

Plate Osteosynthesis of Proximal Humerus Fracture is Associated with Significant Complications and Poor Functional Score for Patients Older than 45 Years Old: A Cohort Study

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INTRODUCTION:

Despite introducing new implants and biomechanical characteristics for proximal humerus fracture (PHF), the complication rate is still noticeable, especially in older adults. This study aimed to identify risk factors for complications and failure following plate osteosynthesis for PHF and discuss a cut-off age that surgeons should consider the high rate of complications.

METHODS:

Adults with PHF treated with proximal humerus internal locking system (PHILOS) at our large tertiary academic referral center between 2015 and 2020 were retrospectively identified. Univariate analysis was used to compare complicated and non-complicated patients. Then, a multivariate regression analysis was conducted to assess the risk factors of complications. The receiver operating characteristic (ROC) curve of age for predicting complication-free and favorable functional outcome at the most recent follow up was drawn. Oxford Shoulder Score (OSS) was considered favorable if $OSS < 10$.

RESULTS:

A total of 135 patients were identified with a mean age of 44 y/o (range 18–85 years), and the mean follow up was 4.6 years (range, 2–8 years). Complications were observed in 19 cases (14.1%), including nonunion ($n=5$), avascular necrosis ($n=1$), infection ($n=1$), intra-articular screw perforation ($n=1$), arthritic changes ($n=5$), and superior humeral head migration ($n=5$). Reoperation was required in eight (5.9%) patients. In logistic multinomial regression analysis, only older age ($OR=1.09$) and Neer IV class ($OR= 8.3$) were associated with an increased likelihood of complication ($P<0.05$).

The age ROC curve for predicting complication-free cases had an area under the curve (AUC) of 0.829, indicating that age could predict the outcomes of ORIF in PHF ($P<0.05$) (Figure 1). The optimal age cut-off was 44 years, which yielded a sensitivity of 100% and a specificity of 65.7. The age ROC curve for predicting favorable OSS ($OSS < 10$) had an AUC of 0.829, indicating that age could predict the favorable OSS outcomes of ORIF in PHF (Figure 2). The optimal age cut-off was 46 years, yielding a sensitivity of 70.0%, and a specificity of 78.6%.

DISCUSSION AND CONCLUSION: The outcomes of ORIF for PHF in patients older than 45 years are associated with significantly higher complication rates and inferior functional outcomes. Surgeons should possibly consider other treatment options for PHF in individuals beyond the age of 45, especially with Neer type IV fractures.

