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A preoperative scoring system to select patients for arthroscopic subacromial decompression

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Background: This study investigated the clinical and radiographic factors that influence outcome after arthroscopic subacromial decompression (ASAD) for shoulder impingement syndrome. The goal was to develop a new preoperative scoring system to identify patients who would have a prompt and sustained benefit from ASAD.

Methods: We prospectively reviewed 112 consecutive patients with impingement syndrome who subsequently underwent ASAD. The Oxford Shoulder Score (OSS) was recorded preoperatively and 3 and 12 months postoperatively. A statistically significant improvement in OSS at 3 months after surgery was considered a good outcome.

Results: The variables associated with good outcome were shoulder pain with overhead activities, persistent symptoms for more than 6 months, symptoms persistent despite a 3-month course of supervised physiotherapy, consistently positive Hawkins test result, radiologic changes of impingement on both acromion and humerus in the subacromial region, and improvement for more than 1 week after a steroid injection. These 6 criteria were combined into a single score for this study, termed the *preoperative score* (PrOS). Sixty-two patients who had been symptomatic for 1 year with a preoperative score of 5 to 6 showed significant improvement in OSS at 3 months after surgery ($P < .001$). Thirty-eight patients with a score 3 to 4 had no statistically significant improvement in OSS at 3 months but had a further slight improvement at 1 year. Twelve patients with a score of ≤ 2 had no significant improvement in OSS at 3 months or 1 year.

Conclusion: This scoring system can identify patients who would have a prompt benefit from ASAD. The impact of surgery in patients with a PrOS of ≤ 4 points is questionable.

Level of evidence: Level I, Prospective Design, Prognosis Study.

Keywords: Arthroscopic subacromial decompression; scoring system; impingement syndrome

Questions have been raised about the value of arthroscopic subacromial decompression (ASAD) in the management[9,11] of shoulder impingement syndrome.[21] Reports indicate that a structured and supervised exercise program is as effective as ASAD in relieving pain and improving function.[1,3,9] Despite the emerging evidence, there has been a significant increase in the number of ASADs performed in the last decade.[12,25] There remains a question of whether some of these ASADs are unnecessary. It is important to identify patients who would clearly benefit from ASAD after a period of failed conservative management.

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It is generally agreed that a period of rehabilitation and physical therapy is advisable for shoulder impingement syndrome,[7,11] whereas failure to respond to sustained conservative management and continuing severe shoulder pain with functional restriction are indications for surgery.[18] At this stage, a prompt and sustained relief of symptoms after surgery would certainly be of value to the patient and form an effective outcome measure.[16]

In most painful conditions, clinicians expect prompt relief of pain after surgery once the offending cause has been removed. After joint replacement surgery, once arthritic surfaces are replaced, patients perceive the most improvement in their health status in the first 3 months after surgery that is reflected in the patient's reported health questionnaire.[15,23] A subsequent sustained relief in symptoms over time after surgery points against the placebo effect.[19]

ASAD has been found to be an effective operation in appropriate patients.[17] It would, however, be useful to have a guide that could help clinicians identify a patient who could receive a prompt and sustained relief in symptoms from ASAD after initial failure of preoperative conservative management. We propose a new preoperative scoring system to identify such patients who would benefit from ASAD.

Material and methods

In this prospective clinical outcomes study, a consecutive cohort of 122 patients referred to our outpatient clinics from their general practitioners with shoulder pain with overhead activities between 2005 and 2010 was reviewed. We assessed these patients for signs and symptoms of impingement. They had an anteroposterior and lateral radiograph of the shoulder (outlet views are not routine protocol in our hospital) and a shoulder ultrasound or magnetic resonance imaging scan to exclude rotator cuff tears and glenohumeral and acromioclavicular joint arthritis. All patients received at least a 3-month course of physiotherapy supervised by a qualified therapist. The patients received a subacromial steroid and local anesthetic injection. If the patients continued to have symptoms or the symptoms recurred despite at least 6 months of nonoperative treatment (physiotherapy and subacromial injection), they were then offered ASAD.

We reviewed these patients in the preassessment clinics 2 weeks before surgery to verify that ASAD was still required, and the senior author performed the Hawkins test again. The patients were also asked to complete the new Oxford Shoulder Score (OSS).[6] The factors affecting the outcome after ASAD have been studied before.[17] We reviewed the clinical records and radiographs of the patients for each of the following criteria: age, gender, hand dominance, vocation, shoulder pain with overhead activities, time since persistent symptoms, response to a course of supervised physiotherapy, consistently positive Hawkins test result, presence of radiologic changes of sclerosis and osteophyte formation on both the acromion and the humeral head in the subacromial region suggestive of impingement (Fig. 1), and presence of improvement for more than 1 week after a steroid injection after accounting for the initial relief in symptoms from the local anesthetic.

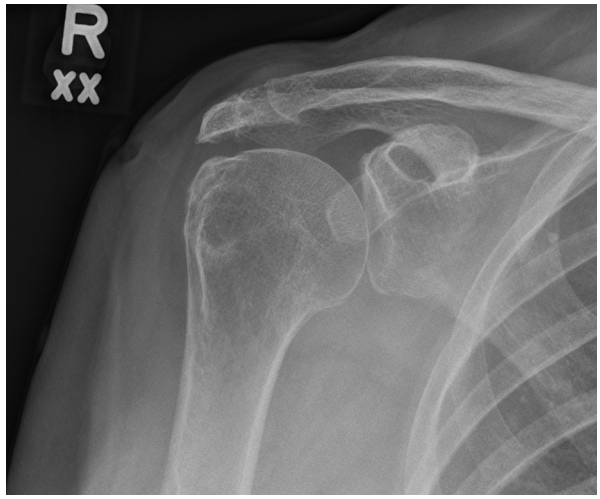

Figure 1 Anteroposterior radiograph of right shoulder shows changes suggestive of subacromial impingement on both the acromion and humerus.

Ten patients improved while awaiting surgery and were excluded from this study. Subsequently, 112 patients underwent standard ASAD in the lateral decubitus position under general anesthesia and nerve block. The senior surgeon (R.P.) recorded the surgical findings in the patients' case notes. Postoperatively, collar and cuff support was applied; patients were discharged within 24 hours with oral analgesia and advised to mobilize the arm as pain permits once the nerve block wears off. A physiotherapist provided these patients with a set of graded shoulder exercises to be performed at home. We followed up these patients in outpatient clinics at 3 months and 1 year postoperatively. The OSS[6] was completed at each visit to evaluate outcome, and any complications were noted.

A statistically significant improvement of more than 12 points in the OSS (1 point improvement in each item) between the score before surgery and the score at 3 months after surgery was considered a good outcome. In a recent article,[24] the minimal important clinical change was reported as 6 points (slight improvement) in the OSS. We, however, preferred a change of 12 points as this criterion will be more robust.[24] We selected follow-up at 3 months as this allowed the patients time to recover from the initial symptoms of surgical trauma. It was noted that the preoperative variables for subacromial impingement that could predict the outcome after ASAD were age (<45 years/more), gender (male/female), hand dominance (dominant/nondominant), vocation (manual/nonmanual), shoulder pain with overhead activities (presence/absence), time of persistent symptoms (<6 months/more), response to a course of supervised physiotherapy (yes/no), consistently positive Hawkins test result (yes/no), altered shoulder kinematics associated with dysfunction of the rotator cuff and scapular muscles (yes/no), capsular tightness (yes/no), presence of radiologic changes of impingement on both the acromion and greater tuberosity in the subacromial region (yes/no), and presence of improvement for more than 1 week after a steroid injection (yes/no). We carried out univariate logistic regression analyses with each of the 12 possible predictive variables and the binary variable of good outcome (statistically significant improvement in OSS). Multivariate logistic regression analyses