Deltopectoral versus Deltoid Split Approach for Proximal HUmerus Fracture Fixation with Locking Plate: A Prospective RAndomized Study (HURA Study)

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Purpose: There are 2 options when choosing the surgical approach for locking plate fixation to treat proximal humerus fractures (PHFs). The deltoid split (DS) approach, developed according to minimally invasive surgery principles, and the classic deltopectoral (DP) approach, believed to increase the risk of avascular necrosis and making access to the greater tuberosity more difficult. The purpose of the present study (NCT-00612391) was to compare outcomes for both methods in terms of function, quality of life, and complications in a prospective randomized multicenter study using CONSORT (Consolidated Standards of Reporting Trials) guidelines.

Methods: From 2007 to 2016, all patients, from 2 university trauma centers, meeting the inclusion criteria (PHF Neer II/III, isolated injury, skeletal maturity, speaking French or English, available for follow-up (FU), ability to fill questionnaires) were invited to participate. Exclusion criteria were: preexisting pathology to the limb, patient-refusing or too ill to undergo surgery, patient needing another type of treatment (nail, arthroplasty), axillary nerve impairment, open fracture. After consent, patients were randomized to 1 of the 2 treatments using the dark envelope method. Preinjury status was documented by questionnaires (Short Form-12 [SF12], Q-DASH [an abbreviated version of the Disabilities of the Arm, Shoulder and Hand Questionnaire], Constant score). Range of motion was assessed. Patients were followed at 2 and 6 weeks, and 3, 6, 12, 18, and 24 months. Power calculation was done with primary outcome: Q-DASH.

Results: A total of 83 patients were randomized; 44 to the DS and 39 to the DP approach with a mean age of 62 years (±14) and 77% were females. Groups were equivalent in terms of age, gender, body mass index (BMI), severity of fracture and preinjury scores, Neer II (53%) and Neer III (47%). Minimum FU was 12 months, mean was 26 months. All clinical outcome measures were in favor of the deltopectoral approach. Primary outcome measure, Q-DASH, was better statistically and clinically in the DP group (12 vs 26, P = 0.003). Patients with DP had less pain and better quality of life scores than with DS (VAS [visual analog scale] 1/10 vs 2/10, P = 0.019 and SF12 mental 56 vs 51, P = 0,049, respectively). Constant-Murley score was higher in the DP group (73 vs 60, P = 0.014). However, active external rotation was better with the DS approach (45° vs 35°). There were more complications in DS patients, with 4 screw cut-outs versus 0, 4 avascular necrosis versus 1, and 5 reoperations versus 2. Calcar screws were used for a majority of DP fixations (57%) versus a minority of DS (27%) (P = 0.012).

Conclusion: The primary hypothesis on the superiority of the deltoid split incision was rebutted. The added difficulty involved with the use of calcar screws and intramuscular dissection for the DS approach could be partly responsible for this difference. The DP approach should be used during Neer II and III PHF fixation.

See the meeting app for complete listing of authors' disclosure information.