

EP18.05 – Advancements in automatic assessment of instrumental delivery feasibility: evaluating the impact of maternal ethnicity.

Andrea Dall'Asta¹, Chiara Botrugno², Chiara Melito¹, Alberto Bottino³, Rocco Morello², Francesco Conversano², Paola Pisani², Sergio Casciaro², Tullio Ghi^{1,3}

¹Department of Medicine and Surgery, Obstetrics and Gynaecology Unit, University of Parma, Italy

²National Research Council, Institute of Clinical Physiology, Lecce, Italy

³Department of Engineering for Innovation, University of Salento, Lecce, Italy

Objectives

Fetal occiput position during labor is crucial in determining the optimal delivery method, whether Caesarean or instrumental. This study advances an automatic algorithm that classifies instrumental delivery feasibility using a color-coded system (green, yellow, red). A key objective is to assess whether maternal ethnicity affects the algorithm's predictive accuracy through intergroup variability analysis.

Methods:

A retrospective analysis was conducted on 176 women in the second stage of labor, including 127 Caucasian, 23 African, 18 Asian, and 8 South American patients. The algorithm processes three parameters, derived from transperineal ultrasound scans: occiput position, head-perineum distance, and midline angle. These variables are integrated to classify delivery feasibility as high (green), moderate (yellow), or low (red) likelihood of success (Figure 1). Performance metrics were assessed by comparing results with actual clinical outcomes (ground truth).

Results

The algorithm demonstrated strong predictive performance, achieving a sensitivity of up to 0.79, specificity up to 0.96, and a Cohen's Kappa coefficient of 0.78. Intergroup analysis revealed minimal variability, with overall accuracy ranging from 0.83 to 0.86 from Asian to Caucasian women, sensitivity ranging from 0.72 to 0.76 from South American to Asian women, and specificity from 0.93 to 0.96 from South American to Caucasian women. Statistical tests confirmed no significant differences across ethnic groups ($p > 0.05$), suggesting that maternal ethnicity does not impact algorithm performance.

