The cervix has to open to allow vaginal birth. Ultrasound has now shown that this lower part of the uterus begins to show changes weeks before eventual birth. Only transvaginal ultrasound should be used to evaluate the cervix for prediction of preterm birth (PTB). The shortest best cervical length (CL) is the most effective measurement for clinical use. Proper technique is paramount for accurate results. The risk of PTB increases with ever shorter CL (<25 mm). Other factors that must be carefully considered when using CL for prediction of PTB are number of fetuses, risk factors for PTB, and gestational age at screening.

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KEYWORDS cervical length, prediction, preterm birth

Prediction Is the Basis of Prevention

The aim of any healthcare worker assisting a patient is to prevent disease. Often, the first step in preventing disease is early prediction. In the case of preterm birth (PTB), one of the best, if not the best, predictive test has been shown to be cervical sonography. The cervix has to open to allow vaginal birth. As we have known for decades, the process of parturition takes months of preparation, and early changes can be detected in human beings.

With regard to the cervix, ultrasound has now shown that this lower part of the uterus begins to show changes weeks before eventual birth. Even for PTB, which often we had characterized in the past as something happening suddenly and unexpectedly, the changes are gradual and usually very slow. In fact, in many high-risk women delivering preterm, the cervix starts to shorten a few months before preterm labor (PTL) or preterm premature rupture of membranes occurs.

Early detection of change is paramount in allowing interventions the chance to work before the pathology is so far in its pathways as to thwart prevention. In this chapter, we will review the evidence for cervical sonography as a screening test for the prediction of PTB. There are now more than 1000 manuscripts published on this topic, and ample evidence to support the efficacy of cervical sonography in the prevention of PTB.

Evaluation of Cervical Length–Technical Aspects

Evaluation of cervical length (CL) may be done either sonographically or through direct physical examination of the cervix. Sonographic detection of CL may be approached through transabdominal, translabial, or transvaginal routes, with each method having its own benefits and limitations.

Physical Examination

In the past, serial digital and speculum examinations have been used to follow-up women with suspected cervical insufficiency. The physical changes notable on examination, revealing the likelihood of cervical insufficiency, include bulging membranes, a pink or tan discharge, or appreciable softening of the cervix and lower uterine segment. Of these findings, softening and development of the lower uterine segment is most strongly correlated with early effacement. However, these reported physical changes are often not evident until the cervix is significantly effaced, as this process begins at the internal os. Therefore, the absence of these physical findings cannot exclude cervical insufficiency. In addition, a digital examination has been found to be significantly less consistent than ultrasound in assessing CL. On average, manual estimations of CL are shorter by 11 mm than sonographic measurements of CL.1 Cervical funneling at the internal os may also occur while the external os is fully closed. Many multiparous women who deliver at term have cervices that are already dilated 1-2 cm in the late second trimester.1
that the image is not obstructed by fetal parts, the bladder does not have to be filled, and the transducer is closer to the cervix, thus allowing for 100% visualization of the cervix. Other advantages offered by this technique include the fact that it does not require another transducer; it is noninvasive, and it is therefore well accepted by most women. The biggest downfalls to translabial ultrasound include the possibility that gas in the rectum may impede the view of the external os and the technique is more challenging to master than other ultrasonographic methods.3

Transvaginal Ultrasound

Transvaginal ultrasonography (TVU) was first described in the late 1980s, around the same time as translabial ultrasound, as another method available to study the pregnant cervix. It has become the gold standard for measuring CL because it offers the same advantages as translabial ultrasound as well as improved visualization of the cervix without the interference of bowel gas.3 For transvaginal cervical sonography to accurately measure CL, appropriate technique is required to yield significant prediction. Table 1 summarizes the main aspects of this procedure.3

Although TVU is the most sensitive and specific screening test, it also has its limitations. Funneling of the cervix may be masked if the bladder is not completely empty and if excessive pressure is exerted on the cervix by the probe. In contrast, uterine contractions may mimic the appearance of cervical funneling of the internal os (Table 2).3,6 In such instances the cervical canal may assume an “S” shape, and the lower uterine segments (either anteriorly or posteriorly or both) are thickened and asymmetric. Finally, before 14 weeks gestation, it is often difficult to distinguish the lower uterine segment from the endocervical canal. This occurs because the gestational sac has not reached a sufficient size to completely expand the lower part of the uterus. Therefore, CL should usually not be studied before 14 weeks.3,4

Clearly, the cervix must be evaluated by TVU if accurate prediction of PTB is desired. Unlike the other 2 sonographic

<table>
<thead>
<tr>
<th>Table 1 Proper Technique of TVU Screening of The Cervix for Prediction of PTB (Figs. 1-3)</th>
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</thead>
<tbody>
<tr>
<td>1. Have the woman empty her bladder just before ultrasound</td>
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<td>2. Prepare the clean probe covered by a condom</td>
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<tr>
<td>3. Insert the probe (probe can be inserted by the woman for her comfort)</td>
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<tr>
<td>4. Guide the probe in the anterior fornix of the vagina</td>
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<td>5. Obtain a sagittal long-axis view of the entire endocervical canal</td>
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<tr>
<td>6. Withdraw the probe until the image is blurred, and reapply just enough pressure to restore the image (to avoid excessive pressure on the cervix, which can elongate it)</td>
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<tr>
<td>7. Enlarge the image so that the cervix occupies at least 2/3 of the screen, and both external and internal os are seen</td>
</tr>
<tr>
<td>8. Measure the cervical length from the internal to the external os along the endocervical canal</td>
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<tr>
<td>9. Obtain at least three measurements, and record the shortest best measurement in millimeters</td>
</tr>
<tr>
<td>10. Apply transfundal pressure for 15 seconds, and record cervical length again at least 3 times, recording best measurement</td>
</tr>
<tr>
<td>11. Entire examination should last at least 5 minutes; record only the shortest best cervical length obtained for clinical management</td>
</tr>
</tbody>
</table>

Adapted from Berghella and Bega.3

Transabdominal Ultrasound

In the 1970s, when ultrasonographic measures were first implemented to evaluate the cervix, transabdominal visualization was the preferred approach. However, the limitations of this technique are numerous and have made it fall out of favor with perinatologists. Included among these shortcomings are the following: (1) the increased distance from the probe to the cervix, which results in poor image quality, especially in obese populations; (2) the bladder needs to be sufficiently filled for a reliable image to be produced, leading to elongation of the cervix and camouflaging of any funneling at the internal os; and (3) the likelihood that fetal parts will obscure the cervix is higher, especially after 20 weeks of gestation.3,4 Hassan2 reports that the sensitivity of predicting PTB is only 8%, a value significantly lower than the other methods; therefore, this method should be avoided and used only when other techniques are not readily available.

Translabial (Transperineal) Ultrasound

Translabial (also known as transperineal) ultrasound was originally used in France in the 1980s and proved to be more fruitful than the transabdominal approach. This technique involves having the woman lie on an examination table with the knees and hips in a flexed position, and placing a gloved transducer on the perineum between the labia majora, ensuring to keep the transducer in a sagittal orientation. A cushion may be placed underneath the patient to elevate the hips and enhance visualization of the cervix. Unlike transabdominal ultrasound, this technique offers significant improvements in
techniques, transvaginal cervical imaging is highly reproducible, with low (<10%) inter- and intraobserver variability. In 95% of cases studied, the difference in CL between 2 measurements by the same observer and by 2 observers was ≤3.5 and ≤4.2 mm, respectively.

**Clinical Application:**

**Prediction of Preterm Birth by Transvaginal Ultrasound of the Cervix**

**Screening Test**

For the reasons mentioned earlier, transvaginal cervical sonography, as opposed to any other method of investigation, is the gold standard test for prediction of PTB, as it fulfils all the requirements for a good screening test.

First, transvaginal cervical ultrasonography can screen for a clinically important and prevalent condition as PTB occurs in almost 13% of births in the United States. This technique has been well described in published reports and can be performed by trained sonographers. After a trained sonographer completes approximately 50 supervised transvaginal examinations of CL, the inter- and intraobserver variability is usually <10%. There is high reproducibility of this method of study when strict adherence to technique occurs (Table 1; Figs. 1-3). Pitfalls must be avoided (Table 2).

Transvaginal sonography is a safe and acceptable method of studying the cervix, as it is well accepted by >99% of women, and pain is reportedly felt in <2% of the cases. A report by Carlan et al showed that TVU of the cervix does not result in inoculation of bacteria or increased risk of infection for the mother or fetus compared with women who do not undergo transvaginal sonography.

Transvaginal cervical sonography is unlike any other method used to evaluate the cervix because it can accurately assess cervical insufficiency at an early asymptomatic stage, at a point where preventative measures may be used to thwart PTB. Cervical changes visible on TVU include the initial opening of the internal cervical os, progressive cervical widening and shortening of the endocervical canal from internal to the external os, and dilation of the external os.

**Optimal Timing and Frequency for Measuring Cervical Length Via Transvaginal Ultrasound**

Prior to 14 weeks gestation, almost all women, including those at the highest risk of PTB, will have a normal CL. CL of
<25 mm at this gestation is seen only in women who have had a previous second-trimester loss or those with a history of a large cervical cone biopsy. A CL of 25-50 mm is normal at 14-24 weeks in all pregnant women (Fig. 1). In low-risk women, mean CL at 14-30 weeks of gestation is 35-40 mm, with the lower 10th percentile being 25 mm and the upper 10th percentile being 50 mm. Optimal timing for measuring CL must be established because if attempted too early, the lower uterine segment may be too difficult to separate from the true cervix. In addition, after 30 weeks, the cervix normally shortens progressively in preparation for term labor, so a CL < 25 mm after 30 weeks is physiological and not indicative of PTB in asymptomatic women.

In most women who will have a PTB, a short CL is first noted at approximately 18-22 weeks of gestation; therefore, initial screening should be started at this time. The earlier the short CL is detected, the higher the likelihood of PTB. There also exists an inverse relationship between CL and PTL, in that the shorter the cervix, the greater the likelihood that PTB will occur. In the highest risk women, CL and PTL, in that the shorter the cervix, the greater the likelihood of PTB. There also exists an inverse relationship between the early the short CL is detected, the higher the likelihood

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The benefit of repeated transvaginal sonographic examinations and the ideal interval for repeating scans have not been clearly established in the published reports. Given the variation in CL based on risk of PTB, current research shows that it may be best to break down transvaginal ultrasonographic screening into 3 groups: those at low risk, high risk, and very high risk for PTB. If a screening program were employed in relatively low-risk women, 1 TVU at approximately 18-22 weeks would probably be sufficient, with no need to repeat the scan in the future. In high-risk women, it seems that 2 normal CLs, 1 at 14-18 weeks of gestation and another at 18-22 weeks is enough. Finally, in very high-risk women, including those with a previous second-trimester loss or very early spontaneous PTB, it is best to undergo serial transvaginal examinations every 2 weeks from 14 to 24 weeks of gestation. Appropriate timing of CL measurement is necessary so that changes leading to PTB are detected early enough in the process to allow for intervention.

Cervical Evaluation: What to Measure and What Not to Measure

Cervical Length

Although multiple cervical parameters have been evaluated as predictors of PTB, CL continues to be the most reproducible and reliable indicator. Accurate measurements of CL begin at the internal os, follow the path along the endocervical canal, and end at the external os. If the cervical canal is curved (a deviation of the canal >5 mm from a straight line from the internal to external os), then the canal can either be traced, or the sum of 2 straight lines that follow the curve of the canal can be used. If the endocervical canal takes on a curvilinear appearance, this is a reassuring finding because a curved cervix usually signifies a CL >25 mm (Fig. 1). A worrisome finding would be a short, straight endocervical canal.

Funneling

Funneling of the cervix is defined as the opening of the internal cervical os on ultrasound. In about 10% of low-risk women and 25%-33% of high-risk women, the internal os is open in the second trimester (Figs. 2 and 3). The open portion of the cervix is the funnel length and the internal diameter is the funnel width. Percent funneling is defined as funnel length divided by total CL, in which total CL is equal to the sum of funnel length and functional length. Functional CL is defined as the portion of endocervical canal that remains closed. Functional CL is the measurement that is typically used for calculations and predictions of PTB (Figs. 2 and 3).

Funneling of the internal portion of the cervix occurs along a continuum. A normal closed cervix takes on a T appearance. As the cervix begins to show funneling, the first shape it morphs into is that of a Y. A Y shape represents a small funnel, which if it includes <25% of the cervix, it is not a clinically significant finding. Next, the cervical funneling takes the shape of a V. This represents a more significant funnel that extends closer to the external cervical os. Finally, the most ominous funnel shape is that of a U as this shape is the most indicative of PTB. Dr Iams has created the following pneumonic for the progression TVU: “Trust Your Vaginal Ultrasound”!

Evaluation of cervical funneling should take place over the course of at least 5 minutes to resolve any question of morphology of the upper cervical canal. Not only may uterine segment contractions mimic the appearance of funneling, but the funneled portion of the cervix may also merge with the lower uterine segment and distort the image. There is higher interobserver variability among trained sonographers when detecting cervical funneling as opposed to when studying CL.

Despite the high interobserver variability, funneling has been shown to have good predictive accuracy for PTB. In a study of high-risk women, minimal funneling (<25%) between 14 and 22 weeks was not associated with a significant increased risk of PTB. In contrast, moderate (25%-50%) and severe (>50%) funneling were both associated with a ≥ 50% likelihood of PTB. If funneling is present, the CL is typically <25 mm. Compared with a CL of <25 mm alone, CL plus the presence of funneling will increase the sensitivity of predicting PTB from 61% to 74%, without changing specificity and positive and negative predictive values. In addition, the risk of PTB has been found to be higher in instances in which both a short CL (<25 mm) and funneling is detected, as opposed to short CL alone. In contrast, if a normal CL of ≥25 mm is present; the additional finding of funneling does not increase the risk of PTB. In general, it is most important to report CL, and we prefer, in most cases, not to report
percent funneling even if present, because it does not affect clinical management. Interventions based on TVU have been based on a short CL, and not solely on the presence of funneling.

**Sludge**

Intra-amniotic sludge on ultrasonography appears as a cluster of free-floating hyperechogenic material within the amniotic fluid near the uterine cervix. Sludge is an independent risk factor for histologic chorioamnionitis and microbial invasion of the amniotic cavity in women with spontaneous PTL and intact membranes. Moreover, the presence of sludge is an independent risk factor for preterm premature rupture of membranes and spontaneous preterm delivery. Espinoza et al in a study showed that 71% of women who were found to have intra-amniotic sludge went into PTL within 7 days, compared to 16% of women without the presence of sludge. The combination of “sludge” and a short cervix (<25 mm) confers a higher risk for spontaneous preterm delivery at <28 and <32 weeks than that of a short cervix alone. However, although intra-amniotic sludge has been shown to be predictive of PTB, there is insufficient evidence to assess whether measuring the presence of sludge alone improves the predictive accuracy that is already provided by CL.

**Three-Dimensional Ultrasound**

Three-dimensional ultrasound can be used to assess CL. The true CL is more easily identified with all 3 planes available. At times, funneling is only detectable on planes other that the 2-dimensional sagittal plane. Despite these advantages, 3-dimensional ultrasound is not necessary in clinical practice to assess CL.

**Other Measurements**

Many other parameters have been studied in transvaginal sonographic imaging as factors to predict PTB. Examples include funnel width, funnel length, endocervical canal dilatation, anterior and posterior cervical width, cervical position (horizontal vs vertical), lower uterine segment thickness, cervical angle, visibility of chorion at internal os, cervical index (funnel length + 1/functional length), and vascularity. Among those mentioned, none have proven to be more reliable or predictive of PTB than CL.

**Factors Affecting Prediction**

TVU CL has been shown to be predictive in all populations studied (Table 3). One of the most important features of this screening test for PTB is its sensitivity. Sensitivity represents the detection rate—the percent of women who will deliver preterm that are detected during asymptomatic weeks before the PTB by visualizing a short CL on TVU in the second trimester. This prediction is highly dependent on several factors:

1. **Number of Fetuses.** TVU CL is most effective as a predictor of PTB in singleton gestations. In multiple gestations, most of the women who eventually deliver preterm do not manifest a short CL in the second trimester. The sensitivity of this test is <50% in multiple gestations.

2. **Ob-Gyn Risk Factors.** TVU CL is most sensitive in singleton gestations with poor obstetrical history. The population most studied has been singleton gestations with previous PTB. In these women, screening with TVU CL in the second trimester is associated with high sensitivity, as over two-thirds of women destined to deliver preterm can be detected early while asymptomatic.

<table>
<thead>
<tr>
<th>Table 3 Prediction of PTB by TVU in Different Populations of Pregnant Women</th>
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<tbody>
<tr>
<td><strong>Author</strong></td>
</tr>
<tr>
<td>Singleton: low-risk (Cross-sectional)</td>
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<tr>
<td>Iams</td>
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<tr>
<td>Singleton: prior PTB</td>
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<tr>
<td>Owen</td>
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<tr>
<td>Singleton: prior cone biopsy</td>
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<td>Berghella</td>
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<tr>
<td>Singleton: mullerian anomaly</td>
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<td>Airoldi</td>
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<td>Singleton: prior D&amp;E</td>
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<td>Visintine</td>
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<td>Twins</td>
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<td>Goldberg</td>
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<td>Triples</td>
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<td>Guzman</td>
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<td>Symptomatic</td>
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<td>Singletones with preterm labor</td>
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<td>Vendetti</td>
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</tbody>
</table>

Abbreviations: PTB%, incidence of preterm birth; GA, gestational age; CL, cervical length; % Abn, percent abnormal; Sens, sensitivity; Spec, specificity; PPV, positive predictive value; NPV, negative predictive value; RR, relative risk compared to those with normal CL, except *there, comparison is for values above the 75th percentile; NA, Not Available.
atic by this test\textsuperscript{13} (Table 3; Fig. 3). Sensitivity remains >50% in women with single gestations and other risk factors for PTB, such as previous cone biopsy, Mullerian anomaly, or previous multiple dilation and evacuations (D&Es) (Table 3).\textsuperscript{23-25} The sensitivity is also high in singleton gestations with PTL (Table 3).\textsuperscript{28} It is not surprising that interventions aimed at preventing PTB based on TVU CL screening seems to be most effective in these populations of singleton gestations with risk factors for PTB. On the contrary, as the sensitivity is $\leq 30\%$ in multiple gestations, TVU CL is an ineffective screening test for PTB in these populations.\textsuperscript{26,27}

In women with singleton gestations, but no particular risk factors for PTB, the sensitivity of this test is only 37\% (Table 3).\textsuperscript{12} Therefore, most of these women, who represent the biggest group of women delivering preterm, do not seem to develop TVU CL shortening in the second trimester. This may be the possible reason for the ineffectiveness of intervention based on TVU CL screening so far in this population.

3. CL. The shorter is the CL, the higher is the risk of delivering preterm (Table 4).\textsuperscript{29} Therefore, CL and predicted gestational age at delivery are directly proportional. A CL of 25 mm represents the 10th and 25th percentiles of distribution of CL for the general (low-risk) and “prior PTB” population of singleton gestations, respectively. For ease of clinical use, 25 mm has been chosen as the cut-off at and above which a cervix can be called “normal,” and below which it can be called “short.” A CL of $<$25 mm at or before 28 weeks is always abnormal and associated with a higher incidence of PTB (Table 4).\textsuperscript{29}

Many women with a CL 16-24 mm, especially without other risk factors, may not deliver preterm. Only 1%-2\% of the general population of women carrying an uncomplicated singleton gestation develop a CL $\leq 15$ mm before 24 weeks.\textsuperscript{30} Different interventions may have different efficacies depending on the degree of cervical shortening.

4. Gestational Age at CL Measurement. The earlier the short CL in gestation is detected, the higher is the risk of PTB (Table 4).\textsuperscript{29} A TVU CL $<$ 25 mm, especially $>$28 weeks, may be physiological, as the cervix starts to prepare for term ($>$37 weeks) many weeks before the process of labor becomes symptomatic and recognizably clinically. This may be the reason why TVU CL is uncommon and not generally recommended after 28 weeks.

Gestational age at screening with TVU CL is also dependent on which intervention will be used. For cerclage, most trials have been done between 16 and 23 weeks, so that TVU CL should occur in this period if detection of a short cervix is aimed at offering a cerclage. In case of progesterone, instead, this intervention may still have a benefit if initiated later in the second or even early in the third trimester. Therefore, gestational age at TVU CL screening may be extended until after 24 weeks in the future if, and when, there will be an effective intervention in case of a positive test.

Screening for PTB by TVU CL is not very effective when performed before 14 weeks. CL is not correlated with maternal height; hence, short women do not have a shorter CL than tall women.\textsuperscript{31} In the first trimester, even women at highest risk for PTB usually maintain a seemingly closed and long ($>$25 mm) cervix even on TVU.\textsuperscript{13} This is because the endocervical canal is continuous with the lower uterine segment, which is falsely “counted” in the CL.

5. FFN Status. There have been several reports on the interaction of TVU CL and FFN.\textsuperscript{32-34} Although their prediction overlaps slightly, most studies do report that having both tests yield positive result does increase the risk of PTB over having only positive test result. Unfortunately, no interventions that pre-

\textbf{Table 4 Predicted Probability of Preterm Delivery Before Week 35, by Cervical Length (mm) and Time of Measurement (Week of Pregnancy)}\textsuperscript{29}

<table>
<thead>
<tr>
<th>Weeks of Pregnancy</th>
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<th>16</th>
<th>17</th>
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<td>Cervical length (mm)</td>
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vent PTB just based on a positive FFN have been yet discovered. Therefore, FFN is not currently recommended for asymptomatic women. We predict that quantitative FFN screening will improve the effectiveness of this screening test, especially when done before 24 weeks.

The combination and TVU CL and FFN for the assessment of risk of PTB of the symptomatic woman with PTL has been well studied, and it seems clinically beneficial. In fact, the woman in PTL between 24 and 34 weeks with a CL ≥ 30 mm has a <2% incidence of delivering within 7 days, and <10% chance of delivering <35 weeks, and can be managed without special interventions. A similar woman but one with a CL < 20 mm has a very high risk of PTB, and deserves admission, steroids for fetal maturity, and tocolysis for 48 hours to ensure that a full steroid course is administered. It is less clear what to do with the woman with PTL and a TVU CL 20-29 mm, or borderline. In these cases, we suggest that the FFN previously collected should be sent. Women with positive FFN should be managed similarly to those with a CL <20 mm, while those with a negative FFN can probably be observed without intervention.35

6. Presence of Contractions. Most asymptomatic women with a short CL on TVU in the second trimester are having uterine contractions that they are not aware of.36 Therefore, we recommend that anytime a short CL is detected before 28 weeks, the woman is sent to labor and delivery for tocomonitoring. Women with a CL < 25 mm and contractions have twice the incidence of PTB than similar women with a CL < 25 mm but no contractions on the monitor.37 These characteristics lend support to the possible use of a tocolytic agent to attempt to prevent PTB in these women. Indomethacin has been proposed as such an intervention.38

7. Presence of Infection. Infection is indirectly correlated with CL: the shorter is the CL, the higher is the incidence of intra-amniotic infection. Amniocentesis of women with singleton gestations, a poor obstetrical history and a TVU CL < 25 mm in the second trimester has revealed that the incidence of intra-amniotic infection in these women is about 1%-2%.18 Therefore, it is probably not indicated to routinely perform an amniocentesis on asymptomatic women with a short cervix.

In women who have regular contractions, this incidence may increase to 5%-10%. Incidence of intra-amniotic infection is much increased if there are cervical changes that can be detected by physical examination. After detection of short CL, manual examination of the cervix is closed and long in about three-quarters of women. In women who instead have visual (by speculum examination) or manually detected dilatation of the cervix, the incidence of intra-amniotic infection is much higher, up to 50% if the cervix is dilated by ≥2 cm. Bulging of membranes past the external os is also associated with a high rate of infection and of PTB.

The presence of bacterial vaginosis further increases the risk of PTB in women with a short cervix. Unfortunately, there are no studies that evaluate whether an intervention (eg, antibiotics) does decrease PTB in this scenario. There are also no studies on any association between other infections that contribute to PTB (eg, Chlamydia, gonorrhea, etc.) and TVU CL.

Causes of Short Cervical Length

It is unclear what exactly “causes” PTB, and so it is unclear what “causes” a shortening of CL in the second trimester. As we have seen, contractions can shorten the cervix. The contrary is probably also true, that is, a short CL can eventually be associated with contractions. The 2 probably have a common etiology in most cases. A short CL is associated with intrauterine infection. Once again, it is unclear whether first bacteria “weaken” and shorten the cervix, or it is cervical shortening that allows the vaginal flora to invade and infect the originally sterile uterus. Both these mechanisms can occur, and create a “catch 22” phenomenon.

Women with multiple D&E’s often develop a short cervix in the second trimester. To us, these are the women in whom a cervical-insufficiency mechanism causing the short cervix is most evident. On the contrary, in twins the cervix shortens only at the very end, just before clinical signs, and not because of an abnormal cervix, but because of excessive pressure from the quickly enlarging uterus above.

We encourage further research in the many yet unknown mechanisms responsible for the development of a short CL in the second trimester.

Conclusions

CL measurement by TVU in the second trimester is one of the most effective screening methods for the prediction of PTB. To achieve adequate prediction, proper technique of TVU CL measurement should be followed (Table 1).3 with particular precautions (Table 2). CL is the most predictive of the findings on the cervix at TVU. Prediction of PTB varies widely depending on several factors, particularly the population studied (Table 3).12,13,23,28 It’s sensitivity is highest in asymptomatic singleton gestations with risk factors for PTB (previous PTB, cone biopsy, Mullerian anomalies, and greater than or equal to D&E’s), and in asymptomatic singleton gestations with PTL. In all populations, the shorter is the CL, and the earlier it is detected in pregnancy, the higher is the incidence of PTB (Table 4).29

References