Cerclage for Short Cervix on Ultrasonography in Women With Singleton Gestations and Previous Preterm Birth: A Meta-Analysis

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Cerclage for Short Cervix on Ultrasonography in Women With Singleton Gestations and Previous Preterm Birth

A Meta-Analysis

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OBJECTIVE: To estimate if cerclage prevents preterm birth and perinatal mortality and morbidity in women with previous preterm birth, singleton gestation, and short cervical length in a meta-analysis of randomized trials.

DATA SOURCES: MEDLINE, PUBMED, EMBASE, and the Cochrane Library were searched using the terms "cerclage," "short cervix," "ultrasound," and "randomized trial."

METHODS OF STUDY SELECTION: We included randomized trials of cerclage in women with short cervical length on transvaginal ultrasonography, limiting the analysis to women with previous spontaneous preterm birth and singleton gestation.

TABULATION, INTEGRATION, AND RESULTS: Patient-level data abstraction and analysis were accomplished by two independent investigators. Five trials met inclusion criteria. In women with a singleton gestation, previous spontaneous preterm birth, and cervical length less than 25 mm before 24 weeks of gestation, preterm birth before 35 weeks of gestation was 28.4% (71/250) in the cerclage compared with 41.3% (105/254) in the no cerclage groups (relative risk 0.70, 95% confidence interval 0.55–0.89). Cerclage also significantly reduced preterm birth before 37, 32, 28, and 24 weeks of gestation. Composite perinatal mortality and morbidity were significantly reduced (15.6% in cerclage compared with 24.8% in no cerclage groups; relative risk 0.64, 95% confidence interval 0.45–0.91).

CONCLUSION: In women with previous spontaneous preterm birth, singleton gestation, and cervical length less than 25 mm, cerclage significantly prevents preterm birth and composite perinatal mortality and morbidity.

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Despite major research efforts, more than 10 million births before 37 weeks of gestation occur annually worldwide, and more than 1 million infants die from this common complication of pregnancy (5–12% incidence).[1] A short cervical length detected by transvaginal ultrasonography before 24 weeks of gestation has been shown to be one of the best predictors for preterm birth.[2,3] For this screening test to be clinically useful, an intervention should decrease preterm birth once the cervical length shortening is recognized.

Cerclage has been investigated to prevent preterm birth once a short cervical length has been detected in asymptomatic women. Early randomized trials that evaluated the effectiveness of ultrasound-indicated cerclage (ie, cerclage for the indication of short cervical length) have shown contradictory results.[4–7] A meta-analysis of these trials published between 2001 and 2004 reported nonsignificant overall findings but demonstrated that cerclage for short

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cervical length was effective in women with singleton gestations and previous preterm birth, and that cerclage was paradoxically detrimental in women with twin gestations.[8] A recent, large, multicenter trial included only women with previous spontaneous preterm birth and singleton gestation.[9] This trial randomized 60% of this population assessed for the effect of cerclage in randomized trials published so far and prompts new evaluation of the totality of the data. The objective of this meta-analysis was to systematically review randomized trials on cerclage for prevention of preterm birth in asymptomatic singleton gestations with both previous preterm birth and short cervical length on second-trimester transvaginal ultrasonography.

SOURCES

MEDLINE, PUBMED, EMBASE, and the Cochrane Library were searched for the terms "cerclage," "cervical cerclage," "salvage," "rescue," "emergency," "ultrasound-indicated," "short cervix," "cervical length," "ultrasound," and "randomized trial" from 1966 through March 2010. All articles were reviewed for pertinent references. No language restrictions were applied.

STUDY SELECTION

We included trials of asymptomatic pregnant women screened with transvaginal ultrasonography and found to have a short cervical length, then randomized to management with either cerclage or no cerclage. Only randomized study design trials were included. All randomized studies on cerclage were carefully screened. Exclusion criteria were cerclage trials evaluating history-indicated cerclage (placed for the sole indication of poor obstetrical history), or cerclage indicated on physical examination (placed for second-trimester cervical dilatation detected on physical examination), as well as studies on technical aspects of cerclage. Eligible trials had to include women with singleton gestations, previous spontaneous preterm birth, a short cervical length in the second trimester, and who were randomized to cerclage compared with no cerclage and were followed-up for the primary outcome of preterm birth.

Data abstraction was accomplished by two completely independent investigators (V.B., T.J.R.). Each investigator abstracted data from each study and analyzed the data separately. Differences were resolved by common review of the data.

Only data for women with singleton gestations and previous spontaneous preterm birth were collected, as per our inclusion criteria. Women with multiple gestations were excluded. Abstracted data items included gestational age at earliest previous preterm birth, cervical length at randomization, gestational age at short cervical length, gestational age at delivery, perinatal death (defined as death occurring after 20 weeks of gestation and before 29 days of neonatal life or discharge from hospital), and neonatal morbidities (respiratory distress syndrome, intraventricular hemorrhage grades III and IV, necrotizing enterocolitis, sepsis, chronic lung disease, low birth weight [defined as less than 2,500 grams], very low birth weight [defined as less than 1,500 grams], and neonatal intensive care unit admission). There was no funding source.

Studies were reviewed for study design, assuring proper randomization. Adequate sequence generation, allocation concealment, blinding, selection bias, intention-to-treat analysis, and other characteristics were studied (Table 1). A formal quality score for each study was assigned.[10]

The primary outcomes were preterm birth at less than 35 weeks of gestation and composite perinatal mortality and morbidity. Perinatal morbidity included respiratory distress syndrome, intraventricular hemorrhage grades III and IV, necrotizing enterocolitis, sepsis, and chronic lung disease. Secondary outcomes included preterm birth at less than 37, less

Table 1. Descriptive Data for Each Trial

Study	Population Screened	Sample Size (n)	Singleton Gestations With Previous Preterm Birth and Cervical Length Less Than 25 mm [n/N (%)]	Gestational Age at Screening (wk)
Rust[4]	Singletons, twins, and triplets	207	102/207 (49.3)	16–24
Althuisius[5]	Singletons with suspected cervical insufficiency; twins	52	26/35 (80)	14–27
To[6]	All singletons	253	44/253 (17.4)	22–24
Berghella[7]	Singletons with risk factors for preterm birth and twins	61	31/52 (59.6)	14–24
Owen[9]	Singletons with previous preterm birth	301	301/301 (100)	16–226/7

than 32, less than 28, and less than 24 weeks of gestation; perinatal mortality; composite neonatal morbidities as described; and individual neonatal morbidities, including low and very low birth weight, and neonatal intensive care admission. The principal summary measures were risk ratios (RRs) with 95% confidence intervals (CIs), using a fixed or random-effect model, as appropriate.

The cervical length cut-off chosen to qualify women for randomization and the gestational age when the shortening was observed were reviewed. The cerclage intervention was reviewed for surgical method and suture used. Given that characteristics and outcomes reported differed among reports considered for the meta-analysis, the primary authors of each trial selected for inclusion were asked to provide their raw data to perform a patient-level meta-analysis.

The two independent analyses were performed directly from the data files provided from the primary investigators of each trial. Both analysts (V.B. and T.J.R.) completed a new analysis for each trial. Both independent investigators (V.B. and T.J.R.) analyzed data using Review Manager. Once completed, the two analyses were then compared and any difference was resolved by review of individual patient data. There were no missing data because authors of included trials provided their entire databases.

All analyses maintained the intention-to-treat group assignment of the original trials. Additional unpublished data obtained from authors,[4,9] including women randomized according to the protocol of the original study after manuscript was submitted for publication,[4] and some outcomes not reported[9] were included in the analyses. Planned analyses comparing cerclage to no cerclage groups included cervical length less than 25 mm, cervical length 16–24.9 mm, cervical length 15.9 mm or less, short cervical length less than 25 mm at less than 20 weeks of gestation, and previous preterm birth at less than 24 weeks of gestation.

Heterogeneity among the studies was estimated using the Mantel-Haenszel Q statistics. Because such tests of heterogeneity are relatively insensitive, $P<.10$ was considered significant. If significant heterogeneity was not observed, then only the fixed-effects result was reported. Otherwise, a random-effects model was used. Statistical tests of all outcomes were evaluated at a .05 level of significance.

We restricted our analysis to a homogenous group of women selected from the trials, ie, those with previous preterm birth, singleton gestation, and short cervical length less than 25 mm before 24 weeks of gestation. We planned to stratify results by gestational age at detection of the short cervical length. We also planned to examine the effect limiting the analysis to women with cervical length of 15.9 mm or less compared with 16–24.9 mm. All abstracts and unpublished studies possibly including such patients were sought. Because we obtained the patient-level data, no selective reporting within trials was possible. This report follows PRISMA statement recommendations for reporting systematic reviews and meta-analyses.[11]

RESULTS

Eighteen randomized trials of cerclage in pregnancy were identified.[4–7,9,12–24] Thirteen were excluded (Fig. 1).[12–24] Five trials[4–7,9] that met criteria for inclusion in this meta-analysis were analyzed. All trials randomized women with a short cervical length to cerclage or no cerclage. All primary authors agreed to provide the actual databases, including all women randomized. The author of one report[4] supplied data for more randomized women than were included in the original publication. Descriptive data for each trial, including population screened, number of women with previous preterm birth, and cervical length at randomization, are presented in Table 1. All trials included some women with previous preterm birth. Primary outcome was preterm birth for all trials. Methodologic quality assessment was evaluated for

Cervical Length Cut-off (mm)	Preferred Cerclage Method	Preferred Cerclage Suture	Definition of Previous Preterm Birth (wk)	Preterm Birth Primary Outcome (wk)
Less than 25	McDonald	Permanent monofilament	16–36	Less than 34
Less than 25	McDonald	Braided polyester thread	17–33	Less than 34
15 or less	Shirodkar	Braided tape	16–32	Less than 33
Less than 25	McDonald	Braided tape	16–34	Less than 35
Less than 25	McDonald	Braided tape	17–336/7	Less than 35

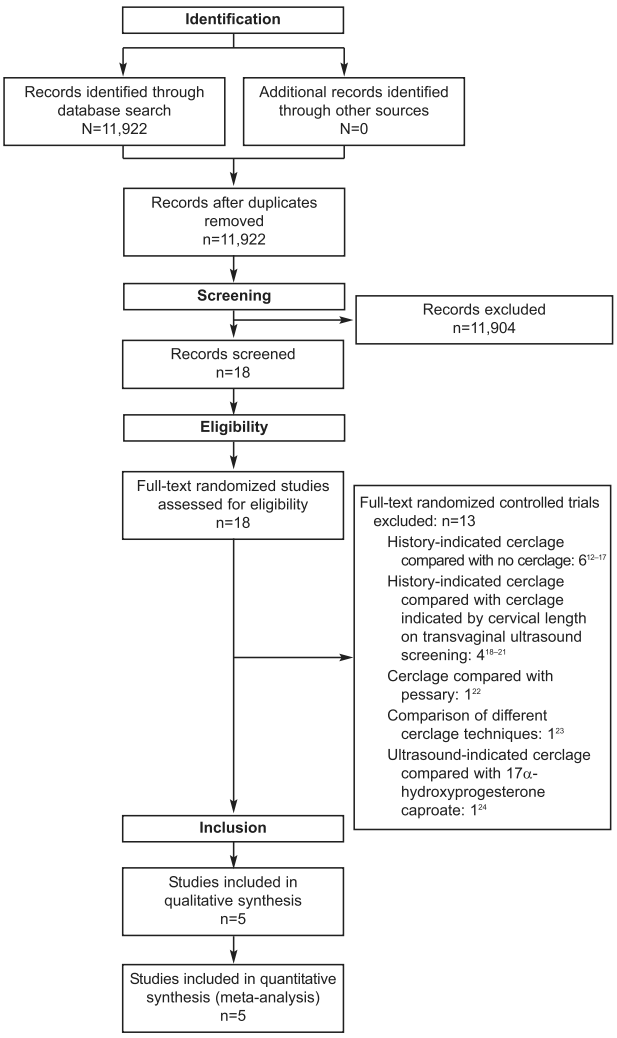

Fig. 1. Flow of information through the different phases of the review.

Berghella. Cerclage for Short Cervical Length. Obstet Gynecol 2011.

each trial (Table 2).[10] These five reports explicitly stated an intention-to-treat analysis. The methods of randomization were reported adequately by all authors. Allocation concealment was adequate for all the studies. One study[5] did not document how random numbers were generated in the article but acknowledged on request that they were generated using computer-generated numbers. None of the studies was double-blind, because this was deemed difficult methodologically given the surgical intervention.[9] Gestational age was determined by ultrasonography before 24 weeks of gestation in all trials. Of the 908 women randomized in the five trials, 504 with previous preterm birth and singleton gestation had a cervical length less than 25 mm at randomization before 24 weeks and were included in our analysis (Fig. 2).

In women with singleton gestations, previous spontaneous preterm birth, and cervical length less than 25 mm before 24 weeks of gestation, preterm birth at less than 35 weeks of gestation was significantly reduced from 41% (105/254) in the no cerclage group to 28% (71/250) in the cerclage group (RR 0.70, 95% CI 0.55–0.89; Fig. 3, Table 3). There was no significant heterogeneity in the overall analysis (P=.46). In the cerclage group compared to the no cerclage group, there were also significant reductions in preterm birth at less than 37 weeks, less than 32 weeks, less than 28 weeks, and less than 24 weeks of gestation (Table 3). Composite perinatal mortality and morbidity were significantly decreased in the cerclage group compared to controls (15.6% compared with 24.8%, RR 0.64, 95% CI 0.45–0.91; Fig. 4, Table 4). Although not statistically significant, there was a reduction in perinatal mortality in the cerclage group compared with the no cerclage group (8.8% compared with 13.8%, RR 0.65, 95% CI 0.40–1.07). Selected neonatal morbidities were available for only some studies.[4,5,7,25] Although RRs of morbidities available from multiple trials in general pointed to benefit of cerclage in terms of individual neonatal morbidities, only birth weight less than 1,500 grams

Table 2. Methodologic Quality Summary for Each Randomized Trial Included

	Randomization	Method to Generate Randomization Is Clear and Appropriate	Double Blind	Methods for Blinding Are Appropriate
Rust 2001[4]	Yes	Yes	No	Not available
Althuisius 2001[5]	Yes	Yes	No	Not available
To 2004[6]	Yes	Yes	No	Not available
Berghella 2004[7]	Yes	Yes	No	Not available
Owen 2009[9]	Yes	Yes	No	Not available

Jadad scoring: yes=1 point; no=zero points. Allocation concealment: adequate=2 points; no concealment of allocation or inadequate method or unreported=0 points. Follow-up: 95% or more=1 point. Follow-up less than 95% or unreported=0 points. Overall Jadad score: 0=lowest quality, 8=highest quality.

* Excluded one patient after randomization.

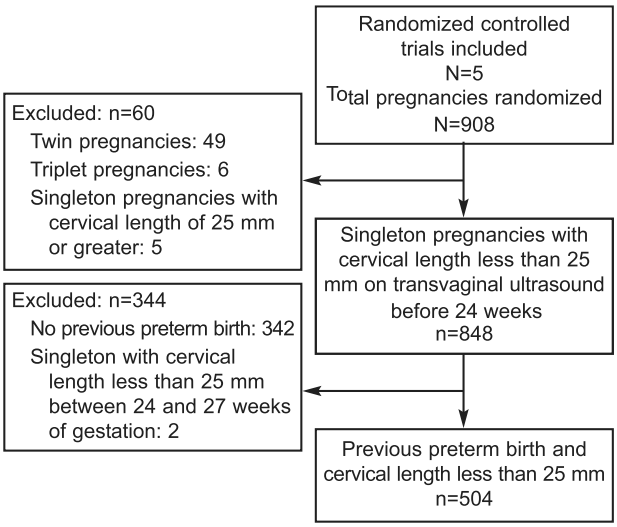

Fig. 2. Flow of patients in the meta-analysis.
Berghella. Cerclage for Short Cervical Length. Obstet Gynecol 2011.

was significantly decreased in the cerclage group (Table 4).

Subgroup analyses by cervical length cut-offs revealed that in women with cervical length 15.9 mm or less, cerclage was associated with significant prevention of preterm birth cut-offs of less than 37, less than 35, less than 32, and less than 28 weeks of gestation (Table 3). For cervical length 16–24.9 mm, cerclage was associated with significant prevention of preterm birth at less than 37 and less than 24 weeks of gestation (Table 3).

In women with previous preterm birth and cervical length less than 25 mm detected before 20 weeks of gestation, cerclage was associated with significant prevention of preterm birth at less than 35weeks and a significant reduction in perinatal mortality (RR 0.49, 95% CI 0.27–0.87; Table 3). In women with previous preterm birth at less than 24 weeks of gestation and cervical length less than 25 mm, cerclage was associated with significant prevention of preterm birth at less than 35 weeks of gestation and a significant reduction in perinatal mortality (Table 3).

CONCLUSION

After more than 50 years since its introduction in clinical medicine, our data show that cervical cerclage is beneficial in prevention of preterm birth and in improving perinatal mortality and morbidity in a specific population. The first investigators in the 1950s[26,27] had proposed that a stitch of the cervix would benefit women with both previous early births and also cervical changes in the second trimester in the subsequent pregnancy. This meta-analysis of the five trials evaluating cerclage for women with previous spontaneous preterm birth, singleton gestations, and short cervical length less than 25 mm before 24 weeks of gestation shows a significant 30% reduction in recurrent preterm birth at less than 35weeks of gestation and a significant and clinically important 36% decrease in perinatal mortality and morbidity. It would take approximately 20 cerclage procedures to prevent one perinatal death.

The benefit of cerclage in this selected population is clear. All cut-offs for preterm births were decreased, as were neonatal mortality and morbidities, except for chronic lung disease (only reported by one trial). As can be seen, RRs were between 0.38 and 0.80 in Table 3 and between 0.28 and 0.65 for variables reported by most trials in Table 4. Results in the trials were remarkably consistent, with heterogeneity not significant, except in the analysis of birth weight less than 2,500 grams and neonatal intensive care unit admission. The beneficial effect of cerclage was significant with all cervical lengths less than 25 mm, with seemingly even greater effects with shorter cervical lengths. Also, the earlier the short cervical length was detected, the greater the benefit from cerclage may be (Table 3). More than half of the population included

Method of Allocation Concealment	Description of Withdrawal or Drop-out	Completeness of Follow-up of Randomized Fetuses (%)	Jadad Score[10]
Adequate	No	Unreported	4
Adequate	Yes*	97.2	6
Adequate	Yes	99.6	6
Adequate	Yes	100	6
Adequate	Yes	99.7	6

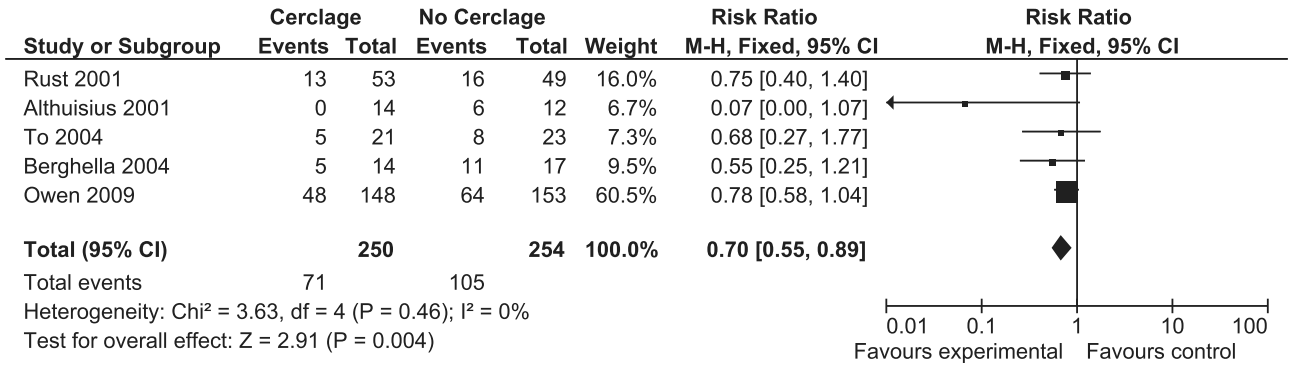

Fig. 3. Forest plot analysis of preterm birth before 35 weeks of gestation.
Berghella. Cerclage for Short Cervical Length. Obstet Gynecol 2011.

was derived from one trial,[9] which then should be used most for clinical correlation.

Assuming approximately 8% of women have previous spontaneous preterm birth (approximately 344,000 women in the United States), of which half occurs before 34 weeks of gestation, approximately 32% would have a cervical length less than 25 mm develop before 24 weeks of gestation (approximately 110,000).[9] The incidence of preterm birth at less than 37 weeks of gestation in this population would decrease from 61% to 40% (Table 3), so that 23,100 preterm births would be prevented. More than 6,500 newborns would be saved from perinatal death. The effect of this intervention is important but clearly is not the solution to the whole problem of preterm birth. Further progress in prevention based on short

Table 3. Selected Outcomes in Women With Previous Preterm Birth, Singleton Gestation, and Short Cervical Length Comparing Those With Cerclage and Those With No Cerclage

Population	Outcome	Cerclage	No Cerclage	RR (95% CI)
Singleton gestation, previous PTB at less than 37 wk, short CL before 24 wk				
CL less than 25 mm	PTB less than 37 wk	105/250 (42)	154/254 (60.6)	**0.70 (0.58–0.83)**
	PTB less than 35 wk	**71/250 (28.4)**	**105/254 (41.3)**	**0.70 (0.55–0.89)**
	PTB less than 32 wk	48/250 (19.2)	75/254 (29.5)	**0.66 (0.48–0.91)**
	PTB less than 28 wk	32/250 (12.8)	51/254 (20.1)	**0.64 (0.43–0.96)**
	PTB less than 24 wk	13/250 (5.2)	28/254 (11)	**0.48 (0.26–0.90)**
	Perinatal mortality	22/250 (8.8)	35/254 (13.8)	0.65 (0.40–1.07)
CL 16–24.9 mm	PTB less than 37 wk	67/170 (39.4)	98/180 (54.4)	**0.74 (0.59–0.93)**
	PTB less than 35 wk	43/170 (25.3)	62/180 (34.4)	0.77 (0.55–1.06)
	PTB less than 32 wk	30/170 (17.6)	42/180 (23.3)	0.80 (0.53–1.21)
	PTB less than 28 wk	18/170 (10.6)	25/180 (13.9)	0.77 (0.44–1.35)
	PTB less than 24 wk	5/170 (2.9)	16/180 (8.9)	**0.38 (0.15–0.94)**
	Perinatal mortality	11/170 (6.5)	19/180 (10.6)	0.63 (0.31–1.26)
CL 15.9 mm or less	PTB less than 37 wk	38/80 (47.5)	56/74 (75.7)	**0.62 (0.48–0.80)**
	PTB less than 35 wk	28/80 (35)	43/74 (58.1)	**0.59 (0.42–0.83)**
	PTB less than 32 wk	18/80 (22.5)	33/74 (44.6)	**0.50 (0.32–0.78)**
	PTB less than 28 wk	14/80 (17.5)	26/74 (35.1)	**0.47 (0.28–0.79)**
	PTB less than 24 wk	8/80 (10)	12/74 (16.2)	0.53 (0.24–1.16)
	Perinatal mortality	11/80 (13.8)	16/74 (21.6)	0.59 (0.31–1.14)
Singleton gestation, previous PTB at less than 37 wk, CL less than 25 mm before 20 wk	PTB less than 35 wk	42/132 (31.8)	63/120 (52.5)	**0.61 (0.45–0.83)**
	Perinatal mortality	15/132 (11.4)	28/120 (23.3)	**0.49 (0.27–0.87)**
Singleton gestation, previous PTB at less than 24 wk, CL less than 25 mm before 24 wk	PTB less than 35 wk	43/140 (30.7)	54/119 (45.4)	**0.71 (0.52–0.96)**
	Perinatal mortality	12/140 (8.6)	21/119 (17.6)	**0.52 (0.27–0.99)**

RR, relative risk; CI, confidence interval; PTB, preterm birth; CL, cervical length.
Data are n/N (%) unless otherise indicated.
Significant results are in bold.

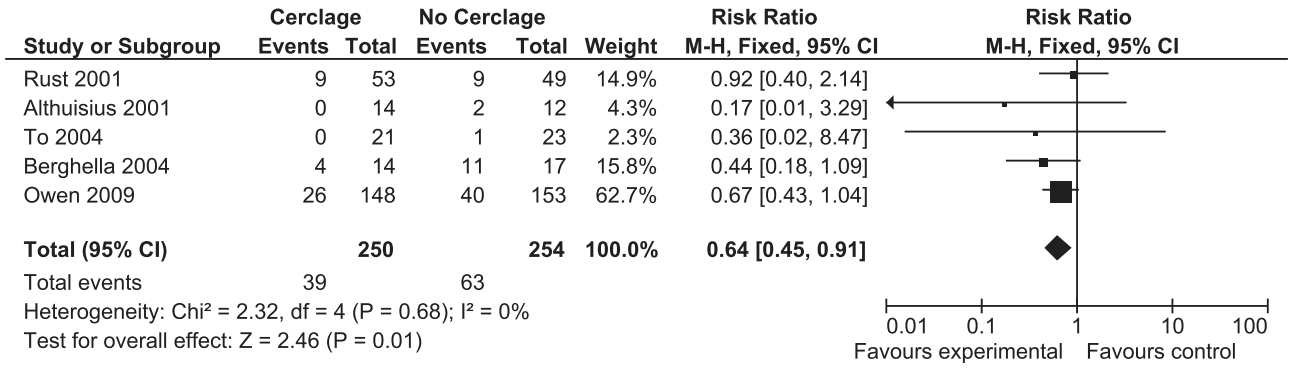

Fig. 4. Forest plot analysis of composite perinatal mortality and morbidity.
Berghella. Cerclage for Short Cervical Length. Obstet Gynecol 2011.

cervical length also will depend on further understanding of the pathophysiology of spontaneous preterm birth.

To optimally select patients for this intervention, cerclage effectiveness should be assessed separately in different populations. All cerclage trials should not be combined into one meta-analysis, because these procedures are performed for different indications and among varying populations. Results of such meta-analyses are not clinically interpretable.[28] Cerclage has not been shown to be beneficial in other populations, including women with only previous preterm births,[13,14] only short cervical length,[4–7] multiple gestations,[8,12] or other risk factors for preterm births.[4–7,13,14] Given this information, the incidence of cerclage in the United States has significantly decreased.[29] Cerclage should be offered only to women who have been shown to benefit from this procedure.

The diagnosis of cervical insufficiency is usually based on recurrent painless second-trimester cervical changes leading to early preterm births.[30] Our control data show that singleton gestations with previous preterm birth found to have a painless cervical length less than 25 mm before 24 weeks of gestation have a 61% incidence of birth before 37 weeks of gestation and 30% before 32 weeks of gestation compared to general U.S. population incidences of 12% and 2%, respectively.[31] It is plausible that women with previous preterm birth with painless cervical length shortening to less than 25 mm in the subsequent pregnancy before 24 weeks of gestation do have a clinically

Table 4. Neonatal Mortality and Morbidities in Women With Prior Preterm Birth, Singleton Gestation, and Short Cervical Length Comparing Those With Cerclage and Those With No Cerclage

Population	Outcome	Cerclage	No Cerclage	RR (95% CI)
Singleton gestation, previous PTB less than 37 wk CL less than 25 mm	Composite perinatal mortality or morbidity[4–7,25]	39/250 (15.6)	63/254 (24.8)	0.64 (0.45–0.91)
	Perinatal mortality[4–7,9]	22/250 (8.8)	35/254 (13.8)	0.65 (0.40–1.07)
	Composite neonatal morbidity[4,5,7,25]*	17/207 (8.2)	28/196 (14.3)	0.60 (0.34–1.06)
	RDS[4,5,7,25]	13/207 (6.3)	21/196 (10.7)	0.61 (0.32–1.19)
	IVH[4,5,7,25]	0/207 (0)	4/196 (2.0)	0.28 (0.05–1.64)
	NEC[4,5,7,25]	1/207 (0.5)	2/196 (1.0)	0.62 (0.08–4.67)
	Sepsis[4,5,7,25]	8/207 (3.7)	17/196 (8.3)	0.47 (0.21–1.05)
	Chronic lung disease[25]	7/135 (5.2)	6/127 (4.7)	1.10 (0.38–3.18)
	Birth weight less than 2,500 g[4–7,9]	86/250 (34.4)	117/249 (47.0)	0.65 (0.42–1.00)†
	Birth weight less than 1,500 g[4–7,9]	42/250 (16.8)	66/249 (26.5)	0.64 (0.45–0.90)
	NICU admission[4,5,7,25]	57/207 (27.5)	67/196 (34.2)	0.63 (0.34–1.18)†

RR, relative risk; CI, confidence interval; PTB, preterm birth; CL, cervical length; RDS, respiratory distress syndrome; IVH, intraventricular hemorrhage (grades III and IV only); NEC, necrotizing enterocolitis; NICU, neonatal intensive care unit.
Data are n/N (%) unless otherwise specified.
* Neonatal morbidity results specific for this population were not available from To et al.[6]
† Random effect.

significant component of cervical insufficiency, and that is why cerclage is beneficial.

Strengths of our study are the inclusion of only randomized trials and the consistency of the results with minimal heterogeneity. It is remarkable that the results of the latest, largest trial[9] confirmed and were consistent with the meta-analysis of the first trials.[8] This meta-analysis differs from the previous meta-analysis[8] we reported on cerclage in that we have now restricted the analysis to only women with previous preterm birth, singleton gestations, and short cervical length. The largest randomized trial performed with this population was recently published[9] and is now added to the analysis. Moreover, perinatal mortality and morbidities are now available and presented in detail. In addition, by using individual patient-level data, we were able to provide information on outcomes not available by using summary statistics from the original trials and to perform specific subgroup analyses. This method of analyzing individual patient level data has been shown to be most reliable in addressing questions unresolved by individual clinical trials.[32]

Limitations of our study are those inherent to any meta-analysis. Although we are not aware of unpublished trials on this topic, publication bias cannot be excluded. Other interventions such as tocolytics, activity restriction, antibiotics, and hormonal therapy were not consistent among patients in different trials. None of these interventions has been definitively proven to benefit this selected group of women. Weekly 17-alpha hydroxyprogesterone caproate, beginning at 16–20 weeks of gestation and continuing until 36 weeks of gestation or delivery is currently recommended for women with previous spontaneous preterm birth, because it has been shown to significantly reduce the risk of preterm birth.[33] Whether this formulation of progesterone has a cumulative effect on prolonging gestation in women who receive ultrasound-indicated cerclage has recently come into question, with a secondary analysis demonstrating no significant additive benefit of progesterone to cerclage.[34] Given these results, it is unlikely that this intervention would alter the results of our analysis, but more research is needed on the interaction of cerclage and progesterone as preventive interventions for preterm birth.

Change in practice is complex and poorly understood and should be based on consistent data from many studies. These results, consistent in five different trials, offer level 1 evidence for benefit from cerclage in a selected population of women at high risk. There is already evidence that history-indicated cerclage, performed for obstetrical risk factors such as previous preterm birth, can be safely replaced by selecting women (ie, those with previous preterm birth) for cerclage based on cervical length screening.[18–20] Women with previous spontaneous preterm birth (between 16 and 34 weeks) and singleton gestation can be offered safe and effective screening with transvaginal ultrasonography. Based on data from the largest trial, this screening should start at approximately 16 weeks and continue every 2 weeks until 23 6/7 weeks, unless the cervical length is 25–29 mm, in which case weekly screening is performed.[9] If cervical length less than 25 mm develops, then the risks and benefits of cerclage should be discussed and cerclage may be recommended for prevention of recurrent preterm birth.

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