The Bone & Joint Journal

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Lädermann A, Walch G, Denard PJ. **Reverse shoulder arthroplasty in patients with pre-operative impairment of the deltoid muscle.** *Bone Joint J* 2013;95-B:1106-13.

Summary
Purpose
To determine the functional outcome and risk of dislocation in a patient cohort treated with reverse shoulder arthroplasty (RSA) in the presence of impaired deltoid function.

Methods
This is a retrospective multi-centre analysis of 49 patients with impaired deltoid function undergoing RSA.
Inclusion criteria were electrodiagnostic studies or CT/MRI studies showing evidence of partial denervation or fatty degeneration in the deltoid. If a patient had documented deltoid dissection at a previous surgery no further evidence was required. No cases of completely incompetent deltoid function were included. Deltoid muscle strength of at least MRC grade 3 was required for inclusion.
Exclusion criteria comprised less than 12 months follow up and a MRC deltoid strength grading of 2 or less.
The patients were studied according to aetiology, extent and location of deltoid impairment with 4 major groupings:
Anterior/Anterior and middle/Middle/Global

Outcome Measures:
Passive and active range of movement and constant scores pre- and post-operatively; Single Assessment Numeric Evaluation (SANE) score and patient satisfaction levels.

Results:
49 shoulders were reviewed at a mean of 38 months (range:12-142). The indications for surgery included trauma,13 (27%), and revision arthroplasty, 13 (27%). There were four cases of deltoid muscle flaps for irreparable cuff tears and eight shoulders had previous deep infection. Anterior deltoid impairment was the commonest location. High grade fatty infiltration was seen in 27 pts (55%).
Nine post operative complications (18%) were reported with 2 episodes of dislocation. Five patients required surgery (10%). In the cases involving dislocation, one patient required

closed reduction, the other case was infected and was treated with lavage and polyethylene liner exchange.
The mean improvement in forward elevation was from 50 degrees pre- operatively to 121 degrees post-operatively. The mean Constant score improved from 24 to 58. The mean Single Assessment Numeric Evaluation score was 71. Patient satisfaction was measured at 98%.

Discussion
The rate of dislocation in this cohort was relatively low (4%) and does not seem to link deltoid impairment in RSA to clinically unacceptable dislocation rates.
Factors that were not examined in the study included component positioning, glenosphere size, the degree of tension of the deltoid and the status of subscpaularis.
It was shown that pre-operative diagnosis, age at the time of surgery and the number of previous operations did not influence the final range of motion. This study demonstrated that the extent of deltoid lesion in such cases determines the clinical outcome.
Emphasis is placed on the importance of evaluation of the power of the deltoid muscle and exact localisation of the degree of deltoid injury prior to implanting RSA in deltoid deficient shoulders.

Critique:

Strengths

- Unique topic
- Large sample size

Weaknesses

- Mean of 38 months follow-up relatively short term
- Retrospective
- Multicentre design
- No comparative group

Overall conclusion
This study has a clinical impact as it demonstrates that deltoid impairment is not an absolute contraindication to the use of reverse total shoulder arthroplasty. Outcome results while satisfactory, can be expected to be inferior to those in cases with an intact deltoid.
Patients undergoing reverse total shoulder arthroplasty in the presence of deltoid deficiency are likely to get pain relief with a stable prosthesis.
This paper offers good early data to support a change in practice in relation to reverse total shoulder arthroplasty in these situations.