Clinical and ultrasonographic model for prediction of failed cervical ripening at term

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Objective
To develop a model combining different clinical and ultrasonographic parameters able to predict failure of pharmacological or mechanical cervical ripening at term.

Methods
Prior to placement of intracervical Foley catheter and/or prostaglandin administration, ultrasonographic images of uterine cervix and fetal head position were obtained. 76 variables were selected for testing. Findings were blinded to clinicians. The main outcome was failed cervical ripening, defined as the failure to achieve active labor after mechanical or pharmacological methods. Clinical information, offline image measurements and outcomes of IOL were collected. Logistic regression analysis was performed to develop the predictive model.

Results
225 singletons at term, with unfavourable cervical conditions (Bishop’s score < 6) and medically indicated induction of labor were consecutively and prospectively recruited for participation. Main outcome occurred in 44.4% (100/225) of patients. Univariate analysis was performed to discard parameters unrelated to outcome (p>0.10). Forward and backward stepwise logistic regression with remaining characteristics resulted in a model including 6 variables: antepartum BMI>25, weight gain during pregnancy, PROM, gestational age at start of procedure, Bishop’s index and cervical length applying fundal pressure. Area under the receiver operating characteristic curve was 0.8493. A cutoff point ≥-0.2221 was suggested to predict failed cervical ripening, with values of sensitivity, specificity, positive and negative predictive values of 84.3%, 76.2%, 74.7% and 84.2%, respectively. 79.9% of patients were correctly allocated.

Conclusion
This model adequately predicted patients with a high probability of failed cervical ripening, using prostaglandins or mechanical methods. The application of these findings could help to adequate IOL procedures, in order to select women who may benefit from different strategies.