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Patients recall worse preoperative pain after shoulder arthroplasty than originally reported: a study of recall accuracy using the American Shoulder and Elbow Surgeons score

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Background: Patient-reported outcome measures (PROMs) are valuable tools for quantifying outcomes of orthopedic surgery. However, when baseline scores are not obtained, there is considerable controversy about whether PROMs can be administered retrospectively for patients to recall their preoperative state. We investigated the accuracy of patient recall after total shoulder arthroplasty (TSA) using the American Shoulder and Elbow Surgeons (ASES) assessment score.

Methods: Recalled ASES scores were collected postoperatively at 6 weeks, 3 months, 6 months, and 12 months from 169 patients who previously completed baseline scores before TSA. The ASES total score was divided into its two subcomponents: functional ability and visual analog scale (VAS) for pain. We compared preoperative and recalled scores for each subcomponent and the total ASES score.

Results: Recalled ASES function scores were comparable to corresponding preoperative scores across all time points (analysis of variance, $P = .21$), but recalled VAS pain was significantly higher at all time points beyond 6 weeks after surgery ($P = .0001$ at 3 months; $P = .005$ at 6 months; and $P = .001$ at 12 months). As a result, the ASES total score was only comparable at 6 weeks after surgery ($P = .39$) and differed at all time points thereafter.

Conclusion: Patients are able to recall preoperative function with considerable accuracy for up to 12 months after TSA. However, beyond 6 weeks postoperatively, patients recall having worse pain than they originally reported, and recalled ASES total scores are unreliable as a result.

Level of evidence: Basic Science Study; Validation of Outcome Instruments

Keywords: American Shoulder and Elbow Surgeons score (ASES); patient recall; shoulder arthroplasty; outcomes; visual analog scale pain (VAS); patient-reported outcome measure (PROM)

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For patients undergoing total shoulder arthroplasty (TSA), functional improvement is often measured using patient-reported outcome measures (PROMs) such as the American Shoulder and Elbow Surgeons (ASES) score. The ASES score,

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which consists of a functional ability section and the visual analog scale (VAS) for pain, has been validated as a responsive and reliable metric of shoulder function and disability.[1,9,13] PROMs such as the ASES score are well-established measures for quantifying pain and function in outcomes research, which has become increasingly emphasized in orthopedics and medicine as a whole.[15] To assess outcome trends among patients undergoing TSA, preoperative and postoperative ASES data must both be collected.[17] However, when preoperative scores are not obtained, there is considerable controversy about whether PROMs, such as the ASES, can be administered retrospectively for patients to recall their preoperative pain and function.[4,5,7,14,17]

As implementation of PROMs becomes a ubiquitous aspect of orthopedic surgery, likewise do situations arise when researchers lack sufficient preoperative data. This can be the case for surgeons transitioning to the use of the ASES questionnaire as a new measure for tracking outcomes or simply when researchers did not anticipate a need for preoperative scores. Stemming from this, recent studies have investigated whether PROMs can be retrospectively administered.

Stepan et al[14] reported that hand and elbow patients receiving a variety of treatments were able to accurately recall preoperative function for up to 2 years using the 11-item version of the Disabilities of the Arm, Shoulder and Hand (QuickDASH) questionnaire. In addition, Marsh et al,[7] using their own self-validated questionnaire, found that total hip arthroplasty patients were able to recall preoperative health status 6 weeks after surgery, and Howell et al[4] reported accurate recall of the Oxford Hip Score for up to 3 months. However, Wilson et al[17] found unreliable recall accuracy using the Oxford Shoulder Score, and a large study of 770 total knee arthroplasty patients by Lingard et al[5] concluded that recalled pain and function was poor at 3 months postoperatively, with patients tending to recall significantly greater pain than they originally reported.

We are unaware of any research regarding the recall accuracy of TSA patients using the ASES form, and studies that address recall longevity are sparse. Thus, the objective of the present study was to assess the accuracy and longevity of preoperative pain and function recall using the ASES form among TSA patients for up to 12 months to answer the question: Do patients remember their preoperative pain and function and if so, for how long? From the available research, we hypothesized that patients would be able to accurately recall their preoperative ASES score at initial follow-up intervals,[7] but we expected accuracy to decline at subsequent visits to the point of unreliability as early as 3 months after surgery.[5]

Materials and methods

All participants in the study underwent TSA by a single fellowship-trained, high-volume shoulder surgeon (A.J.). We obtained actual follow-up scores and recalled ASES scores, including the VAS pain score, which is a subcomponent of the questionnaire, from 193 TSA patients who came for postoperative appointments at 6 weeks, 3 months, 6 months, and 12 months from April to December 2015. Except for the 6-month follow-up, which is considered an optional appointment, all other follow-up intervals in the study are consistent with the surgeon's protocol for postoperative appointments.

In accordance with the surgeon's routine clinical practice, preoperative ASES scores were obtained at the appointment most immediately preceding surgery. At follow-up appointments, study patients were first asked to complete the ASES form about their postoperative function on the given day and then were asked to recall their preoperative state on a second form. To avoid potential bias, neither the surgeon nor study staff were present while patients completed the ASES questionnaires.

Patients in the study received anatomic, reverse, or revision TSA for treatment of degenerative joint disease, rotator cuff arthropathy, or failed previous arthroplasty, respectively (Table I). Among that population, individuals were included if they attended their follow-up appointments at the suggested intervals (6 weeks, 3 months, 6 months, 12 months) and had properly completed the preoperative ASES form.

The patient-reported section of the ASES standardized assessment form consists of the VAS pain score (rated from 0 to 10) and 10 functional questions that are specific to the upper extremity (rated from 0 to 3). As described by Richards et al,[12] a standardized algorithm is applied using the selected numbers to calculate a score from 0 to 100, of which 50 points correspond to pain and 50 correspond to function. A low score indicates more limited function and higher pain. For the purposes of our comparative analysis, we separated the ASES total score into its subcomponents VAS pain (0 to 10 scale) and ASES function score (0 to 50 scale).

Statistical analysis

A descriptive analysis of continuous variables was performed and is reported in Table I. To evaluate differences between preoperative and recalled and ASES function scores over all time intervals, we performed a linear mixed-model analysis of variance with repeated measurements to reconcile absent data points. For post hoc analysis, we first evaluated the normality of the data at each time point using the Kolmogorov-Smirnov test. If the continuous variables of a given time-point satisfied a normal distribution, a paired *t* test was used to assess the difference between preoperative ASES function and recalled ASES function scores at each time point, with $\alpha = 0.05$ as the level of significance. If data were not normally distributed, the Wilcoxon signed rank test was used. All analyses were repeated with preoperative and recalled VAS pain level.

For the purpose of regression analysis, we used the absolute difference between preoperative and recalled ASES total scores to represent recall accuracy, with a greater value indicating poorer recall accuracy. Univariate analysis (general linear model) was used to individually evaluate the relationship between relevant variables and recall accuracy. The variables considered were age, sex, type of shoulder arthroplasty; preoperative, recalled, and actual follow-up ASES total score; preoperative, recalled, and actual follow-up VAS pain score; number of days before the surgery date that preoperative questionnaires were completed, number of days after