Utility of transperineal ultrasound parameters in predicting the mode of delivery during second stage of labour

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Objective
The aim of this study was to investigate the role of transperineal ultrasound in prediction the mode of delivery.

Methods
This was a prospective, observational study involving 110 low-risk parturients at term with a singleton fetus in cephalic presentation. Transperineal ultrasound was performed 60 minutes after confirmation of a fully dilated cervix by digital examination. Angle of progression (AoP) and head direction (HD) were assessed between contractions by single observer. Digital and ultrasound examiners were blinded for each other’s results. Decisions regarding the mode of delivery were based only on clinical assessment. All cases were classified into three groups: vaginal delivery (VD), vacuum extractor (VE) and Caesarean section (CS) for failure to progress. Obtained measurements of AoP and HD were compared between three groups.

Results
Out of the 110 women enrolled 59 (53,6%) had vaginal delivery, 13 (11,8%) had vacuum extractor due to labour arrest and 38 (34,5%) required Caesarean section for the same reason. No statistically significant differences were observed in obstetric and neonatal characteristic between the study groups with the exception of second stage duration (119 vs. 154 vs. 143 min.; student’s t test < 0.001). Among women who delivered vaginally (VD) the mean value of AoP and the angle of HD were significantly higher than observed in VE and CS group (137° vs. 125° vs. 119°; 22° vs. 0° vs. -5°, respectively, student’s t test < 0.001). Diagnostic accuracy was tested with a receiver-operating curve. AUC was 87.6% (95% CI, 81.3 - 93.9) for AoP and 92.2% (95% CI, 87.5 - 97.0) for HD. The optimal cut-off value for both parameters was calculated. An AoP ≥ 128° and an angle of HD ≥ 9° were the best predictors of successful vaginal delivery (sensitivity 81% and 83%, specificity 83% and 86%, respectively). There was moderate, but statistically significant correlation between both parameters (AoP, HD) and duration of second stage of labour (Pearson’s correlation r = - 0.36; r = -0.42; p < 0.05).

Conclusion
Transperineal ultrasound measurements of angle of progression (AoP) and head direction (HD) might be a useful tool in predicting the outcome of labour in women during second stage. We proposed the value of angle for assessment head direction is a much better predictor for successful vaginal delivery than classified category "head up", "horizontal" or "head up". Both parameters are strongly associated with the remaining time in labour.