A Short Cervical Length in Pregnancy: Management Options

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ABSTRACT

Measuring cervical length using transvaginal ultrasonography is a useful tool to predict the risk of preterm birth in low- and high-risk pregnancies. Management of a short cervix poses a significant dilemma for clinicians. Different management plans have been proposed and studied, with mixed results in different clinical settings. This article reviews the various management options in the different patient subpopulations and proposes a scheme for management once a short cervix is identified.

KEYWORDS: Short cervical length, management, cerclage, progestational agents

Preterm birth (PTB) remains a major cause of perinatal morbidity and mortality.1 Much of the effort in the past two decades has focused on the prediction and primary prevention of preterm labor (PTL).2 Measuring cervical parameters using transvaginal ultrasonography (TVU) has been found to be a useful tool, and the value of cervical length (CL) measurement has been ascertained across different patient subpopulations.3–13 A statistically significant inverse relationship between midtrimester CL on TVU and the risk of PTB has been demonstrated in asymptomatic low-risk singleton pregnancies4,5 and in high-risk patients including those with prior PTB,6 prior loop electrical excision procedure (LEEP),7 prior cold knife conization,7 prior induced abortions,8 uterine anomalies,9 multiple gestation,10–12 and symptomatic PTL.13 This evidence coupled with the availability of ultrasound screening in most maternity units, the acceptance of pregnant women to undergo TVU,14,15 and the rather easy procedure of CL measurement and its reliability and reproducibility16 have led some experts to advocate a strategy of routine CL screening to identify those at risk for PTB.17 Different management plans for short CL have been proposed and studied, with mixed results in different clinical settings. Some have shown benefit, others have shown no benefit, and some have even proven to increase maternal morbidity and the risk of subsequent PTL. This article reviews the various interventions in the different patient subpopulations and proposes a scheme for management once a short cervix is identified.

MEASURING CL

The technique of measuring CL has been well described.4,18,19 After emptying the bladder, a transvaginal
probe is guided to the anterior fornix to obtain a sagittal cut of the cervix along the entire length of the cervical canal. The image should be enlarged to at least two-thirds of the screen, and three measurements from internal os to external os should be obtained before and after applying transfundal pressure for at least 15 seconds. The shortest, best measurement should be used. When the appropriate technique is performed, CL can be achieved with a total examination time of at least 5 minutes and is characterized by a high reproducibility with inter- and intraobserver variability of <10%.26

DEFINITION OF SHORT CERVIX
In low-risk women, CL is a continuous variable with a mean of 35 to 40 mm between 14 and 30 weeks of gestation.20 The mean gestational age at which cervical shortening is usually noted ranges between 18 and 22 weeks.6,16 Consequently, a single screening may be sufficient in this population where a CL < 25 mm (the 10th percentile for closed CL) carries the best predictive accuracy for PTB.4 Some studies have used the second percentile ≤15 mm to test interventions. In women at high risk for PTB, serial CL screening may be better. Generally, the shorter the CL, the higher the risk for PTB.4,5,19 This might not hold true for twin gestations. Comparing the CL to the no-CL group, there were no differences with respect to gestational age at delivery, antepartum admissions, cerclage placement, tocolysis use, PTL, PTB (<28 weeks, <34 weeks, or <37 weeks), or neonatal outcomes.21 The only significant difference was antepartum length of stay. Dilation of the internal os with prolapse of the fetal membranes through the endocervical canal (i.e., cervical funneling) has also been found to be a risk factor for PTB but only when funneling exceeds 25%.4,18,2–26 Rust et al studied 279 patients with a CL ≤25 mm and compared those with and those without funneling. Whereas the presence of cervical funneling was a significant risk factor for PTB, the width and depth of the funnel did not correlate with adverse perinatal outcome.25 As an independent finding, funneling does not add appreciably to the predictive accuracy of CL.26

MANAGEMENT OPTIONS
The detection of a short cervix on TVU in the midtrimester poses a significant dilemma for clinicians. Many interventions have been assessed for effectiveness including progesterone, cervical cerclage, indomethacin, and antibiotics. In a retrospective cohort study of women carrying singleton pregnancies with CL ≤25 mm at 16 to 28 weeks managed expectantly, hospitalization was an independent risk factor for delivery <34 weeks (p = 0.066), an earlier gestational age at delivery (p = 0.058), and a shorter time from diagnosis to delivery (p = 0.078).27 This was also true in women with CL ≤15 mm.

PROGESTERONE
The mechanism of action of progesterone in prolonging gestation is not entirely known. It has been hypothesized that progesterone relaxes myometrial smooth muscle, blocks the action of oxytocin, and inhibits the formation of gap junctions.28–30 Recently, high-dose α-hydroxyprogesterone caproate (341 mg twice weekly) was shown to inhibit cervical proinflammatory interleukin (IL)-1β secretion.31 Administration of progesterone prophylactically for women with a history of PTB has been shown to decrease recurrence by 50% compared with no intervention.32–35 Most studies have used intramuscular 17α-hydroxyprogesterone caproate or vaginal micronized progesterone.

In a secondary analysis of a multicenter, randomized, placebo-controlled trial, 46 women with short CL <28 mm were randomized between 18 and 22 6/7 weeks of gestation to receive daily vaginal progesterone gel (90 mg) or placebo.36 PTB <32 weeks was significantly lower for women receiving progesterone (0% versus 29.6%, p = 0.014). The main limitation of this study is that it was initially planned to recruit women with CL ≤25 mm and no previous PTB. Due to an insufficient number of subjects recruited (n = 9), they modified the planned analysis to include women enrolled with a prior PTB who also had a short CL.

Fonseca et al in a multicenter, randomized trial proposed using daily vaginal micronized progesterone (200 mg) to women with CL 15 mm or less, irrespective of other risk factors.17 They showed a significant reduction in PTB <34 weeks from 34.4% in the placebo (n = 125) to 19.2% in the progesterone (n = 125) group with a relative risk (RR) = 0.56, 95% confidence interval [CI] 0.36 to 0.86. They were unable, however, to find a significant reduction in neonatal morbidity or mortality and attributed that to the lack of power to assess these outcomes. To the best of our knowledge, this is the only appropriately powered randomized study published so far to assess ultrasound–indicated progesterone use to prevent PTB. Ongoing studies are still recruiting women to confirm these findings and to study the effectiveness of other prophylactic agents and different routes of administration in preventing PTB in this high-risk population (Appendix).

HOSPITALIZATION
Cerclage placement carries potential risks that include infection, bleeding, preterm premature rupture of
membranes, and suture displacement. Placement of a cerclage after the detection of short cervix on TVU is known as ultrasound-indicated, as opposed to its placement based on maternal history of cervical incompetence, which is referred to as history-indicated cerclage.

Until 2005, cerclage was the only intervention studied to prevent PTB in asymptomatic women with short CL. Four randomized trials have assessed the effectiveness of ultrasound-indicated cerclage for short CL. Rust et al randomized 113 women with CL <25 mm or ≥25% funneling measured between 16 and 24 weeks to either modified bed rest or cerclage. No significant differences between the 2 groups regarding risk of PTB <34 weeks or perinatal death were noted. It is noteworthy that women were included based on an incidental finding of a short cervix without taking into account other risk factors in the maternal history. Hence, the majority of women were considered low risk before the sonographic findings. To et al also sampled 47,123 asymptomatic women and identified a cervix of 15 mm or less in 470, of whom 253 (54%) were randomized to either cervical cerclage (n = 137) or expectant management (n = 126). No significant differences in the rate of PTB <33 weeks or in perinatal or maternal morbidity or mortality were noted. Again, women in this study were incidentally found to have a short cervix. Subgroup analysis of the utility of cerclage in the high-risk population, based on maternal history, was not performed. This analysis was performed, however, by Berghella et al in 2004. In their study, women at risk for PTB based on one or more risk factors (>1 PTB at 35 weeks of gestation, >2 curretages, diethylstilbestrol exposure, cone biopsy, Mullerian anomaly, or twin gestation) were screened with TVU every 2 weeks from 14 to 32/7 weeks of gestation. Those screened (n = 51) and 10 low-risk, unscreened women incidentally identified with a short cervix (<25 mm) or significant funneling (>25%) were randomized to cerclage versus no cerclage. There was no significant difference between the two groups in the rate of PTB <35 weeks or any of the obstetric or neonatal outcomes studied despite the higher risk for PTB compared with that of the two previous studies. This continued to hold true for the high-risk population, but a sample size of 150 women would have been needed for sufficient power to make such a conclusion.

This is further supported by the CIPRACT study where women at high risk for cervical insufficiency on the basis of their adverse obstetric history were followed with serial TVU measurements of CL. When a CL <25 mm was identified, women were randomly allocated to either bed rest with therapeutic McDonald cerclage (n = 19) or bed rest alone (n = 16). With 92% power, they showed a statistically significant reduction in PTB <34 weeks to 0% in the cerclage group despite a nonsignificant change in perinatal mortality. The biggest factor that differentiates CIPRACT from other studies is the high-risk patient population, on the basis of history of PTB consistent with cervical incompetence in 71.4% (as opposed to 16% in the study of To et al) and on gynecologic history that increases the risk of cervical insufficiency in 34.3%. This is the most likely explanation for the differences in outcome as all studies targeted women with short CL who are at increased risk of PTB but only the CIPRACT used maternal history consistent with cervical incompetence in their selection criteria.

A meta-analysis using individual patient data of the four randomized trials showed that cerclage does not prevent PTB less than 35 weeks of gestation in all women with short CL, particularly the low-risk population. In this group, the incidence of PTB <35 weeks was 26% in the cerclage group and 33% in the no cerclage group (RR 0.76, 95% CI 0.52 to 1.15). Cerclage, however, was shown to be effective in singleton gestations with a history of PTB or a second-trimester loss, whereas it was associated with a significantly higher incidence of PTB in twin gestations. A more recent case-controlled study also found that cerclage does not reduce PTB in low-risk women with short CL compared with rest alone. However, this is not the case in women with previous PTB. A recent multicenter randomized trial included 302 women with at least one prior PTB ≤32 weeks and TVU CL <25 mm between 16 and 22/7 weeks randomized to either cerclage (n = 148) or no cerclage (n = 153). PTB <35 weeks was similar in both groups (42% versus 32%; p = 0.09), but the benefit was most pronounced when CL was <15 mm, suggesting the presence of a more significant, and treatable, component of cervical insufficiency.

**History-Indicated Versus Ultrasound-Indicated Cerclage**

Evidence from randomized controlled trials demonstrates that history-indicated cerclage alters outcome in a minority of cases. Published literature points to a comparable risk of PTB in women at high risk for cervical insufficiency who were managed by surveillance and ultrasound-indicated cerclage and those who received elective cerclage based on history alone (Table 1). Ultrasound surveillance of CL before placement of cerclage in women at high risk for cervical insufficiency has been suggested in an attempt to decrease the number of unnecessary cerclages and to identify a high-risk population that might further benefit from cerclage. The rationale is that women without cervical shortening are at a lower risk for cervical insufficiency and hence the complications of the procedure may outweigh its benefits. It is
important to note that even without intervention, 60% of women with a history of PTB will maintain a normal CL up to 24 weeks. In addition, 61% of these women and 79% of those with a history of surgical surgery will still deliver at term. Higgins et al showed that those with ultrasound-indicated cerclages have an even lower rate of PTB (Table 1). It seems, therefore, that serial sonographic examination of the cervix in women at risk for PTB, followed by cerclage in those with short CL, is a reasonable alternative to prophylactic placement of a cerclage based on uncontrolled studies. This is contradicted by a recent multicenter trial that randomized women with at least one previous delivery between 16 and 34 weeks (n = 253) to cerclage, if the obstetric history justified the procedure or if CL measured ≤ 2 cm by serial TVU. Women offered TVU surveillance were more likely to receive cerclage (31.7% versus 20%), which did not translate to an improvement in outcome or a reduction of PTB. The authors suggested that decision to insert a cerclage in women with previous PTB should be made on the basis of history rather than ultrasound and concluded that CL surveillance might not improve the identification of candidates for cerclage in women at risk of cervical insufficiency. Martinez et al reported on 1076 cases admitted to a community hospital. Of 171 cases where CL was measured, 21.1% had CL ≥ 25 mm. They concluded that in a community hospital, cerclages for short cervix are often performed in nulliparous women without antecedent risk factors at a gestational age when CL is not a reliable tool for predicting adverse pregnancy outcome.

### Table 1 Studies Comparing Outcome of High-Risk Women Assigned to Elective Cerclage versus Ultrasound-Indicated Cerclage

<table>
<thead>
<tr>
<th>Author</th>
<th>Study Design</th>
<th>Inclusion Criteria</th>
<th>Indications for US-Indicated Cerclage</th>
<th>Rate of PTB (History versus US-Indicated)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guzman et al</td>
<td>Retrospective</td>
<td>Singleton pregnancies, at risk for pregnancy loss and/or early spontaneous PTB</td>
<td>CL &lt; 20 mm at &lt; 24 wk</td>
<td>29/81 (35.8%) vs 21/57 (36.8%); p = 1.000</td>
</tr>
<tr>
<td>Althuisius et al</td>
<td>Randomized trial</td>
<td>Singleton pregnancies, spontaneous PTB (15–34 wk) with painless dilatation or PPROM not preceded by contractions</td>
<td>CL &lt; 25 mm at &lt; 27 wk</td>
<td>3/23 (13.0%) vs 1/36 (2.8%); p = 0.289</td>
</tr>
<tr>
<td>To et al</td>
<td>Retrospective</td>
<td>Singleton pregnancies, history of spontaneous PTB (16–33 wk) or STL</td>
<td>CL ≤ 25 mm at &lt; 24 wk</td>
<td>6/41 (14.6%) vs 9/43 (20.9%); p = 0.640</td>
</tr>
<tr>
<td>Berghella et al</td>
<td>Retrospective</td>
<td>Singleton pregnancies, history of spontaneous PTB or STL</td>
<td>CL &lt; 25 mm, funneling &gt;25% at &lt; 24 wk</td>
<td>15/66 (23%) vs 33/111 (30%); p = 0.3</td>
</tr>
<tr>
<td>Higgins et al</td>
<td>Prospective</td>
<td>History of spontaneous PTB (20–36 wk) or STL, cervix torn, previous forced dilatation, or cone biopsy</td>
<td>CL &lt; 25 mm at ≤ 24 wk</td>
<td>18/97 (18.6%) vs 1/38 (2.6%); p = 0.034</td>
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<tr>
<td>Groom et al</td>
<td>Case-controlled</td>
<td>History of spontaneous PTB, STL, or cervical surgery</td>
<td>CL ≤ 15 mm, progressive shortening to ≤ 25 mm, or funneling &gt;50% before the third trimester</td>
<td>15/39 (38.5%) vs 16/39 (41.0%); p = 1.000</td>
</tr>
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*PTB was defined as delivery < 37 weeks,
1 < 34 weeks,
2 < 35 weeks,
3 < 30 weeks.
PTB, preterm birth; US, ultrasound; PPROM, preterm premature rupture of membranes; STL, second trimester loss.

### Reinforcing Cerclage

In some instances, there are progressive cervical changes even after performing the cerclage. A reinforcing cerclage was suggested in an attempt to delay further cervical dilation and avoid PTB. In the largest study to date, Baxter et al in 2005 retrospectively studied 24 women in whom history-indicated cerclages were placed and subsequently developed a short cervix < 25 mm on TVU before 24 weeks. They received either a reinforcing cerclage or expectant management. The reinforcing cerclage group delivered earlier (20.8 versus 32.9 weeks, p = 0.002) with a 100% rate of PTB < 35 weeks and 80% preivable delivery < 24 weeks compared with 32% and 16%, respectively, in the expectant management group. They hypothesized that this could be due to intra-amniotic infection or cervical inflammation. Even
though type II error because of the small sample size and selection bias owing to its retrospective nature cannot be ruled out, it remains the only series of ultrasound-indicated reinforcing cerclage after primary history-indicated cerclage. Therefore, it seems that reinforcing cerclage should not be placed after detection of cervical shortening and could possibly be reserved to cases at the lowest limit of fetal viability in the presence of extreme cervical changes.

Choice of Cerclage Technique
In the only study to date comparing Shirodkar and McDonald sutures, no differences in PTB <33 weeks were noted between the two techniques (20% versus 23%, odds ratio [OR] 0.85, 95% CI 0.5 to 1.6).²

Ultrasound after Placement of a Cerclage
Hedriana et al⁵⁶ examined the value of ultrasonographic follow-up after the placement of cerclage, and they found that the CL above the cerclage rather than the overall CL better predicted PTB. More recently, Scheib et al⁵⁷ have shown that cerclage height (the distance from cerclage to the external cervical os) of at least 18 mm after ultrasound-indicated cerclage is associated with a reduction in spontaneous PTB <35 weeks (4% versus 33%, RR 0.69, 95% CI 0.55 to 0.86).

CERCLAGE VERSUS PROGESTERONE
Weekly intramuscular 17α-hydroxyprogesterone caproate was compared with McDonald cerclage in women with short CL <25 mm and funneling in the mid-trimester.⁵⁸ The study was terminated, however, when the interim analysis showed no difference in PTB <35 weeks between treatment groups. However, cerclage may be more effective in preventing spontaneous PTB in women with CL ≤15 mm.

COMBINATION OF CERCLAGE AND PROGESTERONE
The effectiveness of a combination of cerclage and progesterone in women at risk of PTB has never been studied. Currently, a study is being conducted in University of Mississippi that will include, among other groups of women at risk of PTB, those with cervical cerclage (http://www.clinicaltrials.gov/ct2/show/NCT00830765?term=University+of+Mississippi+and+cerclage&rank=1). These women will be randomized to weekly 17α-hydroxyprogesterone caproate or placebo. This might provide an answer on whether combination of surgical and medical therapy in women at risk of PTB would be superior to cerclage alone.

INDOMETHACIN
Many studies have shown that women with a short cervix have asymptomatic contractions.⁵⁹,⁶⁰ Therefore, it has been postulated that the use of indomethacin might be beneficial in the management of these women. No randomized controlled trials have specifically addressed the role of indomethacin use alone in the management of women with short cervixes. However, Berghella et al⁶¹ utilized data from three randomized trials originally designed to study the utility of cerclage in asymptomatic women with short CL <25 mm on TVU between 14 and 27 weeks. They compared the outcome in women with singleton gestations who received indomethacin at time of original randomization (n = 99) with those who did not (n = 40). A significant reduction in PTB <24 weeks (RR 0.14, 95% CI 0.02 to 0.92) but not <35 weeks (RR 0.69, 95% CI 0.44 to 1.13) was noted in women who received indomethacin. It should be pointed out that their sample size was 35% of that required to provide sufficient power to assess PTB <35 weeks. This study is unique in that it is the only one so far to assess the efficacy of tocolytic therapy for a short CL. In a more recent study, the same author sought to estimate the effect of indomethacin on the duration of pregnancy in women with dilated cervix between 14 and 26 weeks.⁶² In women receiving cerclage, PTB <32 weeks (OR 0.56, 95% CI 0.26 to 1.25) and <35 weeks (OR 0.52, 95% CI 0.23 to 1.14) suggested a possible but not significant benefit for indomethacin use. Further randomized controlled trials should be performed for proper assessment of the utility of indomethacin in this context.

ANTIBIOTICS
In 2006, Hassan et al⁶³ established that 9% of asymptomatic women with CL <25 have microbiologically proven, subclinical intra-amniotic infection that may precede the development of the clinical picture of acute cervical insufficiency. In the only retrospective cohort that was published as an abstract, antibiotics were not shown to decrease the incidence of PTB <35 weeks in women with CL <25 mm (29% versus 33%, adjusted RR 0.80, 95% CI 0.40 to 1.59).⁶⁴

WOMEN WITH SYMPTOMS OF PRETERM LABOR
Because a short CL is predictive of PTB even in women with symptoms of PTL, it has been postulated that TVU CL screening in these women can be of benefit in directing treatment and in avoiding unnecessary interventions. In one study, the knowledge of CL and fetal fibronectin (fFN) results led to a 65% decrease in PTB <37 weeks in those evaluated for PTL between 24 and 33½ weeks (RR 0.35, 95% CI 0.15 to
In another observational study, 99% of women presenting at 35 weeks with regular painful contractions and a CL >15 mm remained undelivered till term. Alfirevic et al tested the hypothesis that management of threatened PTL based on TVU CL measurement can reduce the number of women who receive inappropriate treatment. They withheld steroid and tocolytic treatment in those with CL >15 mm. In the ultrasound group, only 14% received such treatment compared with 90% in the group that received the conventional management. It is interesting to note that in both groups all babies born prematurely had received steroids, showing that using CL to direct treatment decreases unnecessary intervention. This trial needs to be repeated before TVU CL can be recommended for routine evaluation of women with threatened PTL.

FUTURE HORIZONS
Evidence is pointing to the presence of different causes of cervical shortening. In the future, pathway-specific therapies may target different causes of cervical shortening differently. Recent literature has shed some light on tools that help in directing the most appropriate therapy according to the underlying cause of cervical shortening.

fFN, an extracellular matrix protein that marks the disruption of the maternal-fetal junction when present after 18 weeks, has been proposed as a tool to stratify women with short CL to those who should or should not receive cerclage. However, the results of the only study by Keeler et al were disappointing. Singleton pregnancies between 18 and 24 weeks of gestation with an ultrasound-diagnosed short cervix (<25 mm) or funneling (>25%) were analyzed for fFN levels and then randomized to cerclage or no cerclage. Although fFN was able to predict PTB, cerclage was unable to prevent it (17.7% versus 31.0%; p = 0.25). Based on this study, the use of fFN in women with short CL should be used solely for the purposes of counseling and anticipation of PTB and is of no benefit in identifying candidates for ultrasound-indicated cerclage.

IL-8 plays a vital role in initiating the inflammatory response by promoting chemotaxis of neutrophils, thus causing ripening of the cervix and ultimately resulting in PTB. Kiefer et al have recently demonstrated a correlation between intra-amniotic inflammation as measured by cytokine levels and the degree of cervical shortening by TVU, even after excluding women with infection or labor. These findings provide a plausible explanation for the variable success rates of different interventional modalities in women with short CL. Some women may be so far along the inflammation cascade that our current therapies may be ineffective. Differentiation of women with and without inflammation may be crucial for choosing the most appropriate therapy for women with cervical shortening. Sakai et al attempted to study the usefulness of IL-8 levels in the cervical mucus of women with short CL. They noted that women with CL ≤25 mm would benefit from cerclage (lower PTB <37 weeks) only if cervical mucus IL-8 levels were normal. In contrast, cerclage

![Figure 1](image-url)  
**Figure 1** Algorithm for the management of women with short cervical length. *Fetal fibronectin and interleukin-8 may further stratify women to prevent unnecessary cerclages. **Indomethacin was used in studies that were originally designed to study the utility of cerclage in asymptomatic women with short cervical length. †Available evidence supports the use of progesterone to women with cervical length ≤15 mm. PTB, preterm birth.
treatment with elevated cervical mucus IL-8 may increase the rate of PTB <37 weeks (78% versus 54.1%, p = 0.03). The same authors investigated whether short CL and high IL-8 in cervical mucus were valuable indications for treatment (bed rest or cerclage) to prevent PTB. Normalizing IL-8 through vaginal washing with povidone iodine and insertion of chloramphenicol vaginal tablets in cervical mucus significantly decreased PTB rate compared with women who had persistently elevated IL-8 levels and those where treatment was not attempted. An interesting aspect of this study is that in women with elevated IL-8 levels who received cerclage, the rate of PTB was similar to that in women who received only bed rest. This is evidence that a proportion of women have short CL due to an inflammatory process, and cerclage insertion in these women may worsen the pregnancy outcome. A randomized controlled study is needed to consolidate those findings.

**CONCLUSIONS**

A short CL on TVU is a powerful predictor of eminent PTB. Efforts have been made, with variable success, for the management of short CL. Successful management of these patients depends on the understanding that short CL is the final common pathway of various causes of PTB. Mechanical failure of the cervix (cervical incompetence), intra-amniotic or cervical infection or inflammation, or preterm contractions all lead to premature shortening of the cervix. As such, there probably isn’t one management technique that can be used across the board in all patients. Rather, the specific management technique needs to be tailored to the etiology of the short CL and according to the patient in question (Fig. 1). It is becoming increasingly clear that the identification of women who will benefit from any intervention including cerclage cannot be made on the basis of either history or cervical ultrasound alone. On the other hand, the combination of a sonographic short CL, a history of a previous preterm delivery, and the absence of endocervical inflammation (and vaginal inflammation) is more likely to target women who would benefit. Ultrasound–indicated cerclage may be of benefit in women at risk for PTB but will exacerbate an infection and could be harmful in multiple gestations. A reinforcing cerclage is also harmful. Antibiotics do not seem to be beneficial. Indomethacin may be helpful in preventing early preterm delivery <24 weeks. IL–8 might help in stratifying women who will best benefit from ultrasound–indicated cerclages, but the role of fFN needs to be further studied. Future efforts need to be directed toward better patient selection for different management techniques.
REFERENCES


MANAGEMENT OF THE SHORT CERVIX/SINNO ET AL