# Ultrasound approach for cervical length screening in preterm birth prevention

**THE ISSUE:** Sonographic cervical length assessment to detect shortening has been shown to be an effective screening test for prediction and prevention of spontaneous preterm birth, and variations of the strategy have been widely adopted for clinical practice. Interventions used to decrease the risk of preterm birth in women with a short cervix are based on study designs that employed cervical length measurement using transvaginal ultrasound. Transabdominal ultrasound cervical length measurement appears to correlate with transvaginal measurements and has also been used for screening. However, there are limited data on implementing a screening program. This debate addresses the topic of which should be the preferred ultrasound approach—transvaginal or transabdominal—in screening for patients at high risk for spontaneous preterm birth.

## Not transabdominal!

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Preterm birth (PTB) remains a major cause of perinatal morbidity and mortality, despite a decrease in its incidence of approximately 25% in the last 7 years in the United States, from 12.8% in 2006 to 9.5% in 2014.[1] Cervical length (CL) measured by ultrasound has been shown to be one of the most predictive screening test for spontaneous PTB (SPTB).[2-5] Both the American Congress of Obstetrics and Gynecology (ACOG)[4] and the Society for Maternal-Fetal Medicine (SMFM)[5] supported CL screening for singleton gestations with a prior SPTB with serial second-trimester CL measurements between 16-24 weeks. The 2 organizations consider it reasonable to screen singletons without a prior SPTB (often called "universal CL screening"). We have already published an article outlining the many reasons supporting universal CL screening.[6]

In 2015, we surveyed maternal-fetal medicine divisions with fellowship programs in the United States regarding their practices with respect to CL screening for singletons without prior SPTB. Responses indicated that approxi-

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## Transabdominal ultrasound is appropriate

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Sonographic cervical length assessment to detect shortening has been shown to be an effective screening test for prediction and prevention of spontaneous preterm birth, and variations of the strategy have been widely adopted for clinical practice.[1] Some experts have recommended abandoning transabdominal (TA) ultrasound as a screening modality for short cervix, advocating for exclusive use of transvaginal (TV) ultrasound for this purpose. Drs Khalifeh and Berghella are proponents of exclusive TV ultrasound screening and present the argument for this strategy in their accompanying viewpoint. Their argument is largely based on the fact that, per patient, the accuracy of TV ultrasound in estimating cervical length is superior to that of TA ultrasound. As a counterpoint, we submit the opposing argument in favor of maintaining TA ultrasound as a reasonable initial screening approach. We offer 5 main counterpoints to support the argument for incorporating TA ultrasound in the screening and prevention of spontaneous preterm birth.

First, we think the authors of the accompanying viewpoint summarize the current clinical research data without

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**TABLE**
**Studies comparing transabdominal ultrasound and transvaginal ultrasound for cervical length measurement**

| Study | Gestational age, wk (mean) | No. of women (with TVU CL <25 mm) | Bladder status at TAU screening | TAU and TVU results blind to each other | TAU cutoff, mm | TAU longer/ shorter than TVU | TAU CL not attainable | Sensitivity[a] | Follow-up TVU needed |
|---|---|---|---|---|---|---|---|---|---|
| To et al,[10] 2000 | 22–24 (23) | 149 | Prevoid (bladder volume calculated) | NR | NR | NR | 51% | NR | NR |
| Saul et al,[8] 2008 | 14–34 (22) | 191 (14) | Postvoid | Yes | ≤30 | Similar | NR | 100% | NR |
| Stone et al,[9] 2010 | 18–20 | 203 | Postvoid | No | NR | Shorter | NR | NR | NR |
| Hernandez-Andrade et al,[11] 2012 | 6–39 (24) | 220 (20) | Prevoid | Yes | ≤25<br>≤30 | Longer<br>Longer | NR | 43%<br>57% | NR |
| Friedman et al,[12] 2013 | 18–24 (20.5) | 1217 (76) | Prevoid<br>Postvoid | No<br>No | ≤36<br><35 | Shorter<br>Shorter | 6%<br>17% | 96%<br>96% | 60%<br>NR |
| Rhoades et al,[13] 2016 | 17–23 (20) | 404 | Postvoid | No | ≤35 | Shorter | 21% | 93% | 32.4% |
| Marren et al,[14] 2014 | 18–20 (19) | 198 (13) | Prevoid<br>Postvoid | No<br>No | <30<br><30 | Longer<br>Similar | 3%<br>18% | "Poor"[b]<br>39% | NR |

*CL*, cervical length; *NR*, not reported; *TAU*, transabdominal ultrasound; *TVU*, transvaginal ultrasound.

[a] For detecting TVU CL <25 mm; [b] Exact percentage not reported.

*Khalifeh. Cervical length measurement: not with transabdominal ultrasound. Am J Obstet Gynecol 2016.*

**Dr Stamilio** (*continued*)

adhering to an equally objective or rigorous assessment of both techniques of cervical length assessment. The presented summation of the literature seems biased in favor of TV ultrasound, without considering equally the benefits and limitations of each strategy. Several articles that the authors cite actually do not support their argument and firm conclusions. Based on critical review of the same body of literature, we identified several study issues that undermine the argument in favor of exclusive TV ultrasound screening. In the observational study by Stone and colleagues,[2] TA ultrasound underestimates cervical length and therefore overcalls cervical shortening. This leads to concern that TA ultrasound results in an excess of false-positive screens, which would not reduce sensitivity. This error would be eliminated by a 2-tiered screening scheme in which TV ultrasound is used in the minority of patients with a short cervix on TA examination, and the authors of this study conclude that for patients with adequate cervical length detected on TA, TV ultrasound would not provide additional information. Saul et al[3] observed 100% sensitivity for detection of TV cervical length <25 mm using a TA ultrasound cervical length cutoff of 3 cm in a prospective cohort. They also concluded that good TA ultrasound technique for cervical length includes post-void measurements and trained sonographers. In the observational study by Friedman and colleagues,[4] 97% of TV ultrasound short cervices would be detected with a TA ultrasound cervical length cutoff of <34 mm. Using a prospective cohort study design, Rhoades et al[5] observed that a TA cervical length cutoff of 35 mm excludes a short cervix of <30 mm and avoids TV ultrasound in 68% of patients. In the observational study by To and colleagues,[6] TA ultrasound was shown to consistently underestimate cervical length compared to TV ultrasound. In addition, TV measurements were significantly shorter after bladder emptying than prior to bladder emptying.[6] These authors confirmed that high bladder volume erroneously lengthens the cervix, a finding confirmed by Marren et al[7]; notably, the cervix was well visualized by TA approach in 49% of patients with low urine volume.[6] Marren et al[7] report that in their cohort, the cervix was well visualized in 82.8% of patients with an empty bladder. In this study, using a TA ultrasound cervical length cutoff of 35 mm improved sensitivity for identifying a short cervix, but would result in 77% of women needing a TV scan (inadequate image in 18%; cervix <35 mm in 59%).[7] The study that showed poorest test characteristics for TA cervical length appeared aimed to prove a preconception that TA ultrasound was inferior rather than to objectively compare 2 methods.[8] To quote the authors, "We undertook this study because we were surprised that some investigators continue to propose that transabdominal sonography can be used to screen patients to detect those with a short cervix." In doing so, the research team optimized the protocol and performance of TV ultrasound, but did not optimize the