Universal or selective cervical length screening?

Doing nothing is no longer an option, say the authors. Cervical length assessment should be provided to a larger population of women to identify and treat those with cervical shortening.

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Significant advances in neonatology have improved survival and outcomes for infants born at ever-earlier gestational ages, but preterm birth (PTB) is still the leading cause of infant mortality in the United States, contributing to nearly 35% of all infant deaths.1 Of the nearly half-million premature births in the United States annually, approximately 75% follow either spontaneous preterm labor or preterm premature rupture of membranes.2 Prevention of these spontaneous PTBs is the obvious answer to the question of how to decrease our nation’s PTB rate, but this goal has remained elusive until recently.

Recent progress in understanding the pathways and clinical presentations of PTB has created an opportunity to prevent PTB by prolonging pregnancy in women whose pregnancies are complicated by a short cervix. Once believed to be a marker of insufficient cervical strength or integrity, a short cervix in the second trimester is now recognized as evidence of the early onset of parturition. Reduced rates of PTB in women with a short cervix who are treated with progesterone has led to the realization that the initial steps toward PTB begin long before clinical presentation with preterm labor or ruptured membranes, and can be detected by transvaginal ultrasound.

Do you have questions about coding and billing for ultrasound to assess cervical length? See this month’s Society for Maternal-Fetal Medicine consult on page 44.
ultrasound measurement of cervical length (CL). Women with a CL below the fifth percentile (corresponding to CL <25 mm) before 20 weeks’ gestation have a markedly increased risk of PTB (likelihood ratio: 4.31 in women with no prior PTB and 11.30 in women with a previous early delivery). This risk is reduced significantly by progesterone treatment, and in selected cases, by cervical cerclage as well.

Safe and effective treatments are now available for women with a short cervix. To this end, sonographic measurement of CL has met the standard criteria for a screening test. It addresses a significant health problem, is a safe and relatively inexpensive test that is not difficult to perform, and can identify women at risk of PTB who are eligible for effective treatment. The major remaining question about cervical ultrasound screening is how to best define or select women who could benefit from this test. Should it be a part of prenatal care for all women, or used selectively in women who meet certain criteria? Current data indicate that transvaginal ultrasonography (TVUS) should be used more widely, but issues of selection, sonographer training, and cost remain.

**CL measurements and risk of PTB**

The goal of CL measurement in pregnancy is to identify women with the highest risk of PTB. CL measurements at 16 to 22 weeks’ gestation form a normal bell-shaped curve, with 27 mm corresponding to the fifth percentile, 30 mm to the 10th percentile, and 45 mm to the 90th percentile. The definition of short cervix varies according to the gestational age at cervical measurement (cervix normally shortens after 22 weeks) and the outcome of interest (gestational age of the PTB). Although a CL measurement of less than 25 mm is reliably associated with an increased risk of PTB, a treatment benefit for progesterone is evident only with a cervical length less than 20 mm in women with no previous PTB.

**Importance of technique**

TVUS has several advantages over transabdominal ultrasonography (TAUS). These include a nearly universal ability to image the cervix regardless of maternal body habitus, ability to detect the effect of transabdominal pressure on the length of the cervix, and improved image quality related to the shorter distance between the ultrasound probe and the cervix. Adherence to standards for obtaining and measuring ultrasound images of the cervix is essential (Figure 1). For example, the volume of urine in the maternal bladder has an unpredictable effect on the length of the cervix, and operator technique can affect the quality of the images obtained. For this reason, education and credentialing of sonographers and physicians who obtain CL measurements is recommended. The Perinatal Quality Foundation (ie, CLEAR [Cervical Length Education and Review] program) and the Fetal Medicine Foundation both offer online training and credentialing.

ILLUSTRATION BY ALEX BAKER, DNA ILLUSTRATIONS, INC.
CL measurement in women with history of PTB

Women with a history of PTB have a 1.5-fold to 2-fold increased risk of another early delivery. Recent recommendations from the American College of Obstetricians and Gynecologists (ACOG) and the Society for Maternal-Fetal Medicine endorsed progesterone supplementation for women with a prior PTB.18,19 These recommendations are based on evidence that progesterone prophylaxis can reduce the risk of recurrent PTB by approximately one third.4 TVUS in this population identifies women with the highest risk of recurrent PTB.20 To that end, we recommend CL measurements beginning at 15 to 16 weeks' gestation in women with a prior PTB, with additional CL measurements at 1- to 2-week intervals until 24 weeks' gestation to identify those with CL measurements below 20 to 25 mm who are candidates for cerclage placement.19

Women with a history of a prior PTB and current cervical shortening despite progesterone supplementation may be candidates for cerclage placement. In a meta-analysis that reviewed outcomes from 504 women with a prior sPTB and CL less than 25 mm enrolled into 1 of 4 randomized, controlled trials, the risk of recurrent PTB (<35 weeks) was reduced by approximately 30% in those randomized to cerclage.9 Current data are insufficient to evaluate the efficacy of concurrent treatment with progesterone supplementation and cervical cerclage, but the SMFM recommends consideration of cerclage for women with a prior PTB who experience progressive cervical shortening (CL <25 mm) despite progesterone therapy.19

CL measurements in women with multiple gestations

Women with multiple gestations have an increased risk of PTB for a variety of reasons, including medical and obstetrical indications as well as preterm parturition. Interventions reported to reduce or prevent PTB in women with singleton pregnancies have been ineffective in multifetal pregnancies.21-25 Specifically, neither progesterone supplementation nor cerclage placement appears to prolong gestation and, in fact, cerclage placement appears to increase the risk of PTB in women with cervical shortening.19

Studies of progesterone supplementation in women with twins or triplets have not included sufficient numbers of patients with cervical shortening to reach a confident conclusion.21-25 The benefit of supplemental progesterone in women with multifetal pregnancies and a short cervix, however, is not supported by available data, including a recent study from France.22 This has caused some centers to abandon CL measurements entirely for women with twins and triplets. Despite this we find CL measurements may be useful in this population, in that the detection of cervical shortening may drive additional interventions such as antenatal corticosteroids, later in gestation, while the finding of a relatively long cervical length may reassure the patient and her physician.

CL measurements in women with history of cervical surgery

The risk of PTB is increased in women with a history of cervical dysplasia who have been treated with cold knife conization (CKC), but the relationship between early delivery and loop electrosurgical excision (LEEP) is less clear.26-29 Whether these associations relate to factors common to dysplasia and sPTB or to an effect on cervical function is also unclear. Regardless of the explanation, the linkage is sufficient to consider CL measurement at 18 to 20 weeks’ gestation for women with a history of cervical dysplasia who have undergone treatment with CKC or LEEP cervical biopsy. This mid-second-trimester measurement can serve as a baseline for comparison if the patient later presents with symptoms of preterm labor. We believe that women with a short cervix (<20 mm) should be offered progesterone prophylaxis regardless of a history of LEEP or CKC.
Perhaps the most interesting issue today regarding TVUS is whether low-risk women with singleton gestations and no prior history of PTB should undergo universal TVUS CL screening at 18 to 22 weeks of pregnancy. The crux of the discussion is whether the risk of PTB can be reduced by progesterone treatment in women with a short cervix regardless of whether there is a history of PTB. Two randomized, controlled trials have shown a 35% to 45% reduction in PTB in women with cervical shortening less than 15 to 20 mm who were treated with vaginal progesterone preparations. A recent meta-analysis confirmed this finding, revealing that treatment with vaginal progesterone significantly reduced the rate of PTB before 33 weeks’ gestation by 40% in women with a CL measurement less than or equal to 25 mm and no prior PTB.

Given the efficacy of vaginal progesterone in reducing PTB in women with cervical shortening and no prior PTB, attention has now turned to the question of what population should be screened with TVUS CL measurements: all pregnant women (universal screening) or only those with an increased risk for PTB based on risk factors, physical exam, or findings on transabdominal ultrasound (selective screening)?

Proponents of universal screening recommend TVUS CL measurements for all pregnant women during the second trimester at the time of the 18- to 22-week anatomy ultrasound examination. Their recommendations are based on the safety, acceptability to patients, and wide availability of TVUS as well as the argument that only universal screening offers every woman an opportunity to reduce her risk of PTB. Furthermore, according to recent decision and economic analyses, universal screening is cost-effective, with one study showing savings of over $12 million for every 100,000 women screened.

Proponents of selective screening recommend obtaining CL measurements in women deemed to have an increased risk of PTB. Table 1 lists examples of findings on history or exam that, in addition to the specific situations discussed above, could trigger the performance of a TVUS in an otherwise low-risk patient.

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<thead>
<tr>
<th>Potential clinical triggers for TVUS in a low-risk patient</th>
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<td>• Transabdominal imaging, suggesting cervical shortening or a TAUS CL below safety threshold</td>
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<td>• Patient reporting symptoms of preterm cervical change such as persistent pelvic pressure, increased vaginal discharge, or menstrual-like cramps</td>
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<td>• Patient with complaints of first- or second-trimester vaginal bleeding</td>
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<td>• Pregnancy in women with a history of genitourinary tract infection</td>
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<td>• Pregnancy conceived using assisted reproductive techniques</td>
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At this time, ACOG “recognizes that both sides of this debate raise valid issues.” The question may be resolved by experience if one or the other strategy leads to significantly lower rates of adverse outcomes, as was the case when universal and selective strategies were proposed to prevent neonatal infection with group B beta-hemolytic streptococcus.

### Conclusion

Additional information is required before we can ultimately recommend either universal CL measurement screening or selective screening strategies. Strategies may vary according to the risk of PTB in the population being cared for in each practice. Regardless, TVUS assessment of cervical length should be provided to a larger population of women to identify and treat women with cervical shortening, because complications of PTB are the leading causes of infant mortality. This is a small but important step toward a reduction in the incidence of PTB, preventing neonatal and infant deaths through interventions during pregnancy instead of after the fact.

### References
2. Goldenberg RL, Culhane JF, Iams JD, Romero R. Epidemiology and