Complex coronar shear fractures of the distal humerus- what are the odds of an osteosynthetic reconstruction?

PD Dr. Med. Habil. A Klug, Yves Gramlich[1], Reinhard Friedrich Gustav Hoffmann
[1]BG Unfallklinik Frankfurt

INTRODUCTION: Coronar shear fractures of the distal humerus are rare injury patterns whose treatment is highly demanding, because the stable fixation of several small joint fragments often reaches its technical limits. Therefore, they are often associated with a poor functional outcome. Optimal treatment as well as surgical access selection remain the subject of current research.
METHODS: Between 2014 and 2020, a total of 16 patients (mean age: 58.9 years, range, 41-73years) with a complex shear injury of the distal humerus, defined as a Dubberly type 3B fracture, were treated by osteosynthetic reconstruction in our clinic and included in a retrospective study design (average follow-up: 58 months). The objective and subjective outcome was assessed using specific elbow scores (DASH, OES, MEPS) including range of motion, stability and grip strength. Furthermore, rehabilitation time, revision rate, type and reasons were recorded and available radiological images were analyzed.

RESULTS: All patients were treated using head-sunk screw osteosynthesis via a triceps-preserving approach, with additive posterior plate osteosynthesis due to dorsal comminution (subtype B).
At the time of last presentation, all fractures achieved bony union, with necrosis of the capitulum radiologically evident in one case. Overall, the mean MEPS was 80.0 (range, 50-100), the OES was 34.1 (range, 18-48), and the DASH was 19.5 (range, 0-52). The median range of motion reached 117° (range, 45-155°) in Ext/Flex and 175° (range, 125-180°) in Pro/Supination.
Overall complication rate was about 42%, with more than 60% of these patients receiving an second surgical procedure, although no secondary total joint arthroplasty had been performed. Patients with an BMI greater than 30kg/m² (pOES=0.043) showed significant inferior outcome scores, whereas age had no significant influence on the functional outcome (pOES=0.41).
DISCUSSION AND CONCLUSION: With accurate preoperative planning and a standardized approach, patients with complex coronar shear injuries of the distal humerus can achieve satisfactory outcomes using osteosynthetic reconstruction. However, an increased complication and reoperation rate should be considered in treatment planning. As alternative procedures, like hemiarthoplasty or total elbow arthroplasty, still show inferior results in higher demanding patients with high rates of aseptic loosening, we favour a reconstructive approach as long as a sufficient fracture stability can be achieved.