National Institute for Health and Care Excellence

Final

Intrapartum care for women with existing medical conditions or obstetric complications and their babies

[P] Evidence review for small-for-gestational age baby

NICE guideline NG121

Evidence reviews for women at high risk of adverse outcomes for themselves and/or their baby because of obstetric complications or other reasons

March 2019

Final

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

Disclaimer

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

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

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 All NICE guidance is subject to regular review and may be updated or withdrawn.

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Contents

Intrapartum care for women with a small-for-gestational-age baby – fetal monitoring

Review question

How should fetal monitoring be managed during labour for women with a small-for-gestational-age baby?

Introduction

The aim of this review is to determine how fetal monitoring should be managed during labour for women with a small-for-gestational-age baby.

Summary of the protocol

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	Women in labour at term with a suspected or confirmed (diagnosed) small-for-gestational-age baby

Intervention	Intervention 1
	• CTG alone
	  ○ on admission
	  ○ during established labour
	
	Intervention 2
	• CTG using FSE
	• CTG plus digital FSS
	• CTG using FSE plus FBS
	• CTG plus FBS
	
	Intervention 3
	• Ultrasound for volume of liquor or amniotic fluid

Comparison	Comparison 1
	• IA
	  ○ on admission
	  ○ during established labour
	
	Comparison 2
	• CTG alone
	
	Comparison 3
	• No ultrasound for volume of liquor/amniotic fluid

Outcomes	For the woman: • mode of birth

	• major morbidities (major haemorrhage, bladder and bowel injury, sepsis, thromboembolic disease, obstetrical anal sphincter injury (OASI), pelvic girdle pain, or pubic symphysis diastasis)
	• woman's experience of labour and birth, including experience of the birth companion, separation of the woman and baby and breastfeeding initiation
	• admission to HDU or ITU and duration of hospital stay
	
	For the baby:
	• mortality
	• major morbidities:
	  ○ intracranial haemorrhage
	  ○ hypoxic ischaemic encephalopathy
	  ○ cerebral palsy, neurodevelopmental disability or developmental delay
	  ○ neonatal seizures
	• admission to NICU and duration of hospital stay

CTG: cardiotocography; FBS: fetal blood sampling; FSE: fetal scalp electrode; FSS: fetal scalp stimulation; HDU: high dependency unit; IA: intermittent auscultation; ITU: intensive therapy unit; NICU: neonatal intensive care unit; OASI: obstetric anal sphincter injury

For further details see the full review protocol in Appendix A – Review protocol. The search strategies are presented in Appendix B – Literature search strategies.

Clinical evidence

Included studies

No clinical evidence was identified for this review.

See the study selection flow chart in Appendix C – Clinical evidence study selection.

Excluded studies

Studies not included in this review with reasons for their exclusion are listed in Appendix D – Excluded studies.

Summary of clinical studies included in the evidence review

No clinical evidence was identified for this review (and so there are no evidence tables in Appendix E – Clinical evidence tables). No meta-analysis was undertaken for this review (and so there are no forest plots in Appendix F – Forest plots).

Quality assessment of clinical studies included in the evidence review

No clinical evidence was identified for this review (and so no quality assessment was undertaken and there are no GRADE tables in Appendix G – GRADE tables).

Economic evidence

Included studies

No economic evidence was identified for this review.

See the study selection flow chart in Supplement 2 (Health economics).

Excluded studies

Studies not included in this review with reasons for their exclusion are listed in Supplement 2 (Health economics).

Summary of studies included in the economic evidence review

No economic evidence was identified for this review (and so there are no economic evidence tables in Supplement 2 (Health economics)).

Economic model

No economic modelling was undertaken for this review because the committee agreed that other topics were higher priorities for economic evaluation (see Supplement 2 (Health economics)).

Evidence statements

No clinical evidence was identified for this review.

The committee's discussion of the evidence

Interpreting the evidence

The outcomes that matter most

The committee rated mode of birth as a critical outcome because they were aware that women could feel pressurised into having a caesarean section. Caesarean section might result in separation of the woman and baby and the committee agreed that this could have a negative impact on breastfeeding, mother-and-baby bonding and the woman's perinatal mental health. The committee considered mortality and major morbidities in the baby such as intracranial haemorrhage, hypoxic ischaemic encephalopathy, cerebral palsy, neurodevelopmental disability or developmental delay, and neonatal seizures as critical outcomes because they can be influenced by mode of birth, degree of growth restriction, gestational age and by the effectiveness of different modalities of fetal monitoring. The committee rated major maternal morbidities such as major haemorrhage, bladder and bowel injury, sepsis, thromboembolic disease, obstetrical anal sphincter injury (OASI), pelvic girdle pain, and pubic symphysis diastasis as important outcomes because these can occur with both caesarean section and vaginal birth. The committee also rated the woman's experience of labour and birth, including experience of her birth companion(s), separation of the woman and baby and breastfeeding initiation as important outcomes. The committee wanted to support women in making informed choices about options available to them in labour, as opposed to women feeling pressurised into having a caesarean section. However, some women might feel concerned that their baby might not cope with the stress of labour and they too should be able to make informed choices about mode of birth. The committee felt that some women might not be offered enough information regarding concerns about the size of the baby and the uncertainty around the accuracy of diagnosing a small-for-gestational-age baby. Moreover, emergency complications during vaginal birth and emergency caesarean section can lead to physical and psychological birth trauma for both the woman and the baby. Finally, the committee considered admission of the baby to

NICU and associated duration of hospital stay to be an important outcome because these are proxies for morbidity in the baby, and avoiding them could improve outcomes related to perinatal mental health, separation of the woman and baby and breastfeeding.

The quality of the evidence

No clinical evidence was identified for this review.

Benefits and harms

The committee agreed that being small for gestational age is associated with an increased risk of adverse outcomes for the baby. They discussed that small-for-gestational-age babies are at increased risk of perinatal mortality and morbidity, however most adverse outcomes are in growth-restricted babies (see the Royal College of Obstetricians and Gynaecologists (RCOG) small-for-gestational-age fetus, investigation and management (Green-top Guideline No. 31)). These babies are at increased risk of intrapartum morbidity and mortality and the committee felt that the risk would be increased further based on gestational age and the progress and events of labour and birth. Recognition of the condition is challenging and suspicion might prove unfounded.

The committee felt it was important that women are informed of the increased risks associated with small-for-gestational-age babies while acknowledging that there is uncertainty about the accuracy of a diagnosis of small for gestational age. The committee felt it was important to give the woman balanced information to support shared decision making. The discussion between healthcare professionals and a woman with a baby suspected of being small for gestational age should focus not only on the potential risk of medical problems for the baby, but also on the uncertainty around the diagnosis of small-for-gestational age and what it might mean for the woman and her baby if problems did occur. The committee agreed that woman should be informed that the risks associated with a baby being small for gestational age could be influenced by factors such as the presence of growth restriction, prematurity and complications during labour or birth.

Despite a lack of evidence, the committee believed that recommending continuous cardiotocography might improve perinatal outcomes. In view of this, they concluded that continuous cardiotocography should be to all women with a suspected small-for-gestational-age baby after a full discussion of the benefits and risks. The committee agreed that, on the one hand, continuous cardiotocography could help healthcare professionals to detect a deterioration in the baby's condition and inform about the need to expedite the birth, while on the other, babies who are suspected as being small for gestational age but are actually appropriate for gestational age might undergo an unnecessary birth intervention, such as a caesarean section that is not otherwise indicated.

Cost effectiveness and resource use

The committee agreed that uncertainty with respect to diagnosis of small for gestational age made it difficult to ascertain the cost effectiveness of continuous cardiotocography. The committee reflected on the balance between unnecessary interventions and monitoring, representing an inefficient use of scarce NHS resources, and the use of monitoring to mitigate the risks of adverse outcomes associated with small for gestational age.

The committee agreed that their recommendations reflect current best practice and that there would not be a significant resource impact to the NHS from their implementation.

References

No publications (other than publications that are freely available on the Internet) were cited in the review(s) in this document and so there is no reference list.

Appendices

Appendix A – Review protocol

Intrapartum care for women with a small-for-gestational-age baby – fetal monitoring

Item	Details	Working notes
Area in the scope	Women at high risk of adverse outcomes for themselves and/or their baby because of obstetric complications or other reasons – intrapartum care for women with a small-for-gestational-age baby – fetal monitoring	
Review question in the scope	How should fetal monitoring be managed during labour for women with a small-for-gestational-age baby?	
Review question for the guideline	How should fetal monitoring be managed during labour for women with a small-for-gestational-age baby?	
Objective	The aim of this review is to determine how fetal monitoring should be managed during labour for women with a small-for-gestational-age baby. This is an important topic because in England and Wales, 7% (48,711) of live births were low birthweight (less than 2.5 kg) in 2015 (ONS 2016).	
Population and directness	Women in labour at term with a suspected or confirmed (diagnosed) small-for-gestational-age baby. Small-for-gestational-age as defined in the studies. Studies involving babies with chromosomal abnormalities or structural anomalies will be excluded. Studies in which up to 34% of the women have multiple pregnancy will be included. Evidence in which any of the women have multiple pregnancy should be downgraded for indirectness.	

Intervention	<u>Intervention 1</u>
	• CTG alone
	  ○ on admission
	  ○ during established labour
	
	<u>Intervention 2</u>
	• CTG using FSE
	• CTG plus digital FSS
	• CTG using FSE plus FBS	

Item	Details	Working notes
	• CTG plus FBS Intervention 3 • Ultrasound for volume of liquor/amniotic fluid	

Comparison	Comparison 1:
	• IA
	  ○ on admission
	  ○ during established labour
	
	Comparison 2:
	• CTG alone
	
	Comparison 3:
	No ultrasound for volume of liquor/amniotic fluid
		•

Outcomes	Critical outcomes:
	• for the woman:
	  ○ mode of birth
	• for the baby:
	  ○ mortality
	  ○ major morbidities:
	  - intracranial haemorrhage
	  - hypoxic ischaemic encephalopathy
	  - cerebral palsy/neurodevelopmental disability/developmental delay
	  - neonatal seizures
	
	Important outcomes:
	• for the woman:
	  ○ major morbidities (major haemorrhage, bladder and bowel injury, sepsis, thromboembolic disease, obstetrical anal sphincter injury (OASI), pelvic girdle pain, or pubic symphysis diastasis)
	  ○ woman's experience of labour and birth, including experience of the birth companion, separation of the woman and baby and breastfeeding initiation
	• for the baby:
	  ○ admission to NICU and duration of hospital stay
	
	Outcomes of limited importance:
	• for the woman:
	  ○ admission to HDU/ITU and duration of hospital stay	

Importance of outcomes	Preliminary classification of the outcomes for decision making: • critical (up to 3 outcomes) • important but not critical (up to 3 outcomes) • of limited importance (1 outcome)	

Item	Details	Working notes
Setting	All birth settings	
Stratified, subgroup and adjusted analyses	Groups that will be reviewed and analysed separately: • parity • gestational age In the presence of heterogeneity, the following subgroups will be considered for sensitivity analysis: • none Potential confounders: • maternal age • ethnicity • gestational age • parity • body mass index • smoking • recreational drug use including alcohol • previous SGA baby • previous stillbirth • chronic hypertension • diabetes with vascular disease • renal impairment • antiphospholipid syndrome • antepartum haemorrhage • pregnancy-associated plasma protein-A (PAPP-A) <0.4 multiples of the median (MOM)	
Language	English	
Study design	• Published full text papers only • Systematic reviews • RCTs • Only if RCTs unavailable or there is limited data to inform decision making: ○ prospective or retrospective comparative observational studies (including cohort and case-control studies) • Prospective study designs will be prioritised over retrospective study designs • Conference abstracts will not be considered	
Search strategy	Sources to be searched: Medline, Medline In-Process, CCTR, CDSR, DARE, HTA and Embase. Limits (e.g. date, study design): All study designs. Apply standard animal/non-English language filters. No date limit. Supplementary search techniques: No supplementary search techniques were used. See Appendix B – Literature search strategies for full strategies	

Item	Details	Working notes
Review strategy	Appraisal of methodological quality: • the methodological quality of each study will be assessed using checklists recommended in the NICE guidelines manual 2014 (for example, AMSTAR or ROBIS for systematic reviews, and Cochrane RoB tool for RCTs) and the quality of the evidence for each outcome (that is, across studies) will be assessed using GRADE • if studies report only p-values, this information will be recorded in GRADE tables without an assessment of imprecision Synthesis of data: • meta-analysis will be conducted where appropriate • default MIDs will be used; 0.8 and 1.25 for dichotomous outcomes; 0.5 times the SD of the measurement in the control arm (or median score across control arms if multiple studies are included) for continuous outcomes • for continuous data, change scores will be used in preference to final scores for data from non-RCT studies; final and change scores will not be pooled; if any study reports both, the method used in the majority of studies will be adopted	Review questions selected as high priorities for health economic analysis (and those selected as medium priorities and where health economic analysis could influence recommendations) will be subject to dual weeding and study selection; any discrepancies will be resolved through discussion between the first and second reviewers or by reference to a third person. This review question was not prioritised for health economic analysis and so no formal dual weeding, study selection (inclusion/exclusion) or data extraction into evidence tables will be undertaken. However, internal (NGA) quality assurance processes will include consideration of the outcomes of weeding, study selection and data extraction and the committee will review the results of study selection and data extraction
Equalities	Equalities considerations will be considered systematically in relation to the available evidence and draft recommendations. The guideline scope includes women with cognitive or physical disability as populations for whom there may be equalities issues. Women who have received no antenatal care will be considered as a subgroup for all systematic reviews performed within the medical conditions work stream and a specific question has been included in the obstetric complications work stream for this population	
Notes/additional information	• Statistical bulletin: Birth characteristics in England and Wales: 2015. Live births by sex, ethnicity and month. Maternities by place of birth and with multiple births. Stillbirths by age of parents and quarter, 2016, Office for National Statistics (https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/livebirths/bulletins/birthcharacteristicsinenglandandwales/2015#birthweight)	
Key papers	• The Investigation and Management of the Small–for–Gestational–Age Fetus. RCOG Green–top Guideline No. 31, 2nd Edition, February 2013, Minor revisions – January 2014 (https://www.rcog.org.uk/globalassets/documents/guidelines/gtg_31.pdf)	

AMSTAR: Assessing the Methodological Quality of Systematic Reviews; CDSR: Cochrane Database of Systematic Reviews; CENTRAL: Cochrane Central Register of Controlled Trials; CTG: cardiotocography; DARE: Database of Abstracts of Reviews of Effects; FBS: fetal blood sampling; FSE: fetal scalp electrode; FSS: fetal scalp stimulation; GRADE: Grading of Recommendations Assessment, Development and Evaluation; HDU: high dependency unit; HTA: Health Technology Assessment; IA: intermittent auscultation; ITU: intensive therapy unit; MID: minimally important difference; NGA: National Guideline Alliance; NICE: National Institute for Health and Care Excellence; NICU: neonatal intensive care unit; RCT: randomised controlled trial; RoB: risk of bias; ROBIS: Risk of Bias in Systematic Reviews; SD: standard deviation; SGA: small-for-gestational age

Appendix B – Literature search strategies

Intrapartum care for women with a small-for-gestational-age baby – fetal monitoring

Database: Medline; Medline EPub Ahead of Print; and Medline In-Process & Other Non-Indexed Citations

#	Searches
1	INFANT, SMALL FOR GESTATIONAL AGE/
2	GESTATIONAL AGE/ and small.ti.
3	GESTATIONAL AGE/ and small.ab. /freq=2
4	(small adj3 gestational age?).ab,ti.
5	SGA.ti,ab.
6	FETAL GROWTH RETARDATION/
7	((fetal$ or fetus$ or intrauterine) adj3 grow$ adj3 (restrict$ or retard$)).ti,ab.
8	IUGR.ti,ab.
9	INFANT, LOW BIRTH WEIGHT/
10	exp INFANT, VERY LOW BIRTH WEIGHT/
11	(low birthweight? or low birth weight?).ti,ab.
12	LBW.ti,ab.
13	or/1-12
14	CARDIOTOCOGRAPHY/
15	ELECTROCARDIOGRAPHY/
16	cardiotocogra$.ti,ab.
17	CTG.ti,ab.
18	electrocardiogra$.ti,ab.
19	ECG.ti,ab.
20	EKG.ti,ab.
21	(electr$ adj5 (f?etal or f?etus$ or uter$) adj5 (heart$ or monitor$ or assess$)).ti,ab.
22	EFM.ti,ab.
23	or/14-22
24	exp AUSCULTATION/
25	STETHOSCOPES/
26	(auscultat$ or IA or pin?ard$ or fetoscop$).ti,ab.
27	((f?etal or f?etus$) adj3 stethoscop$).ti,ab.
28	"listen$ in".ti,ab.
29	or/24-28
30	FETAL MONITORING/
31	UTERINE MONITORING/
32	HEART RATE, FETAL/ and (monitor$ or assess$).ti,ab.

#	Searches
33	exp FETAL HEART/ and (monitor$ or assess$).ti,ab.
34	FETAL DISTRESS/ and (monitor$ or assess$).ti,ab.
35	((f?etal or f?etus$ or uter$) adj5 heart$ adj5 (monitor$ or assess$)).ti,ab.
36	EFM.ti,ab.
37	FHR.ti,ab.
38	CARDIOTOCOGRAPHY/
39	ELECTROCARDIOGRAPHY/
40	cardiotocogra$.ti,ab.
41	CTG.ti,ab.
42	electrocardiogra$.ti,ab.
43	ECG.ti,ab.
44	EKG.ti,ab.
45	((nonstress or non-stress) adj3 test$).ti,ab.
46	NST.ti,ab.
47	or/30-46
48	SCALP/ and ELECTRODES/
49	((f?etal or f?etus$) adj5 scalp? adj5 electrode?).ti,ab.
50	FSE.ti,ab.
51	or/48-50
52	BLOOD SPECIMEN COLLECTION/
53	FETAL BLOOD/ and (samp$ or analys$ or gas$).ti,ab.
54	((f?etal or f?etus) adj5 (lactate? or pH or scalp? or base$ or acid$ or alk#l$)).ti,ab.
55	((f?etal or f?etus) adj5 blood adj5 (gas$ or sampl$ or analys$)).ti,ab.
56	FBS.ti,ab.
57	exp BLOOD GAS ANALYSIS/
58	exp ACID-BASE IMBALANCE/
59	(blood adj5 (gas$ or oxygen or carbon dioxide or CO2) adj5 analys$).ti,ab.
60	((acidbase or acid base) adj5 (imbalanc$ or equ?l$)).ti,ab.
61	or/52-60
62	(exp PHYSICAL STIMULATION/ or VIBRATION/) and SCALP/
63	((f?etal or f?etus$) adj5 (stimulat$ or stimuli or stimulus)).ti,ab.
64	((scalp? or digit$ or acoustic$ or vibroacoustic$) adj5 (stimulat$ or stimuli or stimulus or punctur$)).ti,ab.
65	((acoustic or artificial) adj laryn$).ti,ab.
66	FSS.ti,ab.
67	or/62-66
68	exp ULTRASONOGRAPHY/
69	ultrasonograph$.ti,ab.
70	sonograph$.ti,ab.
71	ultrasound.ti,ab.

#	Searches
72	sonogram?.ti,ab.
73	or/68-72
74	AMNIOTIC FLUID/ and (volume? or index$).ti,ab.
75	((amniotic or amnii) adj3 (fluid? or liquor) adj3 (volume? or index$)).ti,ab.
76	(liquor adj3 (volume? or index$)).ti,ab.
77	AFI.ti,ab.
78	or/74-77
79	AMNIOTIC FLUID/dg [Diagnostic Imaging]
80	FETAL MONITORING/mt [Methods]
81	13 and 23 and 29
82	13 and 47 and 51
83	13 and 47 and 61
84	13 and 47 and 67
85	13 and 73 and 78
86	13 and 79
87	13 and 80
88	or/81-87
89	limit 88 to english language
90	LETTER/
91	EDITORIAL/
92	NEWS/
93	exp HISTORICAL ARTICLE/
94	ANECDOTES AS TOPIC/
95	COMMENT/
96	CASE REPORT/
97	(letter or comment*).ti.
98	or/90-97
99	RANDOMIZED CONTROLLED TRIAL/ or random*.ti,ab.
100	98 not 99
101	ANIMALS/ not HUMANS/
102	exp ANIMALS, LABORATORY/
103	exp ANIMAL EXPERIMENTATION/
104	exp MODELS, ANIMAL/
105	exp RODENTIA/
106	(rat or rats or mouse or mice).ti.
107	or/100-106
108	89 not 107

Database: Cochrane Central Register of Controlled Trials

#	Searches
1	INFANT, SMALL FOR GESTATIONAL AGE/
2	GESTATIONAL AGE/ and small.ti.
3	GESTATIONAL AGE/ and small.ab. /freq=2
4	(small adj3 gestational age?).ab,ti.
5	SGA.ti,ab.
6	FETAL GROWTH RETARDATION/
7	((fetal$ or fetus$ or intrauterine) adj3 grow$ adj3 (restrict$ or retard$)).ti,ab.
8	IUGR.ti,ab.
9	INFANT, LOW BIRTH WEIGHT/
10	exp INFANT, VERY LOW BIRTH WEIGHT/
11	(low birthweight? or low birth weight?).ti,ab,kw.
12	LBW.ti,ab.
13	or/1-12
14	CARDIOTOCOGRAPHY/
15	ELECTROCARDIOGRAPHY/
16	cardiotocogra$.ti,ab,kw.
17	CTG.ti,ab.
18	electrocardiogra$.ti,ab,kw.
19	ECG.ti,ab.
20	EKG.ti,ab.
21	(electr$ adj5 (f?etal or f?etus$ or uter$) adj5 (heart$ or monitor$ or assess$)).ti,ab.
22	EFM.ti,ab.
23	or/14-22
24	exp AUSCULTATION/
25	STETHOSCOPES/
26	(auscultat$ or IA or pin?ard$ or fetoscop$).ti,ab,kw.
27	((f?etal or f?etus$) adj3 stethoscop$).ti,ab.
28	"listen$ in".ti,ab.
29	or/24-28
30	FETAL MONITORING/
31	UTERINE MONITORING/
32	HEART RATE, FETAL/ and (monitor$ or assess$).ti,ab.
33	exp FETAL HEART/ and (monitor$ or assess$).ti,ab.
34	FETAL DISTRESS/ and (monitor$ or assess$).ti,ab.
35	((f?etal or f?etus$ or uter$) adj5 heart$ adj5 (monitor$ or assess$)).ti,ab.
36	EFM.ti,ab.
37	FHR.ti,ab.
38	CARDIOTOCOGRAPHY/
39	ELECTROCARDIOGRAPHY/

#	Searches
40	cardiotocogra$.ti,ab,kw.
41	CTG.ti,ab.
42	electrocardiogra$.ti,ab,kw.
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44	EKG.ti,ab.
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53	FETAL BLOOD/ and (samp$ or analys$ or gas$).ti,ab.
54	((f?etal or f?etus) adj5 (lactate? or pH or scalp? or base$ or acid$ or alk#l$)).ti,ab.
55	((f?etal or f?etus) adj5 blood adj5 (gas$ or sampl$ or analys$)).ti,ab.
56	FBS.ti,ab.
57	exp BLOOD GAS ANALYSIS/
58	exp ACID-BASE IMBALANCE/
59	(blood adj5 (gas$ or oxygen or carbon dioxide or CO2) adj5 analys$).ti,ab.
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61	or/52-60
62	(exp PHYSICAL STIMULATION/ or VIBRATION/) and SCALP/
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64	((scalp? or digit$ or acoustic$ or vibroacoustic$) adj5 (stimulat$ or stimuli or stimulus or punctur$)).ti,ab.
65	((acoustic or artificial) adj laryn$).ti,ab.
66	FSS.ti,ab.
67	or/62-66
68	exp ULTRASONOGRAPHY/
69	ultrasonograph$.ti,ab,kw.
70	sonograph$.ti,ab,kw.
71	ultrasound.ti,ab,kw.
72	sonogram?.ti,ab,kw.
73	or/68-72
74	AMNIOTIC FLUID/ and (volume? or index$).ti,ab.
75	((amniotic or amnii) adj3 (fluid? or liquor) adj3 (volume? or index$)).ti,ab.
76	(liquor adj3 (volume? or index$)).ti,ab.
77	AFI.ti,ab.
78	or/74-77

#	Searches
79	AMNIOTIC FLUID/us [Ultrasonography]
80	FETAL MONITORING/mt [Methods]
81	13 and 23 and 29
82	13 and 47 and 51
83	13 and 47 and 61
84	13 and 47 and 67
85	13 and 73 and 78
86	13 and 79
87	13 and 80
88	or/81-87

Database: Cochrane Database of Systematic Reviews

#	Searches
1	INFANT, SMALL FOR GESTATIONAL AGE.kw.
2	GESTATIONAL AGE.kw. and small.ti.
3	GESTATIONAL AGE.kw. and small.ab. /freq=2
4	(small adj3 gestational age?).ab,ti.
5	SGA.ti,ab.
6	FETAL GROWTH RETARDATION.kw.
7	((fetal$ or fetus$ or intrauterine) adj3 grow$ adj3 (restrict$ or retard$)).ti,ab.
8	IUGR.ti,ab.
9	INFANT, LOW BIRTH WEIGHT.kw.
10	INFANT, VERY LOW BIRTH WEIGHT.kw.
11	(low birthweight? or low birth weight?).ti,ab.
12	LBW.ti,ab.
13	or/1-12
14	CARDIOTOCOGRAPHY.kw.
15	ELECTROCARDIOGRAPHY.kw.
16	cardiotocogra$.ti,ab.
17	CTG.ti,ab.
18	electrocardiogra$.ti,ab.
19	ECG.ti,ab.
20	EKG.ti,ab.
21	(electr$ adj5 (f?etal or f?etus$ or uter$) adj5 (heart$ or monitor$ or assess$)).ti,ab.
22	EFM.ti,ab.
23	or/14-22
24	AUSCULTATION.kw.
25	STETHOSCOPES.kw.
26	(auscultat$ or IA or pin?ard$ or fetoscop$).ti,ab.
27	((f?etal or f?etus$) adj3 stethoscop$).ti,ab.

#	Searches
28	"listen$ in".ti,ab.
29	or/24-28
30	FETAL MONITORING.kw.
31	UTERINE MONITORING.kw.
32	HEART RATE, FETAL.kw. and (monitor$ or assess$).ti,ab.
33	FETAL HEART.kw. and (monitor$ or assess$).ti,ab.
34	FETAL DISTRESS.kw. and (monitor$ or assess$).ti,ab.
35	((f?etal or f?etus$ or uter$) adj5 heart$ adj5 (monitor$ or assess$)).ti,ab.
36	EFM.ti,ab.
37	FHR.ti,ab.
38	CARDIOTOCOGRAPHY.kw.
39	ELECTROCARDIOGRAPHY.kw.
40	cardiotocogra$.ti,ab.
41	CTG.ti,ab.
42	electrocardiogra$.ti,ab.
43	ECG.ti,ab.
44	EKG.ti,ab.
45	((nonstress or non-stress) adj3 test$).ti,ab.
46	NST.ti,ab.
47	or/30-46
48	(SCALP and ELECTRODES).kw.
49	((f?etal or f?etus$) adj5 scalp? adj5 electrode?).ti,ab.
50	FSE.ti,ab.
51	or/48-50
52	BLOOD SPECIMEN COLLECTION.kw.
53	FETAL BLOOD.kw. and (samp$ or analys$ or gas$).ti,ab.
54	((f?etal or f?etus) adj5 (lactate? or pH or scalp? or base$ or acid$ or alk#l$)).ti,ab.
55	((f?etal or f?etus) adj5 blood adj5 (gas$ or sampl$ or analys$)).ti,ab.
56	FBS.ti,ab.
57	BLOOD GAS ANALYSIS.kw.
58	ACID-BASE IMBALANCE.kw.
59	(blood adj5 (gas$ or oxygen or carbon dioxide or CO2) adj5 analys$).ti,ab.
60	((acidbase or acid base) adj5 (imbalanc$ or equ?l$)).ti,ab.
61	or/52-60
62	((PHYSICAL STIMULATION or VIBRATION) and SCALP).kw.
63	((f?etal or f?etus$) adj5 (stimulat$ or stimuli or stimulus)).ti,ab.
64	((scalp? or digit$ or acoustic$ or vibroacoustic$) adj5 (stimulat$ or stimuli or stimulus or punctur$)).ti,ab.
65	((acoustic or artificial) adj laryn$).ti,ab.
66	FSS.ti,ab.

#	Searches
67	or/62-66
68	ULTRASONOGRAPHY.kw.
69	ultrasonograph$.ti,ab.
70	sonograph$.ti,ab.
71	ultrasound.ti,ab.
72	sonogram?.ti,ab.
73	or/68-72
74	AMNIOTIC FLUID.kw. and (volume? or index$).ti,ab.
75	((amniotic or amnii) adj3 (fluid? or liquor) adj3 (volume? or index$)).ti,ab.
76	(liquor adj3 (volume? or index$)).ti,ab.
77	AFI.ti,ab.
78	or/74-77
79	13 and 23 and 29
80	13 and 47 and 51
81	13 and 47 and 61
82	13 and 47 and 67
83	13 and 73 and 78
84	or/79-83

Database: Database of Abstracts of Reviews of Effects

#	Searches
1	INFANT, SMALL FOR GESTATIONAL AGE.kw.
2	GESTATIONAL AGE.kw. and small.tw.
3	GESTATIONAL AGE.kw. and small.tx.
4	(small adj3 gestational age?).tw,tx.
5	SGA.tw,tx.
6	FETAL GROWTH RETARDATION.kw.
7	((fetal$ or fetus$ or intrauterine) adj3 grow$ adj3 (restrict$ or retard$)).tw,tx.
8	IUGR.tw,tx.
9	INFANT, LOW BIRTH WEIGHT.kw.
10	INFANT, VERY LOW BIRTH WEIGHT.kw.
11	(low birthweight? or low birth weight?).tw,tx.
12	LBW.tw,tx.
13	or/1-12
14	CARDIOTOCOGRAPHY.kw.
15	ELECTROCARDIOGRAPHY.kw.
16	cardiotocogra$.tw,tx.
17	CTG.tw,tx.
18	electrocardiogra$.tw,tx.
19	ECG.tw,tx.

#	Searches
20	EKG.tw,tx.
21	(electr$ adj5 (f?etal or f?etus$ or uter$) adj5 (heart$ or monitor$ or assess$)).tw,tx.
22	EFM.tw,tx.
23	or/14-22
24	AUSCULTATION.kw.
25	STETHOSCOPES.kw.
26	(auscultat$ or IA or pin?ard$ or fetoscop$).tw,tx.
27	((f?etal or f?etus$) adj3 stethoscop$).tw,tx.
28	"listen$ in".tw,tx.
29	or/24-28
30	FETAL MONITORING.kw.
31	UTERINE MONITORING.kw.
32	HEART RATE, FETAL.kw. and (monitor$ or assess$).tw,tx.
33	FETAL HEART.kw. and (monitor$ or assess$).tw,tx.
34	FETAL DISTRESS.kw. and (monitor$ or assess$).tw,tx.
35	((f?etal or f?etus$ or uter$) adj5 heart$ adj5 (monitor$ or assess$)).tw,tx.
36	EFM.tw,tx.
37	FHR.tw,tx.
38	CARDIOTOCOGRAPHY.kw.
39	ELECTROCARDIOGRAPHY.kw.
40	cardiotocogra$.tw,tx.
41	CTG.tw,tx.
42	electrocardiogra$.tw,tx.
43	ECG.tw,tx.
44	EKG.tw,tx.
45	((nonstress or non-stress) adj3 test$).tw,tx.
46	NST.tw,tx.
47	or/30-46
48	(SCALP and ELECTRODES).kw.
49	((f?etal or f?etus$) adj5 scalp? adj5 electrode?).tw,tx.
50	FSE.tw,tx.
51	or/48-50
52	BLOOD SPECIMEN COLLECTION.kw.
53	FETAL BLOOD.kw. and (samp$ or analys$ or gas$).tw,tx.
54	((f?etal or f?etus) adj5 (lactate? or pH or scalp? or base$ or acid$ or alk#l$)).tw,tx.
55	((f?etal or f?etus) adj5 blood adj5 (gas$ or sampl$ or analys$)).tw,tx.
56	FBS.tw,tx.
57	BLOOD GAS ANALYSIS.kw.
58	ACID-BASE IMBALANCE.kw.
59	(blood adj5 (gas$ or oxygen or carbon dioxide or CO2) adj5 analys$).tw,tx.

#	Searches
60	((acidbase or acid base) adj5 (imbalanc$ or equ?l$)).tw,tx.
61	or/52-60
62	((PHYSICAL STIMULATION or VIBRATION) and SCALP).kw.
63	((f?etal or f?etus$) adj5 (stimulat$ or stimuli or stimulus)).tw,tx.
64	((scalp? or digit$ or acoustic$ or vibroacoustic$) adj5 (stimulat$ or stimuli or stimulus or punctur$)).tw,tx.
65	((acoustic or artificial) adj laryn$).tw,tx.
66	FSS.tw,tx.
67	or/62-66
68	ULTRASONOGRAPHY.kw.
69	ultrasonograph$.tw,tx.
70	sonograph$.tw,tx.
71	ultrasound.tw,tx.
72	sonogram?.tw,tx.
73	or/68-72
74	AMNIOTIC FLUID.kw. and (volume? or index$).tw,tx.
75	((amniotic or amnii) adj3 (fluid? or liquor) adj3 (volume? or index$)).tw,tx.
76	(liquor adj3 (volume? or index$)).tw,tx.
77	AFI.tw,tx.
78	or/74-77
79	13 and 23 and 29
80	13 and 47 and 51
81	13 and 47 and 61
82	13 and 47 and 67
83	13 and 73 and 78
84	or/79-83

Database: Health Technology Assessment

#	Searches
1	INFANT, SMALL FOR GESTATIONAL AGE/
2	GESTATIONAL AGE/ and small.tw.
3	GESTATIONAL AGE/ and small.tw.
4	(small adj3 gestational age?).tw.
5	SGA.tw.
6	FETAL GROWTH RETARDATION/
7	((fetal$ or fetus$ or intrauterine) adj3 grow$ adj3 (restrict$ or retard$)).tw.
8	IUGR.tw.
9	INFANT, LOW BIRTH WEIGHT/
10	exp INFANT, VERY LOW BIRTH WEIGHT/
11	(low birthweight? or low birth weight?).tw.

#	Searches
12	LBW.tw.
13	or/1-12
14	CARDIOTOCOGRAPHY/
15	ELECTROCARDIOGRAPHY/
16	cardiotocogra$.tw.
17	CTG.tw.
18	electrocardiogra$.tw.
19	ECG.tw.
20	EKG.tw.
21	(electr$ adj5 (f?etal or f?etus$ or uter$) adj5 (heart$ or monitor$ or assess$)).tw.
22	EFM.tw.
23	or/14-22
24	exp AUSCULTATION/
25	STETHOSCOPES/
26	(auscultat$ or IA or pin?ard$ or fetoscop$).tw.
27	((f?etal or f?etus$) adj3 stethoscop$).tw.
28	"listen$ in".tw.
29	or/24-28
30	FETAL MONITORING/
31	UTERINE MONITORING/
32	HEART RATE, FETAL/ and (monitor$ or assess$).tw.
33	exp FETAL HEART/ and (monitor$ or assess$).tw.
34	FETAL DISTRESS/ and (monitor$ or assess$).tw.
35	((f?etal or f?etus$ or uter$) adj5 heart$ adj5 (monitor$ or assess$)).tw.
36	EFM.tw.
37	FHR.tw.
38	CARDIOTOCOGRAPHY/
39	ELECTROCARDIOGRAPHY/
40	cardiotocogra$.tw.
41	CTG.tw.
42	electrocardiogra$.tw.
43	ECG.tw.
44	EKG.tw.
45	((nonstress or non-stress) adj3 test$).tw.
46	NST.tw.
47	or/30-46
48	SCALP/ and ELECTRODES/
49	((f?etal or f?etus$) adj5 scalp? adj5 electrode?).tw.
50	FSE.tw.
51	or/48-50

#	Searches
52	BLOOD SPECIMEN COLLECTION/
53	FETAL BLOOD/ and (samp$ or analys$ or gas$).tw.
54	((f?etal or f?etus) adj5 (lactate? or pH or scalp? or base$ or acid$ or alk#l$)).tw.
55	((f?etal or f?etus) adj5 blood adj5 (gas$ or sampl$ or analys$)).tw.
56	FBS.tw.
57	exp BLOOD GAS ANALYSIS/
58	exp ACID-BASE IMBALANCE/
59	(blood adj5 (gas$ or oxygen or carbon dioxide or CO2) adj5 analys$).tw.
60	((acidbase or acid base) adj5 (imbalanc$ or equ?l$)).tw.
61	or/52-60
62	(exp PHYSICAL STIMULATION/ or VIBRATION/) and SCALP/
63	((f?etal or f?etus$) adj5 (stimulat$ or stimuli or stimulus)).tw.
64	((scalp? or digit$ or acoustic$ or vibroacoustic$) adj5 (stimulat$ or stimuli or stimulus or punctur$)).tw.
65	((acoustic or artificial) adj laryn$).tw.
66	FSS.tw.
67	or/62-66
68	exp ULTRASONOGRAPHY/
69	ultrasonograph$.tw.
70	sonograph$.tw.
71	ultrasound.tw.
72	sonogram?.tw.
73	or/68-72
74	AMNIOTIC FLUID/ and (volume? or index$).tw.
75	((amniotic or amnii) adj3 (fluid? or liquor) adj3 (volume? or index$)).tw.
76	(liquor adj3 (volume? or index$)).tw.
77	AFI.tw.
78	or/74-77
79	FETAL MONITORING/mt [Methods]
80	13 and 23 and 29
81	13 and 47 and 51
82	13 and 47 and 61
83	13 and 47 and 67
84	13 and 73 and 78
85	13 and 79
86	or/80-85

Database: Embase

#	Searches
1	SMALL FOR DATE INFANT/

#	Searches
2	GESTATIONAL AGE/ and small.ti.
3	GESTATIONAL AGE/ and small.ab. /freq=2
4	(small adj3 gestational age?).ab,ti.
5	SGA.ti,ab.
6	INTRAUTERINE GROWTH RETARDATION/
7	((fetal$ or fetus$ or intrauterine) adj3 grow$ adj3 (restrict$ or retard$)).ti,ab.
8	IUGR.ti,ab.
9	LOW BIRTH WEIGHT/
10	exp VERY LOW BIRTH WEIGHT/
11	(low birthweight? or low birth weight?).ti,ab.
12	LBW.ti,ab.
13	or/1-12
14	CARDIOTOCOGRAPHY/
15	ELECTROCARDIOGRAPHY/ or FETUS ELECTROCARDIOGRAPHY/
16	cardiotocogra$.ti,ab.
17	CTG.ti,ab.
18	electrocardiogra$.ti,ab.
19	ECG.ti,ab.
20	EKG.ti,ab.
21	(electr$ adj5 (f?etal or f?etus$ or uter$) adj5 (heart$ or monitor$ or assess$)).ti,ab.
22	EFM.ti,ab.
23	or/14-22
24	exp AUSCULTATION/
25	exp STETHOSCOPE/
26	(auscultat$ or IA or pin?ard$ or fetoscop$).ti,ab.
27	((f?etal or f?etus$) adj3 stethoscop$).ti,ab.
28	"listen$ in".ti,ab.
29	or/24-28
30	FETUS MONITORING/
31	UTERINE ACTIVITY MONITORING/
32	FETUS HEART RATE/ and (monitor$ or assess$).ti,ab.
33	FETUS HEART/ and (monitor$ or assess$).ti,ab.
34	FETUS DISTRESS/ and (monitor$ or assess$).ti,ab.
35	((f?etal or f?etus$ or uter$) adj5 heart$ adj5 (monitor$ or assess$)).ti,ab.
36	EFM.ti,ab.
37	FHR.ti,ab.
38	CARDIOTOCOGRAPHY/
39	ELECTROCARDIOGRAPHY/ or FETUS ELECTROCARDIOGRAPHY/
40	cardiotocogra$.ti,ab.
41	CTG.ti,ab.

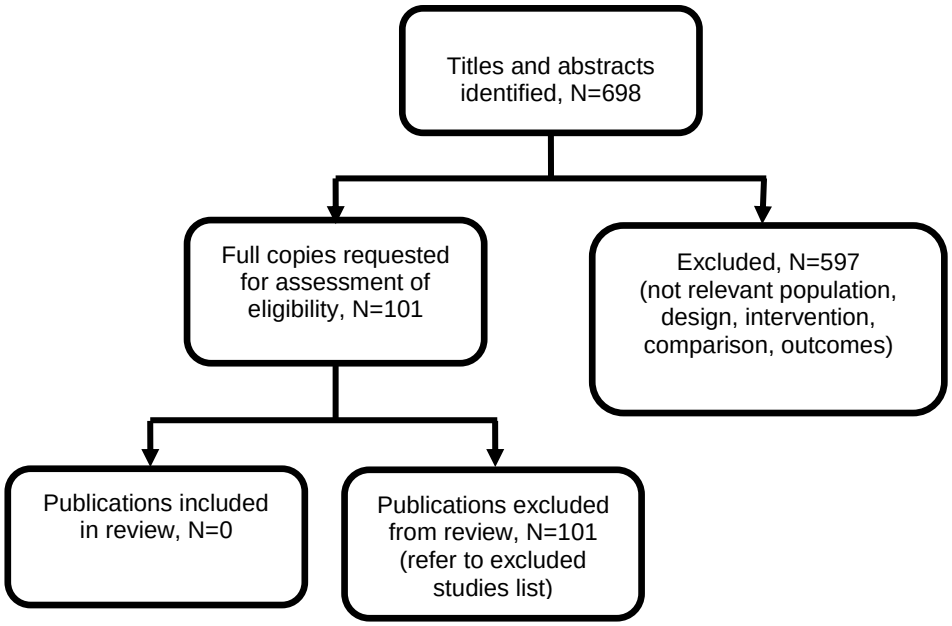
#	Searches
42	electrocardiogra$.ti,ab.
43	ECG.ti,ab.
44	EKG.ti,ab.
45	((nonstress or non-stress) adj3 test$).ti,ab.
46	NST.ti,ab.
47	or/30-46
48	SCALP/ and ELECTRODE/
49	((f?etal or f?etus$) adj5 scalp? adj5 electrode?).ti,ab.
50	FSE.ti,ab.
51	or/48-50
52	FETUS BLOOD SAMPLING/
53	((f?etal or f?etus) adj5 (lactate? or pH or scalp? or base$ or acid$ or alk#l$)).ti,ab.
54	((f?etal or f?etus) adj5 blood adj5 (gas$ or sampl$ or analys$)).ti,ab.
55	FBS.ti,ab.
56	exp BLOOD GAS ANALYSIS/
57	exp "DISORDERS OF ACID BASE BALANCE"/
58	(blood adj5 (gas$ or oxygen or carbon dioxide or CO2) adj5 analys$).ti,ab.
59	((acidbase or acid base) adj5 (imbalanc$ or equ?l$)).ti,ab.
60	or/52-59
61	(STIMULATION/ or VIBRATION/) and SCALP/
62	((f?etal or f?etus$) adj5 (stimulat$ or stimuli or stimulus)).ti,ab.
63	((scalp? or digit$ or acoustic$ or vibroacoustic$) adj5 (stimulat$ or stimuli or stimulus or punctur$)).ti,ab.
64	((acoustic or artificial) adj laryn$).ti,ab.
65	FSS.ti,ab.
66	or/61-65
67	exp ECHOGRAPHY/
68	ultrasonograph$.ti,ab.
69	sonograph$.ti,ab.
70	ultrasound.ti,ab.
71	sonogram?.ti,ab.
72	or/67-71
73	AMNION FLUID/ and (volume? or index$).ti,ab.
74	((amniotic or amnii) adj3 (fluid? or liquor) adj3 (volume? or index$)).ti,ab.
75	(liquor adj3 (volume? or index$)).ti,ab.
76	AFI.ti,ab.
77	or/73-76
78	13 and 23 and 29
79	13 and 47 and 51
80	13 and 47 and 60

#	Searches
81	13 and 47 and 66
82	13 and 72 and 77
83	or/78-82
84	limit 83 to english language
85	letter.pt. or LETTER/
86	note.pt.
87	editorial.pt.
88	CASE REPORT/ or CASE STUDY/
89	(letter or comment*).ti.
90	or/85-89
91	RANDOMIZED CONTROLLED TRIAL/ or random*.ti,ab.
92	90 not 91
93	ANIMAL/ not HUMAN/
94	NONHUMAN/
95	exp ANIMAL EXPERIMENT/
96	exp EXPERIMENTAL ANIMAL/
97	ANIMAL MODEL/
98	exp RODENT/
99	(rat or rats or mouse or mice).ti.
100	or/92-99
101	84 not 100

Appendix C – Clinical evidence study selection

Intrapartum care for women with a small-for-gestational-age baby – fetal monitoring

Figure 1: Flow diagram of clinical article selection for intrapartum care for women with a small-for-gestational-age baby – fetal monitoring



Appendix D – Excluded studies

Intrapartum care for women with a small-for-gestational-age baby – fetal monitoring

Clinical studies

Study	Reason for exclusion
Akhavan, S., Lak, P., Rahimi-Sharbaf, F., Mohammadi, S. R., Shirazi, M., Admission test and pregnancy outcome, Iranian Journal of Medical Sciences, 42, 362-368, 2017	Not relevant population, that is, not women with small-for-gestational age babies
Alshimmiri,M., Bocking,A.D., Gagnon,R., Natale,R., Richardson,B.S., Prediction of umbilical artery base excess by intrapartum fetal oxygen saturation monitoring, American Journal of Obstetrics and Gynecology, 177, 775-779, 1997	Preterm pregnancies (>=35 weeks of gestation) were included (not reported how many)
Anceschi, M. M., Ruozi-Berretta, A., Piazze, J. J., Cosmi, E., Cerekja, A., Meloni, P., Cosmi, E. V., Computerized cardiotocography in the management of intrauterine growth restriction associated with Doppler velocimetry alterations, International Journal of Gynecology and Obstetrics, 86, 365-370, 2004	Women not in labour
Arabin, B., Becker, R., Mohnhaupt, A., Entezami, M., Weitzel, H. K., Prediction of fetal distress and poor outcome in intrauterine growth retardation - A comparison of fetal heart rate monitoring combined with stress tests and Doppler ultrasound, Fetal Diagnosis and Therapy, 8, 234-240, 1993	Antenatal surveillance
Arabin,B., Ragosch,V., Mohnhaupt,A., From biochemical to biophysical placental function tests in fetal surveillance, American Journal of Perinatology, 12, 168-171, 1995	Not relevant population, that is, hospitalised pregnant women due to a previous history of high-risk pregnancy or social risks, diabetes, antepartum hemorrhage, suspected intrauterine growth restriction, pregnancy-induced hypertension, pre-eclampsia without suspected intrauterine growth restriction or with suspected intrauterine growth restriction and various other complications
Arduini, D., Rizzo, G., Differential diagnosis of small-for-gestational age fetuses by Doppler ultrasound, Fetal Therapy, 3, 31-6, 1988	Preterm pregnancies (gestational age from 22 to 40 weeks) were included; no relevant subgroup analysis
Baschat, A. A., Pathophysiology of fetal growth restriction: Implications for diagnosis and surveillance, Obstetrical and Gynecological Survey, 59, 617-627, 2004	Narrative review on the relationship between pathophysiology and clinical presentation in pregnancies complicated by placental insufficiency
Baschat, A. A., Gembruch, U., Harman, C. R., The sequence of changes in Doppler and biophysical parameters as severe fetal growth restriction worsens,	Antenatal surveillance

Study	Reason for exclusion
Ultrasound in Obstetrics & Gynecology, 18, 571-7, 2001	
Baschat,A.A., Weiner,C.P., Umbilical artery doppler screening for detection of the small fetus in need of antepartum surveillance, American Journal of Obstetrics and Gynecology, 182, 154-158, 2000	Determines whether an abnormal ultrasound resistance improves the diagnostic accuracy of intrauterine growth restriction and identifies babies at risk of chronic hypoxaemic distress and in need of antenatal surveillance
Ben-Haroush,A., Yogev,Y., Bar,J., Mashiach,R., Kaplan,B., Hod,M., Meizner,I., Accuracy of sonographically estimated fetal weight in 840 women with different pregnancy complications prior to induction of labor, Ultrasound in Obstetrics and Gynecology, 23, 172-176, 2004	Not relevant as the article describes the ultrasound prediction of fetal weight shortly before induction of labour in women with pregnancy complications
Bhartiya, V., Sharma, R., Kumar, A., Srivastava, H., Admission Cardiotocography: A Predictor of Neonatal Outcome, Journal of Obstetrics and Gynecology of India, 66, 321-329, 2016	Includes premature pregnancies, no stratified data for small-for-gestational age babies
Bligh, L., Al Solai, A., Greer, R. M., Kumar, S., Changes in the fetal cerebroumbilical artery ratio at term and its predictive value for intrapartum fetal compromise, BJOG: An International Journal of Obstetrics and Gynaecology, 122, 393, 2015	Conference abstract
Bottoms, S. F., Welch, R. A., Zador, I. E., Sokol, R. J., Limitations of using maximum vertical pocket and other sonographic evaluations of amniotic fluid volume to predict fetal growth: Technical or physiologic?, American Journal of Obstetrics and Gynecology, 155, 154-158, 1986	Describes the use of maximum vertical pocket to diagnose abnormal fetal growth
Bowes,W.A.,Jr., Gabre,S.G., Bowes,C., Fetal heart rate monitoring in premature infants weighing 1,500 grams or less, American Journal of Obstetrics and Gynecology, 137, 791-796, 1980	Preterm babies
Brar, H. S., The use of Doppler ultrasound to assess intrauterine growth retardation in the fetus, Seminars in Perinatology, 12, 40-51, 1988	Narrative review about the principles of Doppler ultrasound and its use for intrauterine growth restriction
Cahill,A., Odibo,A., Roehl,K., MacOnes,G., Effect of growth restriction on intrapartum electronic fetal heart rate monitoring (EFM) patterns?, American Journal of Obstetrics and Gynecology, 208, S314-S315, 2013	Conference abstract
Carroll, B., Ultrasonic features of preeclampsia, Journal of Clinical Ultrasound, 8, 483-8, 1980	All women had pre-eclampsia
Chamberlain, P. F., Manning, F. A., Morrison, I., Harman, C. R., Lange, I. R., Ultrasound evaluation of amniotic fluid volume. I. The relationship of marginal and decreased amniotic fluid volumes to perinatal outcome, American Journal of Obstetrics and Gynecology, 150, 245-249, 1984	Women not in labour

Study	Reason for exclusion
Chan,F.Y., Lam,C., Lam,Y.H., To,W.K., Pun,T.C., Lee,C.P., Umbilical artery Doppler velocimetry compared with fetal heart rate monitoring as a labor admission test, European Journal of Obstetrics, Gynecology, and Reproductive Biology, 54, 1-6, 1994	Not relevant population as it includes pregnant women with various pregnancy-related conditions not only growth restricted babies
Chang,T.C., Robson,S.C., Spencer,J.A., Gallivan,S., Prediction of perinatal morbidity at term in small fetuses: comparison of fetal growth and Doppler ultrasound, British Journal of Obstetrics and Gynaecology, 101, 422-427, 1994	Antepartum fetal assessment
Chauhan, S. P., Magann, E. F., Dohrety, D. A., Ennen, C. S., Niederhauser, A., Morrison, J. C., Prediction of small for gestational age newborns using ultrasound estimated and actual amniotic fluid volume: Published data revisited, Australian and New Zealand Journal of Obstetrics and Gynaecology, 48, 160-164, 2008	Identification of small-for-gestational age babies
Chauhan,S.P., Taylor,M., Shields,D., Parker,D., Scardo,J.A., Magann,E.F., Intrauterine growth restriction and oligohydramnios among high-risk patients, American Journal of Perinatology, 24, 215-221, 2007	Not relevant population as intrauterine growth restriction with oligohydramnios
Chauhan,S.P., Washburne,J.F., Magann,E.F., Perry,K.G.,Jr., Martin,J.N.,Jr., Morrison,J.C., A randomized study to assess the efficacy of the amniotic fluid index as a fetal admission test, Obstetrics and Gynecology, 86, 9-13, 1995	Not relevant population (not small-for-gestational age babies)
Chiba, Y., Comparative evaluation of non-stress test, Doppler examinations, and contraction stress test; Evaluated with cord blood sampling in growth-retarded fetuses, Journal of Maternal-Fetal Investigation, 6, 125-131, 1996	Antenatal testing
Chuang,J., Chou,C.T., Cheng,W.C., Huang,L.W., Hwang,J.L., Tsai,Y.L., Spontaneous fetal heart rate deceleration: an ominous sign for fetal outcome, Archives of Gynecology and Obstetrics, 269, 254-258, 2004	Not relevant population as pregnant women diagnosed with fetal heart-rate deceleration
Cosmi,E., Ambrosini,G., D'Antona,D., Saccardi,C., Mari,G., Doppler, cardiotocography, and biophysical profile changes in growth-restricted fetuses, Obstetrics and Gynecology, 106, 1240-1245, 2005	Premature babies
Cruz, A. C., Frentzen, B. H., Gomez, K. J., Allen, G., Tyson-Thomas, M., Continuous-wave Doppler ultrasound and decreased amniotic fluid volume in pregnant women with intact or ruptured membranes, American Journal of Obstetrics & Gynecology, 159, 708-14, 1988	Women not in labour
Deering,S.H., Patel,N., Spong,C.Y., Pezzullo,J.C., Ghidini,A., Fetal growth after preterm premature rupture of membranes: is it related to amniotic fluid	Monitoring not during labour

Study	Reason for exclusion
volume?, Journal of Maternal-Fetal and Neonatal Medicine, 20, 397-400, 2007	
Devoe, L. D., Boehm, F., Paul, R., Frigoletto, F., Penso, C., Goldenberg, R., Rayburn, W., Smith, C., Clinical experience with the Hewlett-Packard M-1350A fetal monitor: Correlation of Doppler-detected fetal body movements with fetal heart rate parameters and perinatal outcome, American Journal of Obstetrics and Gynecology, 170, 650-655, 1994	Antenatal testing
Devoe,L.D., Castillo,R.A., Searle,N., Searle,J.S., Prognostic components of computerized fetal biophysical testing, American Journal of Obstetrics and Gynecology, 158, 1144-1148, 1988	Mixed population as it includes not only intrauterine growth restriction but also other high-risk pregnancies, and also premature babies
Devoe,L.D., Gardner,P., Dear,C., Castillo,R.A., The diagnostic values of concurrent nonstress testing, amniotic fluid measurement, and Doppler velocimetry in screening a general high-risk population, American Journal of Obstetrics and Gynecology, 163, 1040-1047, 1990	Antenatal testing
Di Renzo, G. C., Luzi, G., Cucchia, G. C., Caserta, G., Fusaro, P., Perdikaris, A., Cosmi, E. V., The role of Doppler technology in the evaluation of fetal hypoxia, Early Human Development, 29, 259-267, 1992	Describes the use of Doppler velocimetry for fetal surveillance
du Plessis, J. H., Chauke, H. L., Management of intra uterine growth restriction, Obstetrics and Gynaecology Forum, 18, 47-50, 2008	A full-text copy of the article could not be obtained
Duff, G. B., The realities of screening for the small for dates fetus using ultrasound measurement, Australian & New Zealand Journal of Obstetrics & Gynaecology, 26, 102-5, 1986	Focuses on the screening for the small-for-dates babies using ultrasound
Echizenya,N., Kagiya,A., Tachizaki,T., Saito,Y., Significance of velocimetry as a monitor of fetal assessment and management, Fetal Therapy, 4, 188-194, 1989	Monitoring during pregnancy
Farley,D., Dudley,D.J., Fetal assessment during pregnancy, Pediatric Clinics of North America, 56, 489-504, 2009	Focuses on fetal monitoring in pregnancy
Farrell,T., Chien,P.F.W., Gordon,A., Intrapartum umbilical artery Doppler velocimetry as a predictor of adverse perinatal outcome: A systematic review, British Journal of Obstetrics and Gynaecology, 106, 783-792, 1999	Not relevant population as women with low- and high-risk pregnancies, including small-for-gestational age babies
Figueras,F., Eixarch,E., Meler,E., Palacio,M., Puerto,B., Coll,O., Figueras,J., Cararach,V., Vanrell,A.J., Umbilical artery Doppler and umbilical cord pH at birth in small-for-gestational-age fetuses: valid estimate of their relationship, Journal of Perinatal Medicine, 33, 219-225, 2005	Antenatal monitoring

Study	Reason for exclusion
Fuchs, T., Grobelak, K., Pomorski, M., Zimmer, M., Fetal heart rate monitoring using maternal abdominal surface electrodes in third trimester: Can we obtain additional information other than CTG trace?, Advances in Clinical and Experimental Medicine, 25, 309-316, 2016	Antenatal monitoring
Gagnon,R., Hunse,C., Bocking,A.D., Fetal heart rate patterns in the small-for-gestational-age human fetus, American Journal of Obstetrics and Gynecology, 161, 779-784, 1989	Antenatal fetal heart monitoring
Geerts, L., Van der Merwe, E., Theron, A., Rademan, K., Placental insufficiency among high-risk pregnancies with a normal umbilical artery resistance index after 32 weeks, International Journal of Gynecology and Obstetrics, 135, 38-42, 2016	Antenatal monitoring
Gnirs, J., Schneider, K. T., Mohrling, D., Wilhelm, O., Graeff, H., [Doppler sonography, kineto-cardiotocography and fetal stimulation tests in risk pregnancies], Gynakologisch geburtshilfliche Rundschau, 33, 252-3, 1993	Not in English language
Grossman, M., Flynn, J. J., Aufrichtig, D., Handler, C. R., Pitfalls in ultrasonic determination of total intrauterine volume, Journal of Clinical Ultrasound, 10, 17-20, 1982	Focuses on the calculation of uterine volume
Habek, D., Salihagic, A., Jugovic, D., Herman, R., Doppler cerebro-umbilical ratio and fetal biophysical profile in the assessment of peripartal cardiotocography in growth-retarded fetuses, Fetal Diagnosis & Therapy, 22, 452-6, 2007	Antenatal monitoring
Habek,D., Hodek,B., Herman,R., Jugovic,D., Habek,J.C., Salihagic,A., Fetal biophysical profile and cerebro-umbilical ratio in assessment of perinatal outcome in growth-restricted fetuses, Fetal Diagnosis and Therapy, 18, 12-16, 2003	Antenatal monitoring of growth-restricted and hypoxic fetuses
Hameed,C., Tejani,N., Tuck,S., Novotny,P., Verma,U., Chayen,B., Correlation of fetal heart rate monitoring and acid-base status with periventricular/intraventricular hemorrhage in the low birthweight neonate, American Journal of Perinatology, 3, 24-27, 1986	Not relevant comparison
Hata,T., Aoki,S., Manabe,A., Kanenishi,K., Yamashiro,C., Tanaka,H., Yanagihara,T., Subclassification of small-for-gestational-age fetus using fetal Doppler velocimetry, Gynecologic and Obstetric Investigation, 49, 236-239, 2000	Compares perinatal outcomes between small-for-gestational age babies with normal middle cerebral artery puslatility index and umbilical artery pulsatility index, and those with low middle cerebral artery puslatility index but normal umbilical artery pulsatility index
Hata,T., Kuno,A., Akiyama,M., Yanagihara,T., Manabe,A., Miyazaki,K., Detection of small-for-gestational-age infants with poor perinatal outcomes	Antenatal ultrasound monitoring (using individualized growth assessment model)

Study	Reason for exclusion
using individualized growth assessment, Gynecologic and Obstetric Investigation, 47, 162-165, 1999	to detect small-for-gestational age babies with a poor perinatal outcome
Henderson,M.J., Dear,P.R.F., Role of the clinical biochemistry laboratory in the management of very low birthweight infants, Annals of Clinical Biochemistry, 30, 341-354, 1993	Describes the commonest biochemical problems associated with the management of very low birth weight babies
Hoopmann, M., Schermuly, S., Abele, H., Zubke, W., Kagan, K. O., First trimester pregnancy volumes and subsequent small for gestational age fetuses, Archives of Gynecology and Obstetrics, 290, 41-46, 2014	Antenatal screening
Horenstein, J., Ultrasound assessment of fetal growth and fetal measurements, Seminars in Perinatology, 12, 23-30, 1988	Describes standard fetal growth parameters to diagnose intrauterine growth restriction
Hristova, I., Vakrilova, L., Dimitrova, V., Zlatkov, G., Slancheva, B., Mode of delivery, illness severity and short term outcome of very low birth weight neonates, Journal of Perinatal Medicine, 43, 2015	Conference abstract
Hruban,L., Janku,P., Zahradnickova,J., Kurecova,B., Roztocil,A., Kachlik,P., Kucera,M., Jelenek,G., [Role of ST-analysis of fetal ECG in intrapartal fetus monitoring with presumed growth retardation], Ceska gynekologie / Ceska lekarska spolecnost J.Ev.Purkyne, 71, 268-272, 2006	Not in English language
Hutchinson, L., Moss, H., Gibson, J. L., Gherghe, M., Suchetha, M., Brennand, J. E., Audit of the management of the small for gestation age (SGA) fetus against RCOG (2002) and regional guidelines: Case recognition and implications for the next regional guideline, Archives of Disease in Childhood: Fetal and Neonatal Edition, 99, A87-A88, 2014	Conference abstract
Kaar, K., Antepartal cardiotocography in the assessment of fetal outcome, Acta Obstetricia et Gynecologica Scandinavica - Supplement, 94, 1-56, 1980	Focuses on possible differences in the various antepartal components of fetal heart rate patterns between normal and high-risk pregnancy
Kessler, J., Kiserud, T., Albrechtsen, S., Intrapartum use of ST analysis of the fetal ECG (STAN) in fetal growth restriction, Acta Obstetricia et Gynecologica Scandinavica, 91, 98, 2012	Conference abstract
Kirkinen, P., Jouppila, P., Huch, R., Huch, A., Blood flow velocity waveforms at late pregnancy and during labor, Archives of Gynecology & Obstetrics, 244 Suppl, S19-23, 1988	Examines the association between labour and birth with changes of fetal pulse rate or velocity waveform indices of the umbilical artery
Kwon,J.Y., Park,I.Y., Lim,J., Shin,J.C., Changes in spectral power of fetal heart rate variability in small-for-gestational-age fetuses are associated with fetal sex, Early Human Development, 90, 9-13, 2014	Comparison between small-for-gestational age and non-small-for-gestational-age babies
Larson, E. B., van Belle, G., Shy, K. K., Luthy, D. A., Strickland, D., Hughes, J. P., Fetal monitoring and predictions by clinicians: observations during a	Focuses on health professionals' ability to predict perinatal outcomes. Women with premature babies

Study	Reason for exclusion
randomized clinical trial in very low birth weight infants, Obstetrics and gynecology, 74, 584-9, 1989	
Leader,L.R., Baillie,P., Martin,B., Molteno,C., Wynchank,S., Fetal responses to vibrotactile stimulation, a possible predictor of fetal and neonatal outcome, Australian and New Zealand Journal of Obstetrics and Gynaecology, 24, 251-256, 1984	Not relevant comparison
Lenstrup, C., Predictive value of a single unstressed antepartum cardiotocogram in apparently uncomplicated pregnancy. Introduction of a new cardiotocography score, Acta Obstetricia et Gynecologica Scandinavica, 61, 177-82, 1982	Monitoring during pregnancy
Leveno,K.J., Williams,M.L., DePalma,R.T., Whalley,P.J., Perinatal outcome in the absence of antepartum fetal heart rate acceleration, Obstetrics and Gynecology, 61, 347-355, 1983	Monitoring during pregnancy
Low,J.A., Cox,M.J., Karchmar,E.J., McGrath,M.J., Pancham,S.R., Piercy,W.N., The effect of maternal, labor, and fetal factors upon fetal heart rate during the intrapartum period, American Journal of Obstetrics and Gynecology, 139, 306-310, 1981	Not relevant population as women did not have pregnancies with suspected or diagnosed small-for-gestational-age babies; also monitoring prior to labour
McCowan,L.M., Harding,J.E., Roberts,A.B., Barker,S.E., Ford,C., Stewart,A.W., A pilot randomized controlled trial of two regimens of fetal surveillance for small-for-gestational-age fetuses with normal results of umbilical artery doppler velocimetry, American Journal of Obstetrics and Gynecology, 182, 81-86, 2000	Antenatal monitoring
Miyamura,T., Masuzaki,H., Miyamoto,M., Ishimaru,T., Comparison between the single deepest pocket and amniotic fluid index in predicting fetal distress in small-for-gestational age fetuses, Acta Obstetricia et Gynecologica Scandinavica, 76, 123-127, 1997	Antenatal monitoring
Moore, T. R., Assessment of amniotic fluid volume in at-risk pregnancies, Clinical Obstetrics and Gynecology, 38, 78-90, 1995	Narrative review about the value of amniotic fluid volume assessment in optimising pregnancy outcome
Morales,W.J., Koerten,J., Obstetric management and intraventricular hemorrhage in very-low-birth-weight infants, Obstetrics and Gynecology, 68, 35-40, 1986	Women with preterm pregnancies (gestational age under 33 weeks)
Nawathe, A., Lees, C., Early onset fetal growth restriction, Best Practice & Research in Clinical Obstetrics & Gynaecology, 38, 24-37, 2017	Focuses on the pathogenesis of fetal growth restriction and it monitoring
Nordstrom, U. L., Patel, N. B., Taylor, D. J., Umbilical artery waveform analysis and biophysical profile. A comparison of two methods to identify compromised fetuses, European Journal of Obstetrics, Gynecology, & Reproductive Biology, 30, 245-51, 1989	Mixed population as it includes not only those suspected with intrauterine growth restriction but also other high-risk pregnancies; also includes premature babies
O'Dwyer, V., Burke, G., Untershceider, J., Daly, S., Geary, M., Kennelly, M., McAuliffe, F., O'Donoghue, K., Hunter, A., Morrison, J., Dicker, P., Tully, E.,	Conference abstract

Study	Reason for exclusion
Malone, F., Defining the residual risk of adverse perinatal outcome in growth-restricted fetuses when umbilical arterial blood flow is normal, American Journal of Obstetrics and Gynecology, 210, S62, 2014	
Okamura, K., Endoh, H., Watanabe, T., Tanigawara, S., Iwamoto, M., Murotsuki, J., Yajima, A., Reevaluation of nonstress test by umbilical venous blood profile using cordocentesis, Fetal Therapy, 4, 146-51, 1989	Antenatal fetal heart rate monitoring
Palo, P., Erkkola, R., Intrapartal cardiotocography in prediction of well-being of small for gestational age newborns, Gynecologic & Obstetric Investigation, 31, 86-9, 1991	Comparison between small-for-gestational age and and non-small-for-gestational age babies
Pardi,G., Cetin,I., Marconi,A.M., Lanfranchi,A., Bozzetti,P., Ferrazzi,E., Buscaglia,M., Battaglia,F.C., Diagnostic value of blood sampling in fetuses with growth retardation, New England Journal of Medicine, 328, 692-696, 1993	Antenatal fetal testing
Pavelka, R., Schmid, R., Reinold, E., Evaluation of various monitoring techniques in late pregnancy to detect poor intrauterine fetal growth, Gynecologic & Obstetric Investigation, 13, 65-75, 1982	Antenatal cardiotocography
Pearce, J. M., Uteroplacental and fetal blood flow, Baillieres Clinical Obstetrics & Gynaecology, 1, 157-84, 1987	Narrative review about the use of Doppler ultrasound in the management of pregnancy
Perkins,R.P., Perinatal observations in a high-risk population managed without intrapartum fetal pH studies, American Journal of Obstetrics and Gynecology, 149, 327-336, 1984	Retrospective review of all perinatal statistics during 1978 and 1980 in a hospital
Platt, L. D., Walla, C. A., Paul, R. H., Trujillo, M. E., Loesser, C. V., Jacobs, N. D., Broussard, P. M., A prospective trial of the fetal biophysical profile versus the nonstress test in the management of high-risk pregnancies, American Journal of Obstetrics & Gynecology, 153, 624-33, 1985	Not relevant population as it includes not only women with intrauterine growth restriction but also other high-risk pregnancies; antenatal monitoring
Porat, N., Al-Ibraheemi, Z., Taylor, D., Kalberer, M., Rosenn, B., Isolated oligohydramnios near term: Should we be looking at umbilical artery doppler?, Reproductive Sciences, 24, 186A-187A, 2017	Conference abstract
Pratt,D., Diamond,F., Yen,H., Bieniarz,J., Burd,L., Fetal stress and nonstress tests: an analysis and comparison of their ability to identify fetal outcome, Obstetrics and Gynecology, 54, 419-423, 1979	Antenatal monitoring
Price, K., Cotton, J., Bapir, M., Audit of the detection of small-for-gestational-age (SGA) and fetal growth restriction (FGR) in babies born in North Tees and Hartlepool NHS Foundation Trust, BJOG: An International Journal of Obstetrics and Gynaecology, 123, 87, 2016	Conference abstract

Study	Reason for exclusion
Quetel, T. A., Bezjian, A. A., Obstetrical ultrasound: an overview and update, Journal of the Florida Medical Association, 70, 732-8, 1983	Narrative review about the use of ultrasound in obstetrics
Redman, C. W. G., Szafranski, P., Georgieva, A., Computerised antepartum fetal monitoring updated: The new Dawes-Redman 2016 system, Journal of Maternal-Fetal and Neonatal Medicine, 29, 36, 2016	Conference abstract
Ribbert,L.S., Snijders,R.J., Nicolaides,K.H., Visser,G.H., Relation of fetal blood gases and data from computer-assisted analysis of fetal heart rate patterns in small for gestation fetuses, British Journal of Obstetrics and Gynaecology, 98, 820-823, 1991	Antenatal fetal heart monitoring
Rizzo,G., Capponi,A., Arduini,D., Romanini,C., The value of fetal arterial, cardiac and venous flows in predicting pH and blood gases measured in umbilical blood at cordocentesis in growth retarded fetuses, British Journal of Obstetrics and Gynaecology, 102, 963-969, 1995	Preterm babies (mean gestational age at birth 32.5 weeks); antenatal Doppler measurements
Schifrin, B. S., Antenatal fetal assessment: Overview and implications for neurologic injury and routine testing, Clinical Obstetrics and Gynecology, 38, 132-141, 1995	This narrative review focuses on antenatal testing (electronic fetal monitoring)
Shalev, E., Zalel, Y., Weiner, E., A comparison of the nonstress test, oxytocin challenge test, Doppler velocimetry and biophysical profile in predicting umbilical vein pH in growth-retarded fetuses, International Journal of Gynecology and Obstetrics, 43, 15-19, 1993	Antenatal testing
Sharbaf,F.R., Amjadi,N., Alavi,A., Akbari,S., Forghani,F., Normal and indeterminate pattern of fetal cardiotocography in admission test and pregnancy outcome, Journal of Obstetrics and Gynaecology Research, 40, 694-699, 2014	Comparison of pregnancy outcomes between low- and high-risk pregnancies. High-risk pregnancies include various risk factors, not only intrauterine growth restriction
Shy,K.K., Olshan,A.F., Hickok,D.E., Luthy,D.A., Electronic fetal monitoring during premature labor and the occurrence of perinatal mortality in very low birthweight infants, Birth, 15, 14-18, 1988	Preterm labour
Siristatidis,C., Salamalekis,E., Vitoratos,N., Loghis,C., Salloum,J., Kassanos,D., Panayotopoulos,N., Creatsas,G., Intrapartum surveillance of IUGR fetuses with cardiotocography and fetal pulse oximetry, Biology of the Neonate, 83, 162-165, 2003	Comparison of neonatal outcomes between small-for-gestational age and non-small-for-gestational age babies
Tagliaferri, S., Fanelli, A., Esposito, G., Esposito, F. G., Magenes, G., Signorini, M. G., Campanile, M., Martinelli, P., Evaluation of the acceleration and deceleration phase-rectified slope to detect and improve IUGR clinical management, Computational and Mathematical Methods in Medicine, 2015 (no pagination), 2015	Focuses on evaluation of the trend of computerised cardiotocography parameters in healthy and intrauterine growth restricted babies

Study	Reason for exclusion
The Netherlands Organisation for Health Research and Development (ZonMw), Randomized trial of timing of delivery in early preterm fetal growth restriction based on early and late fetal Doppler venous changes versus cardiotocography. Acronym TRUFFLE = Trial of Umbilical and Fetal Flow in Europe (Project record), Health Technology Assessment Database, 2016	A full-text copy of the article could not be obtained
Tongsong, T., Srisomboon, J., Amniotic fluid volume as a predictor of fetal distress in intrauterine growth retardation, International Journal of Gynecology and Obstetrics, 40, 131-134, 1993	Antenatal testing (amniotic fluid volume and the non- stress test)
Turan,S., Turan,O.M., Berg,C., Moyano,D., Bhide,A., Bower,S., Thilaganathan,B., Gembruch,U., Nicolaides,K., Harman,C., Baschat,A.A., Computerized fetal heart rate analysis, Doppler ultrasound and biophysical profile score in the prediction of acid-base status of growth-restricted fetuses, Ultrasound in Obstetrics and Gynecology, 30, 750-756, 2007	Antenatal testing
Unterscheider, J., Daly, S., Geary, M. P., Kennelly, M. M., McAuliffe, F. M., O'Donoghue, K., Hunter, A., Morrison, J. J., Burke, G., Dicker, P., Tully, E. C., Malone, F. D., Predictable progressive Doppler deterioration in IUGR: does it really exist?, American Journal of Obstetrics & Gynecology, 209, 539.e1-7, 2013	Examines the association between multivessel Doppler changes to predict a progressive sequence of Doppler deterioration and correlate them with perinatal outcomes
Vardhan,S., Bhattacharyya,T.K., Kathpalia,S.K., Kochar,S.P.S., Intrapartum electronic foetal monitoring: Does it lead or mislead?, Medical Journal Armed Forces India, 62, 51-55, 2006	Narrative review about intrapartum electronic fetal monitoring
Warrick, P. A., Hamilton, E. F., Precup, D., Kearney, R. E., Detecting the temporal extent of the impulse response function from intra-partum cardiotocography for normal and hypoxic fetuses, Conference Proceedings: ... Annual International Conference of the IEEE Engineering in Medicine & Biology Society, 2008, 2797-800, 2008	No relevant comparison. Unclear if population included any women with small-for-gestational age babies
Weiner,Z., Farmakides,G., Schulman,H., Lopresti,S., Schneider,E., Surveillance of growth-retarded fetuses with computerized fetal heart rate monitoring combined with Doppler velocimetry of the umbilical and uterine arteries, Journal of Reproductive Medicine, 41, 112-118, 1996	Antenatal fetal surveillance
Wood,C., Diagnostic and therapeutic implications of intrapartum fetal pH measurement, Acta Obstetricia et Gynecologica Scandinavica,Acta Obstet.Gynecol.Scand., 57, 13-18, 1978	Narrative review about the use of fetal heart rate monitoring and scalp sampling
Yang,S.L., Lin,C.C., River,P., Moawad,A.H., Immunoglobulin concentrations in newborn infants associated with intrauterine growth retardation, Obstetrics and Gynecology, 62, 561-564, 1983	Not relevant comparison (that is, between different monitoring protocols). The study compares pregnancies with intrauterine growth restriction with and without

Study	Reason for exclusion
	intrapartum fetal heart rate decelerations. This comparison focuses on immunoglobulin levels in maternal and cord serum samples, on birthweight and on placental weight (no relevant outcomes)
Yoshimura, S., Masuzaki, H., Gotoh, H., Ishimaru, T., Fetal redistribution of blood flow and amniotic fluid volume in growth-retarded fetuses, Early Human Development, 47, 297-304, 1997	Not relevant comparison and outcomes. The study compares Doppler measurements and head to abdomen circumference ratio between pregnancies with intrauterine growth restriction and oligohydramnios and pregnancies with intrauterine growth restriction and adequate amniotic fluid volume
Zelop, C. M., Javitt, M. C., Glanc, P., Dubinsky, T., Harisinghani, M. G., Harris, R. D., Khati, N. J., Mitchell, D. G., Pandharipande, P. V., Pannu, H. K., Podrasky, A. E., Shipp, T. D., Siegel, C. L., Simpson, L., Wall, D. J., Wong-You-Cheong, J. J., ACR appropriateness criteria growth disturbances-risk of intrauterine growth restriction, Ultrasound Quarterly, 29, 147-151, 2013	Non-systematic literature review and evidence-based guidelines. The article focuses on antenatal fetal surveillance

Economic studies

See Supplement 2 (Health economics) for details of economic evidence reviews and health economic modelling.

Appendix E – Clinical evidence tables

Intrapartum care for women with a small-for-gestational-age baby – fetal monitoring

No clinical evidence was identified for this review and so there are no evidence tables.

Appendix F – Forest plots

Intrapartum care for women with a small-for-gestational-age baby – fetal monitoring

No meta-analysis was undertaken for this review and so there are no forest plots.

Appendix G – GRADE tables

Intrapartum care for women with a small-for-gestational-age baby – fetal monitoring

No clinical evidence was identified for this review and so there are no GRADE tables.

Appendix H – Economic evidence study selection

Intrapartum care for women with a small-for-gestational-age baby – fetal monitoring

See Supplement 2 (Health economics) for details of economic evidence reviews and health economic modelling.

Appendix I – Economic evidence tables

Intrapartum care for women with a small-for-gestational-age baby – fetal monitoring

See Supplement 2 (Health economics) for details of economic evidence reviews and health economic modelling.

Appendix J – Health economic evidence profiles

Intrapartum care for women with a small-for-gestational-age baby – fetal monitoring

See Supplement 2 (Health economics) for details of economic evidence reviews and health economic modelling.

Appendix K – Health economic analysis

Intrapartum care for women with a small-for-gestational-age baby – fetal monitoring

See Supplement 2 (Health economics) for details of economic evidence reviews and health economic modelling.

Appendix L – Research recommendations

Intrapartum care for women with a small-for-gestational-age baby – fetal monitoring

No research recommendations were made for this review.