Comparison of six cervical measurement methods in first trimester: reproducibility and predictive value for preterm delivery

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Objective

Prediction and prevention of pretem birth (PB) is a major challenge in pregnancy care. Cervical length measurement by transvaginal ultrasound (TVU) has been shown to be the best predictive test in second trimester to predict PTB. Moreover, some reports shown that measurement of the cervix by TVU in screening for preterm birth may also be useful even in the first trimester. However, there is not a clear standard method for measurement of cervical length in first trimester. The aim of our study was to compare the six most described measurement methods of cervical length and to give their relevance in prediction of preterm birth.

Methods

Forty-two patients followed up in our institution with PTB (<34 weeks') were matched to control patients at a 1: 7 ratio. Two operators, blinded to the outcome of pregnancy, measured cervical length based on standardized images stored at the time of 1st trimester examination in the 307 and 42 controls and cases respectively. The cervix was measured using three techniques between the external os (EO) and the internal cervical os (IO) (single straight line, two straight lines, tracing), and the same three techniques between the external os and the lower pole of the egg (LPE). All measurements were repeated to assess the intra and inter operator variability. The value of measurements to predict PTB was compared based on ROC curves.

Results

Mean cervical length examined by the single-line, two-lines and trace, from the EO to the IO, approaches were 37. 4 mm (+/-3. 9mm), 39. 1mm (+/- 4. 2mm), and 39. 1mm (+/- 4. 3mm) respectively. Mean cervical length examined by the single-line, two-lines and trace, from the EO to the LPE, approaches were 48. 7 mm (+/- 7. 7mm), 52. 7mm (+/- 8. 7mm), and 54mm (+/- 9. 2mm) respectively. No correlation was found between gestational age and cervical length. The three methods using the IO were the most useful to predict preterm birth before 34 week's gestation. The most discriminating was the tracing techniques (AUC = 0, 85) with a cut off of 37 mm (Se=87%, Sp=70%). However Intra- and inter-operator agreements were higher with LPE-based methods as compared to IO-based methods.

Conclusion

Tracing and single line methods from EO to IO have greater potential to predict preterm birth before 34 week's gestation although they have lower reproducibillity than LPE-based methods.