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Cervical pessary for preventing preterm birth (Review)

Abdel-Aleem H, Shaaban OM, Abdel-Aleem MA

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[Intervention Review]

Cervical pessary for preventing preterm birth

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ABSTRACT

Background

Preterm birth is a major health problem and contributes to more than 50% of the overall perinatal mortality. Preterm birth has multiple risk factors including cervical incompetence and multiple pregnancy. Different management strategies have been tried to prevent preterm birth, including cervical cerclage. Cervical cerclage is an invasive technique that needs anaesthesia and may be associated with complications. Moreover, there is still controversy regarding the efficacy and the group of patients that could benefit from this operation. Cervical pessary has been tried as a simple, non-invasive alternative that might replace the above invasive cervical stitch operation to prevent preterm birth.

Objectives

To evaluate the efficacy of cervical pessary for the prevention of preterm birth in women with risk factors for cervical incompetence.

Search methods

We searched the Cochrane Pregnancy and Childbirth Group's Trials Register (1 September 2012), Current Controlled Trials and the Australian New Zealand Clinical Trials Registry (1 September 2012).

Selection criteria

We selected all published and unpublished randomised clinical trials comparing the use of cervical pessary with cervical cerclage or expectant management for prevention of preterm birth. We did not include quasi-randomised trials. Cluster-randomised or cross-over trials were not eligible for inclusion.

Data collection and analysis

Two review authors independently assessed trials for inclusion.

Main results

The review included one randomised controlled trial. The study included 385 pregnant women with a short cervix of 25 mm or less who were between 18 to 22 weeks of pregnancy. The use of cervical pessary (192 women) was associated with a statistically significantly decrease in the incidence of spontaneous preterm birth less than 37 weeks' gestation compared with expectant management (22% versus 59 %; respectively, risk ratio (RR) 0.36, 95% confidence interval (CI) 0.27 to 0.49). Spontaneous preterm birth before 34 weeks was statistically significantly reduced in the pessary group (6% and 27% respectively, RR 0.24; 95% CI 0.13 to 0.43). Mean gestational age at delivery was 37.7 $\pm$ 2 weeks in the pessary group and 34.9 $\pm$ 4 weeks in the expectant group. Women in the pessary group used less tocolytics (RR 0.63; 95% CI 0.50 to 0.81) and corticosteroids (RR 0.66; 95% CI 0.54 to 0.81) than the expectant group. Vaginal discharge was more common in the pessary group (RR 2.18; 95% CI 1.87 to 2.54). Among the pessary group, 27 women needed pessary repositioning without removal and there

was one case of pessary removal. Ninety-five per cent of women in the pessary group would recommend this intervention to other people. Neonatal paediatric care admission was reduced in the pessary group in comparison to the expectant group (RR 0.17; 95% CI 0.07 to 0.42).

Authors' conclusions

The review included only one well-designed randomised clinical trial that showed beneficial effect of cervical pessary in reducing preterm birth in women with a short cervix. There is a need for more trials in different settings (developed and developing countries), and with different risk factors including multiple pregnancy.

PLAIN LANGUAGE SUMMARY

Using a cervical pessary to prevent preterm birth

Giving birth before term contributes to more than half of the deaths of newborn babies. Weakness of the cervix (the neck of the womb) and multiple pregnancy are common risk factors. Different management techniques have been tried including tightening the cervix with a stitch (cervical cerclage) to prevent its premature opening. Although it is a simple operation, cervical cerclage is invasive requiring anaesthesia and can have bleeding complications and cause infection and pregnancy loss. There is also controversy regarding the efficacy of cervical cerclage and the women who benefit most from this operation. Closing the cervix with a silicone ring (cervical pessary) that is removed at around 37 weeks is a simple, less invasive procedure that does not require anaesthesia and might replace the cervical stitch operation. To date, data obtained from one well-designed randomised clinical trial suggest that inserting a cervical pessary is superior to expectant management in the prevention of preterm birth in 385 women between 18 and 22 weeks of pregnancy. Neonatal paediatric care admission was reduced in the pessary group in comparison to the expectant group. These women had a singleton pregnancy and high risk of preterm birth because of the short length of the neck of the womb (cervix). Among the pessary group, 27 women needed pessary repositioning without removal and there was one case of pessary removal. Results of both the randomised trial and non-randomised trials show that pessary users complained of increased vaginal discharge. More studies are needed in different settings, with singleton and multiple pregnancies where the weakness of the cervix is from other causes, to confirm the results of the single trial included in this review. Some studies are ongoing.

BACKGROUND

Description of the condition

Preterm delivery is a major health problem; it complicates about 6% to 10% of pregnancies (Lumley 2003). Spontaneous preterm delivery represents a major cause of prenatal deaths (28.7%) (Ngoc 2006). It has also been demonstrated that preterm delivery contributes to about half of the overall perinatal mortality (AIHW 2005). Premature neonates represent a large economic burden; each day in the standard neonatal intensive care can cost approximately 1000 US$ (Rogowski 1999). In developed countries,10% of expenses for treating diseases in children result from preterm delivery (Lewitt 1995).

Cervical incompetence is one of the common causes of preterm birth; however, its firm diagnosis is far from being standardised. Diagnosis is often based retrospectively on history and exclusion of other causes of preterm delivery. Typical historical risk factors include: having two or more second-trimester pregnancy losses, especially if there is a history of losing each pregnancy at an earlier gestational age; having preterm premature rupture of membranes prior to 32 weeks' gestation; a history of cervical trauma caused by cone biopsy, forced dilatation, or intrapartum cervical lacerations; or congenital uterine anomalies (Lo 2009). Clinical examination during pregnancy revealing short cervix, dilated cervix, protruding membranes or cervical tear(s) are suggestive of cervical incompetence. Ultrasound examination during pregnancy showing short cervical length (less than 25 mm at 20 weeks' gestation) (Owen 2004) or funnelling of the cervix during the second or early third trimester of pregnancy (Ayers 1988) have been suggested to be signs of cervical incompetence.

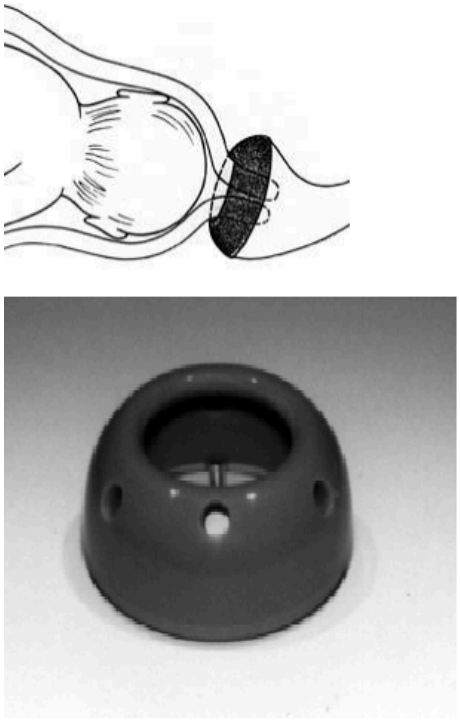
Multiple pregnancy is a another strong risk factor for preterm birth. About one in 60 pregnancies is a twin pregnancy, and about 30% of the preterm born children admitted in a neonatal care are from twin pregnancies (Lumley 2003). Prevention of preterm birth is therefore a major goal of obstetric care of multiple pregnancy. However, strategies to prevent preterm birth in these patients have been largely unsuccessful.

Different management strategies have been tried for prevention of preterm birth due to cervical incompetence, including trials to tighten the cervix (cervical cerclage) to prevent its premature opening (Anthony 1997; Gibb 1995; McDonald 1957; Shirodkar 1955). In spite of being a simple operation, it is an invasive technique that requires anaesthesia, and has its complications including haemorrhage, infection and even pregnancy loss (Grant 1989). Moreover, cervical cerclage is not always very effective in preventing preterm birth. A systematic review by Bachmann 2003 reported that elective cerclage has a significant effect in preventing spontaneous preterm birth before 34 weeks' gestation. The number needed to be treated to prevent one additional preterm birth before 34 weeks was 24 women (95% confidence interval (CI) 10 to 61). However, it has no significant effect on preventing preterm birth between 34 and 37 weeks of pregnancy. Another systematic review concluded that the use of a cervical stitch should not be offered to women at low or medium risk of mid-trimester loss, regardless of cervical length by ultrasound. Cervical cerclage was associated with mild pyrexia, increased use of tocolytic therapy and hospital admissions, but no serious morbidity (Drakeley 2003). A third systematic review evaluated the role of cervical cerclage for a shortened cervix, and concluded that the available evidence does not support cerclage for a sonographically detected short cervix (Belej-Rak 2003). On the other hand, a meta-analysis was carried out of trials of women with singleton gestations and second-trimester transvaginal sonographic cervical length (CL) less than 25 mm randomised to cerclage or no cerclage. The degree of CL shortening was correlated to the efficacy of cerclage in preventing preterm birth.There was a significant reduction in preterm birth before 35 weeks in the cerclage group compared with no the cerclage group in 208 singleton gestations with both a previous preterm birth and CL less than 25 mm (risk ratio (RR), 0.61; 95% CI, 0.40-0.92). In these women, preterm birth before 37 weeks was significantly reduced with cerclage for CL less than or equal to 5.9 mm, less than or equal to 15.9 mm, 16 to 24.9 mm and less than 25 mm. None of the analyses for 344 women without a previous preterm birth was significant (Berghella 2010). The same researchers reported, in another meta-analysis, that in twins, cerclage was associated with a significantly higher incidence of preterm birth (Berghella 2005).

Description of the intervention

Cervical pessary has been tried for management of cervical incompetence since the 1950s (Cross 1959). However, its use for this purpose has passed through waves of enthusiasm and loss of favour (Acharya 2006; Antczak-Judycka 2003; Arabin 2003; Quaas 1990). Most of the studies have used the Arabin pessary which is a flexible, ring-like silicone pessary available in different sizes with the outer diameter varying between 65 mm and 70 mm, the inner diameter between 32 mm and 35 mm, and the height of the curvature between 21 mm and 25 mm (Figure 1). It has been designed to be inserted with its curvature upwards so that the larger diameter is supported by the pelvic floor. The smaller inner diameter is supposed to encompass the cervix (Arabin 2003) Figure 1.

Figure 1. Cervical pessary in place. Images reproduced with the kind permission of Dr. Arabin GmbH & Co. KG



How the intervention might work

The mechanism by which pessaries can help women with an incompetent cervix is not known. In 1961, Vitsky suggested that the incompetent cervix is aligned centrally, with no support except the non-resistant vagina (Vitsky 1961). A lever pessary, however, would change the inclination of the cervical canal, directing it more posteriorly. In doing so, the weight of the pregnancy would be more on the anterior lower segment (Arabin 2003). Another postulated mechanism is that the pessary might support the immunological barrier between the chorioamnion-extraovular space and the vaginal microbiological flora as cerclage has been postulated to do (Goya 2012).

Why it is important to do this review

Cervical pessary is relatively non-invasive, it is operator-independent, easy to use, it does not require anaesthesia, it can be used in an outpatient clinic setting, and it is easily removed when necessary (Acharya 2006; Grzonka 2004; Newcomer 2000; Quaas 1990; Von Forster 1986). Oster et al conducted a non-randomised trial in the USA in 1966 that involved 35 pregnant women. They used Hodge pessaries and reported 83% living children (Oster 1966). Dahl and Barz reported on 115 patients thought to have an incompetent cervix (Dahl 1979). They used a Mayer-Ring pessary (glass ring and pushed around the cervix). Eighty per cent of women treated by pessaries gave birth to neonates more than 2500 gm. More recently, Quaas et al (Quaas 1990) reported on 107 patients using an Arabin-cerclage pessary. The pessary was used instead of surgical cerclage prophylactically in 58 patients, in 44 cases therapeutically, and in five patients it was used instead of emergency cerclage. In 92% of the patients, the pregnancy was maintained until 36 weeks of gestation, when the Arabin-cerclage pessary was removed. There were no infectious complications reported.

Other non-randomised trials have shown that treating women with a short cervix with cervical pessary succeeded in prolonging the pregnancy compared to expectant management. The mean gestational age at delivery was 38 weeks (36 + 6 – 41) in the pessary group and 33 weeks (26 + 4 – 38) in the control group (P = 0.02) (Arabin 2003). In another comparative non-randomised trial, cervical pessary was as effective as cervical cerclage in delaying the onset of labour. The primary outcome measure was prolongation of pregnancy (mean 13.4 weeks and 12.1 weeks for cerclage and pessary respectively) (P = 0.06) (Antczak-Judycka 2003). However, the use of cervical pessary has not been assessed in a systematic way in singleton/multiple pregnancies.

OBJECTIVES

To evaluate the efficacy of cervical pessary for the prevention of preterm birth in women with risk factors for cervical incompetence.

METHODS

Criteria for considering studies for this review

Types of studies

We included one randomised clinical trial that compared the use of cervical pessary with cervical cerclage or expectant management or other interventions for prevention of preterm birth. We did not include any quasi-randomised trials (for example, randomisation

by date of birth or day of admission). Cluster-randomised or cross-over trials were not eligible for inclusion.

Types of participants

Pregnant women with singleton/multiple viable fetus/fetuses in the second trimester of pregnancy and with risk factors for cervical incompetence. These include:

1. history of two or more second-trimester pregnancy losses (excluding those resulting from induced preterm labour or abruption);
2. history of losing each pregnancy at an earlier gestational age;
3. preterm premature rupture of membranes prior to 32 weeks' gestation;
4. short cervical length (less than 25 mm at 20 weeks' gestation);
5. history of cervical trauma caused by cone biopsy, forced dilatation, intrapartum cervical lacerations;
6. history of painless cervical dilatation of up to 4 to 6 cm;
7. congenital uterine anomalies;
8. vaginal ultrasound evidence of cervical incompetence, including shortening (cervical length less than 25 mm at 20 weeks) and funnelling of the cervix during the second or early third trimester of pregnancy.

Types of interventions

To avoid duplication of comparisons in various reviews of interventions for preventing preterm birth, we planned to compare the intervention of interest (cervical pessary) with the following interventions.

- Cervical pessary versus placebo/no treatment (singleton pregnancy).
- Cervical pessary versus placebo/no treatment (multiple pregnancy).
- Cervical pessary versus bedrest (singleton pregnancy).
- Cervical pessary versus bedrest (multiple pregnancy).
- Cervical pessary versus cervical cerclage(singleton pregnancy).
- Cervical pessary versus cervical cerclage (multiple pregnancy).
- Cervical pessary versus medical treatment (singleton pregnancy).
- Cervical pessary versus medical treatment (multiple pregnancy).

Types of outcome measures

Primary

1. Delivery at less than 37 weeks' gestation.

Secondary

Maternal

1. Delivery at less than 34 weeks' gestation.
2. Delivery at less than 32 weeks' gestation.
3. Mean gestational age at time of delivery.
4. Maternal hospital admission.
5. Maternal medications (e.g. antibiotics, tocolytics).
6. Side effects of the intervention including expulsion of the pessary.
7. Patient's satisfaction.
8. Additional costs over that of routine antenatal care.

Fetal

1. Neonatal paediatric care unit admission.
2. Perinatal death.

Search methods for identification of studies

Electronic searches

We contacted the Trials Search Co-ordinator to search the Cochrane Pregnancy and Childbirth Group's Trials Register (1 September 2012).

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

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

Details of the search strategies for CENTRAL, MEDLINE and EMBASE, 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.

In addition, we searched Current Controlled Trials and the Australian New Zealand Clinical Trials Registry (September 2012), using the terms given in Appendix 1.

We did not apply any language restrictions.

Data collection and analysis

For this update, we used the following methods when assessing the reports identified by the updated search.

Selection of studies

Two review authors (O Shaaban and H Abdel-Aleem) independently assessed for inclusion the studies resulting from the search. We resolved any disagreement through discussion with the third author (M Abdel-Aleem).

Data extraction and management

We designed a form to extract data. For eligible studies, two review authors extracted the data using the agreed form. We resolved discrepancies through discussion or, if required, we consulted the third author. We entered data into Review Manager software (RevMan 2011) and checked for accuracy. When information regarding any of the above was unclear, we planned to contact authors of the original reports to provide further details.

Assessment of risk of bias in included studies

Two review authors independently assessed the risk of bias for each study using the criteria outlined in the *Cochrane Handbook for Systematic Reviews of Interventions* (Higgins 2011). Disagreement was resolved by discussion or by involving the third author.

(1) Sequence generation (checking for possible selection bias)

We described for each included study the method used to generate the allocation sequence in sufficient detail to allow an assessment of whether it should produce comparable groups.

We assessed the method as:

- low risk of bias (any truly random process, e.g. random number table; computer random number generator);
- high risk of bias (any non-random process, e.g. odd or even date of birth; hospital or clinic record number);
- unclear risk of bias.

(2) Allocation concealment (checking for possible selection bias)

We described for each included study the method used to conceal allocation to interventions prior to assignment and assessed whether intervention allocation could have been foreseen in advance of, or during recruitment, or changed after assignment.

We assessed the methods as:

- low risk of bias (e.g. telephone or central randomisation; consecutively numbered sealed opaque envelopes);
- high risk of bias (open random allocation; unsealed or non-opaque envelopes, alternation; date of birth);
- unclear risk of bias.

(3.1) Blinding of participants and personnel (checking for possible performance bias)

We described for each included study the methods used, if any, to blind study participants and personnel from knowledge of which intervention a participant received. We considered that studies were at low risk of bias if they were blinded, or if we judged that the lack of blinding would be unlikely to affect results. We planned to assess blinding separately for different outcomes or classes of outcomes.

We assessed the methods as:

- low, high or unclear risk of bias for participants;
- low, high or unclear risk of bias for personnel.

(3.2) Blinding of outcome assessment (checking for possible detection bias)

We described for each included study the methods used, if any, to blind outcome assessors from knowledge of which intervention a participant received. We planned to assess blinding separately for different outcomes or classes of outcomes.

We assessed methods used to blind outcome assessment as:

- low, high or unclear risk of bias.

(4) Incomplete outcome data (checking for possible attrition bias due to the amount, nature and handling of incomplete outcome data)

We described for each included study, and for each outcome or class of outcomes, the completeness of data including attrition and exclusions from the analysis. We stated whether attrition and exclusions were reported and the numbers included in the analysis at each stage (compared with the total randomised participants), reasons for attrition or exclusion where reported, and whether missing data were balanced across groups or were related to outcomes. Where sufficient information was reported, or could be supplied by the trial authors, we planned to re-include missing data in the analyses which we undertook.

We assessed methods as:

- low risk of bias (e.g. no missing outcome data; missing outcome data balanced across groups; or less than 20% losses to follow-up);
- high risk of bias (e.g. numbers or reasons for missing data imbalanced across groups; 'as treated' analysis done with substantial departure of intervention received from that assigned at randomisation);
- unclear risk of bias.

(5) Selective reporting bias

We described for each included study how we investigated the possibility of selective outcome reporting bias and what we found. We assessed the methods as:

- low risk of bias (where it is clear that all of the study's pre-specified outcomes and all expected outcomes of interest to the review have been reported);
- high risk of bias (where not all the study's pre-specified outcomes have been reported; one or more reported primary outcomes were not prespecified; outcomes of interest are reported incompletely and so cannot be used; study fails to include results of a key outcome that would have been expected to have been reported);
- unclear risk of bias.

(6) Other sources of bias (checking for bias due to problems not covered by (1) to (5) above)

We described for each included study any important concerns we had about other possible sources of bias. We assessed whether each study was free of other problems that could put it at risk of bias:

- low risk of other bias;
- high risk of other bias;
- unclear whether there is risk of other bias.

(7) Overall risk of bias

We made explicit judgements about whether studies were at high risk of bias, according to the criteria given in the *Cochrane Handbook* (Higgins 2011). With reference to (1) to (6) above, we assessed the likely magnitude and direction of the bias and whether we considered it likely to impact on the findings. We planned to explore the impact of the level of bias through undertaking sensitivity analyses - *see* Sensitivity analysis.

Measures of treatment effect

Dichotomous data

For dichotomous data, we presented results as summary relative risk with 95% confidence intervals.

Continuous data

For continuous data, we used the mean difference if outcomes were measured in the same way between trials. We planned to use the standardised mean difference to combine trials that measured the same outcome, but used different methods.

Unit of analysis issues

Cluster-randomised trials

Cluster-randomised trials were not eligible for inclusion.

Cross-over trials

Cross-over trials were not eligible for inclusion.

Dealing with missing data

For the included study, we noted levels of attrition. In future updates if more studies are included, we will explore the impact of including studies with high levels of missing data in the overall assessment of treatment effect by using sensitivity analysis.

For all outcomes, we carried out analyses, as far as possible, on an intention-to-treat basis, i.e. we attempted to include all participants randomised to each group in the analyses, and all participants were analysed in the group to which they were allocated, regardless of whether or not they received the allocated intervention. The denominator for each outcome in each trial was the number randomised minus any participants whose outcomes were known to be missing.

Assessment of heterogeneity

In future updates if more studies are included, we will assess statistical heterogeneity in each meta-analysis using the T^2, I^2 and Chi^2 statistics. We will regard heterogeneity as substantial if an I^2 is greater than 30% and either a T^2 is greater than zero, or there is a low P value (less than 0.10) in the Chi^2 test for heterogeneity.

Assessment of reporting biases

In future updates, if 10 or more studies contribute data to meta-analysis for any particular outcome, we will investigate reporting biases (such as publication bias) using funnel plots. We will assess possible asymmetry visually, and if asymmetry is suggested by a visual assessment, we will perform exploratory analyses to investigate it.

Data synthesis

We carried out statistical analysis using the Review Manager software (RevMan 2011). We used fixed-effect meta-analysis for combining data for this update. In future updates, we will use fixed-effect meta-analysis for combining data where it is reasonable to assume that studies are estimating the same underlying treatment effect: i.e. where trials are examining the same intervention, and the trials' populations and methods are judged sufficiently similar. If there is clinical heterogeneity sufficient to expect that the underlying treatment effects differ between trials, or if substantial statistical heterogeneity is detected, we will use random-effects meta-analysis to produce an overall summary if an average treatment effect across trials is considered clinically meaningful. The random-effects summary will be treated as the average range of possible treatment effects and we will discuss the clinical implications of treatment effects differing between trials. If the average treatment effect is not clinically meaningful, we will not combine trials. If we use random-effects analyses, the results will be presented as the average treatment effect with 95% confidence intervals, and the estimates of T^2 and I^2.

Subgroup analysis and investigation of heterogeneity

In future updates, if we identify substantial heterogeneity, we will investigate it using subgroup analyses and sensitivity analyses. We will consider whether an overall summary is meaningful, and if it is, use random-effects analysis to produce it.

We plan to carry out the following subgroup analysis.

1. Women with a short cervix (25 mm or less) versus women with a cervix greater than 25 mm.

The following primary outcome will be used in subgroup analysis.

- Delivery at less than 37 weeks' gestation.

We will assess subgroup differences by interaction tests available within RevMan (RevMan 2011). We will report the results of subgroup analyses quoting the χ2 statistic and P value, and the interaction test I^2 value.

Sensitivity analysis

In future updates, we will carry out sensitivity analyses to explore the effect of trial quality assessed by concealment of allocation, high attrition rates (greater than 20%), or both, with poor-quality studies being excluded from the analyses in order to assess whether this makes any difference to the overall result.

RESULTS

Description of studies

Results of the search

The search retrieved 11 reports of eight trials. We included one randomised controlled trial conducted by Goya et al (Goya 2012) as it met our eligibility criteria. We excluded two other trials (Gmoser 1991; Von Forster 1986). We identified seven ongoing studies (Carreras 2008; Carreras 2011; Driggers 2011; Goya 2011; Hegeman 2009; Nicolaides 2008; Nizard 2007). For more information, *see* Characteristics of ongoing studies.

Included studies

We included one study that tested the efficacy of cervical pessary compared with expectant management in women with a short cervix of 25 mm or less (Goya 2012). In this trial, 385 pregnant women with a short cervix were assigned to the pessary (N = 192) and expectant management groups (N = 193), and 190 were analysed in each group. Analysis was by intention-to-treat.

Excluded studies

We excluded two studies (Gmoser 1991; Von Forster 1986). The Von Forster 1986 study was from Germany and was excluded

because of unclear inclusion and exclusion criteria and the use of quasi-randomisation (by the initial of the woman's surname). The Gmoser 1991 trial was from Austria and was excluded because of inadequate reporting on the methods in relation to randomisation, and inclusion and exclusion criteria. For more information, *see* Characteristics of excluded studies.

Risk of bias in included studies

The included study Goya 2012 is of moderate to high quality as double blinding was not possible.

Allocation

Both random sequence generation and allocation concealment were assessed as being at low risk of bias. Randomisation was performed using a computer-generated random number table and allocation was done using central telephone randomisation.

Blinding

The study was open label and therefore at high risk of bias for blinding of participants, personnel and outcome assessors.

Incomplete outcome data

Loss to follow-up was in the region of between 1% and 2% and therefore at low risk of attrition bias.

Selective reporting

The authors adhered to the study protocol and reported results for all specified outcomes and therefore was considered at low risk of reporting bias.

Other potential sources of bias

Baseline study characteristics are homogenous and no other sources of bias were apparent. The study was assessed as being at low risk of bias for this domain.

Effects of interventions

This review update includes one randomised controlled trial by Goya et al (Goya 2012).

Cervical pessary versus expectant management (singleton pregnancy)

Primary outcomes

The study included 385 pregnant women with a short cervix of 25 mm or less between 18 to 22 weeks of pregnancy. The use of cervical pessary (192 women) was associated with a statistically significantly decrease in the incidence of spontaneous preterm birth less than 37 weeks' gestation compared with expectant management (22% versus 59%; respectively, risk ratio (RR) 0.36; 95% confidence interval (CI) 0.27 to 0.49), Analysis 1.1.

Secondary outcomes

Spontaneous preterm birth before 34 weeks was statistically significantly reduced in the pessary group (RR 0.24; 95% CI 0.13 to 0.43), Analysis 1.2. Mean gestational age at delivery was 37.7 $\pm$ 2 weeks in the pessary group and 34.9 $\pm$ 4 weeks in the expectant group (mean difference (MD) 2.80 weeks; 95% CI 2.16 to 3.44), Analysis 1.3. Women in the pessary group used less tocolytics and corticosteroids than the expectant group (RR 0.63; 95% CI 0.50 to 0.81 and RR 0.66; 95% CI 0.54, 0.81 respectively), Analysis 1.4. Vaginal discharge was more common in the pessary group (RR 2.18; 95% CI 1.87 to 2.54), Analysis 1.5. Among the pessary group, 27 women needed pessary repositioning without removal and there was one case of pessary withdrawal. Ninety-five per cent of women in the pessary group recommended this intervention to other people. Neonatal paediatric care admission was reduced in the pessary group in comparison to the expectant group (RR 0.17; 95% CI 0.07 to 0.42), Analysis 1.6.

DISCUSSION

Preterm birth has its major health (Lumley 2003; Ngoc 2006) and economic (Lewitt 1995; Rogowski 1999) burdens in developed and developing countries. Cervical incompetence and multiple pregnancy are blamed for a high percentage of preterm deliveries. Cervical cerclage has been administered for decades, as the only available option to prevent preterm birth in women with risk factors for cervical incompetency (Anthony 1997; Gibb 1995; Grant 1989; McDonald 1957). Falilure to identify the group of women who definitely get benefit from cervical cerclage, leads to using this invasive procedure unnecessarily in many occasions. Systematic reviews have failed to show a definite benefit from cervical cerclage in prevention of preterm birth or improving neonatal mortality for women with historical (Bachmann 2003) or ultrasonographically-imaged short cervix as a risk factor (Belej-Rak 2003). Berghella 2011 in a more recent meta-analysis, concluded that in women with a previous spontaneous preterm birth, singleton gestation, and cervical length less than 25 mm, cerclage significantly prevents preterm birth and composite perinatal mortality and morbidity.

Cervical pessary, as an inexpensive and less invasive option to cervical stitch, may represent special importance to health services in low-resource countries (Arabin 2003). Using a pessary instead of performing a cerclage operation can decrease hospital stays and costs. If a cervical pessary proves beneficial, this will definitely decrease the burden of premature delivery and care that is given to premature and extremely premature babies. Cervical pessaries have been used for prevention of preterm birth in several non-randomised trials and shown to be effective in many of them. (Arabin 2003; Oster 1966; Quaas 1990; Seyffarth 1978; Vitsky 1968).

We assessed three randomised trials for inclusion in the current review (Gmoser 1991; Goya 2012; Von Forster 1986) Two studies were excluded. Gmoser 1991 found that cervical pessary was as effective as cerclage in the management of cervical incompetence. Pessary treatment was better at prolonging pregnancy and increasing the weight of the baby at birth, compared with no intervention (Gmoser 1991). In the second study (Von Forster 1986) both methods succeeded in prolonging pregnancy at least until 37 weeks in approximately 80% of cases (Von Forster 1986).

The only included study by Goya et al (Goya 2012) is a well-designed multicentre trial involved 385 pregnant women. The study included women with singleton pregnancy and at high risk of preterm birth as evident by short cervix (less than 25 mm) between 18 to 22 weeks' gestation. Cervical pessary significantly decreased the incidence of spontaneous preterm birth before 37 and 34 weeks. The mean gestational age at delivery was statistically significantly higher in the pessary group in comparison to expectant group. Neonatal complications were significantly less in the pessary group. However, the incidence of preterm birth before 37 weeks and 34 weeks in the control group is high (59 % and

27%, respectively). These figures are higher than reported by the World Health Organization for the worldwide incidence of preterm birth (˜ 6.2 -11.8 %) with the lowest figure in Europe (6.2%)(Beck 2010). This could compromise the generalisability of the findings of this trial.

Few complications have been reported from pessary use during pregnancy. Increased vaginal discharge was complained by all pessary users in Goya 2012. Two studies have looked at changes in vaginal flora during pregnancy with pessary use. One study (Havlik 1986) compared the change in vaginal flora of 50 women wearing Mayer pessaries with 50 controls. They found that after two weeks, there were no differences in the change of flora between users and non-users. Another study (Jorde 1983) also reported that 5.5% of women (in a cohort of 200) using pessaries had pathogenic organisms in the vagina during pregnancy, compared with 2% of controls. About half of the pessary users complained of increased vaginal discharge after the use of a cervical pessary (Arabin 2003). So, this could reflect foreign body irritation rather than infection.

Summary of main results

The review included only one randomised clinical trial of moderate to high quality. Double blinding is not possible in such type of studies (Goya 2012). The trial showed beneficial effect of pessary in reducing preterm birth in women with singleton pregnancy and a short cervix.

We also identified other ongoing randomised controlled trials using cervical pessary in pregnant women with a short cervix to prevent preterm birth in singleton and multiple pregnancy. We will assess these ongoing studies for inclusion in the next update of our review if data are available.

AUTHORS' CONCLUSIONS

Implications for practice

There is evidence from one randomised controlled trial that using cervical pessary is superior than expectant management in prevention of preterm birth in women with a singleton pregnancy and a short cervix. Evidence for its beneficial effect in other settings and for other groups of patients is not yet documented.

Implications for research

There is a need for more well-designed randomised controlled trials to confirm the beneficial effect of cervical pessary in reducing preterm birth in women with a short cervix in different settings and in women with other risk factors for preterm birth including multiple pregnancy.

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* Indicates the major publication for the study

CHARACTERISTICS OF STUDIES

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

Goya 2012

Methods	Open-label, randomised controlled trial.
Participants	Women with cervical length < 25 mm between 18-22 weeks' gestation.
Interventions	Arabin cervical pessary versus expectant management.
Outcomes	**Primary outcome:** delivery before 34 weeks' gestation. **Secondary outcomes:** spontaneous delivery before 37 weeks; gestational age at delivery (weeks); tocolytic treatment; corticosteroid treatment for fetal maturation; chorioamnionitis; pregnancy bleeding; premature preterm rupture of membranes; caesarean delivery; **Side-effects:** (vaginal discharge, pessary repositioning without removal , pessary withdrawal); Perinatal outcome: (fetal death, neonatal death, birthweight less than 1500 g, birthweight less than 2500 g);

Goya 2012 *(Continued)*

	Adverse outcomes: (necrotising enterocolitis; intraventricular haemorrhage; respiratory distress syndrome; retinopathy; treatment for sepsis; composite adverse outcomes).
Notes	

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Computer-generated random table.
Allocation concealment (selection bias)	Low risk	Central telephone randomisation.
Blinding of participants and personnel (performance bias) All outcomes	High risk	Open-label study.
Blinding of outcome assessment (detection bias) All outcomes	High risk	Open-label study.
Incomplete outcome data (attrition bias) All outcomes	Low risk	Lost to follow-up rate is between 1% and 2%.
Selective reporting (reporting bias)	Low risk	The authors adhered to the study protocol.
Other bias	Low risk	Baseline study characteristics are homogenous.

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

Study	Reason for exclusion
Gmoser 1991	• Inadequate reporting about method of randomisation. • Inclusion and exclusion criteria were not defined. This study was carried out by Gmoser and colleague, conducted in Austria and published in 1991 (Gmoser 1991). The investigators compared length of gestation and the weight at birth, between women treated with cervical pessary versus those with no intervention. The study included 300 cases. They found that the length of gestation and birthweight were higher in the pessary group compared with no intervention (39 versus 36 weeks and 2950 versus 2400 g, respectively). They did not reach a solid conclusion from their study (Gmoser 1991).
Von Forster 1986	• Using quasi-randomisation in the form of initial of the women's surname. • Unclear inclusion and exclusion criteria. • Incomplete outcome data addressed, women were randomised into 3 groups and only 2 groups were included in the analysis. The study was carried out by Von Forster and colleagues in Germany. It was a prospective randomised trial conducted between 1982 and 1983. In this study, patients were randomised into 3 groups based on the initial letter of their surname (quasi-randomised). Patients in Group 1 were admitted as in-patients and received cerclage (n = 112). Those in Group 2 (n = 130) were fitted with a

Study	Reason for exclusion
	pessary as outpatients. A third group was simply ordered to rest in bed. The type of pessary used was not mentioned. The therapies were used in patients for prophylactic as well as therapeutic reasons, although these terms are not defined in the article. However, at the analysis stage the investigators only analysed the intervention groups because all patients in the rest only group did need treatment. The results reported that the 2 groups were equal in the length of pregnancy (mean 37 to 38 weeks), birthweight (mean 3000 g), Apgar scores, and fetal survival. They investigators concluded that cerclage and pessary were equally effective in the management of cervical incompetence (Von Forster 1986).

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

Carreras 2008

Trial name or title	Prevention of Preterm Birth Using Cervical Pessary in Pregnant Women After Threatened Preterm Labor (PECEP-RETARD).
Methods	Multicentre, randomised, open-label trial.
Participants	Inclusion criteria • Minimal age of 18 years. • Episode of threatened preterm labour. Exclusion criteria • Major fetal abnormalities (requiring surgery or leading to infant death or severe handicap). • Spontaneous rupture of membranes at the time of randomisation. • Cervical cerclage in situ. • Active vaginal bleeding. • Placenta previa.
Interventions	Placement of cervical pessary (Arabin Pessary) between 23 weeks and 37 weeks.
Outcomes	**Primary outcome measures** • Spontaneous delivery before 34 completed weeks **Secondary outcome measures** • Birthweight. • Fetal-neonatal death. • Neonatal morbidity. • Maternal adverse effects. • Preterm birth before 37 weeks or 28 weeks. • Rupture of membranes before 34 weeks. • Hospitalisation for threatened preterm labour.
Starting date	June 2008.
Contact information	Elena Carreras 934893072 ecarrera@vhebron.net
Notes	NCT01242384.

Carreras 2011

Trial name or title	Arabin Cervical Pessary for Prevention of Preterm Birth in Cases of Twin-to-twin Transfusion Syndrome Treated by Fetoscopic Selective Laser Coagulation: The PECEP Laser Trial.
Methods	Multicentre, randomised controlled trial.
Participants	Inclusion criteria • Monochorionic twin pregnancies with severe TTTS requiring intrauterine surgery. • Less than 26 weeks. • Minimal age of 18 years. • Informed consent signature. Exclusion criteria • Major fetal abnormalities (requiring surgery or leading to infant death or severe handicap). • Cerclage during current pregnancy. • Previous cervical surgery. • Uterine malformation. • Placenta previa. • Active vaginal bleeding at the moment of randomisation. • Spontaneous rupture of membranes at the time of randomisation. • Monochorionic - monoamniotic twin pregnancy. • Language problems for informed consent. Silicone allergy.
Interventions	**No Intervention:** usual management of monochorionic pregnancy without the pessary placement. **Experimental:** pessary. The pessary will be inserted 24 hours after fetal surgery in the exploration room. The pessary will be removed at 37 weeks of gestation, or before if any unexpected event occurs.
Outcomes	**Primary outcome** • Spontaneous delivery before 34 completed weeks. • Rate of delivery before 34 + 6 weeks, due to spontaneous preterm labour. • **Secondary outcomes** • Birthweight median weight (g) of the newborns at birth. • Fetal or neonatal death. • Rate of intrauterine demise or neonatal death during the first 24 hours. • Neonatal morbidity. • Rate of major adverse neonatal outcomes before discharge from the hospital. • Significant maternal adverse events. • Rate of heavy bleeding (bleeding that requires a medical intervention), cervical tear (cervical rupture due to the pessary placement), and/or uterine rupture (rupture of the uterus due to contractions or surgery). • Physical or psychological intolerance to pessary. • Discomfort or pain due to the pessary that makes daily life uncomfortable. • Spontaneous preterm birth before 37 weeks. • Rate of delivery before 36 + 6 weeks due to spontaneous contractions and labour. • Spontaneous rupture of membranes before 34 weeks. • Rate of spontaneous rupture of amniotic membranes before 33 + 6 weeks. • Hospitalisation for threatened preterm labour before 34 weeks.

Carreras 2011 *(Continued)*

	Requirement of hospitalisation due to preterm contractions that need medical treatment to try to stop them before 33 + 6 weeks.
Starting date	April 12 2011.
Contact information	Carlota Rodo, MD 0034-934893072 carlotarodo@gmail.com Elena Carreras, PhD 0034-934893072 ecarreras@vhebron.net
Notes	ClinicalTrials.gov Identifier: NCT01334489.

Driggers 2011

Trial name or title	Preventing Preterm Birth With a Pessary (PrePPy).
Methods	Multicentre, randomised controlled trial.
Participants	**Inclusion criteria** • Singleton pregnancies in patients with a history of spontaneous preterm birth (previous delivery between 17 0/7 weeks and 36 6/7 weeks). • Women aged 18 to 45 years of age. **Exclusion criteria** • Major fetal abnormalities (defined as those that are lethal or require prenatal or postnatal surgery), fetal death, or fetal growth restriction diagnosed before randomisation. • Presence of prophylactic cervical cerclage. • Significant maternal-fetal complications (treated chronic hypertension, insulin dependant diabetes mellitus, red cell isoimmunisation). • Painful regular uterine contractions, or ruptured membranes. • Visual cervical dilation of 2 cm or greater and visible membranes. • Patients with a pregnancy dated by an ultrasound after 20 weeks' gestation.
Interventions	Cervical pessary or no intervention.
Outcomes	**Primary outcome measures** • Delivery prior to 37 weeks of gestation. **Secondary outcome measures** • Rate of birth less than 7 days from randomisation. • Previable birth (< 24 weeks). • Perinatal death. • Low birthweight. • Intraventricular haemorrhage. • Respiratory distress syndrome of the newborn. • Retinopathy of prematurity. • Necrotising enterocolitis. • Need for neonatal special care. • Incidence of complications due to pessary.
Starting date	January 2011.
Contact information	Rita W. Driggers, MD

Driggers 2011 *(Continued)*

	rita.w.driggers@medstar.net
Notes	NCT01380158.

Goya 2011

Trial name or title	Prevention of Preterm Birth Using Cervical Pessary in Pregnant Women With Short Cervix in Twins (PECEP-TWINS).
Methods	Randomised, open-label, placebo-controlled trial.
Participants	Inclusion criteria • Twins. • Minimal age of 18 years. Exclusion criteria • Major fetal abnormalities (requiring surgery or leading to infant death or severe handicap). • Spontaneous rupture of membranes at the time of randomisation. • Cervical cerclage in situ. • Active vaginal bleeding. Placenta previa.
Interventions	• Expectant management: no intervention. Cervical pessary (Arabin Cervical Pessary) since 23 weeks until 37 weeks: experimental.
Outcomes	**Primary outcome measures** • Spontaneous delivery before 34 completed weeks. **Secondary outcome measures** • Birthweight. • Fetal-neonatal death. • Neonatal morbidity. • Maternal adverse effects. • Preterm birth before 37 weeks or 28 weeks. • Rupture of membranes before 34 weeks. • Hospitalisation for threatened preterm labour.
Starting date	September 28 2010.
Contact information	Hospital Vall d'Herbron Barcelona, Spain, 08036 Contact: Maria M Goya 934893185 mariagoya@mac.com
Notes	NCT01242410.

Hegeman 2009

Trial name or title	Pessaries in multiple pregnancy as a prevention of preterm birth: the Pro Twin Trial.
Methods	Multicentre, randomised, open-label trial.
Participants	Women with multiple pregnancy between 12 and 19 weeks of gestation. They will also include women with monochorionic pregnancies as well as women with triplet pregnancy or women with previous preterm birth.
Interventions	Cervical pessary (Arabin pessary) or no intervention.
Outcomes	**Primary outcome measures** The composite morbidity rate of children in the 2 groups. **Secondary outcomes** • Include preterm birth before 32 and 37 weeks and days of admission to neonatal intensive care.
Starting date	1 September 2009.
Contact information	Prof. B.W.J. Mol e mail: b.w.mol@amc.nl
Notes	NTR1858.

Nicolaides 2008

Trial name or title	Randomised study of pessary vs standard management in women with increased chance of premature birth.
Methods	Multicentre, randomised, open-label trial.
Participants	Women with singleton pregnancies and with a cervical length of 25 mm or less. Women with twin pregnancies.
Interventions	Vaginal pessary (CE0482, MED/CERT ISO 9003 / EN 46003) versus standard management.
Outcomes	**Primary outcome** • Spontaneous delivery from randomisation to 33 weeks and 6 days (237 days) of gestation. **Seconday outcomes** • Low birthweight. • Fetal or neonatal death. • Major adverse outcomes (IVH, RDS, retinopathy of prematurity or necrotising enterocolitis). • Need for neonatal special care (ventilation, phototherapy, treatment for sepsis, blood transfusion).
Starting date	.
Contact information	Prof, Kypros Nicolaides Tel: +442032999000 ext.: 8256

Nicolaides 2008 *(Continued)*

	kypros@fetalmedicine.com
Notes	ISRCTN01096902.

Nizard 2007

Trial name or title	Evaluation of pessaries in twin pregnancies with a short cervix (25 mm) between 20-28 WG.
Methods	Randomised, open-label, multicentre study.
Participants	
Interventions	Device: silicon ring positioned in the vagina, around the cervix versus control.
Outcomes	**Primary outcome** • Demonstrate the profit of at least 10 days in the pessary group compared to control. **Secondary outcomes** • Evaluate and compare the frequency of the childbirth < 34 SA before 34 weeks. • Deliveries (< 34 WG) 34 weeks. • Evaluate the rate of side effects of pessaries during the pessaries. • Neonatal outcome before 28 weeks.
Starting date	June 2007.
Contact information	Jacky Nizard Hopital POISSY-ST GERMAIN EN LAYE Poissy 78300 Status: Recruiting Contact: Jacky NIZARD, CCA Tel: +33(0) 1 39 27 40 50 jnizard@gmail.com
Notes	NCT00502190.

IVH: intraventricular haemorrhage
RDS: respiratory distress syndrome
SROM: spontaneous rupture of membranes
TTTS: twin-to-twin transfusion
vs: versus
WG: weeks gestation

DATA AND ANALYSES

Comparison 1. Cervical pessary versus expectant management (singleton pregnancy)

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Spontaneous delivery at less than 37 weeks	1		Risk Ratio (M-H, Fixed, 95% CI)	Subtotals only
2 Spontaneous delivery at less than 34 weeks	1		Risk Ratio (M-H, Fixed, 95% CI)	Subtotals only
3 Mean gestational age at time of delivery	1		Mean Difference (IV, Fixed, 95% CI)	Subtotals only
4 Maternal medications	1		Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected
4.1 Tocolytic treatment	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
4.2 Corticosteroid treatment for fetal maturation	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
5 Side effects of the intervention	1	380	Risk Ratio (M-H, Fixed, 95% CI)	2.18 [1.87, 2.54]
5.1 Vaginal discharge	1	380	Risk Ratio (M-H, Fixed, 95% CI)	2.18 [1.87, 2.54]
6 Neonatal paediatric care unit admission (composite adverse outcome)	1		Risk Ratio (M-H, Fixed, 95% CI)	Subtotals only
7 Perinatal death	1		Risk Ratio (M-H, Fixed, 95% CI)	Subtotals only

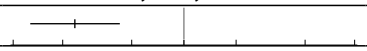
Analysis 1.1. Comparison 1 Cervical pessary versus expectant management (singleton pregnancy), Outcome 1 Spontaneous delivery at less than 37 weeks.

Study or subgroup	Cervical pessary group n/N	Expectant management group n/N	Risk Ratio M-H, Fixed, 95% CI	Weight	Risk Ratio M-H, Fixed, 95% CI
Goya 2012	41/190	113/190		0%	0.36[0.27,0.49]

Favours cervical pessary — Favours expectant group

Analysis 1.2. Comparison 1 Cervical pessary versus expectant management (singleton pregnancy), Outcome 2 Spontaneous delivery at less than 34 weeks.

Study or subgroup	Cervical pessary group n/N	Expectant management group n/N	Risk Ratio M-H, Fixed, 95% CI	Weight	Risk Ratio M-H, Fixed, 95% CI
Goya 2012	12/190	51/190		0%	0.24[0.13,0.43]



Favours cervical pessary — Favours expectant group

Analysis 1.3. Comparison 1 Cervical pessary versus expectant management (singleton pregnancy), Outcome 3 Mean gestational age at time of delivery.

Study or subgroup	Cervical pessary group		Expectant management group		Mean Difference	Weight	Mean Difference
	N	Mean(SD)	N	Mean(SD)	Fixed, 95% CI		Fixed, 95% CI
Goya 2012	190	37.7 (2)	190	34.9 (4)		0%	2.8[2.16,3.44]

Favours expectant group -10 -5 0 5 10 Favours cervical pessary

Analysis 1.4. Comparison 1 Cervical pessary versus expectant management (singleton pregnancy), Outcome 4 Maternal medications.

Study or subgroup	Cervical pessary group	Expectant management group	Risk Ratio	Risk Ratio
	n/N	n/N	M-H, Fixed, 95% CI	M-H, Fixed, 95% CI
1.4.1 Tocolytic treatment				
Goya 2012	64/190	101/190		0.63[0.5,0.81]
1.4.2 Corticosteroid treatment for fetal maturation				
Goya 2012	80/190	121/190		0.66[0.54,0.81]

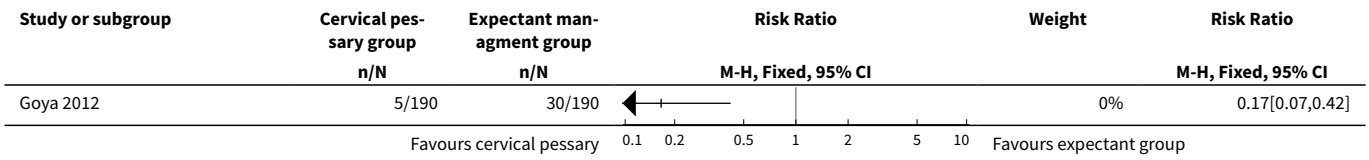
Favours cervical pessary 0.1 0.2 0.5 1 2 5 10 Favours expectant group

Analysis 1.5. Comparison 1 Cervical pessary versus expectant management (singleton pregnancy), Outcome 5 Side effects of the intervention.

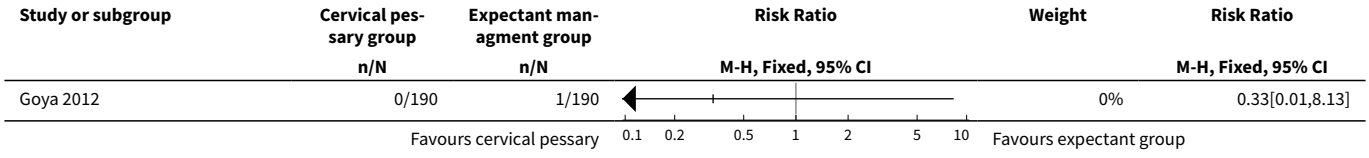
Study or subgroup	Cervical pessary group	Expectant management group	Risk Ratio	Weight	Risk Ratio
	n/N	n/N	M-H, Fixed, 95% CI		M-H, Fixed, 95% CI
1.5.1 Vaginal discharge					
Goya 2012	190/190	87/190		100%	2.18[1.87,2.54]
Subtotal (95% CI)	**190**	**190**		**100%**	**2.18[1.87,2.54]**
Total events: 190 (Cervical pessary group), 87 (Expectant managment group)					
Heterogeneity: Not applicable					
Test for overall effect: Z=9.88(P<0.0001)					
Total (95% CI)	**190**	**190**		**100%**	**2.18[1.87,2.54]**
Total events: 190 (Cervical pessary group), 87 (Expectant managment group)					
Heterogeneity: Not applicable					
Test for overall effect: Z=9.88(P<0.0001)					

Favours cervical pessary 0.01 0.1 1 10 100 Favours expectant group

Analysis 1.6. Comparison 1 Cervical pessary versus expectant management (singleton pregnancy), Outcome 6 Neonatal paediatric care unit admission (composite adverse outcome).



Analysis 1.7. Comparison 1 Cervical pessary versus expectant management (singleton pregnancy), Outcome 7 Perinatal death.



APPENDICES

Appendix 1. Searching trials registry websites

We searched Current controlled trials and Australian and New Zealand Clinical Trials Registry (1 September 2012), using the terms pessary or pessaries.

WHAT'S NEW

Date	Event	Description
15 February 2018	Amended	Updated the Published notes to explain that this review will no longer be updated in it's current form. The review will be split into two new reviews following new protocols.

HISTORY

Protocol first published: Issue 3, 2009
Review first published: Issue 9, 2010

Date	Event	Description
26 September 2012	New citation required and conclusions have changed	One new trial included. Previous published version did not include any trials.
1 September 2012	New search has been performed	Scope of the review has been widened to include use of cervical pessary in multiple pregnancy. Search updated. Methods updated.

CONTRIBUTIONS OF AUTHORS

Hany Abdel-Aleem is the guarantor of the review. He is responsible for conceiving the review; designing and co-ordinating the review. Omar M Shaaban wrote the first draft of the review, assessed the trials retrieved from the search and shared in writing the final version of the review. Mahmoud Abdel-Aleem participated in reviewing the updated review.

DECLARATIONS OF INTEREST

None known.

DIFFERENCES BETWEEN PROTOCOL AND REVIEW

We have updated the methods section in accordance with current guidelines. We searched the databases for registering clinical trials, to identify ongoing trials.

NOTES

This Cochrane Review will no longer be updated in it's current form. The review will be split into two separate Cochrane reviews (one for singleton pregnancies/multiple pregnancies). The two new reviews will be prepared following new protocols.

INDEX TERMS

Medical Subject Headings (MeSH)

*Pessaries; Gestational Age; Premature Birth [*prevention & control]; Randomized Controlled Trials as Topic

MeSH check words

Female; Humans; Pregnancy