Poster 211. Development and Validation of The BRACE (Bankart Risk Assessment & Clinical Estimator) Score – An International Multicenter Study

Eoghan T. Hurley, PhD, MBBCH; Aaron D. Therien; Hannan Mullett; Luciano A. Rossi, PhD; Dean C. Taylor, MD; Lance E. LeClere, MD; Bobby G. Yow, MD; Brian C. Lau, MD; Peter J. Millett; Matthew T. Provencher, MD, MBA; Brett D. Owens, MD; Jonathan F. Dickens, MD

Objective: Arthroscopic Bankart repair (ABR) is the most widely performed surgical treatment for anterior shoulder instability, and the Instability Severity Index Score (ISIS), while widely used to guide surgical decision-making, has demonstrated inconsistent reliability. Recent evidence suggests that incorporating advanced imaging findings and refining patient-specific risk factors may enhance predictive accuracy and improve clinical utility. The purpose of this study was to develop and validate an ABR recurrence risk calculator in an independent clinical dataset and assess its performance in stratifying patients by recurrence risk.
Methods: The BRACE (Bankart Risk Assessment & Clinical Estimator) score was developed, based on age, sex, glenoid bone loss, Hill-Sachs lesion status, number of preoperative dislocations, ligamentous laxity, and sport participation generating 864 distinct clinical scenarios. Odds ratios were extracted from a systematic review of 110 studies and incorporated into a logistic regression model. The model was then evaluated on an international multicenter cohort including 5 institutions from 3 countries. Discrimination (area under the curve (AUC)), Brier score, calibration (slope, Hosmer-Lemeshow), risk stratification (low; 0-14, moderate; 15%-29%, high; 30+%), decision‐curve analysis and operating characteristics from 10%-30% thresholds were reported.
Results: The BRACE score was evaluated on 2535 ABR patients. The interaction between glenoid bone loss >=13.5% and an off-track Hill-Sachs lesion was independently associated with higher recurrence risk. The model demonstrated moderate discriminative ability (AUC = 0.70, 95% CI 0.62-0.78) with appropriate calibration across the range of predicted recurrence probabilities (calibration slope = 0.889, 95% CI 0.62-1.16; Hosmer-Lemeshow p = 0.36). The model achieved a Brier score of 0.067 (95% CI 0.052-0.082), indicating good overall accuracy of the predicted probabilities. At a 15% moderate risk threshold, the specificity was 93.4% (95% CI 91.1%-95.4%), and at a 30% high threshold specificity was 98.0% (95% CI 96.7%-99.1%). Model performance remained consistent across subgroups and predicted risk estimates aligned closely with observed recurrence rates.
Conclusions: The ABR recurrence risk calculator demonstrated moderate discrimination, good overall accuracy, and appropriate calibration when applied to a large, multicenter clinical cohort. The tool effectively stratified patients into low-, moderate-, and high-risk groups, with decision-curve analysis confirming clinical utility across relevant thresholds.

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