Y., Kim, H. R., Kim, D. Y., Kim, Y. J., Ju, J. K., Usefulness of self-expandable metallic stents for malignant colon obstruction, Journal of the Korean Society of Coloproctology, 25, 113-116, 2009	Unavailable from the British Library
Kim, H. J., Choi, G. S., Park, J. S., Park, S. Y., Jun, S. H., Higher rate of perineural invasion in stent-laparoscopic approach in comparison to emergent open resection for obstructing left-sided colon cancer, International journal of colorectal disease, 28, 407â□□414, 2013	Prospective cohort study; RCT evidence available
Kim, H. J., Huh, J. W., Kang, W. S., Kim, C. H., Lim, S. W., Joo, Y. E., Kim, H. R., Kim, Y. J., Oncologic safety of stent as bridge to surgery compared to emergency radical surgery for left-sided colorectal cancer obstruction, Surgical Endoscopy and Other Interventional Techniques, 27, 3121-3128, 2013	Retrospective cohort study; RCT evidence available
Kim, J. S., Hur, H., Min, B. S., Sohn, S. K., Cho, C. H., Kim, N. K., Oncologic outcomes of self-expanding metallic stent insertion as a bridge to surgery in the management of left-sided colon cancer obstruction: Comparison with nonobstructing elective surgery, World journal of surgery, 33, 1281-1286, 2009	Prospective cohort study; RCT evidence available
Kim, M. K., Kye, B. H., Lee, I. K., Oh, S. T., Ahn, C. H., Lee, Y. S., Lee, S. C., Kang, W. K., Outcome of bridge to surgery stenting for obstructive left colon cancer, ANZ Journal of Surgery, 87, E245-E250, 2017	Retrospective cohort study; RCT evidence available
Kim, S. J., Kim, H. W., Park, S. B., Kang, D. H., Choi, C. W., Song, B. J., Hong, J. B., Kim, D. J., Park, B. S., Son, G. M., Colonic perforation either during or after stent insertion as a bridge to surgery for malignant colorectal obstruction increases the risk of peritoneal seeding, Surgical endoscopy and other interventional techniques, 29, 3499-3506, 2015	Retrospective cohort study; RCT evidence available
Knight, A. L., Trompetas, V., Saunders, M. P., Anderson, H. J., Does stenting of left-sided colorectal cancer as a "bridge to surgery" adversely affect oncological outcomes A comparison with non-obstructing elective left-sided colonic resections, International journal of colorectal disease, 27, 1509-1514, 2012	Retrospective cohort study; RCT evidence available

Study	Reason for exclusion
Kwak, M. S., Kim, W. S., Lee, J. M., Yang, D. H., Yoon, Y. S., Yu, C. S., Kim, J. C., Byeon, J. S., Does Stenting as a Bridge to Surgery in Left-Sided Colorectal Cancer Obstruction Really Worsen Oncological Outcomes?, Diseases of the colon and rectum, 59, 725-732, 2016	Retrospective cohort study; RCT evidence available
Lamazza, A., Fiori, E., Schillaci, A., DeMasi, E., Pontone, S., Sterpetti, A. V., Self-expandable metallic stents in patients with stage IV obstructing colorectal cancer, World journal of surgery, 36, 2931-2936, 2012	A systematic review, included studies checked for relevance.
Law, W. L., Choi, H. K., Chu, K. W., Comparison of stenting with emergency surgery as palliative treatment for obstructing primary left-sided colorectal cancer, British Journal of Surgery, 90, 1429-33, 2003	Prospective cohort study; RCT evidence available
Lee, G. J., Kim, H. J., Baek, J. H., Lee, W. S., Kwon, K. A., Comparison of short-term outcomes after elective surgery following endoscopic stent insertion and emergency surgery for obstructive colorectal cancer, International Journal of Surgery, 11, 442-6, 2013	Retrospective cohort study; RCT evidence available
Lee, H. J., Hong, S. P., Cheon, J. H., Kim, T. I., Min, B. S., Kim, N. K., Kim, W. H., Long-term outcome of palliative therapy for malignant colorectal obstruction in patients with unresectable metastatic colorectal cancers: Endoscopic stenting versus surgery, Gastrointestinal Endoscopy, 73, 535-542, 2011	Retrospective cohort study; RCT evidence available
Lee, W. S., Baek, J. H., Kang, J. M., Choi, S., Kwon, K. A., The outcome after stent placement or surgery as the initial treatment for obstructive primary tumor in patients with stage IV colon cancer, American Journal of Surgery, 203, 715-719, 2012	Retrospective cohort study; RCT evidence available
Li, Z. X., Wu, X. H., Wu, H. Y., Chang, W. J., Chang, X. J., Yi, T., Shi, Q., Chen, J. W., Feng, Q. Y., Zhu, D. X., Wei, Y., Zhong, Y. S., Xu, J. M., Self-expandable metallic stent as a bridge to elective surgery versus emergency surgery for acute malignant colorectal obstruction, International journal of colorectal disease, 31, 561-570, 2016	Retrospective cohort study; RCT evidence available
Liang, T. W., Sun, Y., Wei, Y. C., Yang, D. X., Palliative treatment of malignant colorectal obstruction caused by advanced malignancy: A self-expanding metallic stent or surgery? A system review and meta-analysis, Surgery Today, 44, 22-33, 2014	A systematic review, included studies checked for relevance.
Lim, T. Z., Chan, D. K. H., Tan, K. K., Endoscopic stenting should be advocated in patients with stage IV colorectal cancer presenting with acute obstruction, Journal of Gastrointestinal Oncology, 9, 785-790, 2018	Retrospective cohort study; RCT evidence available
Lim, T. Z., Chan, D., Tan, K. K., Patients who failed endoscopic stenting for left-sided malignant colorectal obstruction suffered the worst outcomes, International Journal of Colorectal Disease., 02, 2014	Retrospective cohort study; RCT evidence available
Liu, Z., Kang, L., Li, C., Huang, M., Zhang, X., Wang, J., Meta-analysis of complications of colonic stenting versus emergency surgery for acute left-sided malignant colonic obstruction, Surgical Laparoscopy, Endoscopy and Percutaneous Techniques, 24, 73-79, 2014	A systematic review, included studies checked for relevance.
Mabardy, A., Miller, P., Goldstein, R., Coury, J., Hackford, A., Dao, H., Stenting for obstructing colon cancer: fewer complications and colostomies, JSLS : Journal of the Society of Laparoendoscopic Surgeons, 19, e2014.00254, 2015	Retrospective cohort study; RCT evidence available
Martinez-Santos, C., Lobato, R. F., Fradejas, J. M., Pinto, I., Ortega-Deballon, P., Moreno-Azcoita, M., Self-expandable stent before elective surgery vs. emergency surgery for the treatment of malignant colorectal obstructions: Comparison of primary anastomosis and morbidity rates, Diseases of the colon and rectum, 45, 401-406, 2002	Prospective cohort study; RCT evidence available

Study	Reason for exclusion
Morita, S., Yamamoto, K., Ogawa, A., Naito, A., Mizuno, H., Yoshioka, S., Matsumura, T., Ohta, K., Suzuki, R., Matsuda, C., Hata, T., Nishimura, J., Mizushima, T., Doki, Y., Mori, M., Miyake, M., Miyoshi, N., Tamagawa, H., Ohta, H., Nushijima, Y., Danno, K., Takemoto, H., Fumimoto, Y., Ohashi, I., Benefits of using a self-expandable metallic stent as a bridge to surgery for right- and left-sided obstructive colorectal cancers, Surgery Today, 49, 32-37, 2019	Retrospective cohort study; RCT evidence available
Nagula, S., Ishill, N., Nash, C., Markowitz, A. J., Schattner, M. A., Temple, L., Weiser, M. R., Thaler, H. T., Zauber, A., Gerdes, H., Quality of Life and Symptom Control after Stent Placement or Surgical Palliation of Malignant Colorectal Obstruction, Journal of the American College of Surgeons, 210, 45-53, 2010	Prospective cohort study; RCT evidence available
Ng, K. C., Law, W. L., Lee, Y. M., Choi, H. K., Seto, C. L., Ho, J. W. C., Self-Expanding Metallic Stent as a Bridge to Surgery Versus Emergency Resection for Obstructing Left-Sided Colorectal Cancer: A Case-Matched Study, Journal of gastrointestinal surgery, 10, 798-803, 2006	Prospective cohort study; RCT evidence available
Olson, T. J. P., Pinkerton, C., Brasel, K. J., Schwarze, M. L., Palliative surgery for malignant bowel obstruction from carcinomatosis a systematic review, JAMA Surgery, 149, 383-392, 2014	A systematic review, included studies checked for relevance.
Park, J., Lee, H. J., Park, S. J., Hur, H., Min, B. S., Cheon, J. H., Kim, T. I., Kim, N. K., Kim, W. H., Long-term outcomes after stenting as a bridge to surgery in patients with obstructing left-sided colorectal cancer, International journal of colorectal disease, 33, 799-807, 2018	Retrospective cohort study; RCT evidence available
Poultsides, G. A., Servais, E. L., Saltz, L. B., Patil, S., Kemeny, N. E., Guillem, J. G., Weiser, M., Temple, L. K. F., Wong, W. D., Paty, P. B., Outcome of primary tumor in patients with synchronous stage IV colorectal cancer receiving combination chemotherapy without surgery as initial treatment, Journal of Clinical OncologyJ Clin Oncol, 27, 3379-3384, 2009	Retrospective cohort study; RCT evidence available
Ptok, H., Marusch, F., Steinert, R., Meyer, L., Lippert, H., Gastinger, I., Incurable stenosing colorectal carcinoma: Endoscopic stent implantation or palliative surgery?, World journal of surgery, 30, 1481-1487, 2006	Prospective cohort study; RCT evidence available
Quereshy, F. A., Poon, J. T. C., Law, W. L., Long-term outcome of stenting as a bridge to surgery for acute left-sided malignant colonic obstruction, Colorectal disease, 16, 788-793, 2014	Retrospective cohort study; RCT evidence available
Rees, J., Tanner, J., Patel, P., Trudgill, N., The outcomes of self-expanding metal stents as a bridge to curative resection in patients with colorectal cancer presenting with bowel obstruction, United European Gastroenterology Journal, 4 (5 Supplement 1), A664, 2016	Conference abstract
Ribeiro, I. B., Bernardo, W. M., Martins, B. D. C., de Moura, D. T. H., Baba, E. R., Josino, I. R., Miyahima, N. T., Coronel Cordero, M. A., Visconti, T. A. C., Ide, E., Sakai, P., de Moura, E. G. H., Colonic stent versus emergency surgery as treatment of malignant colonic obstruction in the palliative setting: a systematic review and meta-analysis, Endoscopy International Open, 6, E558-E567, 2018	A systematic review, included studies checked for relevance.
Ribeiro, I., Pinho, R., Leite, M., Proenca, L., Silva, J., Ponte, A., Rodrigues, J., Maciel-Barbosa, J., Carvalho, J., Reevaluation of Self-Expanding Metal Stents as a Bridge to Surgery for Acute Left-Sided Malignant Colonic Obstruction: Six Years Experience, Portuguese Journal of Gastroenterology, 23, 76-83, 2016	Retrospective cohort study; RCT evidence available
Rodrigues-Pinto, E., Morais, R., Coelho, C., Pereira, P., Repici, A., Macedo, G., Bridge-to-surgery versus emergency surgery in the management of left-sided acute malignant colorectal obstruction -	Retrospective cohort study; RCT evidence available

Study	Reason for exclusion
Efficacy, safety and long-term outcomes, Digestive and Liver Disease., 2018	
Sagar, J., Colorectal stents for the management of malignant colonic obstructions, Cochrane Database of Systematic Reviews, 2011	Systematic review - studies assessed individually
Saida, Y., Sumiyama, Y., Nagao, J., Uramatsu, M., Long-term prognosis of preoperative "bridge to surgery" expandable metallic stent insertion for obstructive colorectal cancer: Comparison with emergency operation, Diseases of the colon and rectum, 46, S44-S49, 2003	Retrospective cohort study; RCT evidence available
Sebastian, S., Johnston, S., Geoghegan, T., Torreggiani, W., Buckley, M., Pooled analysis of the efficacy and safety of self-expanding metal stenting in malignant colorectal obstruction, American journal of gastroenterology, 99, 2051-2057, 2004	A systematic review, included studies checked for relevance
Siddiqui, A., Cosgrove, N., Yan, L. H., Brandt, D., Janowski, R., Kalra, A., Zhan, T., Baron, T. H., Repici, A., Taylor, L. J., Adler, D. G., Long-term outcomes of palliative colonic stenting versus emergency surgery for acute proximal malignant colonic obstruction: a multicenter trial, Endoscopy International Open, 5, E232-E238, 2017	Retrospective cohort study; RCT evidence available
Sloothaak, D. A., Van Den Berg, M. W., Dijkgraaf, M. G., Fockens, P., Tanis, P. J., Van Hooft, J. E., Bemelman, W. A., Oncological follow up of the stent-in 2 trial: Cancer recurrence after curative treatment of malignant colonic obstruction, Gastrointestinal Endoscopy, Conference, Digestive Diease Week, DDW 2014 ASGE. Chicago, IL United States. Conference Publication: (var.pagings). 79 (5 SUPPL. 1) (pp AB161), 2014	Conference abstract
Takahashi, H., Okabayashi, K., Tsuruta, M., Hasegawa, H., Yahagi, M., Kitagawa, Y., Self-Expanding Metallic Stents Versus Surgical Intervention as Palliative Therapy for Obstructive Colorectal Cancer: A Meta-analysis, World journal of surgery, 39, 2037-2044, 2015	A systematic review, included studies checked for relevance
Tan, C. J., Dasari, B. V. M., Gardiner, K., Systematic review and meta-analysis of randomized clinical trials of self-expanding metallic stents as a bridge to surgery versus emergency surgery for malignant left-sided large bowel obstruction, British journal of surgery, 99, 469-476, 2012	A systematic review, included studies checked for relevance
Targownik, L. E., Spiegel, B. M., Sack, J., Hines, O. J., Dulai, G. S., Gralnek, I. M., Farrell, J. J., Colonic stent vs. emergency surgery for management of acute left-sided malignant colonic obstruction: A decision analysis, Gastrointestinal endoscopy, 60, 865-874, 2004	Cost analysis
Tilney, H. S., Lovegrove, R. E., Purkayastha, S., Sains, P. S., Weston-Petrides, G. K., Darzi, A. W., Tekkis, P. P., Heriot, A. G., Comparison of colonic stenting and open surgery for malignant large bowel obstruction, Surgical endoscopy and other interventional techniques, 21, 225-233, 2007	A systematic review, included studies checked for relevance
Tomiki, Y., Watanabe, T., Ishibiki, Y., Tanaka, M., Suda, S., Yamamoto, T., Sakamoto, K., Kamano, T., Comparison of stent placement and colostomy as palliative treatment for inoperable malignant colorectal obstruction, Surgical endoscopy and other interventional techniques, 18, 1572-1577, 2004	Prospective cohort study; RCT evidence available
Tominaga, H., Shimizu, Y., Yamashita, S., Odagiri, K., Kurokawa, T., Honmyo, N., Moon, J., Inoue, M., Irei, T., Tanemura, M., et al.,, Feasibility and safety of laparoscopic resection following stent insertion for obstructing colon cancer, Surgical endoscopy and other interventional techniques., 29, S165, 2015	Conference abstract

Study	Reason for exclusion
Van Den Berg, M. W., Sloothaak, D. A. M., Dijkgraaf, M. G. W., Van Der Zaag, E. S., Bemelman, W. A., Tanis, P. J., Bosker, R. J. I., Fockens, P., Ter Borg, F., Van Hooft, J. E., Bridge-to-surgery stent placement versus emergency surgery for acute malignant colonic obstruction, British journal of surgery, 101, 867-873, 2014	Retrospective cohort study; RCT evidence available
van Hooft, J. E., Bemelman, W. A., Breumelhof, R., Siersema, P. D., Kruyt, P. M., van der Linde, K., Veenendaal, R. A., Verhulst, M. L., Marinelli, A. W., Gerritsen, J. J., et al.,, Colonic stenting as bridge to surgery versus emergency surgery for management of acute left-sided malignant colonic obstruction: a multicenter randomized trial (Stent-in 2 study), BMC surgery, 7, 12, 2007	Protocol
Vemulapalli, R., Lara, L. F., Sreenarasimhaiah, J., Harford, W. V., Siddiqui, A. A., A comparison of palliative stenting or emergent surgery for obstructing incurable colon cancer, Digestive Diseases and Sciences, 55, 1732-1737, 2010	Retrospective cohort study; RCT evidence available
Vitale, M. A., Villotti, G., d'Alba, L., Frontespezi, S., Iacopini, F., Iacopini, G., Preoperative colonoscopy after self-expandable metallic stent placement in patients with acute neoplastic colon obstruction, Gastrointestinal endoscopy, 63, 814-819, 2006	Prospective cohort study; RCT evidence available
Wang, X., He, J., Chen, X., Yang, Q., Stenting as a bridge to resection versus emergency surgery for left-sided colorectal cancer with malignant obstruction: A systematic review and meta-analysis, International Journal of Surgery, 48, 64-68, 2017	A systematic review, included studies checked for relevance
White, S. I., Abdool, S. I., Frenkiel, B., Braun, W. V., Management of malignant left-sided large bowel obstruction: A comparison between colonic stents and surgery, ANZ Journal of Surgery, 81, 257-260, 2011	Retrospective cohort study; RCT evidence available
Yan, F. H., Lou, Z., Liu, X. S., Wang, Z., Xu, X. D., Gao, Y. J. Y., He, J., Wang, H., Fu, C. G., Zhang, W., He, H. Y., Cai, B. L., Yu, E. D., Long-Term Oncological Outcomes of Endoscopic Stenting as a Bridge to Surgery Versus Emergency Surgery for Malignant Colorectal Obstruction: A Comparative Study, Journal of Laparoendoscopic and Advanced Surgical Techniques, 27, 611-617, 2017	Prospective cohort study; RCT evidence available
Yang, P., Lin, X. F., Lin, K., Li, W., The Role of Stents as Bridge to Surgery for Acute Left-Sided Obstructive Colorectal Cancer: Meta-Analysis of Randomized Controlled Trials, Revista de investigacion clinica; organo del Hospital de Enfermedades de la Nutricion, 70, 269-278, 2018	A systematic review, included studies checked for relevance
Ye, G. Y., Cui, Z., Chen, L., Zhong, M., Colonic stenting vs emergent surgery for acute left-sided malignant colonic obstruction: A systematic review and meta-analysis, World Journal of Gastroenterology, 18, 5608-5615, 2012	A systematic review, included studies checked for relevance
Yoon, J. Y., Park, S. J., Hong, S. P., Kim, T. I., Kim, W. H., Cheon, J. H., Outcomes of secondary self-expandable metal stents versus surgery after delayed initial palliative stent failure in malignant colorectal obstruction, Digestion, 88, 46-55, 2013	Retrospective cohort study; RCT evidence available
Zhang, Y., Shi, J., Shi, B., Song, C. Y., Xie, W. F., Chen, Y. X., Self-expanding metallic stent as a bridge to surgery versus emergency surgery for obstructive colorectal cancer: A meta-analysis, Surgical endoscopy, 26, 110-119, 2012	A systematic review, included studies checked for relevance
Zhang, Y., Shi, J., Shi, B., Song, C. Y., Xie, W. F., Chen, Y. X., Comparison of efficacy between uncovered and covered self-expanding metallic stents in malignant large bowel obstruction: A	A systematic review, included studies checked for relevance

Study	Reason for exclusion
systematic review and meta-analysis, Colorectal disease, 14, e367-e374, 2012	
Zhao, X. D., Cai, B. B., Cao, R. S., Shi, R. H., Palliative treatment for incurable malignant colorectal obstructions: A meta-analysis, World Journal of Gastroenterology, 19, 5565-5574, 2013	A systematic review, included studies checked for relevance
Zhao, X., Liu, B., Zhao, E., Wang, J., Cai, M., Xia, Z., Xia, Q., Shuai, X., Tao, K., Wang, G., Cai, K., The safety and efficiency of surgery with colonic stents in left-sided malignant colonic obstruction: A meta-analysis, Gastroenterology Research and Practice, 2014 (no pagination), 2014	A systematic review, included studies checked for relevance

RCT: randomised controlled trial

Appendix L – Research recommendations

Research recommendations for review question: What is the effectiveness of stenting compared with emergency surgery for suspected colorectal cancer causing acute large bowel obstruction?

No research recommendations were made for this review question.

1 Appendix M – Expert evidence

2 **Table 7: Expert evidence for review question: What is the effectiveness of stenting**
3 **compared with emergency surgery for suspected colorectal cancer causing**
4 **acute large bowel obstruction?**

Section A: Developer to complete	
Name:	James Hill
Role:	Principal investigator (CReST trial) Consultant Colorectal Surgeon
Institution/Organisation (where applicable): **Contact information:** **[REDACTED TEXT]**	Manchester University NHS Foundation Trust
Guideline title:	Colorectal cancer
Guideline Committee:	Colorectal cancer
Subject of expert testimony:	Findings from the CReST trial (UK ColoRectal Endoscopic Stenting Trial)
Evidence gaps or uncertainties:	The guideline committee reviewed the evidence for the review question "What is the effectiveness of stenting compared with emergency surgery for suspected colorectal cancer causing acute large bowel obstruction?" The CReST trial is a UK phase III randomised trial that directly answers this question and is the largest trial in the topic to date and the only one from the UK, however, the findings of the trial have not yet been published (apart from a conference abstract) and the timeline of the guideline does not allow us to wait for the paper to be published. Therefore, the guideline committee has invited James Hill, the principal investigator of the CReST trial, to present the findings of the CReST trial to the guideline committee and to answer questions they may have.

Section B: Expert to complete

Summary testimony:

NICE already advise on the use of colonic stents in acute large bowel obstruction. For palliative disease the following guidance is given.

> 1.2.2.4 For patients with acute left-sided large bowel obstruction caused by colorectal cancer that is not potentially curable, or for whom surgery is unsuitable: **[new 2014]**
>
> - Resuscitate patients with acute large bowel obstruction, then consider placing a self-expanding metallic stent to initially manage a left-sided complete or near-complete colonic obstruction. **[2011]**
> - A consultant colorectal surgeon should consider inserting a colonic stent in patients presenting with acute large bowel obstruction. They should do this together with an endoscopist or a radiologist (or both) who is experienced in using colonic stents. **[2011]**

I gave verbal evidence that a National Bowel Cancer Audit (NBOCA) of stenting in the palliative setting demonstrated very variable uptake of this guidance in England with some units stenting 80% of such cases and other units 0% of such cases.

NICE guidance on the use of stents in the potentially curative setting was published in 2014.

> 1.2.2.3 For patients with acute left-sided large bowel obstruction caused by colorectal cancer that is potentially curable, and for whom surgery is suitable:
>
> - Resuscitate patients and explain to them and their family members or carers (as appropriate) that acute bowel obstruction can initially be managed either with emergency surgery or a colonic stent, and that there is no clear evidence that one treatment is better than the other. **[new 2014]**

At the time of publication of this guidance there was concern about the use of stents in large bowel obstruction which arose from two European randomised trials. One was stopped early as a result of poor stenting success rates and the second because of increased morbidity in the stenting group. Subsequent studies have raised concerns about the adverse oncological consequences of stenting.

The CReST (ColoRectal endoscopic Stenting Trial) was designed to evaluate in a randomised controlled trial two key questions: is there a worthwhile net benefit (in reduced operative mortality and morbidity, reduced stoma formation and better quality of life adjusted survival) from endoluminal stenting for patients presenting with an obstructing colonic cancer and if a benefit exists, is this identifiable in patients undergoing attempted curative treatment, palliative treatment, or both?

Subsequent to the commencement of CReST trial, evidence for the benefit of self-expandable metal stents (SEMS) in the palliative setting has been published and is largely accepted.

The CReST trial was the largest phase III, multi-center randomised controlled trial to determine if endoluminal stenting for obstructing colonic cancers can result in:

- Reduced perioperative morbidity as assessed by length of hospital stay
- Reduced 30-day mortality

Secondary end points were

- Stenting completion and complication rate
- Presence and duration of a stoma/anastomosis rate
- 6-month survival
- 3 year survival
- Quality of life
- Perioperative morbidity

Eligibility criteria were

- Left-sided colorectal cancer
- Radiological evidence of obstruction
- Patient fit for surgery
- No evidence of peritonitis and/or perforation
- Patient able and willing to give written informed consent
- Patients stratified by palliative or potentially curative

Patients were stratified into those with palliative and potentially curative disease at trial entry. For those with potentially curative disease these were further stratified into; curative probably yes, curative probably no and uncertain. We planned to recruit 200 patients in each group. During the conduct of the trial, evidence for the benefit of stenting in the palliative setting was published. This clearly affected the recruitment rates for this group of patients. The final recruitment number was 245 with more than 90% of cases in the potentially curative group. 122/123 patients randomised to stent received this treatment.

The stenting and emergency surgery groups were well matched for age, gender, site of tumour, APACHE score and ASA grade.

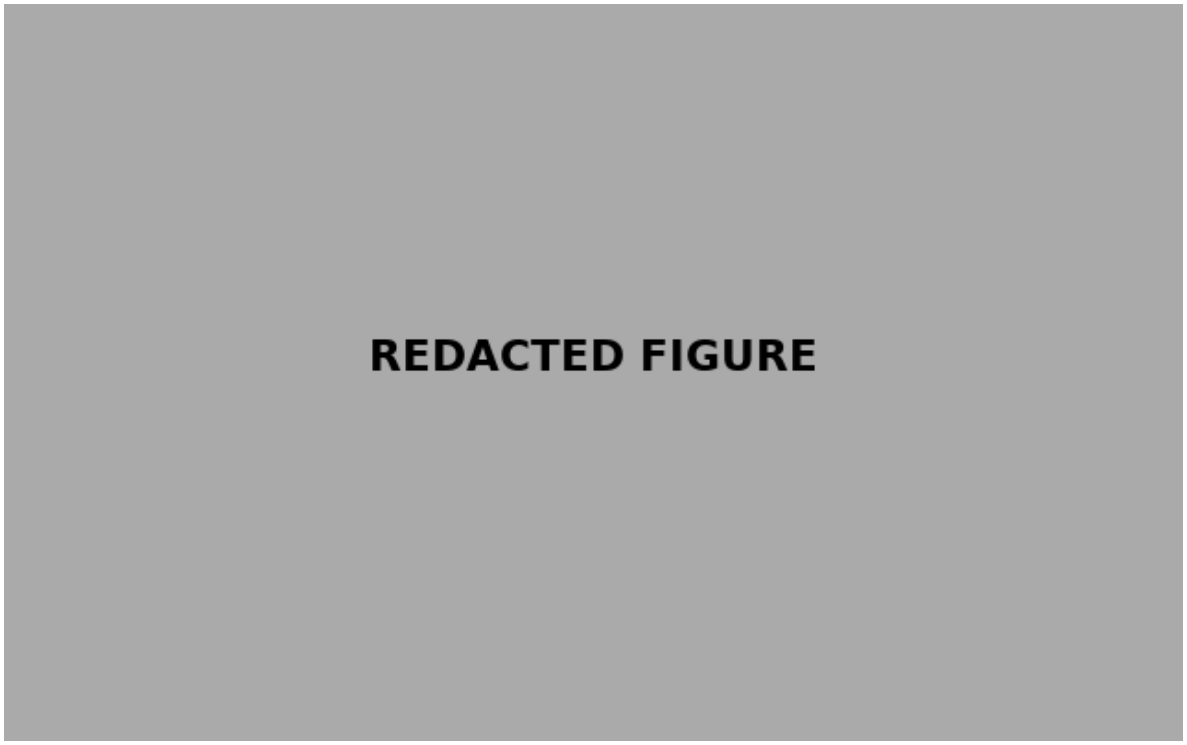
For the potentially curative group, stratification was;

	Stenting	Emergency surgery
Potentially curative	113 (92%)	113 (93%)
Likelihood of cure:		
Probably not	3 (3%)	6 (5%)
Probably yes	78 (69%)	72 (64%)
Uncertain (possibly yes)	32 (28%)	35 (31%)

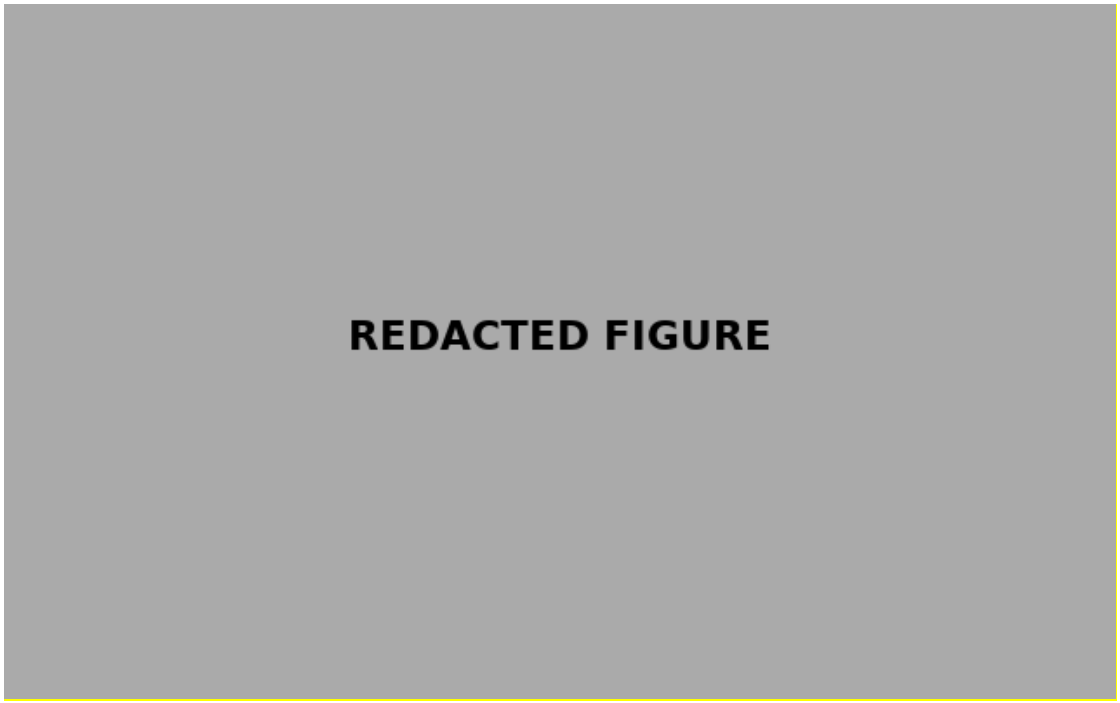
For subsequent analyses the potentially not patients (9) were grouped with the palliative patients.

Primary end points

[REDACTED TEXT]



[REDACTED TEXT]



[REDACTED TEXT]

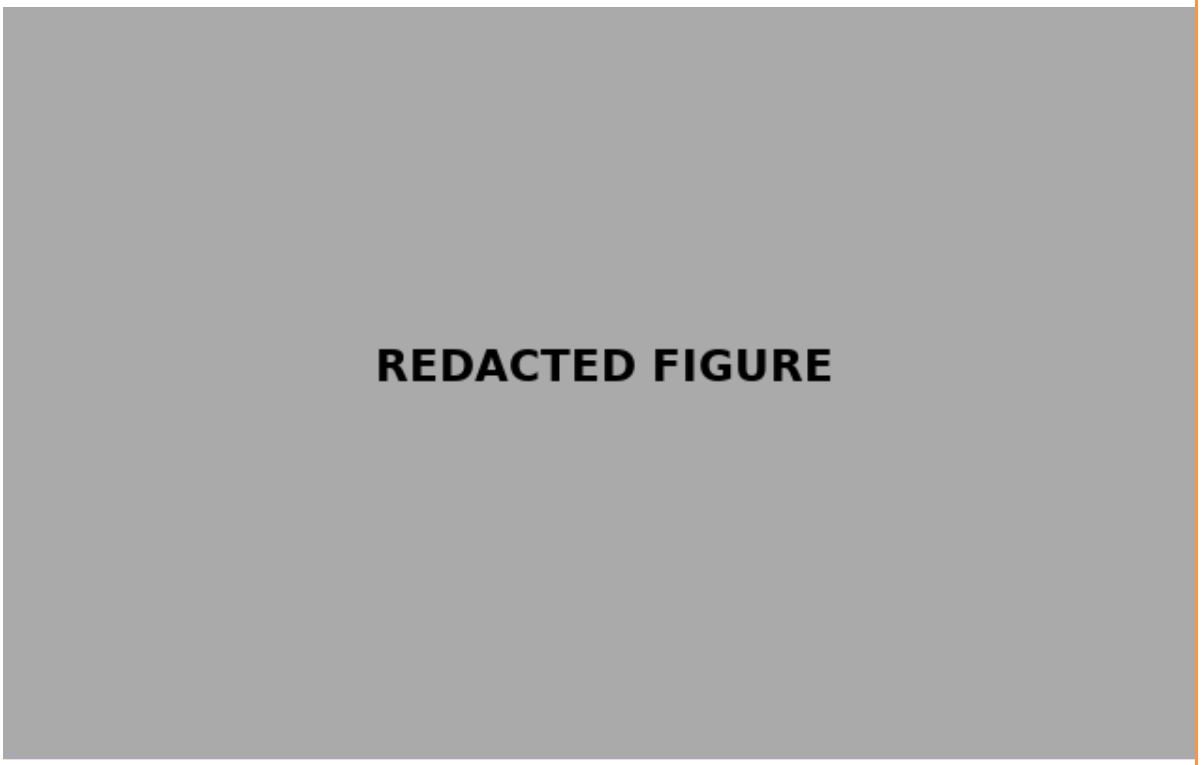
Secondary end points

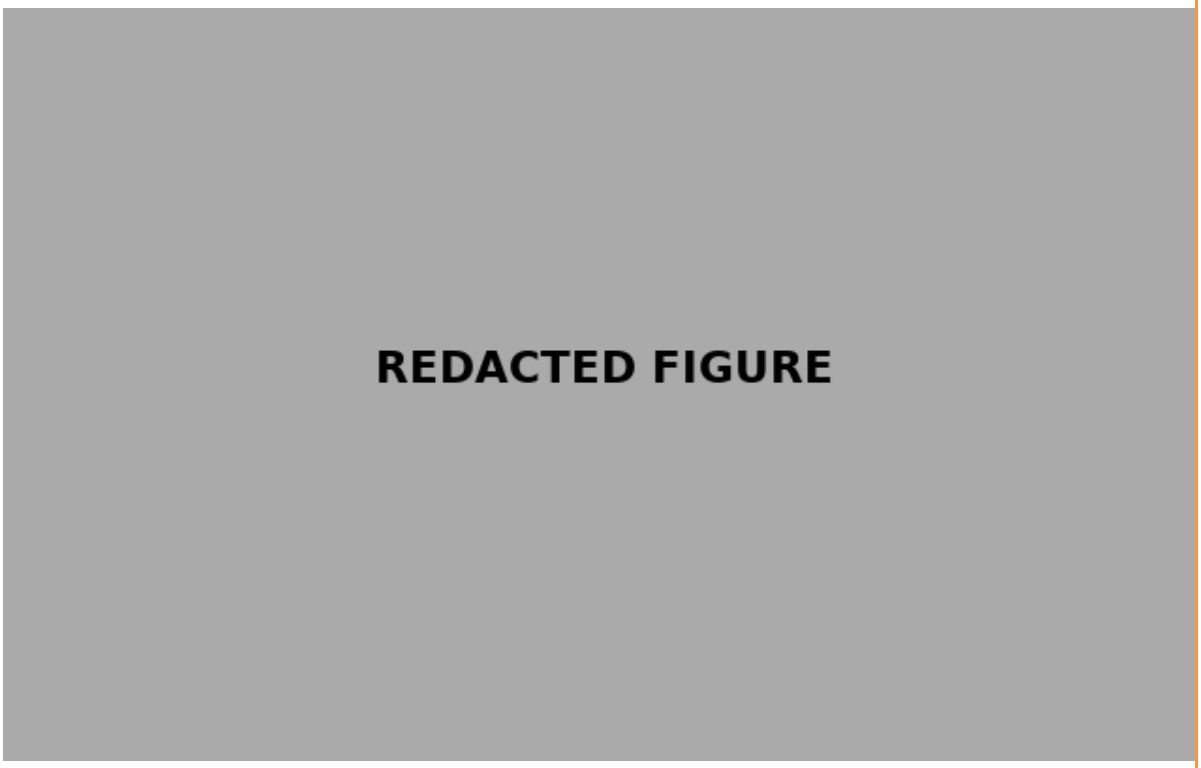
Stenting success – stenting relieved obstruction in 98 patients (82%) This was achieved across multiple hospital sites (39 recruiting hospitals).

Complications – perforation occurred in 6 patients. All required emergency surgery. There was no mortality in this group. One patient required mechanical ventilation post operatively.

Stoma rates - 46/99 (46%) in the stenting group and 82/119 (69%) P<0.001

[REDACTED TEXT]





[REDACTED TEXT]

Summary

The CReST trial of stenting vs emergency surgery in patients with obstructing left sided colorectal cancer is the largest randomised trial in this setting. **[REDACTED TEXT]**

Stenting clinical success rates were high (82%) across multiple hospital sites.

[REDACTED TEXT]

Stenting significantly reduced stoma rates

[REDACTED TEXT]

References to other work or publications to support your testimony (if applicable):

Hill J, Kay C, Morton D et al (2016) Journal of Clinical Oncology. 34 (supplement; abstract 3507)

1

Table 8: Gaps addressed and recommendations supported by expert evidence

Expert evidence	Gaps addressed	Recommendations supported
• Preliminary findings from the CReST trial	• The published evidence base relies on 13 small RCTs (none from the UK). Three of these trials were stopped early due to excess treatment related adverse events which led some trialists to question the role of stenting in patients due to receive curative surgery. • The CReST trial is a UK Phase III randomised trial and is larger than any of the trials published to date. The results from CReST have not yet been published and the timeline of the guideline does not allow us to wait for the results to be published later this year.	• 1.3.15 • 1.3.16

CReST: ColoRectal endoscopic Stenting Trial

Table 9: Quality assessment of expert evidence – outcomes in the public domain[4]

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Stenting + planned bowel resection or palliative care	Emergency bowel surgery	Relative (95% CI)	Absolute		
Clinically successful bowel decompression, stent arm only – Palliative or curative intent												
1	randomised trials	no serious risk of bias[1]	no serious inconsistency	no serious indirectness	serious[2]	none	98/119[4] (82%)	-	-	-	MODERATE	CRITICAL
Perforation rate, stent arm only – Palliative or curative intent												
3	randomised trials	no serious risk of bias[1]	no serious inconsistency	no serious indirectness	serious[2]	none	6/123[4] (5%)	-	Risk 0.05	50 more per 1000	MODERATE	IMPORTANT
Stoma rate - Curative intent												

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Stenting + planned bowel resection or palliative care	Emergency bowel surgery	Relative (95% CI)	Absolute		
1	randomised trials	no serious risk of bias[1]	no serious inconsistency	no serious indirectness	serious[2]	none	46/99[4] (46%)	82/119 (69%)	RR 0.67 (0.53 to 0.86)	112 fewer per 1000 (from 22 fewer to 183 fewer)	MODERATE	IMPORTANT

CI: confidence interval; HR: hazard ratio; RR: relative risk
1 Risk of bias assessed using trial protocol
2 Quality of evidence downgraded by 1 because of imprecision of the effect estimate (< 300 events for dichotomous outcomes or < 400 patients for continuous outcomes)
3 Numbers of events or participants were not reported
4 CREST results presented at ASCO 2016 meeting: Hill J, Kay C, Morton D et al J Clin Oncol 34, 2016 (suppl; abstr 3507)

Table 10: Quality assessment of expert evidence – redacted outcomes (as yet unpublished)

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Stenting + planned bowel resection or palliative care	Emergency bowel surgery	Relative (95% CI)	Absolute		
30-day mortality - Curative intent												
1	randomised trials	no serious risk of bias[1]	no serious inconsistency	no serious indirectness	serious[2]	none	[REDACTED TEXT]	[REDACTED TEXT]	[REDACTED TEXT]	[REDACTED TEXT]	MODERATE	CRITICAL
3-year overall survival, event is death from any cause - Curative intent												

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	**Design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**Stenting + planned bowel resection or palliative care**	**Emergency bowel surgery**	**Relative (95% CI)**	**Absolute**		
1	randomised trials	no serious risk of bias[1]	no serious inconsistency	no serious indirectness	serious[2]	none	[REDACTED TEXT]	[REDACTED TEXT]	[REDACTED TEXT]	[REDACTED TEXT]	MODERATE	IMPORTANT
Hospital stay (time to event analysis of leaving hospital)- Curative intent												
1	randomised trials	no serious risk of bias[1]	no serious inconsistency	no serious indirectness	serious[2]	none	[REDACTED TEXT]	[REDACTED TEXT]	[REDACTED TEXT]	[REDACTED TEXT]	MODERATE	IMPORTANT
Hospital stay - Palliative intent												
1	randomised trials	no serious risk of bias[1]	no serious inconsistency	no serious indirectness	serious[2]	none	[REDACTED TEXT]	[REDACTED TEXT]	[REDACTED TEXT]	[REDACTED TEXT]	MODERATE	IMPORTANT

1 *CI: confidence interval; HR: hazard ratio; RR: relative risk*
2 *1 Risk of bias assessed using trial protocol*
3 *2 Quality of evidence downgraded by 1 because of imprecision of the effect estimate (< 300 events for dichotomous outcomes or < 400 patients for continuous outcomes)*
4 *3 Numbers of events or participants were not reported*