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A Multivariable Predictive Model for Success of External Cephalic Version

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Abstract

Objective: To create a prediction model for external cephalic version (ECV) success using objective patient characteristics.

Methods: This retrospective study included pregnant individuals of at least 18 years of age with a nonanomalous, singleton gestation who underwent an ECV attempt between 2006 and 2016 at a single quaternary care hospital. Variables assessed included maternal age, height, weight, body mass index (BMI), parity, fetal sex, gestational age, estimated fetal weight, type of fetal malpresentation, placental location, and amniotic fluid volume. Univariable and multivariable logistic regression models were used to determine the association of patient characteristics with ECV success. Estimated odds ratios and corresponding 95% CIs were calculated for each variable, and backward elimination and bootstrapping were used to find a parsimonious model for ECV success with the highest discriminatory capacity (as determined by the area under the receiver operating characteristic curve [AUC]). This model was evaluated with a calibration curve across deciles of success.

Results: A total of 1,138 individuals underwent an ECV attempt and were included in this analysis. The overall ECV success frequency was 40.6%. Factors significantly associated with ECV success were maternal age, parity, placental location, estimated fetal weight, and type of fetal malpresentation. A final model with BMI, parity, placental location, and type of fetal malpresentation had the highest AUC (0.667 [95% CI 0.634-0.701]), resulted in good calibration, and is represented by the following equation: $1/[1+e^{-x}]$ where $x=1.1726-0.0314 \text{ (BMI)}-0.9299 \text{ (nulliparity)}+1.0218 \text{ (transverse or oblique presentation at ECV)}-0.5113 \text{ (anterior placenta)}$. An interactive version of this equation was created and can be accessed at [www.ecvcalculator.com](#).

Conclusion: A prediction model that estimates the probability of ECV success was created and internally validated. This model incorporates easily obtainable and objective patient factors known before ECV and may be used in decision making and patient counseling about ECV.

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