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[Intervention Review]

Interventions for suspected placenta praevia

James P Neilson[1]

[1]School of Reproductive and Developmental Medicine, Division of Perinatal and Reproductive Medicine, The University of Liverpool, Liverpool, UK

Contact address: James P Neilson, School of Reproductive and Developmental Medicine, Division of Perinatal and Reproductive Medicine, The University of Liverpool, First Floor, Liverpool Women's NHS Foundation Trust, Crown Street, Liverpool, L8 7SS, UK. jneilson@liverpool.ac.uk.

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ABSTRACT

Background

Because placenta praevia is implanted unusually low in the uterus, it may cause major, and/or repeated, antepartum haemorrhage. The traditional policy of care of women with symptomatic placenta praevia includes prolonged stay in hospital and delivery by caesarean section.

Objectives

To assess the impact of any clinical intervention applied specifically because of a perceived likelihood that a pregnant woman might have placenta praevia.

Search methods

A comprehensive electronic search was performed to identify relevant literature. We searched the Cochrane Pregnancy and Childbirth Group's Trials Register (August 2002), and the Cochrane Controlled Trials Register (The Cochrane Library, Issue 2, 2002). We updated the search of the Cochrane Pregnancy and Childbirth Group's Trials Register on 1 October 2009 and added the results to the awaiting classification section.

Selection criteria

Any controlled clinical trial that has assessed the impact of an intervention in women diagnosed as having, or being likely to have, placenta praevia.

Data collection and analysis

Data were extracted, unblinded, by the author without consideration of results.

Main results

Three trials were included, involving a total of 114 women. Both tested interventions (home versus hospitalisation and cervical cerclage versus no cerclage) were associated with reduced lengths of stay in hospital antenatally: weighted mean difference (WMD) respectively -18.50 days (95% confidence interval (CI) -26.83 to -10.17), -4.80 days (95% CI -6.37 to -3.23). Otherwise, there was little evidence of any clear advantage or disadvantage to a policy of home versus hospital care. The one woman who had a haemorrhage severe enough to require immediate transfusion and delivery was in the home care group. Cervical cerclage may reduce the risk of delivery before 34 weeks: relative risk (RR) 0.45 (95% CI 0.23 to 0.87), or the birth of a baby weighing less than two kilograms RR 0.34 (0.14 to 0.83) or having a low five minute Apgar score RR 0.19 (0.04 to 1.00). In general, these possible benefits were more evident in the trial of lower methodological quality.

Authors' conclusions

There are insufficient data from trials to recommend any change in clinical practice. Available data should, however, encourage further work to address the safety of more conservative policies of hospitalisation for women with suspected placenta praevia, and the possible value of insertion of a cervical suture.

[Note: The six citations in the awaiting classification section of the review may alter the conclusions of the review once assessed.]

PLAIN LANGUAGE SUMMARY

Interventions for suspected placenta praevia

There is little evidence about the best care for placenta praevia, although putting a stitch in the cervix during pregnancy may reduce associated preterm birth.

Placenta praevia is when the placenta (afterbirth) lies across the bottom of the womb. This means that it is lying either totally across the cervix (opening of the womb) or partially so. Placenta praevia can cause life-threatening blood loss. There are different ways of diagnosing placenta praevia, and various options for care around birth. However, there are only trials of cervical cerclage ('tying' the cervix), and the effects of hospitalisation. The review found that cervical cerclage may reduce very premature births, although the evidence was not strong. There is little evidence of advantages or disadvantages to hospitalisation.

BACKGROUND

The major, although not the most common, causes of antepartum haemorrhage are placenta praevia and placental abruption (premature separation). Placenta praevia is a placenta that is implanted entirely or partly in the lower uterine segment. Haemorrhage is especially likely to occur during third trimester with development of the lower uterine segment, and when uterine contractions dilate the cervix, thereby applying shearing forces to the placental attachment to the lower segment, or when separation is provoked by vaginal examination. Placenta praevia may be sub-classified as 'major' (implanted across the cervix) or 'minor' (not implanted across the cervix). Placentas that appear to be praevia but of minor degree may 'rise', as the lower segment develops, to become normally sited.

Maternal deaths from haemorrhage are now uncommon in the industrialised world. The latest Confidential Enquiry into Maternal Deaths in the UK reports three maternal deaths associated with placenta praevia between 1997 and 1999 (Lewis 2001). However, when Macafee (Macafee 1945) began his pioneering work in Belfast on the management of placenta praevia, the maternal mortality associated with this condition was as high as 5%. In developing countries today, widespread pre-existing anaemia, difficulties with transport, and restricted medical facilities ensure that placenta praevia continues to be responsible for many maternal deaths (Harrison 1985).

Fetal loss is less commonly associated with placenta praevia than with placental abruption (Neilson 1994) but both conditions can be associated with perinatal mortality and morbidity. Up to a fifth of very preterm babies are born in association with antepartum haemorrhage (Hagan 1996), and the known significant association of antepartum haemorrhage with cerebral palsy can be explained by the common link of preterm birth (Palmer 1995).

The basic principles of immediate care of women with either type of antepartum haemorrhage include: assessment of maternal and fetal condition; prompt maternal resuscitation if this is required; and consideration of early delivery if there is evidence of fetal distress and if the baby is of sufficient maturity to be potentially capable of survival. Anti D immunoglobulin should be given to all unsensitised Rhesus negative women (Crowther 2002); varying doses are given (Howard 1997).

The two classical presentations of placenta praevia are as antepartum haemorrhage or as fetal malpresentation in late pregnancy. To these must now be added another important presentation - the diagnosis of asymptomatic placenta praevia by routine ultrasound examination. Diagnosis of placenta praevia was an early achievement in the pioneering studies of ultrasound (Donald 1967). For conventional transabdominal ultrasound examination, it is customary to ask the woman to fill her bladder to optimize imaging of her cervix and lower uterine segment. It is easier to delineate the site of anterior placentas than those with posterior attachments for two reasons. First, acoustic shadowing from the fetal presenting part may obscure portions of a posterior placenta. Second, although the utero-vesical angle (the angle between the womb and the bladder) is used for reference anteriorly, a placenta with its lower edge below this being classified as praevia (or low), no such convenient anatomical marker for identifying the upper limit of the lower segment exists posteriorly. The ultrasonographer has to use an arbitrary point on the display screen. An alternative approach, in the light of these practical difficulties, is to measure the distance between the lower edge of the placenta and the internal cervical os. Some would regard a distance of five centimetres or more as excluding placental praevia. Here again, there are some difficulties. The appearances of the cervix may be affected by the amount of urine in the mother's bladder and identification of the precise position of the internal os may therefore be uncertain. Also, as is quite obvious to any obstetrician with experience of performing caesarean section at different stages of pregnancy, the extent of the lower segment is extremely variable rather than constant at five centimetres.

Another source of diagnostic and management difficulty is the now well-recognised phenomenon of the 'rising' placenta. Although around 5% of women have ultrasound evidence of a low placenta at 16 to 18 weeks, only 10% of this 5% (i.e. 0.5% overall) actually have a placenta praevia at delivery. The apparent change of placental position results from formation of the lower uterine segment. It has been suggested that transvaginal ultrasonography is more instructive than conventional transabdominal examination in cases of suspected placenta praevia (Tan 1995). There are a number of potential theoretical advantages to the use of transvaginal ultrasound in this situation because imaging is better and the woman does not need a full bladder, thus avoiding both maternal discomfort and also distortion of the anatomy of the lower uterine segment and cervix. On the other hand, insertion of an ultrasound probe into the vagina of a woman with possible placenta praevia could provoke bleeding. Advocates of transvaginal ultrasound argue that the probe should be inserted no more than three centimetres into the vagina and should not therefore come into contact with the cervix or lower segment, and that the improved images outweigh the theoretical disadvantages of provoking bleeding.

Other imaging techniques which have been used in the past to locate the placenta have fallen by the wayside. They include radio-isotope imaging and arteriography. Ultrasound has today only one technique which in any sense can be seen as a competitor - magnetic resonance imaging (MRI). The equipment required is extremely expensive and it seems at present unlikely, on economic grounds alone, that this technique will play a major role in practical placentography, although the quality of placental imaging that is possible is impressive (Powell 1986).

Although ultrasound imaging has added to the practical diagnosis of placenta praevia, there remain situations in which the final diagnosis is confirmed, or excluded, by vaginal examination in the operating theatre. This may be required if the necessary ultrasound equipment or expertise is not available (including under-resourced settings), or if the woman is actively bleeding to a degree that delay in arranging or performing ultrasonography would be dangerous. In addition, there is a 'grey area' of ultrasonography in which it can be difficult to establish whether there is a minor degree of placenta praevia or a normally sited placenta. Also, ultrasonographers can make mistakes. Certain circumstances encourage these, such as the presence of an accessory lobe in the lower segment while the main bulk of the placenta can be clearly seen to be in the upper uterine segment.

Whether or not the woman is anaesthetised at the time of the examination in the operating theatre is usually a matter for individual clinical judgement depending on the perceived

likelihood of actually encountering a placenta praevia. General anaesthesia allows a more thorough examination of the lower uterine segment but carries a small but real risk to the mother.

The traditional policy of care of women with symptomatic placenta praevia required adherence to several principles: from the time of diagnosis, the woman was advised to remain in hospital; blood was to be constantly available for immediate transfusion; facilities were to be available for immediate caesarean section; anaemia was to be identified and corrected, if necessary by repeated blood transfusion, because of the likelihood of further haemorrhage; delivery (by caesarean section) was planned for 38 weeks unless indicated by further haemorrhage before that time.

Facets of this regimen deserve scrutiny, either because the value of specific interventions has been questioned or because innovations have been suggested.

The well established principle of a need for universal hospitalisation of women with symptomatic placenta praevia has been questioned (Love 1996).

With current anxieties about the risk of viral infection after blood transfusion, the use of autologous blood donation (i.e. by the woman herself) can be considered when the safety of donor blood supply is uncertain (Dinsmoor 1995).

Because it is thought that bleeding occurs mainly as a result of placental detachment from a lengthening lower uterine segment and dilating cervix, cervical cerclage has been advocated (Arias 1988) although insertion of a suture could presumably provoke bleeding even if this intervention were shown to confer other benefits. Similarly, tocolytic drugs, such as ritodrine, could theoretically lessen the likelihood of bleeding by inhibiting uterine contractions and their effect on the lower segment (Besinger 1995). However, their actions on maternal cardiovascular function may be positively unhelpful - the frequently associated tachycardia can make it difficult to assess maternal condition after further bleeding, and the maternal cardiovascular response to acute hypovolaemia may be impaired.

The standard recommendation used to be that once the pregnancy had advanced to 38 weeks, or if the first haemorrhage occurred at that time, delivery should be effected. With enhanced gestational dating as a result of routine early ultrasonography (Neilson 2002), there might be merit in earlier planned delivery to diminish the risk of major haemorrhage. On the other hand, a greater gestational age may minimise the risk of failure to observe a 'rising placenta', and may be better for the baby.

If anything, greater dilemmas exist as to what advice to offer about hospitalisation to women found to have an apparent placenta praevia (on ultrasound examination) but who have not bled. Both the need for hospitalisation and the timing and duration of hospitalisation (if advised) deserve study given the domestic disruption and economic consequences of this policy.

Once a decision to perform caesarean section has been made, questions arise about anaesthesia and surgical technique. It used to be said that epidural and spinal anaesthesia were contraindicated, and that general anaesthesia was mandatory at caesarean section for placenta praevia. Certainly, haemorrhage is encountered more commonly than at caesarean section for other indications and the sympathetic block induced by these forms of regional anaesthesia could inhibit the maternal response to acute blood loss. This theoretical disadvantage has to be weighed against the benefits of regional anaesthesia (Bonner 1995).

Caesarean section for placenta praevia can be difficult and at times extremely difficult. The most commonly encountered difficulty is haemorrhage; the worst scenario may be the discovery of placenta praevia accreta, with invasion of the placenta into the myometrium and consequent difficulties in removing the placenta. Caesarean section is usually performed through a transverse skin incision and through the lower segment of the uterus but if there is an anterior placenta praevia, the vessels may be fearsome and the placenta will be met underneath the uterine incision. The baby may be delivered by the obstetrician passing a hand round the margins of the placenta, or by incising the placenta. Careful ultrasound mapping of the placental site prior to operation may help the surgeon to know in which direction the nearest edge of a placenta-overlying uterine incision, will be located. It may be easier for the obstetrician to bring down one of the baby's feet and perform breech extraction than to try to deliver a very high head past the placenta which occupies the uterine wound. Some recommend immediate cord clamping to prevent fetal exsanguitation if the placenta is cut.

OBJECTIVES

To assess the impact of clinical interventions during pregnancies with suspected placenta praevia.

METHODS

Criteria for considering studies for this review

Types of studies

Any controlled clinical trial that has assessed the impact of a clinical intervention in women diagnosed as having, or being likely to have, placenta praevia. Because of an anticipated paucity of reports before starting the review, it was decided to consider, for inclusion, 'quasi-randomised' as well as randomised trials.

Types of participants

Pregnant women having been diagnosed as having either probable or definite placenta praevia, or those suspected of having this condition.

Types of interventions

Any clinical intervention applied specifically because of a perceived likelihood that a pregnant women might have placenta praevia. Such interventions could be diagnostic techniques e.g. aimed at improving the diagnosis of placenta praevia, or therapeutic interventions designed to improve maternal or fetal outcome, or forms of care aimed at minimising unnecessary social disruption or health costs. The following comparisons would be appropriate for inclusion:

1. Transvaginal versus transabdominal ultrasound for diagnosis of placenta praevia.
2. Magnetic resonance imaging versus ultrasound for diagnosis of placenta praevia.
3. Routine versus selective vaginal examination in theatre.

4. General anaesthesia versus no anaesthesia for 'examination in theatre'.
5. Blood donation by women with diagnosed placenta praevia for autologous transfusion versus reliance on conventional stocks of donated blood.
6. Comparisons of differing doses of anti D immunoglobulin for women with haemorrhage from placenta praevia.
7. Differing policies to prevent anaemia in women with placenta praevia.
8. Hospitalisation of women with symptomatic placenta praevia versus out-patient care.
9. Hospitalisation of women with asymptomatic placenta praevia versus out-patient care.
10. Comparisons of different gestational age criteria for admission to hospital of women with asymptomatic placenta praevia versus out-patient care.
11. Cervical cerclage versus no cervical cerclage.
12. Tocolytic drugs versus no tocolytic drugs.
13. Comparison of differing gestational age criteria for planned caesarean section.
14. Amniocentesis to assess fetal lung maturation versus no amniocentesis prior to planned caesarean section.
15. General anaesthesia versus regional anaesthesia for women undergoing caesarean section.
16. Alternative surgical techniques at caesarean section, including skin incision, uterine incision, ligation of lower uterine segment vessels before uterine incision (Drife 2001), methods of delivering the baby, facilitating placental delivery, and minimising fetal and maternal haemorrhage.

Types of outcome measures

Indices of maternal outcome (death, haemorrhage, severe haemorrhage, shock, anaemia), indices of fetal outcome (perinatal death, stillbirth, neonatal death, respiratory distress syndrome, intraventricular haemorrhage, necrotising enterocolitis, neonatal convulsions, anaemia), rates of medical intervention (length of hospitalisation before delivery, need for blood transfusion (pre- and post- delivery), caesarean section (planned and emergency), caesarean hysterectomy, gestational age at delivery, length of stay in neonatal intensive care unit, days of ventilation (baby), women's feelings/satisfaction, and economic consequences.

Search methods for identification of studies

Electronic searches

The Cochrane Pregnancy and Childbirth Group's Trials Register was searched by the Trials Search Co-ordinator (August 2002). We updated this search on 1 October 2009 and added the results to Studies awaiting classification.

The Cochrane Pregnancy and Childbirth Group's Trials Register is maintained by the Trials Search Co-ordinator and contains trials identified from:

1. quarterly searches of the Cochrane Central Register of Controlled Trials (CENTRAL);
2. weekly searches of MEDLINE;
3. handsearches of 30 journals and the proceedings of major conferences;
4. weekly current awareness alerts for a further 44 journals plus monthly BioMed Central email alerts.

Details of the search strategies for CENTRAL and MEDLINE, the list of handsearched journals and conference proceedings, and the list of journals reviewed via the current awareness service can be found in the 'Specialized Register' section within the editorial information about the Cochrane Pregnancy and Childbirth Group.

Trials identified through the searching activities described above are each assigned to a review topic (or topics). The Trials Search Co-ordinator searches the register for each review using the topic list rather than keywords.

In addition, the Cochrane Controlled Trials Register (*The Cochrane Library* 2002 Issue 2) was searched for relevant material, using the search terms 'praevia OR previa'.

We did not apply any language restrictions.

Data collection and analysis

Reports of identified trials that appeared relevant to the objectives of the review were evaluated for inclusion. Both published and unpublished reports could be included. Non-English language reports were translated if identified. Primary authors were contacted for additional details when necessary. Reasons for excluding apparently relevant trials are made explicit.

Included trials were assessed according to the following criteria:

1. adequate concealment of treatment allocation (e.g. sealed, opaque, numbered envelopes);
2. method of allocation to treatment (e.g. by computer randomisation, random number tables);
3. adequate documentation of how exclusions were handled after treatment allocation - to facilitate 'intention to treat' analyses;
4. adequate blinding of outcome assessment, where appropriate;
5. losses to follow up (trials with losses of greater than 25% were excluded).

Data were entered directly from reports into Review Manager software (RevMan 2000) and statistical analysis performed. For dichotomous data, relative risks (RRs) and 95% confidence intervals (CIs) were calculated. Weighted mean differences (WMDs) and 95% CIs were calculated for continuous data (Clarke 2000).

Heterogeneity between trials was tested using a standard chi squared test if appropriate. In the presence of significant heterogeneity, a sensitivity analysis would be used to explore the influence of high quality trials (fulfilling the criteria above) compared to those of lesser quality.

Trials under consideration were evaluated for methodological quality and appropriateness for inclusion without consideration of their results.

RESULTS

Description of studies

The details of the three eligible trials are described in the Table of Included Studies. (Five reports from an updated search in October 2009 have been added to Studies awaiting classification.)

Risk of bias in included studies

The St Louis 1988 study used the women's year of birth to allocate participants, thus running the risk of selection bias. Analysis was not by 'intention to treat' and one woman who declined cervical cerclage was included, for analyses, in the control group.

The Los Angeles 1996 and Cali 1998 trials employed robust methods of allocation concealment, and 'intention to treat' analyses.

Effects of interventions

Three trials were included, involving a total of 114 women - two of cervical cerclage; the other of home versus hospital care. Both interventions (home versus hospitalisation and cervical cerclage versus no cerclage) were associated with reduced lengths of stay in hospital antenatally: weighted mean difference (WMD) respectively -18.50 days (95% CI -26.83 to -10.17), -4.80 days (95% CI -6.37 to -3.23). Otherwise, there was little evidence of any clear advantage or disadvantage to a policy of home versus hospital care. The one woman who had a haemorrhage severe enough to require immediate transfusion and delivery was in the home care group.

Cervical cerclage may reduce the risk of delivery before 34 weeks with a relative risk (RR) 0.45 (95% CI 0.23 to 0.87), or the birth of a baby weighing less than two kilograms RR 0.34 (0.14 to 0.83) or having a low five-minute Apgar score RR 0.19 (0.04 to 1.00). In general, these possible benefits were more evident in the trial of lower methodological quality.

DISCUSSION

Life threatening haemorrhage from placenta praevia is uncommon in industrialised countries (Lewis 2001) but the manifestly serious nature of this complication means that large trials would be required to demonstrate that novel policies or treatments are safe.

AUTHORS' CONCLUSIONS

Implications for practice

There are only three trials included in this review, generating insufficiently extensive data to recommend any change in practice.

Implications for research

It is surprising that so few trials have addressed aspects of care of this important obstetric complication. The scarce data that are available from clinical trials should encourage further work. In particular, the safety (or risks) of less interventionist policies of hospitalisation for women with suspected placenta praevia deserves attention. The question of whether insertion of a cervical suture helps prolong pregnancies complicated by placenta praevia also deserves further investigation. Such studies should be sufficiently well powered to address substantive indices of fetal outcome.

[Note: The six citations in the awaiting classification section of the review may alter the conclusions of the review once assessed.]

ACKNOWLEDGEMENTS

None.

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CHARACTERISTICS OF STUDIES

Characteristics of included studies *[ordered by study ID]*

Cali 1998

Methods	Randomised by opaque, sealed, numbered envelopes.
Participants	Pregnant women with diagnosis of placenta praevia. Inclusion criteria: ultrasound diagnosis of placenta praevia; single fetus; gestational age 24-30 weeks. Exclusion criteria: fetal distress; ruptured membranes; pre-eclampsia; other complications. Of 145 consecutively admitted to hospital October 1990 to March 1995, 39 fulfilled entry criteria and were enrolled - 37 had had an antepartum haemorrhage; 2 were asymptomatic. Three women were lost to follow up, leaving data for 36.
Interventions	Experimental group: cervical cerclage by braided polyester band - McDonald technique, under general or epidural anaesthesia; control group: vaginal examination only. Women in both groups had betamethasone and terbutaline.

Cali 1998 *(Continued)*

Outcomes	Primary: pregnancies reaching 34 weeks. Secondary: gestational age at delivery; bleeding; blood transfusion; birthweight; hospitalisation for mother and baby; hospital costs.
Notes	

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Low risk	A - Adequate

Los Angeles 1996

Methods	Randomisation by opening consecutively numbered, sealed, opaque envelopes.
Participants	Women with ultrasound diagnosis of placenta praevia (major or minor) after antepartum haemorrhage. Inclusion criteria: singleton pregnancy; gestation 24 to 36 weeks; intact membranes; normal fetal anatomy; reactive cardiotocography. Exclusion criteria: haemodynamic instability; other cause of bleeding; 3 or more episodes of bleeding; other obstetric complications; serious maternal medical disorders; lack of telephone at home; lack of immediate transport from home.
Interventions	It was planned that women in the outpatient care allocation group [N = 26] would be discharged home after around 72 hours; that they would have weekly ultrasound scans; that they would be re-admitted to hospital (and subsequently discharged) if they had a second bleed; that they would remain hospitalized if they had a third bleed. Seven women allocated to outpatient care were not discharged: 4 had complications that precluded discharge; 2 refused to go home; 1 had domestic circumstances that pre-empted home care. Analysis was by 'intention to treat'. Women allocated to inpatient care [N = 27] were advised to remain in bed except for use of bathroom. Seven of these women discharged themselves against medical advice. Women in both groups received weekly corticosteroids until 32 weeks and underwent amniocentesis for assessment of fetal lung maturation at 36 weeks with caesarean section thereafter unless the placenta had risen.
Outcomes	Maternal outcomes: days in hospital, episodes bleeding, transfusions, method of delivery; neonatal outcomes: gestational age, birthweight, intensive care, morbidity.
Notes	

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Low risk	A - Adequate

St Louis 1988

Methods	Allocation to treatment policy based on whether year of birth ended in odd or even digit.
Participants	25 pregnant women admitted to hospital with antepartum haemorrhage between 24 and 30 weeks, and found to have apparent placenta praevia [major (20) or minor (5)] on ultrasound examination.
Interventions	The experimental group [13] underwent cervical cerclage (McDonald procedure using 5mm Mersilene band) once the bleeding had settled with prophylactic tocolytic cover (indomethacin rectal suppository followed by oral dose for 48 hours), and planned discharge home 48 hours after cerclage, on oral

St Louis 1988 *(Continued)*

	terbutaline. Women in the control group [12] remained in hospital until delivery; they were treated with oral terbutaline to try to prevent uterine contractions, and were given a course of corticosteroids to accelerate fetal lung maturation once they reached 28 weeks.
Outcomes	Gestational age and infant weight at delivery; need for blood transfusion; caesarean hysterectomy rates; financial costs.
Notes	Although the intervention of greatest interest in this study is cervical cerclage, this was part of a package of care that differed from that offered to women in the control group in other respects (notably in outpatient versus inpatient care).

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	High risk	C - Inadequate

Characteristics of excluded studies *[ordered by study ID]*

Study	Reason for exclusion
Foshan 1998	Randomised trial of ritodrine versus magnesium sulphate for placenta praevia. Outcome data on mean prolongation of pregnancy and mean birthweight only; data presented without standard deviations.
Los Angeles 1991	No clinical outcome measures or details about any other pre-specified outcome.
Tulsa 1984	Retrospective study comparing two groups of women with diagnoses of placenta praevia. The broad strategies of care differed between the groups but these were determined by the inclinations of the attending physicians and not by any formal experimental design.

DATA AND ANALYSES

Comparison 1. Home versus hospital care for symptomatic placenta praevia

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Episodes of bleeding	1	53	Mean Difference (IV, Fixed, 95% CI)	-0.40 [-1.40, 0.60]
2 Blood transfusion	1	53	Risk Ratio (M-H, Fixed, 95% CI)	0.26 [0.03, 2.17]
3 Caesarean section for recurrent bleeding	1	53	Risk Ratio (M-H, Fixed, 95% CI)	1.42 [0.81, 2.48]
4 Severe haemorrhage requiring immediate transfusion and delivery	1	53	Risk Ratio (M-H, Fixed, 95% CI)	3.11 [0.13, 73.09]

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
5 Caesarean hysterectomy	1	53	Risk Ratio (M-H, Fixed, 95% CI)	1.38 [0.34, 5.60]
6 Gestational age at delivery (weeks)	1	53	Mean Difference (IV, Fixed, 95% CI)	0.10 [-1.17, 1.37]
7 Trial entry to delivery (days)	1	53	Mean Difference (IV, Fixed, 95% CI)	-5.0 [-17.41, 7.41]
8 Antenatal stay in hospital (days)	1	53	Mean Difference (IV, Fixed, 95% CI)	-18.5 [-26.82, -10.18]
9 Birthweight (g)	1	53	Mean Difference (IV, Fixed, 95% CI)	194.0 [-137.26, 525.26]
10 Admission to neonatal intensive care unit	1	53	Risk Ratio (M-H, Fixed, 95% CI)	0.82 [0.46, 1.45]
11 Respiratory distress syndrome	1	53	Risk Ratio (M-H, Fixed, 95% CI)	1.04 [0.42, 2.55]
12 Intraventricular haemorrhage	1	53	Risk Ratio (M-H, Fixed, 95% CI)	0.15 [0.01, 2.73]
13 Confirmed neonatal sepsis	1	53	Risk Ratio (M-H, Fixed, 95% CI)	1.04 [0.07, 15.75]

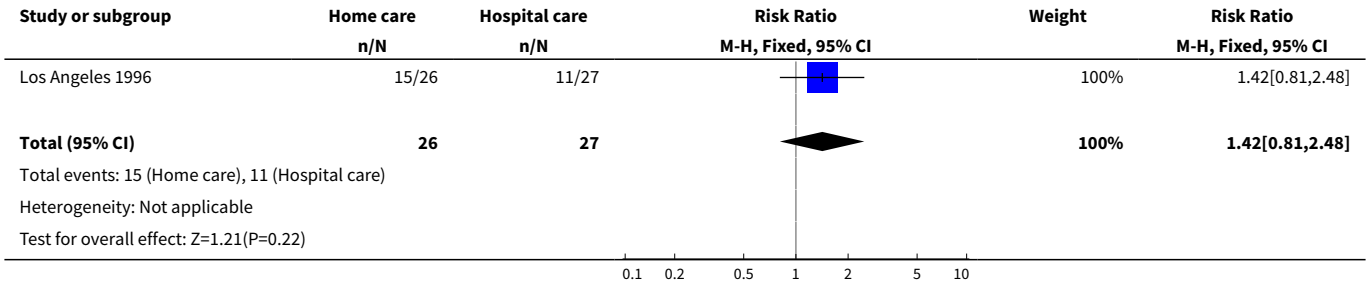
Analysis 1.1. Comparison 1 Home versus hospital care for symptomatic placenta praevia, Outcome 1 Episodes of bleeding.

Study or subgroup	Home care N	Home care Mean(SD)	Hospital care N	Hospital care Mean(SD)	Mean Difference Fixed, 95% CI	Weight	Mean Difference Fixed, 95% CI
Los Angeles 1996	26	2.3 (1.1)	27	2.7 (2.4)		100%	-0.4[-1.4,0.6]
Total ***	**26**		**27**			**100%**	**-0.4[-1.4,0.6]**
Heterogeneity: Not applicable							
Test for overall effect: Z=0.78(P=0.43)							

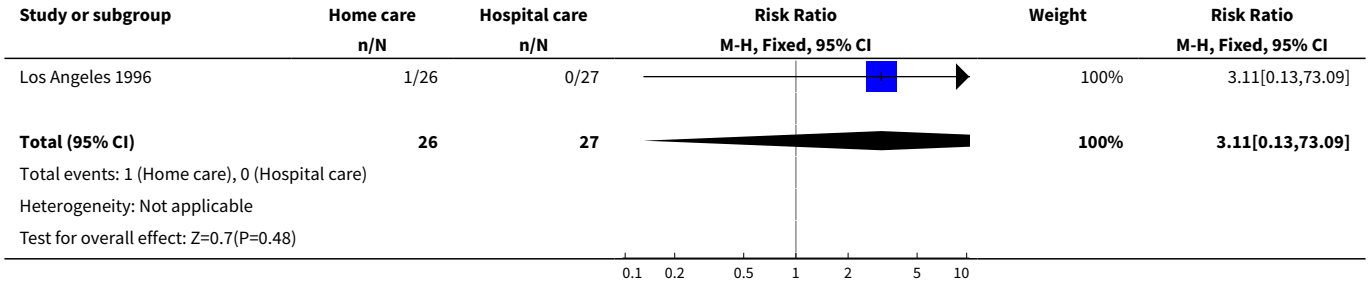
Analysis 1.2. Comparison 1 Home versus hospital care for symptomatic placenta praevia, Outcome 2 Blood transfusion.

Study or subgroup	Home care n/N	Hospital care n/N	Risk Ratio M-H, Fixed, 95% CI	Weight	Risk Ratio M-H, Fixed, 95% CI
Los Angeles 1996	1/26	4/27		100%	0.26[0.03,2.17]
Total (95% CI)	**26**	**27**		**100%**	**0.26[0.03,2.17]**
Total events: 1 (Home care), 4 (Hospital care)					
Heterogeneity: Not applicable					
Test for overall effect: Z=1.24(P=0.21)					

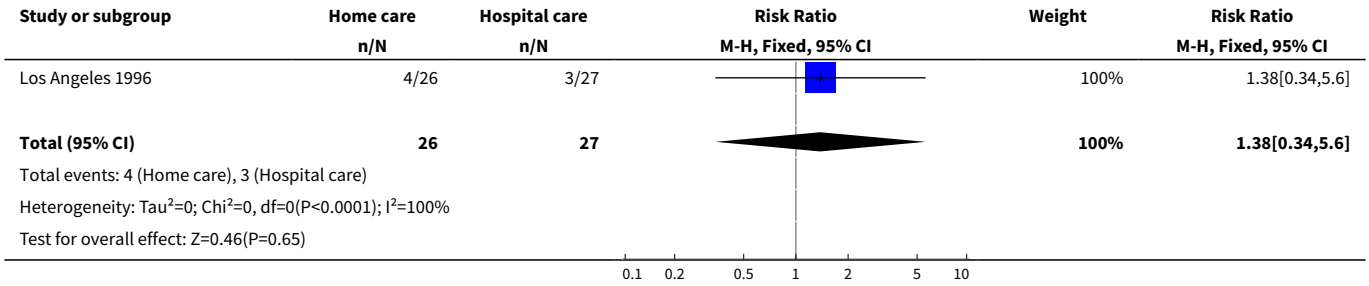
Analysis 1.3. Comparison 1 Home versus hospital care for symptomatic placenta praevia, Outcome 3 Caesarean section for recurrent bleeding.



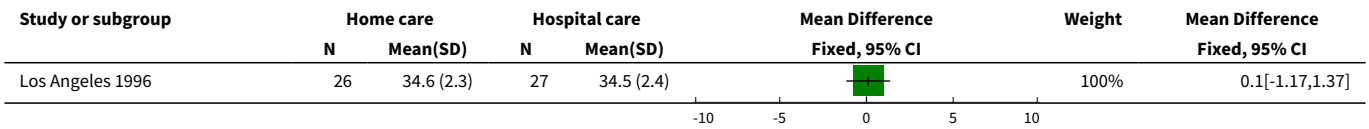
Analysis 1.4. Comparison 1 Home versus hospital care for symptomatic placenta praevia, Outcome 4 Severe haemorrhage requiring immediate transfusion and delivery.

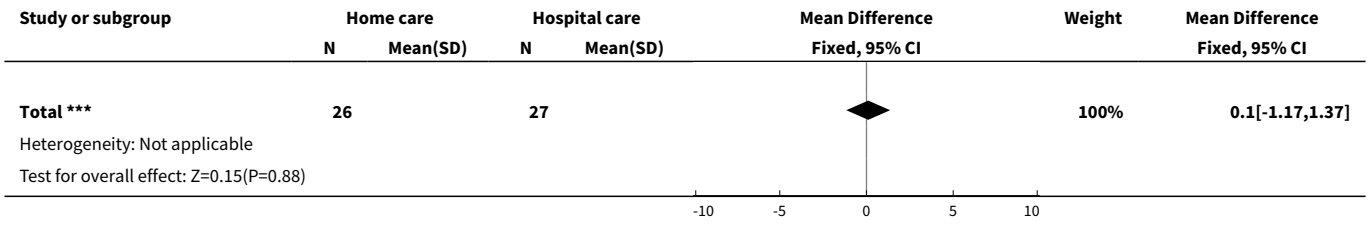


Analysis 1.5. Comparison 1 Home versus hospital care for symptomatic placenta praevia, Outcome 5 Caesarean hysterectomy.

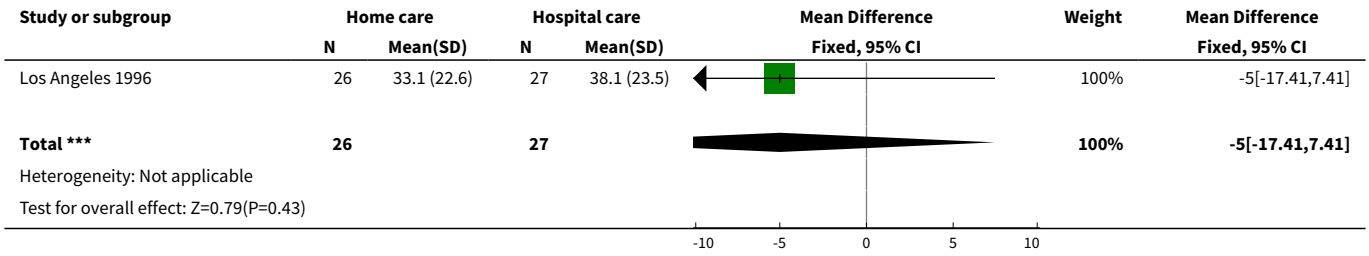


Analysis 1.6. Comparison 1 Home versus hospital care for symptomatic placenta praevia, Outcome 6 Gestational age at delivery (weeks).

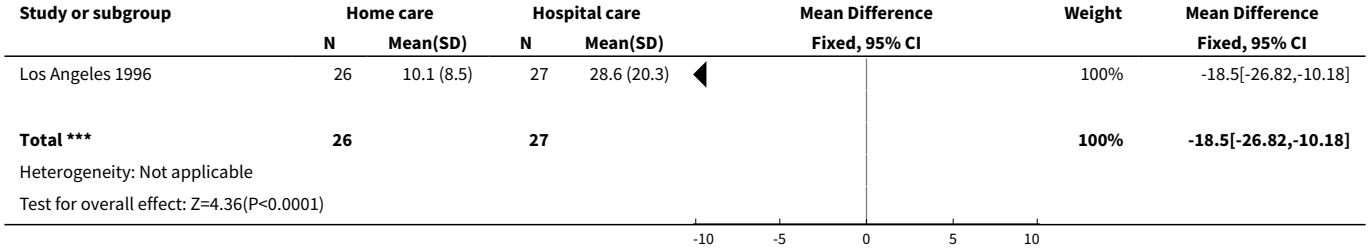




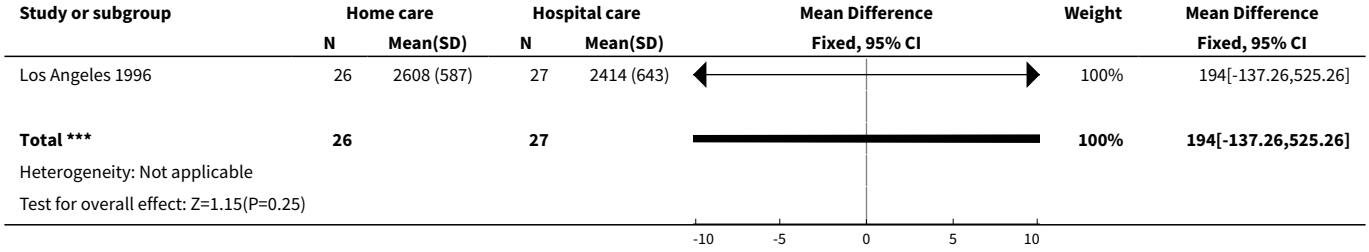
Analysis 1.7. Comparison 1 Home versus hospital care for symptomatic placenta praevia, Outcome 7 Trial entry to delivery (days).



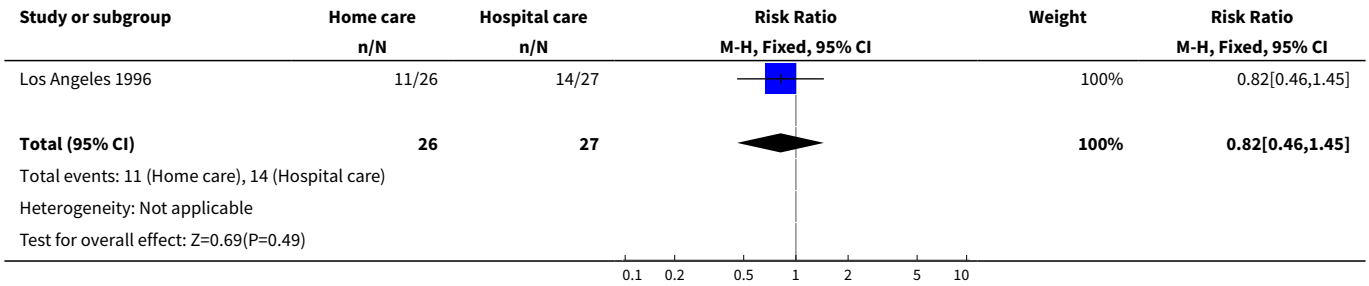
Analysis 1.8. Comparison 1 Home versus hospital care for symptomatic placenta praevia, Outcome 8 Antenatal stay in hospital (days).



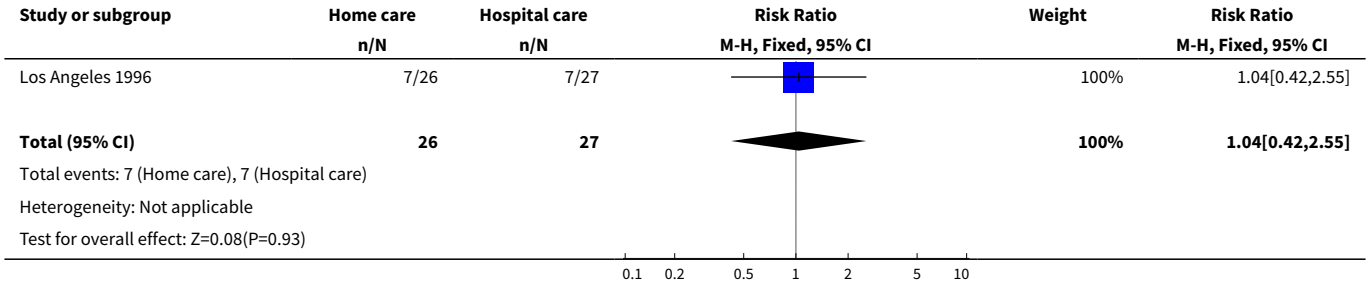
Analysis 1.9. Comparison 1 Home versus hospital care for symptomatic placenta praevia, Outcome 9 Birthweight (g).



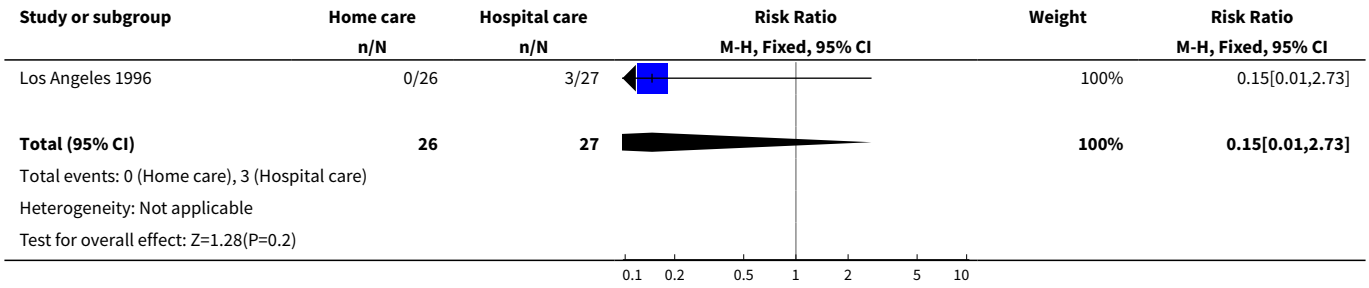
Analysis 1.10. Comparison 1 Home versus hospital care for symptomatic placenta praevia, Outcome 10 Admission to neonatal intensive care unit.



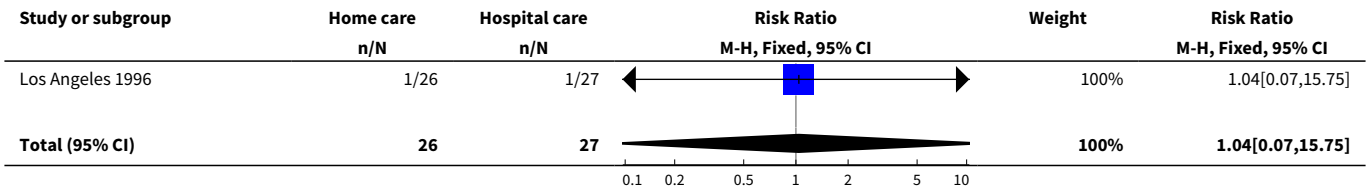
Analysis 1.11. Comparison 1 Home versus hospital care for symptomatic placenta praevia, Outcome 11 Respiratory distress syndrome.

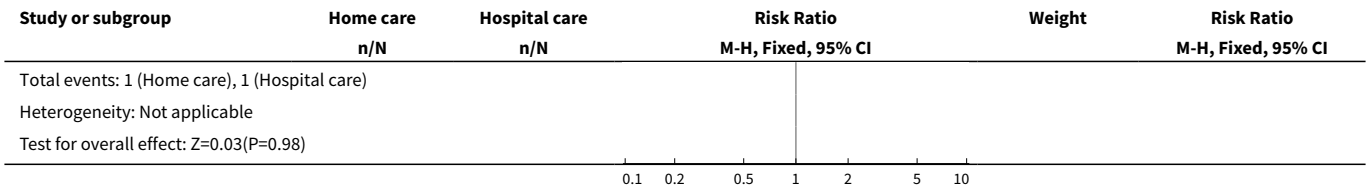


Analysis 1.12. Comparison 1 Home versus hospital care for symptomatic placenta praevia, Outcome 12 Intraventricular haemorrhage.



Analysis 1.13. Comparison 1 Home versus hospital care for symptomatic placenta praevia, Outcome 13 Confirmed neonatal sepsis.



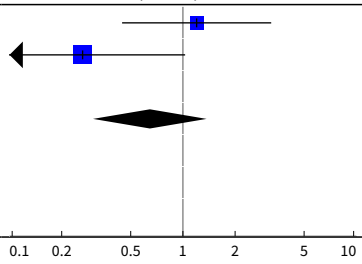


Comparison 2. Cervical cerclage versus no cervical cerclage

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Blood transfusion before delivery	2	61	Risk Ratio (M-H, Fixed, 95% CI)	0.64 [0.30, 1.37]
2 Hospitalisation for mother (days)	1	36	Mean Difference (IV, Fixed, 95% CI)	-4.80 [-6.37, -3.23]
3 Gestational age at delivery (weeks)	1	36	Mean Difference (IV, Fixed, 95% CI)	0.80 [0.37, 1.23]
4 Gestational age at delivery < or = 34 weeks	2	61	Risk Ratio (M-H, Fixed, 95% CI)	0.45 [0.23, 0.87]
5 Trial entry to delivery < or = 6 weeks	1	25	Risk Ratio (M-H, Fixed, 95% CI)	0.34 [0.15, 0.77]
6 Planned delivery	1	25	Risk Ratio (M-H, Fixed, 95% CI)	15.79 [1.01, 247.04]
7 Caesarean section	1	25	Risk Ratio (M-H, Fixed, 95% CI)	0.93 [0.75, 1.15]
8 Caesarean hysterectomy	1	25	Risk Ratio (M-H, Fixed, 95% CI)	1.15 [0.40, 3.31]
9 Blood transfusion at delivery	1	25	Risk Ratio (M-H, Fixed, 95% CI)	0.59 [0.35, 1.00]
10 Neonatal death	2	61	Risk Ratio (M-H, Fixed, 95% CI)	0.96 [0.14, 6.41]
11 Birthweight < 2 kg	2	61	Risk Ratio (M-H, Fixed, 95% CI)	0.34 [0.14, 0.83]
12 Apgar score < 6 (5 minutes)	2	61	Risk Ratio (M-H, Fixed, 95% CI)	0.19 [0.04, 1.00]
13 Respiratory distress syndrome	2	61	Risk Ratio (M-H, Fixed, 95% CI)	0.39 [0.14, 1.11]
14 Admission neonatal intensive care	1	36	Risk Ratio (M-H, Fixed, 95% CI)	0.6 [0.17, 2.14]

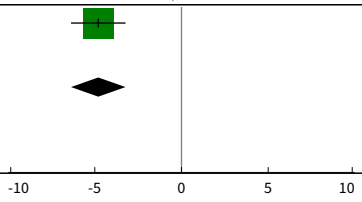
Analysis 2.1. Comparison 2 Cervical cerclage versus no cervical cerclage, Outcome 1 Blood transfusion before delivery.

Study or subgroup	Treatment n/N	Control n/N	Risk Ratio M-H, Fixed, 95% CI	Weight	Risk Ratio M-H, Fixed, 95% CI
Cali 1998	6/18	5/18		40.72%	1.2[0.45,3.23]
St Louis 1988	2/13	7/12		59.28%	0.26[0.07,1.03]
Total (95% CI)	**31**	**30**		**100%**	**0.64[0.3,1.37]**
Total events: 8 (Treatment), 12 (Control)					
Heterogeneity: Tau^2=0; Chi^2=3.17, df=1(P=0.08); I^2=68.41%					
Test for overall effect: Z=1.14(P=0.25)					



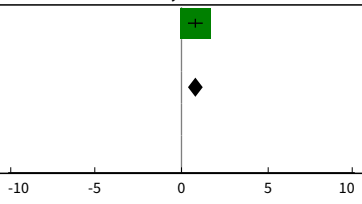
Analysis 2.2. Comparison 2 Cervical cerclage versus no cervical cerclage, Outcome 2 Hospitalisation for mother (days).

Study or subgroup	Treatment N	Treatment Mean(SD)	Control N	Control Mean(SD)	Mean Difference Fixed, 95% CI	Weight	Mean Difference Fixed, 95% CI
Cali 1998	18	10.3 (1.6)	18	15.1 (3)		100%	-4.8[-6.37,-3.23]
Total ***	**18**		**18**			**100%**	**-4.8[-6.37,-3.23]**
Heterogeneity: Not applicable							
Test for overall effect: Z=5.99(P<0.0001)							



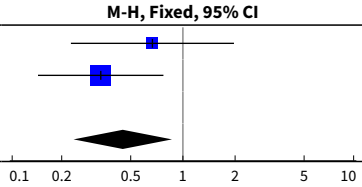
Analysis 2.3. Comparison 2 Cervical cerclage versus no cervical cerclage, Outcome 3 Gestational age at delivery (weeks).

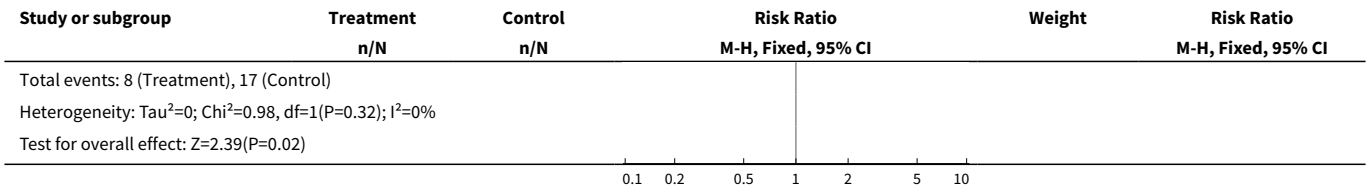
Study or subgroup	Treatment N	Treatment Mean(SD)	Control N	Control Mean(SD)	Mean Difference Fixed, 95% CI	Weight	Mean Difference Fixed, 95% CI
Cali 1998	18	35.1 (0.6)	18	34.3 (0.7)		100%	0.8[0.37,1.23]
Total ***	**18**		**18**			**100%**	**0.8[0.37,1.23]**
Heterogeneity: Not applicable							
Test for overall effect: Z=3.68(P=0)							



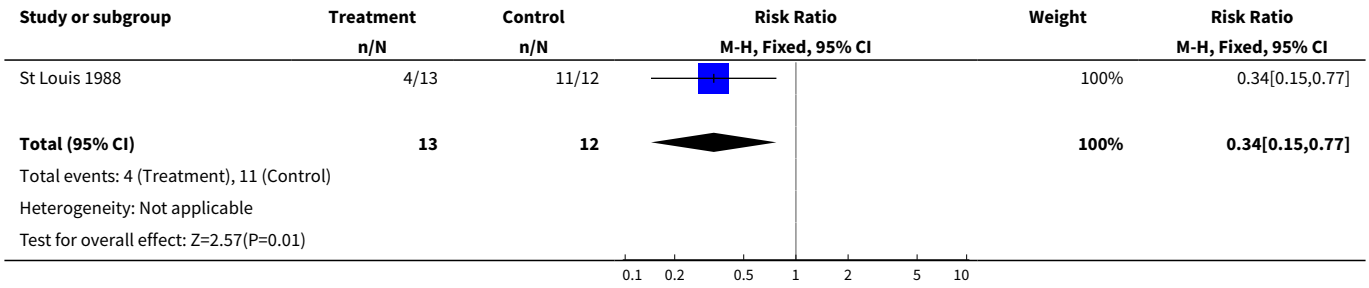
Analysis 2.4. Comparison 2 Cervical cerclage versus no cervical cerclage, Outcome 4 Gestational age at delivery < or = 34 weeks.

Study or subgroup	Treatment n/N	Control n/N	Risk Ratio M-H, Fixed, 95% CI	Weight	Risk Ratio M-H, Fixed, 95% CI
Cali 1998	4/18	6/18		34.4%	0.67[0.23,1.97]
St Louis 1988	4/13	11/12		65.6%	0.34[0.15,0.77]
Total (95% CI)	**31**	**30**		**100%**	**0.45[0.23,0.87]**

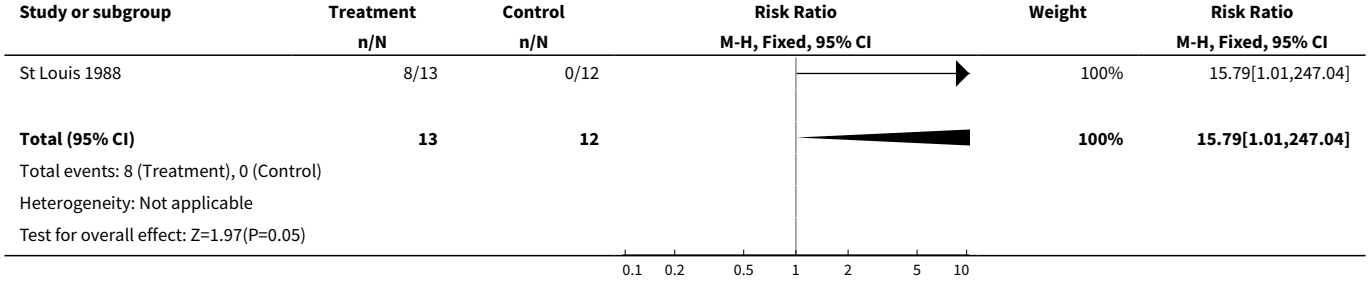




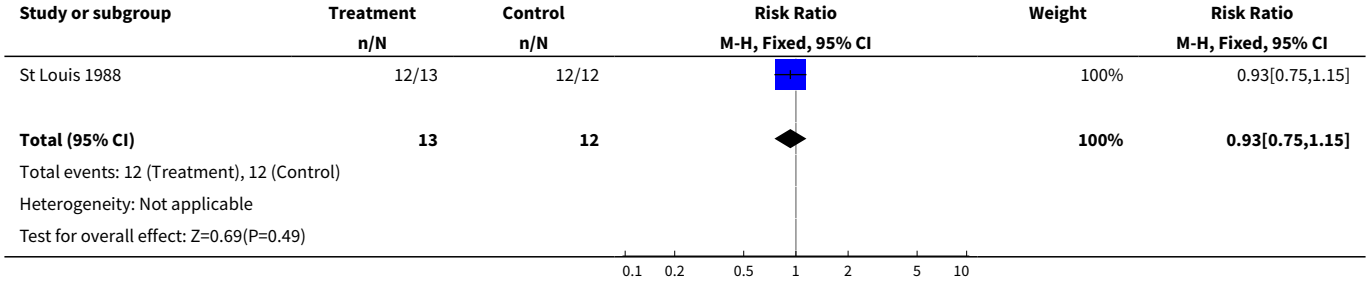
Analysis 2.5. Comparison 2 Cervical cerclage versus no cervical cerclage, Outcome 5 Trial entry to delivery < or = 6 weeks.



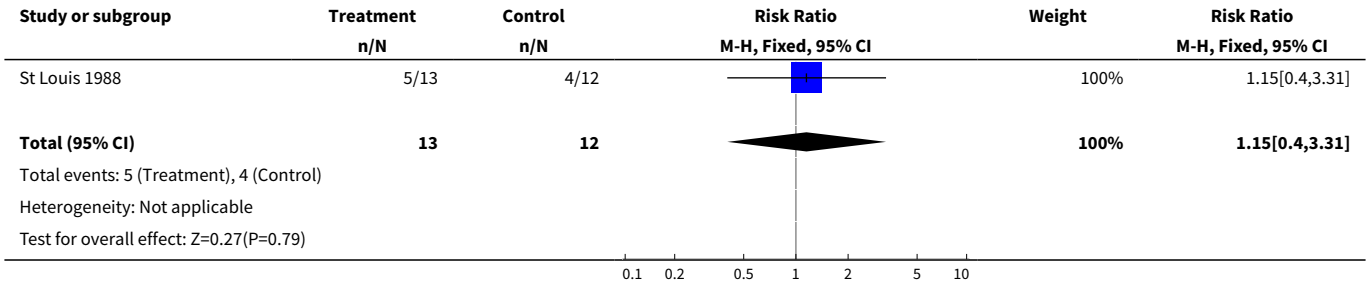
Analysis 2.6. Comparison 2 Cervical cerclage versus no cervical cerclage, Outcome 6 Planned delivery.



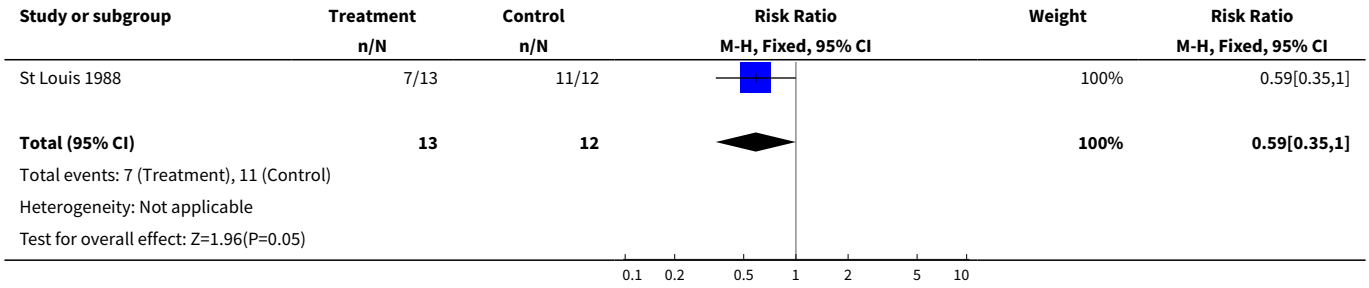
Analysis 2.7. Comparison 2 Cervical cerclage versus no cervical cerclage, Outcome 7 Caesarean section.



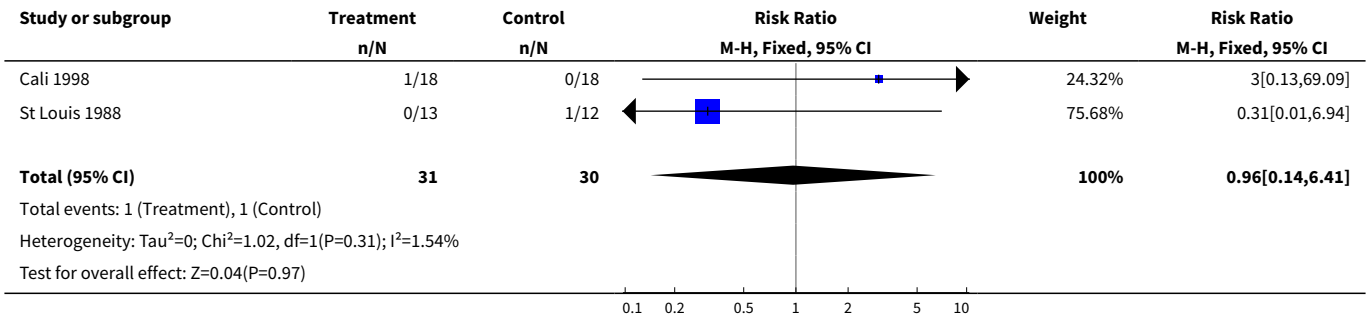
Analysis 2.8. Comparison 2 Cervical cerclage versus no cervical cerclage, Outcome 8 Caesarean hysterectomy.



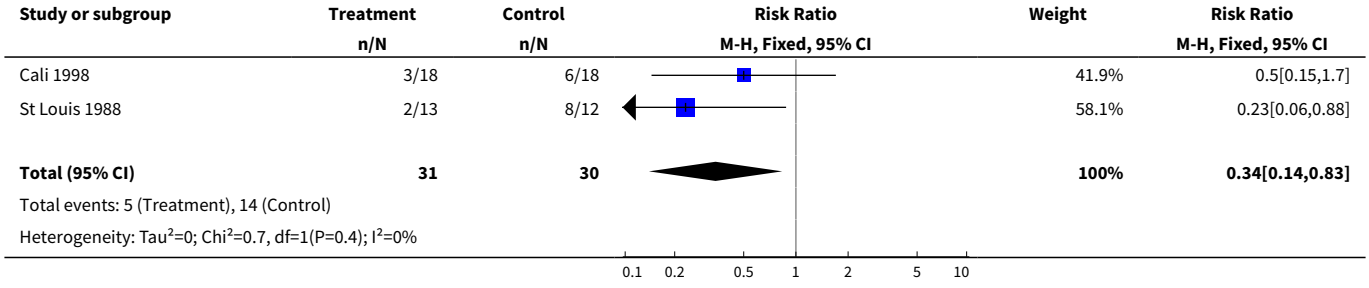
Analysis 2.9. Comparison 2 Cervical cerclage versus no cervical cerclage, Outcome 9 Blood transfusion at delivery.

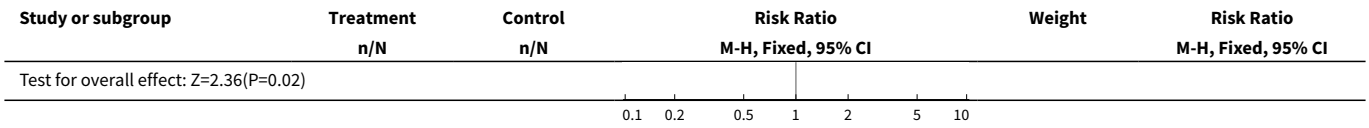


Analysis 2.10. Comparison 2 Cervical cerclage versus no cervical cerclage, Outcome 10 Neonatal death.

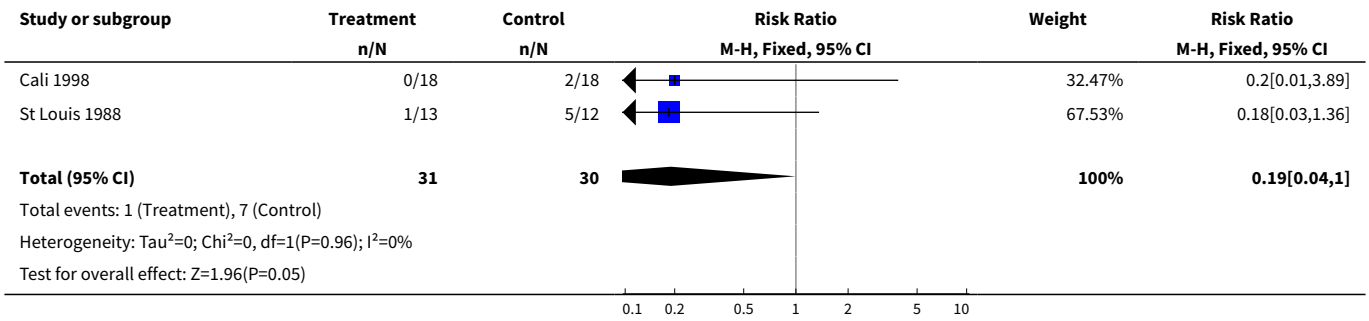


Analysis 2.11. Comparison 2 Cervical cerclage versus no cervical cerclage, Outcome 11 Birthweight < 2 kg.

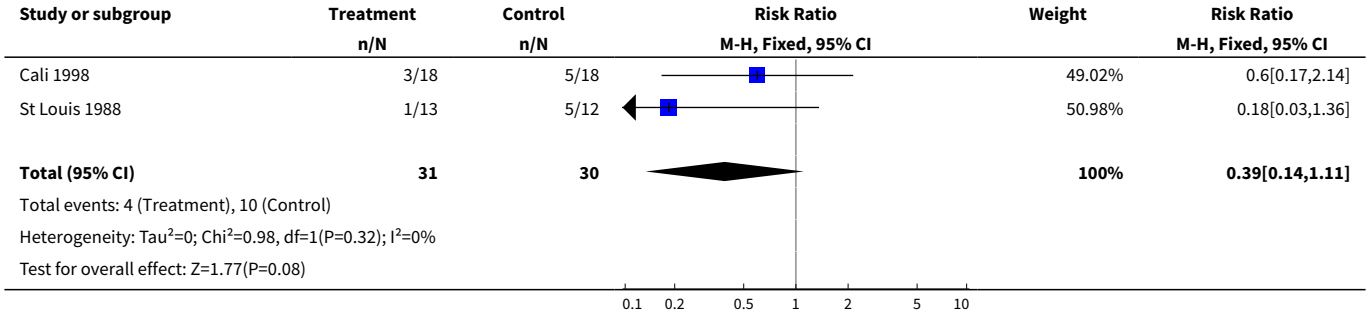




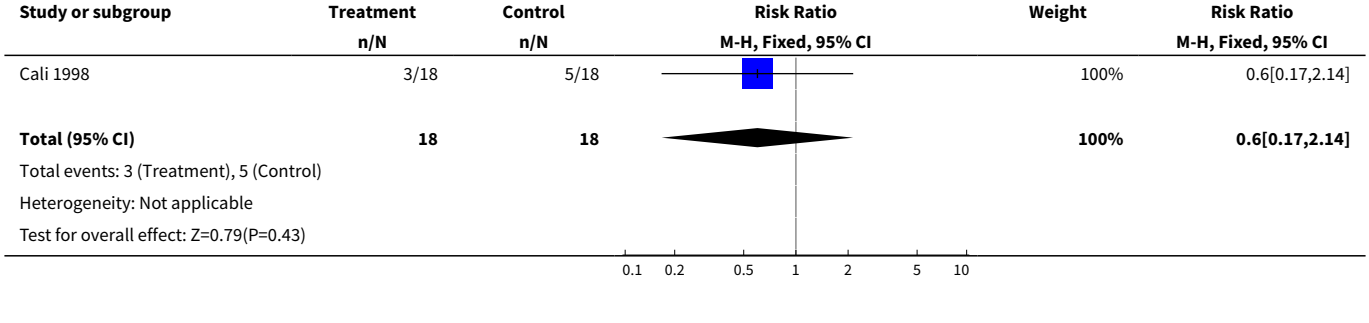
Analysis 2.12. Comparison 2 Cervical cerclage versus no cervical cerclage, Outcome 12 Apgar score < 6 (5 minutes).



Analysis 2.13. Comparison 2 Cervical cerclage versus no cervical cerclage, Outcome 13 Respiratory distress syndrome.



Analysis 2.14. Comparison 2 Cervical cerclage versus no cervical cerclage, Outcome 14 Admission neonatal intensive care.



WHAT'S NEW

Date	Event	Description
27 October 2009	Amended	Search updated. Five reports added to Studies awaiting classification (Hong 2003; Jaswal 2006; Sharma 2004; Sherman 1992; Verspyck 2008).

HISTORY

Protocol first published: Issue 1, 1998
Review first published: Issue 1, 2000

Date	Event	Description
10 August 2008	Amended	Converted to new review format.
13 August 2002	New search has been performed	New trial identified by updated search strategy but excluded from analyses. Minor changes to text. Odds ratios converted to relative risks.

CONTRIBUTIONS OF AUTHORS

JP Neilson prepared and maintains the review.

DECLARATIONS OF INTEREST

None known.

SOURCES OF SUPPORT

Internal sources

- University of Liverpool, UK.

External sources

- No sources of support supplied

INDEX TERMS

Medical Subject Headings (MeSH)

Cerclage, Cervical; Hospitalization; Placenta Previa [*therapy]; Randomized Controlled Trials as Topic

MeSH check words

Female; Humans; Pregnancy