Cervical cerclage for short cervix at 24 to 26 weeks of gestation: systematic review and meta-analysis of randomized controlled trials using individual patient-level data

Moti Gulersen, MD, MSc; Erez Lenchner, PhD; Kypros H. Nicolaides, MD; Katsufumi Otsuki, MD; Orion A. Rust, MD; Sietske Althuisius, MD; Eran Bornstein, MD; Vincenzo Berghella, MD

OBJECTIVE: This study aimed to determine whether cervical cerclage for a transvaginal ultrasound-detected short cervical length after 24 weeks of gestation in singleton pregnancies reduces the risk for preterm birth.

DATA SOURCES: Ovid MEDLINE, Scopus, and the Cochrane Central Register of Controlled Trials were searched using the following terms: "cerclage, cervical," "uterine cervical incompetence," "obstetrical surgical procedures," "cervix uteri," "randomized controlled trial," and "controlled clinical trial."

STUDY ELIGIBILITY CRITERIA: All randomized controlled trials comparing cerclage placement with no cerclage in singleton gestations with a transvaginal ultrasound-detected short cervical length ≤25 mm between 24+0/7 and 29+6/7 weeks of gestation were eligible for inclusion.

METHODS: Individual patient-level data from each trial were collected. If an eligible trial included patients with both multiple and singleton gestations with a short cervical length detected either before or after 24+0/7 weeks of gestation, only singletons who presented at or after 24+0/7 weeks were included. The primary outcome was preterm birth <37 weeks' gestation. Secondary outcomes included preterm birth <34, <32, and <28 weeks' gestation, gestational age at delivery, latency, preterm prelabor rupture of membranes, chorioamnionitis, and adverse neonatal outcomes. Individual patient-level data from each trial were analyzed using a 2-stage approach. Pooled relative risks or mean differences with 95% confidence intervals were calculated as appropriate.

RESULTS: Data from the 4 eligible randomized controlled trials were included. A total of 131 singletons presented at 24+0/7 to 26+6/7 weeks of gestation and were further analyzed; there were no data on patients with a cerclage at 27+0/7 weeks' gestation or later. Of those included, 66 (50.4%) were in the cerclage group and 65 (49.6%) were in the no cerclage group. The rate of preterm birth <37 weeks' gestation was similar between patients who were randomized to the cerclage group and those who were randomized to the no cerclage group (27.3% vs 38.5%; relative risk, 0.78; 95% confidence interval, 0.37–1.28). Secondary outcomes including preterm birth <34, <32, and <28 weeks' gestation, gestational age at delivery, time interval from randomization to delivery, preterm prelabor rupture of membranes, and adverse neonatal outcomes such as low birthweight, very low birthweight, and perinatal death were similar between the 2 groups. Planned subgroup analyses revealed no statistically significant differences in the rate of preterm birth <37 weeks' gestation between the 2 groups when compared based on cervical length measurement (≤15 mm or ≤10 mm), gestational age at randomization (24+0/7 to 24+6/7 weeks or 25+0/7 to 26+6/7 weeks), or history of preterm birth.

CONCLUSION: Cervical cerclage did not reduce or increase the rate of preterm birth among singleton pregnancies with a short cervical length detected after 24 weeks of gestation. Because there was a 22% nonsignificant decrease in preterm birth associated with cerclage, which is a similar amount of risk reduction often associated with ultrasound-indicated cerclage before 24 weeks' gestation, further randomized controlled trials in this patient population are warranted.

Key words: cervical length, neonatal morbidity, periviability, prematurity, preterm birth, shortened cervix, viability

Introduction

Preterm birth (PTB) continues to be a leading cause of neonatal morbidity and mortality in the United States

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From the Division of Maternal-Fetal Medicine, Department of Obstetrics and Gynecology, Sidney Kimmel Medical College at Thomas Jefferson University, Philadelphia, PA (Drs Gulersen and Berghella); Biostatistics and Data Management, New York University Rory Meyers College of Nursing, New York, NY (Dr Lenchner); Harris Birthright Research Centre for Fetal Medicine, Kings College Hospital, London, United Kingdom (Dr Nicolaides); Department of Obstetrics and Gynecology, Showa University Koto Toyosu Hospital, Tokyo, Japan (Dr Otsuki); Department of Obstetrics and Gynecology, Lehigh Valley Health Network, Allentown, PA (Dr Rust); Department of Obstetrics and Gynecology, Dr Horacio E. Oduber Hospital, Oranjestad, Aruba (Dr Althuisius); Division of Maternal-Fetal Medicine, Department of Obstetrics and Gynecology, Lenox Hill Hospital, Donald and Barbara Zucker School of Medicine at Hofstra/Northwell, New York, NY (Dr Bornstein).

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Corresponding author: Moti Gulersen, MD, MSc. moti.gulersen@jefferson.edu

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AJOG MFM at a Glance

Why was this study conducted?

Data exploring the use of a cervical cerclage for the management of a short cervical length (≤25 mm) after 24 weeks' gestation are limited.

Key findings

Cervical cerclage did not reduce or increase the rate of preterm birth <37 weeks' gestation in singletons with a short cervical length detected at 24 to 26 weeks of gestation. Planned subgroup analyses revealed no statistically significant differences in preterm birth <37 weeks' gestation based on different cervical length cutoffs, gestational ages of randomization, or preterm birth history and type of cerclage.

What does this add to what is known?

Given our small sample size and limited power to detect significant differences for our outcomes, a larger, randomized controlled trial focusing exclusively on this patient population is needed.

and represents a major public health concern.[1–5] Consequently, significant research efforts have focused on early identification and management strategies for patients at risk.[6] For example, a short cervical length (CL) ≤25 mm measured on transvaginal ultrasound (TVU) in the second trimester has been shown to identify patients at increased risk for PTB.[6–11]

Subsequently, a number of different treatment options in this select patient population have been explored in efforts to reduce the associated risk of PTB, such as progesterone supplementation, cervical cerclage, and pessary.[12–20] Surgical management with cerclage has been established as an effective intervention for patients with a short CL and a history of spontaneous PTB.[21–23] Furthermore, recent data have suggested cerclage may be useful for patients with a short CL or progressively shortening CL in the absence of a previous PTB.[24–26]

Current TVU CL screening-based intervention concepts for patients identified to be at increased risk for PTB have largely been derived from randomized controlled trials (RCTs) that focused on patients with a short TVU CL identified during screening between 16+0/7 and 23+6/7 weeks of gestation.[12–18] However, a short CL may be identified in patients at later gestational ages, but the evidence supporting risk reduction strategies at these gestational ages is lacking.[27,28] Thus, professional societies, such as the American College of Obstetricians and Gynecologists, have advised against the placement of cerclage in pregnancies at 24 weeks of gestation or later.[21] The selection of this rather arbitrary gestational age threshold, in the past also commonly referred to as fetal viability,[29] has no support in the form of well-designed studies that evaluated the safety and efficacy associated with cerclage use in these settings.

EDITOR'S CHOICE

Objective

We set out to determine whether cerclage for a TVU-determined short CL detected between 24+0/7 and 29+6/7 weeks of gestation in singleton pregnancies reduces the risk for PTB.

Methods

The review protocol for this study was established by 2 of the investigators (M. G., V.B.) and registered with the International Prospective Register of Systematic Reviews under registration number CRD42022361845 before initiation.

Eligibility criteria, information sources, search strategy

Ovid MEDLINE, Scopus, and the Cochrane Central Register of Controlled Trials (Cochranelibrary.org, which includes Pubmed, CINAHL, Embase, ICTRP, and ClinicalTrials.Gov) were searched using the following terms from inception of each database until October 4, 2021: "cerclage, cervical," "uterine cervical incompetence," "obstetrical surgical procedures," "cervix uteri," "randomized controlled trial," and "controlled clinical trial," and appropriate subject headings. No language or geographic restrictions were applied. The full search strategy is available in Appendix 1.

Study selection

All RCTs comparing cerclage placement with no cerclage in singleton gestations with a TVU-detected short CL (≤25 mm) between 24+0/7 and 29+6/7 weeks of gestation were eligible for inclusion. Quasi-randomized trials, trials evaluating history-indicated cerclage (ie, placed for the sole indication of a previous PTB) or physical examination-indicated cerclage (ie, placed for second-trimester cervical dilation detected during a physical examination), and those with multiple gestations were excluded. If an eligible trial included patients with both multiple and singleton gestations with a TVU-determined short CL detected either before or after 24+0/7 weeks of gestation, only singletons who presented at or after 24+0/7 weeks' gestation were included.

Data extraction

Corresponding authors of all included trials were contacted to request access to their data to perform this meta-analysis using individual patient-level data. Authors were asked to provide de-identified data on the baseline characteristics, interventions, and outcome measures for each study participant and were invited to become part of the collaborative group with joint authorship of the final publication. Subsequently, data provided by the investigators were merged into a master database specifically constructed for this review, which were checked for missing information, errors, and inconsistencies by cross-referencing the publications of the original trials. Quality and integrity of the randomization processes in each trial were assessed by reviewing the chronological randomization sequence and pattern of assignment and the balance of baseline

characteristics between the groups. Inconsistencies or missing data were discussed with the authors and corrections were made when deemed necessary.

Assessment of risk of bias

The risk of bias in each included trial was assessed by using the criteria and algorithm outlined in the Cochrane Handbook for Systematic Reviews of Interventions.[30] Five domains related to risk of bias were assessed in each included trial because there is evidence that suggest that the following issues are associated with biased estimates of treatment effect: (1) randomization process; (2) deviations from the intended interventions; (3) missing outcome data; (4) measurement of the outcome; and (5) selection of the reported result. The review authors' judged the studies as being at low risk, high risk, or with some concerns of bias.

Data synthesis

Primary and secondary outcomes were established a priori. The primary outcome was PTB <37 weeks' gestation. Secondary outcomes included PTB <34, <32, and <28 weeks' gestation, gestational age at delivery, latency (ie, time interval from randomization to delivery), rates of preterm prelabor rupture of membranes (PPROM), chorioamnionitis, and neonatal outcomes including birthweight (low if <2500 g or very low if <1500 g), admission to the neonatal intensive care unit (NICU), and perinatal death (defined as either stillbirth or death of a live-born baby within the first 28 weeks after delivery). Planned subgroup analyses evaluating the primary outcome of PTB <37 weeks' gestation were also assessed according to different CL cutoffs (≤15 and ≤10 mm), gestational ages at randomization (24+0/7 to 24+6/7 weeks and 25+0/7 to 26+6/7 weeks), and PTB history and type of cerclage.

Baseline characteristics of the included patients obtained in the master database were compared between the 2 groups using chi-square, Fisher's exact, or Student's *t* tests when appropriate, with statistical significance set at $P<.05$. Statistical analysis of primary and secondary outcomes included the use of a 2-stage approach. First, individual patient-level data from each trial were analyzed separately to produce study-specific estimates of the relative treatment effect. A combined estimate was then obtained in the second step by calculating a weighted average (inverse error-variance–based) of the individual estimates using methods analogous to meta-analyses of aggregate data. Between-study heterogeneity was explored using the I^2 statistic, which represents the percentage of between-study variation that is caused by heterogeneity instead of by chance. The meta-analysis was performed using the random effects model of DerSimonian and Laird to produce summary treatment effects in terms of either a relative risk (RR) or a mean difference (MD) with a 95% confidence interval (CI).

All review stages were conducted independently by 2 authors (M.G., V.B.). The 2 authors independently assessed the electronic search, eligibility of the studies, inclusion criteria, risk of bias, and data extraction. Data analyses were performed with a third author (E.L.).

The meta-analysis was reported according to the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) statement.[31]

Results

Study selection

A flow diagram summarizing the study identification and selection strategy in accordance with the PRISMA 2020 guidelines is shown in Figure 1. Data from 4 RCTs were included in the meta-analysis.

Study characteristics

The characteristics of the included trials are displayed in Table 1. A short CL was defined as a CL <25 mm in 3 of the 4 included trials and as a CL ≤15 mm in the trial by To et al[16] (Table 1). Two trials performed McDonald cerclages only, whereas To et al[16] used Shirodkar cerclage only and Otsuki et al[17] used either McDonald or Shirodkar cerclage (Table 1). Antibiotic and tocolytic therapy were used in 3 of the 4 included trials (Table 1). Three trials routinely recommended similar activity restrictions for patients in both the cerclage and no cerclage groups, whereas activity restriction was not routinely recommended in the trial by To et al.[16] Patients who received a cerclage had it removed between 36+0/7 and 37+6/7 weeks of gestation unless spontaneous onset of labor, ruptured membranes, or a need for early delivery occurred sooner.

Of the 507 pregnancies with TVU-measured CL ≤25 mm randomized to cerclage placement or to no cerclage placement, 131 singletons presented at or after 24+0/7 weeks of gestation and were further analyzed. Of those, 66 (50.4%) were included in the cerclage group and 65 (49.6%) were included in the no cerclage group. A comparison of the baseline characteristics of the 2 groups are displayed in Table 2. Randomization occurred at a later mean gestational age in the cerclage group than in the no cerclage group (24.75 vs 24.44 weeks; $P=.004$) (Table 2). Mean CL at randomization was similar between the 2 groups (14.66 vs 12.86 mm; $P=.06$) (Table 2).

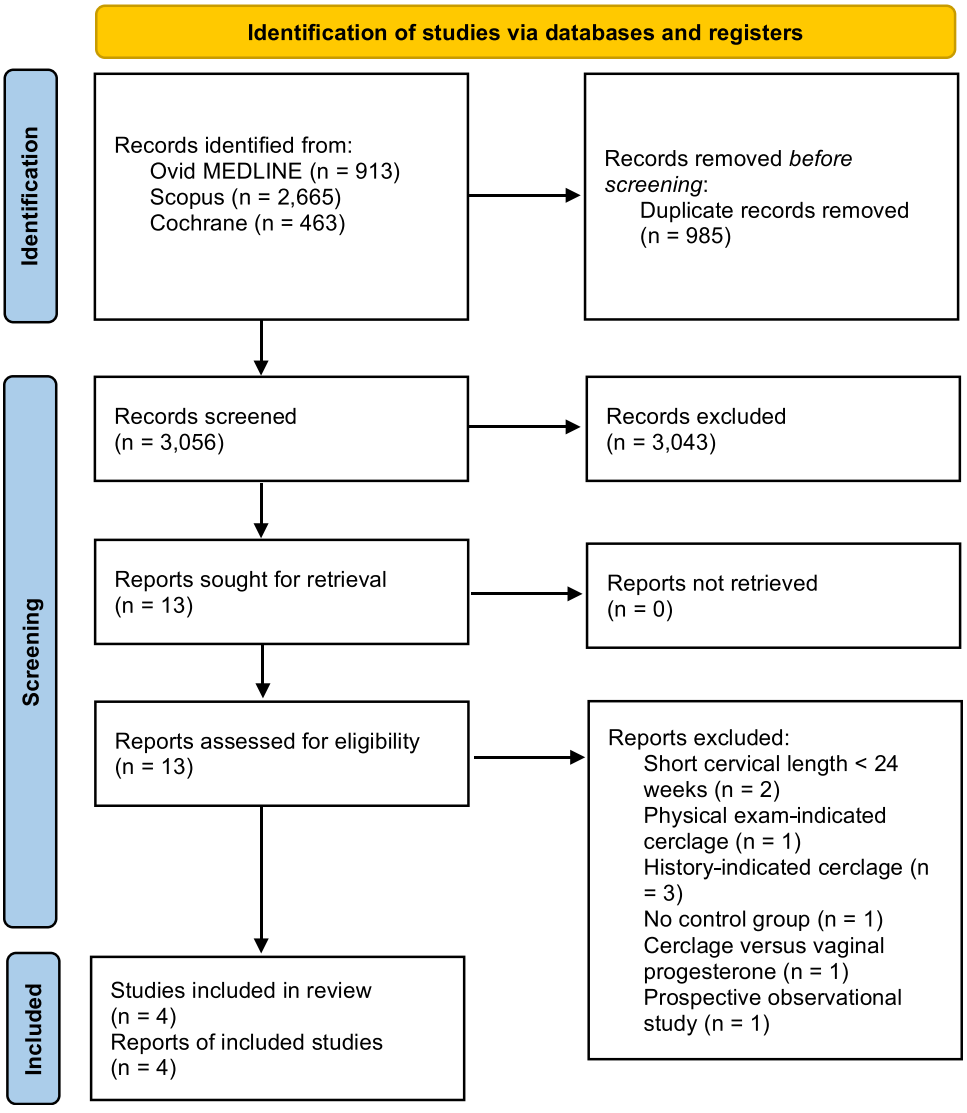
Risk of bias of included studies

The overall risk of bias was low in 3 of the 4 included trials (Figure 2). All studies had a low risk of bias in terms of the randomization process, deviations from the intended interventions, measurement of the outcome, and selection of the reported result (Figure 2). Statistical heterogeneity between the trials was low ($I^2=0\%$) with no inconsistency in the primary and secondary outcomes.

Synthesis of results

The rate of PTB <37 weeks' gestation was similar between patients who were randomized to cerclage and those who were randomized to no cerclage (27.3% vs 38.5%; RR, 0.78; 95% CI, 0.37–1.28) (Table 3, Figure 3). Secondary outcomes including PTB <34, <32, and <28 weeks' gestation, gestational age at delivery, time interval from randomization to delivery, PPROM, and adverse neonatal outcomes such low birthweight, very low birthweight, and perinatal death were similar between the 2

FIGURE 1
PRISMA 2020 flow diagram of identified studies



PRISMA, Preferred Reporting Items for Systematic Reviews and Meta-analyses.

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groups (Table 3). Data regarding the rates of chorioamnionitis were available for 1 trial, whereas data regarding the rates of NICU admission were available for 2 trials; thus, combined estimates were not performed for these outcomes.

Planned subgroup analyses revealed no statistically significant differences in the rate of PTB <37 weeks' gestation between the 2 groups based on CL measurement (≤15 or 10 mm), gestational age at randomization (24+0/7 to 24+6/7 or 25+0/7 to 26+6/7 weeks), history of PTB, or McDonald cerclage type (Table 4). Although nonsignificant, there seems to be a possible reduction in PTB with cerclage among patients with a TVU-determined CL ≤10 mm and among those with a previous PTB (Table 4).

Comment

Main findings

The results of this individual patient-level data meta-analysis illustrate that cervical cerclage did not reduce or increase the rate of PTB among singleton gestations with a short CL detected at 24 to 26 weeks of gestation. Furthermore, planned subgroup analyses revealed no statistically significant differences in PTB <37 weeks' gestation at different CL cutoffs, gestational ages at randomization, or based on PTB history and type of cerclage.

Strengths and limitations

This study has several strengths. We addressed an important and understudied topic by evaluating the use of

TABLE 1
Characteristics of randomized controlled trials included in the systematic review and meta-analysis using individual patient-level data

Reference	Country	Sample size included[a]	GA at randomization	Definition of short TVU CL	Type of cerclage	Antibiotic therapy	Tocolytic therapy	Primary outcome
Rust et al,[14] 2001	United States	21 (6 vs 15)	24+0/7 to 24+6/7	<25 mm	McDonald	Clindamycin 900 mg IV every 8 h for 48–72 h	Indomethacin 100 mg loading dose rectally, followed by 50 mg PO every 6 h for 48–72 h	PTB <34 wk
Althuisius et al,[15] 2001	The Netherlands	5 (3 vs 2)	24+0/7 to 26+6/7	<25 mm	McDonald	amoxicillin and clavulanic acid 1 g IV every 6 h and metronizadole 500 mg IV every 8 h for 24 h, followed by amoxicillin or clavulanic acid PO every 8 h for 6 d	Indomethacin 100 mg, 2 h before and 6 h after surgery	PTB <34 wk
To et al,[16] 2004	International	68 (32 vs 36)	24+0/7 to 24+6/7	≤15 mm	Shirodkar	None	None	PTB <33 wk
Otsuki et al,[17] 2016	Japan	37 (25 vs 12)	24+0/7 to 26+6/7	<25 mm	McDonald (n=13), Shirodkar (n=12)	Ampicillin 2 g/d for 2 d	Ritodrine 100 μg/min IV until the day after surgery and for no longer than 2 d	GA at delivery

CL, cervical length; *GA*, gestational age; *IV*, intravenous; *PO*, oral administration; *PTB*, preterm birth; *TVU*, transvaginal ultrasound.

[a] Cerclage group vs no cerclage group.

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cerclage for the management of a TVU-determined short CL detected after 24 weeks of gestation in singleton gestations. We included individual patient-level data from all RCTs, which were of high quality and mostly at low risk of bias, to provide evidence for this specific population. Patient-level data also allowed for subgroup analyses based on key characteristics that may independently impact PTB risk. Each trial utilized the intention-to-treat principle and statistical heterogeneity was very low in the studies. Furthermore, baseline characteristics were similar between the 2 groups. Although a statistically significant difference was detected, the gestational ages at randomization were nearly identical in both groups, conferring no significant clinical differences for this variable.

This study also has several limitations. Despite no previously published trials reporting PTB outcomes of cerclage vs no cerclage after 24 weeks of gestation, our sample size was relatively small, and 1 trial included only 5 patients. This may have limited the power to detect significant differences in our primary and secondary outcomes. In fact, there was a 22% nonstatistically significant decrease in PTB associated with cerclage, which is similar to the decrease often associated with ultrasound-indicated cerclage before 24 weeks' gestation; thus, a type II error is probable. Moreover, all RCTs seemed to show a similar trend, which gives further credit to the possible benefit of cerclage in this population. Therefore, our data provide guidance for future research that will explore the safety and efficacy of cerclage in the latter part of the second trimester. Other limitations include those that are inherent to the included RCTs. There was heterogeneity in practice patterns between the trials included, such as CL cutoff for inclusion, cerclage and suture type, and the use of perioperative tocolytic and antibiotic treatments. For example, only patients with a CL of ≤15 mm were eligible for inclusion in the trial by To et al,[16] which may indicate a higher risk population.[16] Vaginal progesterone, an effective treatment in reducing the

TABLE 2
Baseline characteristics for the 2 groups

Characteristics	Cerclage (n=66)	No cerclage (n=65)	*P* value
Maternal age (y)	30.85±6.02	29.16±6.15	.06
Race			
White	16/66 (24.2)	28/65 (43.1)	.06
Black	21/66 (31.8)	21/65 (32.3)	
Asian	27/66 (40.9)	14/65 (21.5)	
Hispanic	2/66 (3.0)	2/65 (3.1)	
History of preterm birth	16/66 (24.2)	21/65 (32.3)	.3
History of cervical surgery	2/66 (3.0)	6/65 (9.2)	.2
Smoking	2/58 (3.4)	4/50 (8.0)	.4
GA at randomization (wk)	24.75±0.75	24.44±0.60	.004
CL at randomization (mm)	14.66±6.40	12.86±6.92	.06
Mode of delivery			
Vaginal	48/60 (80.0)	45/50 (90.0)	.2
Cesarean	12/60 (20.0)	5/50 (10.0)	

CL, cervical length; *GA*, gestational age.

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associated risk of PTB among patients with a short cervical length and also when used in combination with cerclage,[12,13,25] was not used in any of the included randomized trials. Data regarding cervical dilation at the time of cerclage placement was not reported in any of the trials. Lastly, a relatively low percentage of patients included in this analysis had a previous PTB. Although evidence has mainly supported cerclage for patients with a short CL detected at < 24 weeks of gestation and for those with a previous PTB,[22] the use of this intervention for patients with a similar poor obstetrical history at later gestational ages requires further study.

Comparison with existing literature

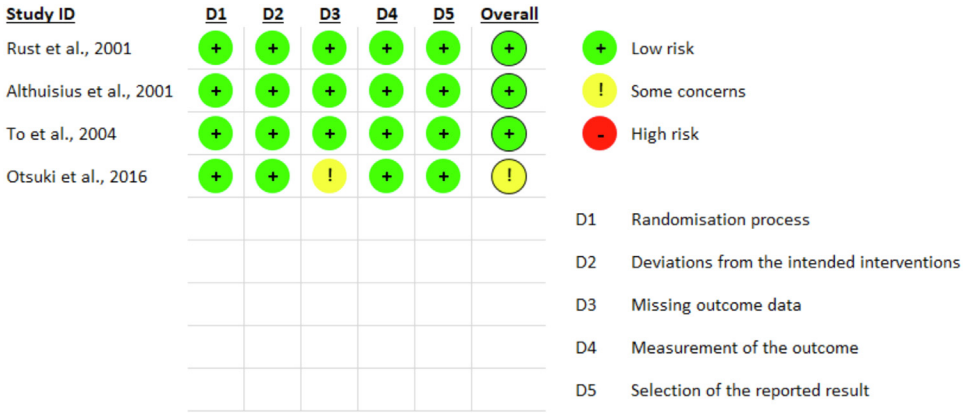
With our search strategy, we were unable to identify any previously performed randomized trials that evaluated the use of cerclage specifically in patients with a short CL after 24 weeks of gestation. Three previous meta-analyses of randomized trials have investigated whether cerclage prevents PTB in singletons with a second-trimester short CL.[22,24,32] Berghella et al[32] first reported cerclage as an effective treatment option in singletons with a short CL (<25 mm), which reduced the risk for PTB <35 weeks' gestation (RR, 0.74; 95% CI, 0.57−0.96) regardless of PTB history.[32] Although 3 of the trials from this meta-analysis were included in that study, most of the patients in their analysis were screened before 24 weeks of gestation, and a subgroup analysis of patients who were randomized at 24 weeks' gestation or later was not performed. After inclusion of a multicenter trial of cerclage for PTB prevention among high-risk patients between 16 and 23 weeks' gestation by Owen et al, Berghella and colleagues reported that cerclage reduced the risk for PTB <37 weeks' gestation and composite perinatal morbidity and mortality in singletons with a short CL (<25 mm) and a previous spontaneous PTB (RR, 0.70; 95% CI, 0.58−0.83).[22] Consequently, offering a cerclage for this select population has become standard of care.[21] However, patients with a short CL at 24 weeks' gestation or later were excluded from their analysis.[22] Lastly, in efforts to determine whether cerclage is an effective intervention for singleton gestations with a short CL and no history of PTB, Berghella et al[24] reported no significant differences in PTB <37 weeks' gestation (RR, 0.93; 95% CI, 0.73−1.18) and adverse perinatal outcomes among patients who were randomized to cerclage when compared with no cerclage.[24] A subgroup analysis of patients with an extremely short CL (<10 mm) who received a cerclage suggested benefit.[24] Given that a history of PTB represents one of the strongest risk factors for recurrent PTB,[6] it is possible that our findings of no statistically significant decrease in PTB rates after cerclage may have been caused by a large proportion of patients with no PTB history in our study.

Conclusions and implications

There are several clinical and research implications from this study. Although decades of research have demonstrated that a short CL is a risk factor for PTB and supported the use of cerclage as an intervention for PTB risk reduction, no studies have evaluated the use of cerclage specifically after 24 weeks of gestation. This may be a result of TVU CL screening strategies being most commonly performed at 16 to 24 weeks of gestation either at the comprehensive fetal anatomic evaluation or in high-risk patients undergoing serial CL surveillance.[6] However, studies have also suggested an increased risk for PTB associated with a short CL that was detected after 24 weeks of gestation; in particular, between 24 and 28 weeks' gestation because cervical shortening after 28 weeks occurs naturally.[7,26,27] Interventions to reduce the risk of PTB in this patient population should be explored, especially for those at highest risk such as those with a previous PTB.

Further complicating the clinical picture is the concept of fetal viability as a threshold for cerclage placement. Practitioners may hesitate to perform a cerclage at a gestational age, such as at and after 24 weeks of gestation, at which neonatal survival becomes increasingly likely because of risks of procedure-related complications such as PPROM

FIGURE 2
Assessment of risk of bias



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or preterm labor. However, advances in neonatal care and resuscitation, along with use of antenatal corticosteroids, have led to improved rates of neonatal survival and survival without major morbidity at gestational ages as early as 22 weeks of gestation[33–35] when cerclages are routinely performed. Neonatal morbidity and mortality remain high after 24 weeks of gestation,[33] and thus, the threshold of viability should not be considered a reason to withhold a potentially beneficial intervention.

Identifying the most appropriate candidates for cerclage placement after 24 weeks of gestation and the upper gestational age limit is of importance. CL shortening in patients after 24 weeks' gestation may be more commonly associated with preterm labor and thus an evaluation for preterm labor and intra-amniotic infection may be considered before cerclage placement in these patients. Furthermore, given that the risk for PTB increases as CL shortens,[8] it is possible that patients with an extremely short CL (≤10 mm)

TABLE 3
Comparison of the primary and secondary outcomes between the 2 groups

Outcome	Cerclage (n=66)	No cerclage (n=65)	RR or MD (95% CI)	I^2 (%)	Q-statistic
PTB <37 wk	18/66 (27.3)	25/65 (38.5)	0.78 (0.37–1.28)	0.000	0.756
PTB <34 wk	10/66 (15.2)	12/65 (18.5)	0.96 (0.46–1.99)	0.000	0.338
PTB <32 wk	8/66 (12.1)	8/65 (12.3)	1.08 (0.46–2.52)	0.000	0.107
PTB <28 wk	6/66 (9.1)	6/65 (9.2)	1.44 (0.48–4.32)	0.000	0.341
GA at delivery (wk)	37.1±4.04	36.6±3.97	0.46 (−0.93 to 1.84)	0.000	1.130
Latency (wk)	12.3±4.11	12.2±3.94	0.13 (−1.26 to 1.53)	0.000	1.200
PPROM	5/46 (10.9)	7/60 (11.7)	0.91 (0.34–2.48)	0.000	0.021
Chorioamnionitis[a]	1/9 (11.1)	1/17 (5.9)	—	—	—
Birthweight (g)	2789.4±769.92	2769.4±762.32	19.99 (−247.1 to 287.1)	0.000	0.92
LBW	15/65 (23.1)	15/64 (23.4)	1.04 (0.53–2.06)	0.000	0.703
VLBW	6/65 (9.2)	6/64 (9.4)	1.07 (0.40–2.87)	0.000	0.108
NICU admission[b]	3/25 (12.0)	0/12 (0)	—	—	—
Perinatal death	3/66 (4.5)	1/65 (1.5)	1.71 (0.36–8.08)	0.000	0.909

When ≤2 studies had the applicable information, the meta-analysis was not conducted.

CI, confidence interval; *GA*, gestational age; *LBW*, low birthweight; *MD*, mean difference; *NICU*, neonatal intensive care unit; *PPROM*, preterm prelabor rupture of membranes; *PTB*, preterm birth; *RCT*, randomized controlled trial; *RR*, relative risk; *VLBW*, very low birthweight.

[a] Available for 2 RCTs; [b] Available for 1 RCT.

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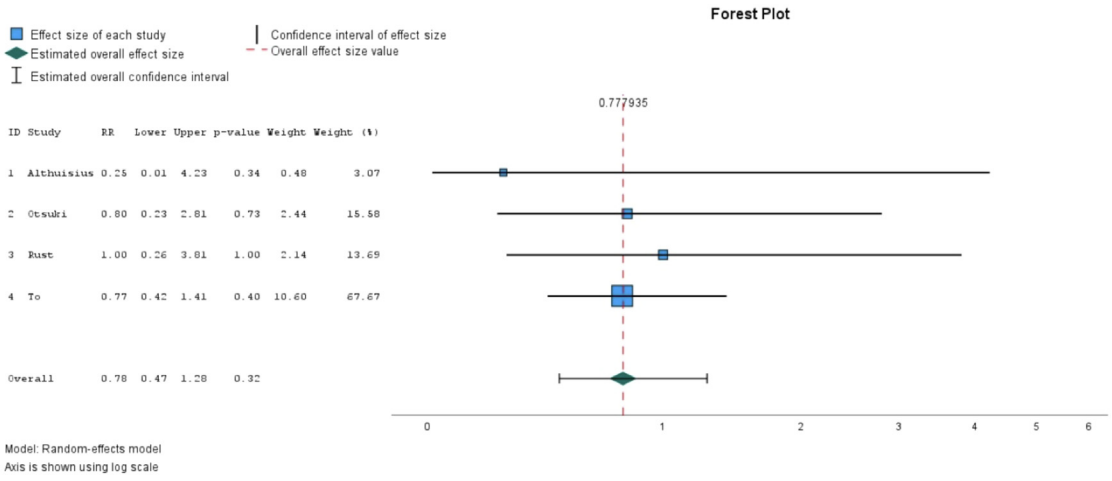
FIGURE 3
Forest plot of risk for preterm birth <37 weeks



RR, relative risk.

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may benefit more from cerclage placement than those with a longer CL (11–25 mm).

Based on these individual patient-level data from 4 RCTs, cerclage did not lead to a statistically significant reduction in PTB in singleton gestations with a short CL between 24 and 27 weeks of gestation. Nevertheless, we did however detect a nonstatistically significant decrease of 22% in PTB associated with cerclage placement, which is a similar magnitude to the reduction often associated with ultrasound-indicated cerclage before 24 weeks, suggesting that we may have been underpowered to detect this change. Although nonsignificant, a possible best effect of cerclage in reducing PTB seemed to be best in patients with TVU CL ≤10 mm, and in those with prior PTB. Given our small sample size and limited power to detect significant differences in our outcomes, a larger RCT focusing exclusively on this patient population is needed before drawing definitive conclusions. A power analysis (power of 0.8 and significance level of 0.05), assuming a baseline PTB rate of 50% including mostly patients with a history of PTB, would require 148 patients in each group to detect a 33% reduction of PTB < 37 weeks. Efforts to initiate this trial are underway, and collaborators welcomed. ■

TABLE 4
Subgroup analyses or primary outcome of preterm birth <37 weeks

Subgroup	Cerclage	No cerclage	RR (95% CI)	I^2 (%)	Q-statistic
CL ≤15 mm	13/38 (34.2)	20/45 (44.4)	0.78 (0.45–1.36)	0.000	0.156
CL ≤10 mm	8/23 (34.8)	17/25 (68.0)	0.55 (0.30–1.02)	0.000	0.079
GA at randomization 24.0–24.9 wk	12/45 (26.7)	21/58 (36.2)	0.84 (0.45–1.55)	0.000	0.085
GA at randomization 25.0–26.9 wk	6/21 (28.6)	4/7 (57.1)	0.62 (0.22–1.76)	0.000	0.336
History of preterm birth	3/16 (18.8)	10/21 (47.6)	0.55 (0.18–1.64)	0.000	0.368
No history of preterm birth	15/50 (30.0)	10/44 (22.7)	0.99 (0.54–1.83)	0.001	0.403
McDonald cerclage	4/22 (18.2)	4/22 (18.2)	1.00 (0.31–3.24)	0.000	0.000
Shirodkar cerclage[a]	14/44 (31.8)	14/44 (31.8)	—	—	—

For some of the outcomes, the information was not available for all studies. (eg, CL ≤15 mm, CL ≤10 mm). When ≤2 studies had the applicable information, the meta-analysis was not conducted.

CI, confidence interval; *CL*, cervical length; *GA*, gestational age; *RCT*, randomized controlled trial; RR, relative risk.

[a] Available for 2 RCTs.

Gulersen. Cerclage for short cervix at 24 to 26 weeks of gestation. Am J Obstet Gynecol MFM 2023.

Supplementary materials

Supplementary material associated with this article can be found in the online version at doi:10.1016/j.ajogmf.2023.100930.

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