Enlargement of fetal zone of the fetal adrenal gland predicts the success of labor induction

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Objective
Fetal zone enlargement (FZE) within the adrenal gland indicates increased physiologic activity. FZE predicts preterm birth, suggesting a fetal component in the onset of parturition. Our hypothesis is FZE increases the likelihood of successful induction of labor (IOL).

Methods
This is a prospective cohort study of singleton gestations undergoing IOL for typical obstetric indications not associated with uterine activity or infection. Immediately prior to IOL the fetal adrenal gland (fetal zone and total gland) dimensions were measured. Fetal zone ratio (FZR: width of adrenal gland fetal zone / width of total adrenal gland) was calculated. Transvaginal cervical length (CL) and Bishop’s scores were obtained. IOL was managed at the discretion of the provider (vaginal misoprostol, intracervical foley balloon, intravenous oxytocin or combinations). The primary outcome of interest was route of delivery. Obstetric and neonatal outcome data were extracted from the clinical record. The proportion of FZE was analyzed in patients with successful vaginal delivery versus failed induction (defined as >24 hours in latent phase of labor, 2nd stage arrest after 2-3 hours of maternal efforts). The predictive value of FZR for successful IOL was analyzed using ROC curve.

Results
Twenty-nine patients met the inclusion criteria. The median BMI was 35 (24 - 47) kg/m2. Successful IOL was achieved in 23 (79.3%) patients. CL and Bishop’s score did not differ between groups. The type of induction agents were not different (p>0.05). FZR was higher in successful induction than failed induction group (44 ± 7 % vs 34 ± 8 %) (p=0.006) (figure 1). The time intervals from initiation of IOL to active labor as well as to delivery were longer in failed induction group (p<0.01 for both). ROC analysis showed FZR >35% to have sensitivity of 96%, specificity of 75%, positive LR of 3.8 and negative LR 0.05 (AOC: 0.82 p=0.04) (figure 2).

Conclusion
Ultrasound measurement of fetal zone enlargement predicts successful IOL. This previously unused marker of fetal physiology may be valuable in obstetric management with regard to induction of labor. These preliminary data need to be confirmed with greater sample size.