Derivation and Internal Validation of a Prediction Model for Deep Surgical Site Infection After Open Extremity Fractures: A Prospective Cohort Study
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Purpose: Open extremity fractures are associated with a high risk of infection, and care should be focused on high-risk patients. Although various risk factors have been reported in previous studies, clinical prediction models still need to be developed using these factors. This study aimed to develop and validate a clinical prediction model that accurately predicts the deep surgical site infection (SSI) after 3 months from open extremity fractures.

Methods: This prospective cohort study consecutively enrolled patients with open extremity fractures at 110 hospitals in Japan between February 2015 and June 2020. This fracture database was organized by the Japanese Society for Fracture Repair. The backward stepwise selection was used to select clinical predictors for developing deep SSI for up to 3 months from 16 candidate predictors. We assigned the score to each selected variable based on the regression coefficient and developed the scoring system. The area under the curve (AUC) and calibration plot were evaluated as diagnostic performance. Internal validation was conducted by bootstrapping to correct the optimism.

Results: Of 2547 fractures included for model derivation, 131 (5.1%) had deep SSI. We developed a clinical prediction model named the ConTRoLED BiGBOSS score based on the initials of selected predictors: sex, body mass index, concomitant trunk injury, fracture location, Gustilo-Anderson classification, OTA-open fracture classification (OFC) of skin, OTA-OFC of contamination. Internal validation showed the optimism corrected AUC of 0.80 and the calibration slope of 1.0. A cut-off of ≥8 points was chosen to classify a high risk of infection, and the predictive value was 0.42.

Conclusion: In this study, we developed a simple prediction model for deep SSI after open extremity fractures with a good value of discrimination and calibration.

PODIUM ABSTRACTS