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Increased Metal Failure Rate in 2.7-mm Variable-Angle Plates for Midshaft Clavicle Fractures: A Propensity Score-Matched Analysis

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Introduction and Background

The use of 2.7-mm variable-angle (VA) plates for midshaft clavicle fractures has increased, yet concerns remain regarding their mechanical durability compared with conventional 3.5-mm plates. This study aimed to compare metal failure rate, failure time, and union time between the two plates.

Material and Method

A retrospective review was conducted as a multicenter study across two hospitals. Patients who underwent surgical fixation for midshaft clavicle fractures between March 2020 and November 2024 and completed at least 1 year of follow-up were included. A total of 180 patients met the criteria (18 treated with a 2.7-mm VA plate and 162 with a 3.5-mm plate). Propensity score matching (3:1) was performed to reduce baseline imbalance, resulting in 18 patients in the 2.7-mm group and 54 patients in the 3.5-mm group. Metal failure rate, failure time, and union time were evaluated.

Results

Metal failure occurred in 5 of 18 patients (27.8%) in the 2.7-mm group and in 1 of 54 patients (1.9%) in the 3.5-mm group ($p = 0.003$). Failure time was 30.1 ± 18.0 weeks in the 2.7-mm group and 25.8 weeks in the single failure case in the 3.5-mm group. Among patients who achieved radiologic union, union time did not differ significantly between groups (31.5 ± 23.5 weeks vs 42.3 ± 31.0 weeks, $p = 0.263$).

Conclusions

The 2.7-mm VA plate demonstrated a higher metal failure rate without a significant advantage in union time compared with the 3.5-mm plate. These findings suggest that the 2.7-mm low-profile plate offers no healing benefit and may be mechanically less reliable in midshaft clavicle fractures.