Society for Maternal-Fetal Medicine
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SMFM Consult Series

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SMFM Consult Series #70: Management of short cervix in individuals without a history of spontaneous preterm birth

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Most deliveries before 34 weeks of gestation occur in individuals with no previous history of preterm birth. Midtrimester cervical length assessment using transvaginal ultrasound is one of the best clinical predictors of spontaneous preterm birth. This Consult provides guidance for the diagnosis and management of a short cervix in an individual without a history of preterm birth. The following are Society for Maternal-Fetal Medicine recommendations: (1) we recommend that all cervical length measurements used to guide therapeutic recommendations be performed using a transvaginal approach and in accordance with standardized procedures as described by organizations such as the Perinatal Quality Foundation or the Fetal Medicine Foundation (GRADE 1C); (2) we recommend using a midtrimester cervical length of ≤25 mm to diagnose a short cervix in individuals with a singleton gestation and no previous history of spontaneous preterm birth (GRADE 1C); (3) we recommend that asymptomatic individuals with a singleton gestation and a transvaginal cervical length of ≤20 mm diagnosed before 24 weeks of gestation be prescribed vaginal progesterone to reduce the risk of preterm birth (GRADE 1A); (4) we recommend that treatment with vaginal progesterone be considered at a cervical length of 21 to 25 mm based on shared decision-making (GRADE 1B); (5) we recommend that 17-alpha hydroxyprogesterone caproate, including compounded formulations, not be prescribed for the treatment of a short cervix (GRADE 1B); (6) in individuals without a history of preterm birth who have a sonographic short cervix (10–25 mm), we recommend against cerclage placement in the absence of cervical dilation (GRADE 1B); (7) we recommend that cervical pessary not be placed for the prevention of preterm birth in individuals with a singleton gestation and a short cervix (GRADE 1B); and (8) we recommend against routine use of progesterone, pessary, or cerclage for the treatment of cervical shortening in twin gestations outside the context of a clinical trial (GRADE 1B).

Key words: cerclage, cervical length, cervical pessary, endocervical ultrasound, health disparities, perinatal morbidity, perinatal mortality, singleton gestation, transvaginal ultrasound, twin gestation, vaginal progesterone

Introduction

Preterm birth (PTB) remains the leading cause of perinatal morbidity and mortality in the United States. Overall, 90% of deliveries before 34 weeks of gestation[1,2] and 85% of deliveries before 37 weeks of gestation[3] occur in individuals with no previous history of PTB, including nulliparas. Different risk stratification methods, including cervical length (CL) screening, have been employed to address this challenge. The reported prevalence of short cervix in individuals without a previous spontaneous PTB (SPTB) ranges from 1.7% to 7.9%, depending on the population, the gestational age at assessment, and the CL threshold used.[4,5] The presence of a short cervix is associated with subsequent PTB. Although the sensitivity and positive predictive value (PPV) of a midtrimester CL measuring ≤25 mm resulting in SPTB before 37 weeks of gestation are low in nulliparas (8% and 16%, respectively), transvaginal midtrimester CL assessment is one of the better available clinical predictors of SPTB.[4] Because of the association of a short cervix with subsequent PTB, second-trimester evaluation of the cervix is recommended by the American Institute of Ultrasound in Medicine, the American College of Radiology, the American College of Obstetricians and Gynecologists, the Society for Maternal-Fetal Medicine, and the Society of Radiologists in Ultrasound. Transvaginal evaluation is recommended when an abnormality of the cervix (eg, suspected shortening) is identified on transabdominal evaluation or when the cervix is not adequately visualized.[6]

Substantial ethnic and racial disparities in the rates of SPTB persist and contribute to ongoing differences in health outcomes. From 2019 to 2021 in the United States,

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non-Hispanic Black pregnant people had a PTB rate of 14.4% compared with 9.3%, 10.0%, and 9.0% in White, Hispanic, and Asian or Pacific Islander pregnant people, respectively.[7] Multiple studies have shown that even after controlling for socioeconomic factors, these disparities remain.[8] Although the underlying mechanisms are poorly defined, systemic racism and its effects on access to care, patient management, stress, and the individual patient experience are likely substantial contributing factors.[9] PTB is associated with an increased risk of short- and long-term adverse health and economic outcomes, worsening health disparities for years to come. These long-lasting consequences emphasize the need for effective ways to reduce the public health burden of PTB.

How is short cervix diagnosed in an individual without a prior preterm birth, and what is the significance of this finding?

Assessment of the cervix should be attempted at the 18 to 22-week anatomy ultrasound using either a transabdominal or transvaginal approach.[6] Because of the increased resource burden associated with universal transvaginal CL measurement, some have proposed using transabdominal CL measurement as a prescreening measurement to identify patients at the highest risk of cervical shortening and for whom transvaginal CL measurement should be performed. Of note, 1 group of investigators reported that a prevoid transabdominal CL measurement of <36 mm detects 96% of patients with a transvaginal CL of ≤25 mm while avoiding transvaginal ultrasound examination in 40% of patients.[10] CL assessment via transabdominal ultrasound is possible in some patients, but appropriate visualization of the anatomic landmarks can make assessment more difficult, resulting in variable correlation of measurements obtained via a transabdominal approach with those obtained via the gold standard transvaginal approach.[10–12] Transperineal assessment of CL has been shown to have a good correlation with transvaginal measurements in several observational cohorts;[13,14] however, data on the clinical use and demonstrated effectiveness in clinical trials are limited. Although transabdominal and transperineal approaches to CL measurement have been studied, there are insufficient data to recommend a specific threshold measurement that should trigger transvaginal assessment.

Even when assessed vaginally, variation in measurement accuracy has been described, leading to recommendations for the development of standardized protocols and accreditation and quality assurance programs.[15] Although a transabdominal or transperineal approach to CL measurement may be useful for initial screening to decrease the number of transvaginal examinations needed, to maximize reproducibility and clinical use of the CL measurement, **we recommend that all CL measurements used to guide therapeutic recommendations be performed using a transvaginal approach and in accordance with standardized procedures as described by organizations such as the Perinatal Quality Foundation or the Fetal Medicine Foundation (GRADE 1C).**

Traditionally, a CL below the 10th percentile for gestational age has been used as an arbitrary cutoff to dichotomize the diagnosis of a short cervix. At 18 to 24 weeks of gestation, the 10th percentile corresponds to a CL of <26 mm.[16] Individuals with singleton gestations with a CL of ≤25 mm at 24 weeks of gestation have a 6-fold increased risk of PTB. This likely represents a continuum, given that there is an increasing risk of PTB with decreasing CL.[16] In 1 study of unselected pregnant patients at 22 to 24 weeks of gestation, only 1.7% had a CL <15 mm, but they accounted for 86% of PTB at <28 weeks of gestation and 58% of PTB at <32 weeks of gestation.[5] At the extreme end of this spectrum, once no appreciable CL can be measured, the risk of delivery before 32 weeks of gestation rises to 75%, and the median interval between diagnosis and delivery is 3 weeks. However, it should also be emphasized that, even with no appreciable CL, not all patients deliver before 32 weeks of gestation.[16,17]

The positive and negative predictive values of transvaginal CL screening are highly dependent on the population being screened, especially for predicting PTB at later gestational ages. Patients with a history of a previous SPTB and a short CL are at the highest risk.[16] A recent observational study of nulliparous patients reported that a CL cutoff of 25 mm at 16 to 22 weeks of gestation identified only 8% of patients with SPTB at <37 weeks of gestation.[4] The specificity of a short CL is related to the cutoff used. In an unselected cohort, the specificity of a CL of ≤20 mm for PTB at <34 weeks of gestation was 99.9% (95% confidence interval [CI], 99.8%–100.0%). For a CL of ≤30 mm, specificity decreased to 90.1% (95% CI, 89.0%–91.2%).[18] The PPV of a midtrimester CL of <25mm for subsequent PTB at later gestational ages (<34 to 35 weeks) is as high as 81.0% in high-risk cohorts with a previous SPTB but is only 26.3% to 39.1% in the general obstetrical population.[18–21] A prospective cohort study of 9410 nulliparas with a prevalence of SPTB of 5% reported PPVs of commonly used CL thresholds measured at 16 to 22 weeks of gestation. For PTB at <37 weeks of gestation, the PPVs were 16.2% (likelihood ratio [LR], 3.67; 95% CI, 2.39–4.95) for a threshold of 25 mm and 15.5% (LR, 3.49; 95% CI, 1.77–5.21) for a threshold of 20 mm.[4] The PPVs for PTB at <32 weeks of gestation were lower at 7.4% (LR, 10.39; 95% CI, 5.73–15.06) using 25 mm and 8.6% (LR, 12.26; 95% CI, 4.87–19.64) using 20 mm (Table).

Despite these limitations, the finding of a short CL, irrespective of previous pregnancy history, has been consistently and reproducibly associated with an elevated risk of SPTB. However, based on observational data alone, there is no universally agreed upon threshold for the diagnosis of a short cervix. Most clinicians use 20 or 25 mm as the threshold for offering or recommending treatment in patients with no history of previous PTB. Regardless of the cutoff, all definitions of short cervix apply only in the

TABLE
Performance of cervical length for SPTB prediction in nulliparous singleton gestations

Variable	Sensitivity (%)	Specificity (%)	PPV (%)	+LR (95% CI)
CL≤25 mm at 16–22 wk				
SPTB<37 wk	8.0	97.8	16.2	3.67 (2.39–4.95)
SPTB<32 wk	23.9	97.7	7.4	10.39 (5.73–15.06)
CL≤25 mm at 22–30 wk				
SPTB<37 wk	23.3	93.6	15.1	3.65 (2.94–4.37)
SPTB<32 wk	52.0	93.0	2.1	7.39 (4.55–10.23)
CL≤20 mm at 16–22 wk				
SPTB<37 wk	4.1	98.8	15.5	3.49 (1.77–5.21)
SPTB<32 wk	14.9	98.8	8.6	12.26 (4.87–19.64)
CL≤20 mm at 22–30 wk				
SPTB<37 wk	17.4	96.8	20.8	5.42 (4.10–6.74)
SPTB<32 wk	52.0	96.3	3.9	13.98 (8.50–19.45)

Adapted from Esplin et al.[4]

+LR, positive likelihood ratio; *CI*, confidence interval; *CL*, cervical length; *PPV*, positive predictive value; *SPTB*, spontaneous preterm birth.

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absence of cervical dilation. **We recommend using a mid-trimester CL of ≤25 mm to diagnose short cervix in individuals with a singleton gestation and no previous history of SPTB (GRADE 1C).**

What interventions should be offered to an individual with a singleton gestation, a diagnosis of short cervix, and no prior preterm birth?

Given the association of cervical shortening with subsequent PTB, several interventions aimed at reducing the risk of PTB have been investigated in this population of patients, including cerclage, pessary, 17-alpha hydroxyprogesterone caproate (17-OHPC), and vaginal progesterone.[22–27] Studies on pessary and cerclage have produced conflicting results, whereas the US Food and Drug Administration (FDA) withdrew approval of 17-OHPC in 2023.[28] However, the results have been more consistent with vaginal progesterone and demonstrate benefit.

Vaginal progesterone

The efficacy of vaginal progesterone in individuals with a sonographic diagnosis of a short cervix was demonstrated in 2 large, multicenter randomized controlled trials and by independent patient-level meta-analyses, including data from these trials and several other smaller trials. Fonseca et al[22] conducted a double-blinded trial that randomized participants to 200-mg micronized progesterone per vagina or placebo. Patients were randomized at 20 to 25 weeks of gestation and were treated from 24 to 34 weeks of gestation. A total of 413 participants with a CL of ≤15 mm were included in the trial. The incidence of delivery before 34 weeks of gestation was reduced to 19.2% in the group that received vaginal progesterone, compared with 34.4% in the placebo group (relative risk [RR], 0.56; 95% CI, 0.36–0.86). Of the participants included in this study, 85% had no previous history of PTB. In a subgroup analysis of patients without a history of PTB, a similar reduction in PTB rate (<34 weeks of gestation) was noted in those with a short cervix (≤15 mm) who received progesterone (RR, 0.57; 95% CI, 0.35–0.93).

In the PREGNANT Trial, Hassan et al[25] reported that the administration of vaginal progesterone gel (90 mg) to patients with a CL of 10 to 20 mm identified at 19 0/7 to 23 6/7 weeks of gestation resulted in a significant reduction in the rate of PTB at <33 (8.9% vs 16.1%; RR, 0.55; 95% CI, 0.33–0.92), <35 (RR, 0.62; 95% CI, 0.42–0.92), and <28 (RR, 0.50; 95% CI, 0.25–0.97) weeks of gestation. Moreover, the study demonstrated a neonatal benefit with a significant reduction in respiratory distress syndrome (RR, 0.39; 95% CI, 0.17–0.92). Only 16% of the study population had a history of previous PTB, and even after excluding these participants, there remained a significant benefit of progesterone in the setting of an isolated short cervix (RR, 0.50; 95% CI, 0.27–0.90).

In 2012, an individual patient-level meta-analysis incorporated the data from the aforementioned studies with 2 additional high-quality trials to investigate the effect of vaginal progesterone in patients with an asymptomatic short cervix (≤25 mm). This analysis demonstrated a reduction in the risk of PTB at <33 (RR, 0.58; 95% CI, 0.42–0.80), <28 (RR, 0.50; 95% CI, 0.30–0.81), and <35 (RR, 0.69; 95% CI, 0.55–0.88)

weeks of gestation. In addition, there was a similar 43% reduction in composite neonatal morbidity and mortality.[27] In 2018, an updated meta-analysis incorporated data on a total of 974 singleton gestations with a CL of ≤25 mm.[26] Of note, 2 of 5 studies included in the meta-analysis specifically enrolled patients with a short cervix,[22,25] whereas the patients included from the other studies represented the short cervix subgroup enrolled in the total study patient population.[29–31] This analysis reported a reduction in the risk of PTB at <32 weeks of gestation (RR, 0.64; 95% CI, 0.48–0.86) with vaginal progesterone treatment; PTB at <28, 34, and 36 weeks of gestation were all significantly reduced as well ($P<.05$) In addition, there was a reduction in composite neonatal morbidity and mortality (RR, 0.59; 95% CI, 0.38–0.91) and a decrease in the prevalence of birthweight of <2500 and <1500 g.[26] This meta-analysis included data on 128 participants with a CL of 21 to 25 mm. In this subgroup, the reduction in PTB was not statistically significant (RR, 0.55; 95% CI, 0.22–1.38) but mirrored the direction and magnitude of benefit seen in participants with more severe cervical shortening. The test of interaction among the CL groups was not significant ($P=.22$), suggesting that the response to treatment did not significantly differ according to CL.

The efficacy of vaginal progesterone for the prevention of recurrent PTB was summarized in the "Evaluating progestogens for preventing preterm birth international collaborative (EPPPIC): meta-analysis of individual participant data from randomized controlled trials" study.[32] EPPPIC used individual patient data from 9 trials of vaginal progesterone in 3769 patients with singleton gestations at high risk of PTB because of a short cervix or previous SPTB. EPPPIC investigators examined effect modification from a short CL using data from 4 studies of vaginal progesterone that had CL data available. In participants with a CL of ≤30 mm without a history of SPTB (n=479), vaginal progesterone reduced the likelihood of PTB (RR, 0.65; 95% CI, 0.45–0.95). In addition, the study examined a smaller group of pregnant people with a CL of ≤25 mm and no previous SPTB (n=418) and noted similar trends (RR, 0.67; 95% CI, 0.43–1.04).

Although the aforementioned data are compelling, treatment with vaginal progesterone after the diagnosis of a short cervix and the threshold of CL at which to initiate treatment remain areas of debate. Importantly, most participants in the aforementioned trials were from outside the United States. The FDA did not approve vaginal progesterone for the indication of prevention of PTB in the setting of a short cervix in part because data from the PREGNANT Trial failed to demonstrate a benefit when only US patients were analyzed.[33,34] In addition, the FDA declined approval because vaginal progesterone did not seem effective in Black patients or those with obesity. Although the meta-analysis by Romero et al[26] reported no interaction between race/ethnicity, maternal age, or obesity and response to vaginal progesterone, subgroup analysis by race/ethnicity, maternal age, and body mass index found differences in risk reduction based on each characteristic. Despite debate about the clinical use in all subgroups, given the data on the potential benefit and lack of harm, the American College of Obstetricians and Gynecologists has recommended vaginal progesterone as a management option for pregnant individuals with a short cervix.[35,36] Although there does not seem to be any substantial risk to treatment with vaginal progesterone, its use for the indication of a short cervix is currently off-label and, thus, requires patient counseling.

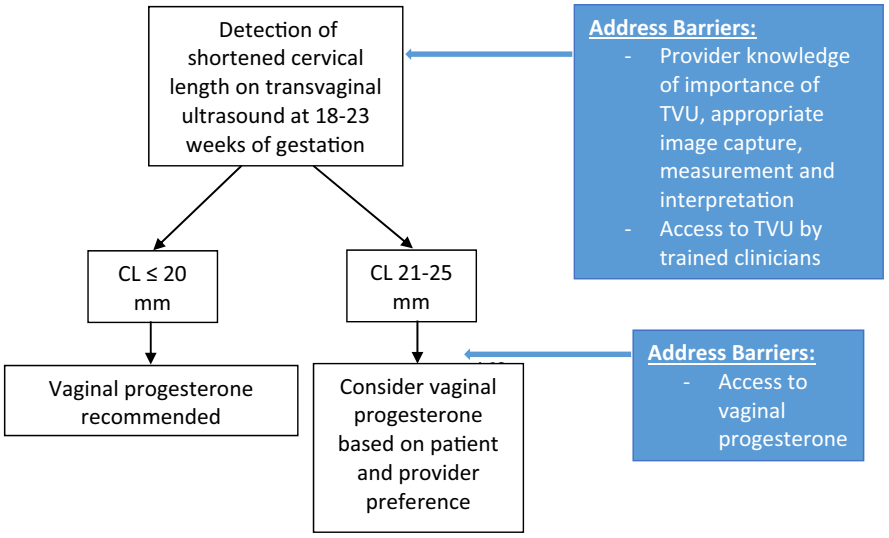
Based on these opinions, the prescription of vaginal progesterone for individuals diagnosed with a short cervix is common. In addition, with evidence of the benefits of vaginal progesterone administration in the setting of a short cervix and its cost-effectiveness,[37–39] some authorities have recommended universal CL screening for asymptomatic individuals without a previous PTB. Of note, 1 group of investigators examined the real-world results of implementing a universal CL screening program at a single tertiary institution in a retrospective cohort study.[40] The prevalence of a CL of ≤25 mm was 0.89% in those screened, and treatment with progesterone was offered to these patients. Compared with the prescreening implementation cohort, universal screening was associated with a decrease in the frequency of PTB at <37 weeks of gestation (6.7% vs 6.0%; odds ratio [OR], 0.82; 95% CI, 0.76–0.88) and decreases in PTB at <34 and <32 weeks of gestation. However, the cost-effectiveness of such recommendations is based on a single, not serial, CL measurement around the time of the anatomy ultrasound examination.

Given the preponderance of evidence demonstrating benefit and the lack of harm and the profound public health effect of PTB and its morbidity for neonates, **we recommend that asymptomatic individuals with a singleton gestation and a transvaginal CL of ≤20 mm diagnosed before 24 weeks of gestation be prescribed vaginal progesterone to reduce the risk of PTB (GRADE 1A).[35] Based on data suggesting benefit, we recommend that treatment with vaginal progesterone be considered at a CL of 21 to 25 mm based on shared decision-making (GRADE 1B)** (Figure). The most studied formulations of vaginal progesterone are 90-mg (8%) progesterone gel and 200-mg micronized progesterone capsules. At this time, there are insufficient data to recommend a specific formulation or dose for the treatment of a short cervix.

17-alpha hydroxyprogesterone caproate

Previous studies have specifically examined treatment with 17-OHPC in individuals with a sonographically short cervix and no history of PTB. In a large multicenter trial, participants with a CL of <30 mm at 16 to 22 weeks of gestation were randomized to weekly administrations of 17-OHPC or placebo. The rate of PTB was similar between the groups (25.1% vs 24.2%; RR, 1.03; 95% CI, 0.79–1.35), and there was no improvement in neonatal outcomes.[24] Of note, 2 smaller studies produced conflicting results on the efficacy

FIGURE
Short cervix in the absence of a history of preterm birth



CL, cervical length; *TVU*, transvaginal ultrasound.

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of 17-OHPC in the setting of a short cervix, with 1 study demonstrating a benefit similar to vaginal progesterone and the other study demonstrating no reduction in PTB.[41,42] In aggregate, 17-OHPC has not consistently been shown to reduce the occurrence of SPTB, even in the setting of a short CL. Consistent with the previous SMFM statement following the FDA withdrawal of 17-OHPC approval on April 5, 2023, because of a lack of efficacy,[28] **we recommend that 17-OHPC, including compounded formulations, not be prescribed for the treatment of a short cervix (GRADE 1B).**

Cerclage

Cerclage has historically been reserved for patients diagnosed with cervical insufficiency. More recently, however, cervical insufficiency has been recognized to be along a spectrum, with some individuals demonstrating cervical shortening before painless dilation or clinically apparent signs, such as labor or rupture of membranes.[43]

Although there are compelling data demonstrating the benefit of cerclage in the setting of a short cervix among patients with a previous PTB,[44] in the absence of a history of previous PTB, cerclage has not generally been demonstrated to result in a reduction of PTB.[45–48] Of note, 1 study randomized 253 participants with very short midtrimester CL (<15 mm) to cerclage (n=127) vs expectant management (n=126); the incidence of PTB at <33 weeks of gestation was not improved with cerclage placement (22% vs 26%; RR, 0.84; 95% CI, 0.54–1.31).[47] A meta-analysis of 5 randomized trials that included 419 asymptomatic patients with a CL of <25 mm and no previous PTB (224 with cerclage and 195 without cerclage) found that cerclage placement did not prevent PTB.[49] The mean gestational age at diagnosis in both groups was 22 weeks, and the mean CL was 12 mm. There was no difference in the rate of PTB at <35 weeks of gestation or in the rate of secondary outcomes between the groups, including other PTB thresholds, birthweight, and neonatal outcomes.[49] In a planned subgroup analysis of patients with a transvaginal CL of <10 mm (n=126; 76 with cerclage and 50 without cerclage), there was a decrease in the rate of PTB at <35 weeks of gestation in those who received a cerclage (39.5% vs 58.0%; RR, 0.68; 95% CI, 0.47–0.98).

Whether there is a use for performing further CL assessments after the diagnosis of a short cervix is an area of debate. Of note, 1 group of investigators reported that, among patients with a short cervix, each 1-mm decrease in the CL was associated with a 3% increase in the odds of SPTB, but CL was assessed only at 24 and 28 weeks of gestation and not at other time points that are used more frequently in clinical practice (eg, 16–24 weeks).[50] Several retrospective studies have examined the use of cerclage placement in patients being treated with vaginal progesterone because of a short cervix who develop further cervical shortening of <10 mm.[51,52] In 1 study, the cohort who received vaginal progesterone plus cerclage delivered 7 weeks later than those treated with progesterone alone (34 3/7 vs 27 2/7 weeks of gestation; $P<.001$), and the rate of SPTB was reduced even after controlling for confounders (RR, 0.11; 95% CI, 0.03–0.41).[51] In another study in which only 62% of patients were treated with vaginal progesterone, cerclage placement was associated with increased latency (17.0 vs 15.0 weeks; $P=.02$), especially among those receiving vaginal progesterone (17.0 vs 13.1 weeks; $P=.01$). After adjusting for gestational age and CL at

diagnosis, the hazard ratio (HR) for early delivery was reduced after cerclage in patients treated concomitantly with vaginal progesterone (adjusted HR, 0.49; 95% CI, 0.27−0.87).[52] Neonatal outcomes, including neonatal intensive care unit admission, respiratory distress syndrome, and necrotizing enterocolitis, improved in both cohorts.[52] Although the findings suggest benefit, the quality of the evidence was low, thus limiting the ability to make definitive recommendations regarding the use of cerclage in a patient treated concomitantly with vaginal progesterone with a CL of <10 mm and no previous SPTB.

Most of the aforementioned studies excluded patients with visible membranes, and therefore, these findings may not extend to this subgroup of patients. Several studies have demonstrated that, in patients with a very short transvaginal CL measurement (defined as either <11 or <15 mm, depending on the study), the prevalence of cervical dilation of ≥1 cm ranges from 30% to 70% and depends on the amount of measurable CL.[53−55] This rate of cervical dilation in the setting of a short cervix suggests that a cervical examination should be considered when cervical shortening of <11 to 15 mm is diagnosed, as some patients may be candidates for an examination-indicated cerclage.

Continuation of vaginal progesterone after placement of a cerclage, whether because of progressive cervical shortening or because of the development of cervical dilation, has been a topic of minimal research in the published literature.[56] In a retrospective study of patients who received ultrasound-indicated cerclage because of a CL of <20 mm, investigators examined the benefit of vaginal progesterone (200 mg daily) postoperatively (n=45) vs no progesterone. The rates of SPTB at <34 and <37 weeks of gestation were significantly lower in patients treated with vaginal progesterone than in patients who did not receive progesterone (2.2% vs 18.4% [adjusted OR, 0.10; 95% CI, 0.01−0.93; *P*=.02] vs 9.1% vs 29.7% [adjusted OR, 0.24; 95% CI, 0.07−0.85; *P*=.02], respectively). The rates of PTB at <32 and <34 weeks of gestation were nominally reduced but did not reach statistical significance because of the small number of events. The results were similar when individuals with previous PTB were excluded from the analysis. Although encouraging, there is a paucity of other published literature on this topic.

There is insufficient high-quality evidence at this time to make a definitive recommendation regarding (1) the role or frequency of follow-up CL assessment of the asymptomatic patient after the initiation of vaginal progesterone, (2) the role of ultrasound-indicated cerclage placement in patients without a previous PTB history who develop progressive cervical shortening despite treatment with vaginal progesterone, and (3) the benefit of continuing vaginal progesterone after cerclage placement in a patient previously on vaginal progesterone who subsequently develops progressive cervical shortening of <10 mm or cervical dilation. Based on the lack of demonstrated benefit **in individuals without a history of PTB who have a sonographic short cervix (10−25 mm), we recommend against cerclage placement in the absence of cervical dilation (GRADE 1B).** Based on data showing increased latency and decreased PTB in individuals with an extremely short cervix, cerclage placement can be considered at a CL of <10 mm, even in the absence of cervical dilation, based on shared decision-making.

Cervical pessary

The Arabin pessary, a silicone ring-shaped pessary that encircles the cervix, has been studied for the treatment of patients with a short cervix. Putative mechanisms of action include alteration in the uterine-cervical angle, displacement of the weight of the gravid uterus, prevention of opening of the internal cervical os, and protection of the cervical mucus plug.[57,58]

Several large randomized trials have investigated whether placement of an Arabin pessary in patients with a short cervix reduces the risk of PTB, and the results have been conflicting.[23,59,60] Goya et al[23] randomized 385 participants with singleton gestations and a CL of ≤25 mm to Arabin pessary or usual care between 18 and 22 weeks of gestation. Approximately 11% of patients in each arm had a previous PTB, and approximately 50% of patients in each arm were nulliparous. Participants treated with a pessary had an 82% reduction in PTB at <34 weeks of gestation compared with the usual care group (6% vs 27%; RR, 0.18; 95% CI, 0.08−0.37) and a similar reduction in adverse neonatal outcomes (3 % vs 16%; RR, 0.14; 95% CI, 0.04−0.39). The pessary was well tolerated, but all participants treated with pessary reported an increase in vaginal discharge, and 14% of patients required pessary repositioning. There was no increase in infection, premature rupture of membranes, or bleeding. The Fetal Medicine Foundation conducted a multisite, multinational trial that randomized 932 participants with a CL of ≤25 mm to pessary or usual care.[59] In the pessary arm, 53.3% of patients were nulliparous, and 15.1% of patients had a previous PTB. In the control group, 55% of patients were nulliparous, and 18.0% of patients had a previous PTB. There was no reduction in SPTB at <34 weeks of gestation (12.0% vs 10.8%; OR, 1.12; 95% CI, 0.75−1.69) or adverse neonatal outcomes (6.7% vs 5.7%; *P*=.55); however, approximately 45% of the patients enrolled in the study received vaginal progesterone. A single-center trial from Italy randomized 300 patients with no previous history of PTB and a CL of ≤25 mm at 18 0/7 to 23 6/7 weeks of gestation to pessary or usual care.[60] In addition, patients with a CL of ≤20 mm, approximately 85% of those enrolled, were treated with 200-mg vaginal progesterone. Treatment with pessary was associated with a 52% reduction in SPTB at <34 weeks of gestation (7.3% vs 15.3%; RR, 0.48; 95% CI, 0.24−0.95) and a similar reduction in adverse neonatal outcomes (14.7% vs 32.0%; RR, 0.46; 95% CI, 0.29−0.72). An open-label trial conducted at 17 centers in Brazil randomized asymptomatic patients with a CL of ≤30 mm to either pessary plus vaginal progesterone or vaginal progesterone alone at 18 0/7 to 22 6/7 weeks of gestation. There was no

UNNUMBERED TABLE
Summary of recommendations

Number	Recommendation	GRADE
1	We recommend that all CL measurements used to guide therapeutic management be performed using a transvaginal approach and in accordance with standardized procedures as described by organizations such as the Perinatal Quality Foundation or the Fetal Medicine Foundation.	1C
2	We recommend using a midtrimester CL of ≤25 mm to diagnose short cervix in individuals with a singleton gestation with no previous history of spontaneous PTB.	1C
3	We recommend that asymptomatic individuals with a singleton gestation and a transvaginal CL of ≤20 mm diagnosed before 24 weeks of gestation be prescribed vaginal progesterone to reduce the risk of PTB.	1A
4	We recommend that treatment with vaginal progesterone be considered at a CL of 21–25 mm based on shared decision-making.	1B
5	We recommend that 17-OHPC, including compounded formulations, not be prescribed for the treatment of a short cervix.	1B
6	In individuals without a history of PTB who have a sonographic short cervix (10–25 mm), we recommend against cerclage placement in the absence of cervical dilation.	1B
7	We recommend that cervical pessary not be placed for the prevention of PTB in individuals with a singleton gestation and a short cervix.	1B
8	We recommend against routine use of progesterone, pessary, or cerclage for the treatment of cervical shortening in twin gestations outside the context of a clinical trial.	1B

17-OHPC, 17-alpha hydroxyprogesterone caproate; *CL*, cervical length.
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difference in the rate of the primary outcome, a composite adverse neonatal outcome, between those treated with pessary and those treated with vaginal progesterone alone (16.2% vs 18.6%; RR, 0.86; 95% CI, 0.65–1.14), although those treated with pessary did seem to have lower rates of PTB at <34, 32, 30, and 28 weeks of gestation.[61] The Maternal-Fetal Medicine Units Trial of Pessary in Singletons randomized singleton gestations with a transvaginal CL measurement of ≤20 mm at 16 0/7 to 23 6/7 weeks of gestation to cervical pessary vs usual care.[62] Patients with a history of SPTB were excluded. The trial ended recruitment early because of futility in conjunction with a potential perinatal mortality safety signal. Of the 544 patients enrolled, 99.0% received vaginal progesterone. Birth or fetal demise before 37 weeks of gestation occurred in 45.5% of those treated with pessary and 45.6% of those who received usual care (RR, 1.00; 95% CI, 0.83–1.20). However, the rate of neonatal or fetal death was higher in the pessary group than in the group who received usual care (13.1% vs 6.8%, respectively; RR, 1.93; 95% CI, 1.13–3.32).[62]

In the absence of consistent data demonstrating benefits and potential safety concerns, **we recommend that cervical pessary not be placed for the prevention of PTB in individuals with a singleton gestation and a short cervix (GRADE 1B).**

Are there any risks or contraindications to treatment with vaginal progesterone?

Many formulations of micronized progesterone contain peanut oil in the excipients (the inert materials in which the drug is suspended). Individuals with severe peanut allergies, such as anaphylaxis, should not receive micronized progesterone capsules. Vaginal gel formulations do not contain peanut oil and can be used in patients with peanut allergies. Other contraindications to vaginal progesterone treatment include typical contraindications to progesterone hormonal therapy, such as hormone receptor–positive breast cancer. Vaginal progesterone has not been associated with an increased risk of gestational diabetes mellitus or glucose intolerance.[63,64]

What interventions should be offered to an individual with a twin gestation, a diagnosis of short cervix, and no prior preterm birth?

The distribution of CL measurements in twin gestations differs from that in singleton gestations, and there is no consensus on the measurement at which to diagnose a short cervix.[16,65,66] Unfortunately, regardless of the diagnostic criteria, there is a lack of definitive evidence on the effectiveness of treatment in twin gestations and higher-order multiples with a short cervix.

Treatment with 17-OHPC at either a standard 250-mg weekly dose or a higher 500-mg weekly dose did not reduce the risk of PTB in twin gestations with a short cervix.[65,67] Several studies of vaginal progesterone included twin gestations with a short cervix. Although some have suggested benefits based on subgroup analyses, the studies were underpowered for these subgroups, and the results varied.[22,29,68–70] An individual patient data meta-

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Society for Maternal-Fetal Medicine grading system: Grading of Recommendations Assessment, Development, and Evaluation[86,a]

Grade of recommendation	Clarity of risk and benefit	Quality of supporting evidence	Implications
1A. Strong recommendation, high-quality evidence	Benefits clearly outweigh risks and burdens or vice versa.	Consistent evidence from well-performed RCTs or overwhelming evidence of some other form. Further research is unlikely to change confidence in the estimate of benefit and risk.	Strong recommendation that can apply to most patients in most circumstances without reservation. Clinicians should follow a strong recommendation unless a clear and compelling rationale for an alternative approach is present.
1B. Strong recommendation, moderate-quality evidence	Benefits clearly outweigh risks and burdens or vice versa.	Evidence from RCTs with important limitations (inconsistent results, methodologic flaws, indirect or imprecise), or very strong evidence of some other research design. Further research (if performed) is likely to have an effect on confidence in the estimate of benefit and risk and may change the estimate.	Strong recommendation that applies to most patients. Clinicians should follow a strong recommendation unless a clear and compelling rationale for an alternative approach is present.
1C. Strong recommendation, l ow-quality evidence	Benefits seem to outweigh risks and burdens or vice versa.	Evidence from observational studies, unsystematic clinical experience, or RCTs with serious flaws. Any estimate of effect is uncertain.	Strong recommendation that applies to most patients. However, some of the evidence base supporting the recommendation is of low quality.
2A. Weak recommendation, high-quality evidence	Benefits closely balanced with risks and burdens.	Consistent evidence from well-performed RCTs or overwhelming evidence of some other form. Further research is unlikely to change confidence in the estimate of benefit and risk.	Weak recommendation; best action may differ depending on circumstances or patients or societal values.
2B. Weak recommendation, moderate-quality evidence	Benefits closely balanced with risks and burdens; some uncertainty in the estimates of benefits, risks, and burdens.	Evidence from RCTs with important limitations (inconsistent results, methodologic flaws, indirect or imprecise) or very strong evidence of some other research design. Further research (if performed) is likely to influence confidence in the estimate of benefit and risk and may change the estimate.	Weak recommendation; alternative approaches likely to be better for some patients under some circumstances.
2C. Weak recommendation, low-quality evidence	Uncertainty in the estimates of benefits, risks, and burdens; benefits may be closely balanced with risks and burdens.	Evidence from observational studies, unsystematic clinical experience, or RCTs with serious flaws. Any estimate of effect is uncertain.	Very weak recommendation; other alternatives may be equally reasonable.
Best practice	Recommendation in which either (1) there is an enormous amount of indirect evidence that clearly justifies strong recommendation (direct evidence would be challenging, and inefficient use of time and resources, to bring together and carefully summarize), or (2) recommendation to the contrary would be unethical.		

RCT, randomized controlled trial.

[a] Adapted from Guyatt et al.[87]

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UNNUMBERED TABLE
Guidelines

The content of this document reflects the national and international guidelines related to management of short cervix in the absence of a history of preterm birth

Organization	Title	Year of publication
American Institute of Ultrasound in Medicine, American College of Radiology, American College of Obstetricians and Gynecologists, Society for Maternal-Fetal Medicine, and Society of Radiologists in Ultrasound	Practice parameter for the performance of standard diagnostic obstetric ultrasound examinations[6]	2018
American College of Obstetricians and Gynecologists	Prediction and prevention of spontaneous preterm birth: ACOG Practice Bulletin Number 234[35]	2021
American College of Obstetricians and Gynecologists	Updated clinical guidance for the use of progesterone supplementation for the prevention of recurrent preterm birth[36]	2023
Society for Maternal-Fetal Medicine	SMFM Statement: Response to the food and drug administration's withdrawal of 17-alpha hydroxyprogesterone caproate[28]	2023

Society for Maternal-Fetal Medicine. Management of short cervix in individuals without a history of spontaneous preterm birth. Am J Obstet Gynecol 2024.

analysis published in 2017 initially showed a reduction in PTB at <33 weeks of gestation (RR, 0.69; 95% CI, 0.51−0.93) and a reduction in composite neonatal morbidity and mortality (RR, 0.61; 95% CI, 0.34−0.98).[71] However, after the exclusion of data from a study that was later retracted, the updated meta-analysis that included data on 79 patients (43 received progesterone and 36 received placebo) found that the reduction in the risk of PTB at < 33 weeks of gestation was no longer significant (RR, 0.77; 95% CI, 0.48−1.24).[72,73] The reduction in neonatal morbidity and mortality remained after adjustment for nonindependence between twins (adjusted RR, 0.61; 95% CI, 0.34−0.98). Although an update to the aforementioned individual patient meta-analysis with data on an additional 16 patients demonstrated a reduction in PTB, the authors concluded that the results of ongoing studies are needed to definitively determine whether vaginal progesterone should be recommended to patients with a twin gestation and a short cervix.[74]

Cervical pessary has been investigated as a treatment for cervical shortening in twin gestations in several studies; however, results of individual studies have been conflicting, and meta-analysis does not demonstrate a benefit to treatment with pessary.[66,75–79] Cerclage placement for cervical shortening in twin gestations has been discouraged based on meta-analysis data; however, data from several retrospective cohort studies suggest a potential benefit to cerclage in the setting of a very short cervix (≤10 mm).[80–83] A recent randomized trial enrolled 30 patients with twin gestation, a CL of ≤10 mm, and cervical dilation of at least 1 cm to cerclage or expectant management and reported a 70% reduction in PTB at <34 weeks of gestation (70% vs 100%; RR, 0.71; 95% CI, 0.52−0.96) in those who received cerclage. The indication for cerclage placement was cervical dilation, not cervical shortening, for all these patients.[84]

Several ongoing clinical trials (listed in www.clinicaltrials.gov)[85] are targeting various interventions in this patient population, so more definitive evidence will hopefully be available in the future to guide the management of these patients. Although several interventions raise the possibility of benefit, given the lack of data demonstrating the efficacy of these interventions, **we recommend against routine use of progesterone, pessary, or cerclage for the treatment of cervical shortening in twin gestations outside the context of a clinical trial (GRADE 1B).**

Conclusion

Midtrimester CL as assessed by transvaginal ultrasound is one of the best clinical predictors of SPTB. Asymptomatic individuals with a singleton gestation and a short cervix (defined as a CL of ≤20 mm) diagnosed before 24 weeks of gestation should be prescribed vaginal progesterone to reduce the risk of PTB. Vaginal progesterone can be considered for patients with a CL of 21 to 25 mm after shared decision-making. Future research should continue to evaluate interventions to prevent PTB and mitigate its public health burden. Studies should prioritize population subgroups disproportionately affected by PTB and those in whom the clinical use of existing interventions has not been established. ■

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The SMFM recognizes that obstetrical patients have diverse gender identities and is striving to use gender-inclusive language in all of its publications. The SMFM will be using the terms “pregnant person” and “pregnant individual” instead of “pregnant woman” and will use the singular pronoun “they.” When describing study populations used in research, the SMFM will use the gender terminology reported by the study investigators.

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