Midterm Outcomes After Arthroscopic Anteroinferior Capsular Release for the Treatment of Idiophatic Adhesive Capsulitis

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Purpose: The purpose of this study is to report the early and midterm functional outcomes and complications of a consecutive series of patients with primary adhesive capsulitis who were treated with isolated anteroinferior arthroscopic capsular release after they did not respond to conservative treatment. **Methods:** Thirty-two consecutive patients with idiopathic adhesive capsulitis who did not respond to conservative physiotherapy were included in the study. Arthroscopic anteroinferior capsular release was performed in all cases. The primary outcome was improvement in range of motion in the short- and midterm follow-up. We also evaluated pain relief with the visual analog scale, functional outcomes with the Constant–Murley score, and we registered postoperative complications. **Results:** The mean age was 49.6 years (range, 33-68 years) and the mean follow-up was 63 months (range, 18-84). Overall, there was significant improvement in the Constant–Murley score from 42.4 to 86 points ($P < .001$). The visual analog scale decreased by approximately 6.3 points compared with the preoperative value ($P < .001$). All parameters improved significantly the first 6 months and then remained stable until the end of follow-up ($P < .001$). There was an additional minor improvement in both parameters between the sixth month and the final follow-up; however, this improvement was less than in the first 6 months and it was not statistically significant. **Conclusions:** In patients who don't respond to conservative treatment for primary adhesive capsulitis, isolated anteroinferior capsular release provides a reliable improvement in pain and range of motion that is maintained in the mid-term follow-up. **Level of Evidence:** Level IV, therapeutic, case series study.

Adhesive capsulitis is a specific pathologic entity in which chronic inflammation of the capsular subsynovial layer produces thickening, fibrosis, and adherence of the capsule to itself and to the anatomic neck of the humerus.[1] The contracted, adherent capsule causes pain and produces a mechanical restraint to motion.[2]

Adhesive capsulitis has been described as a self-limiting disorder[3]; however, Shaffer et al.[4] showed that up to 50% of patients continued to have mild pain or stiffness 7 years after the initial symptoms as well as a deficit in shoulder range of motion (ROM) compared with the contralateral shoulder.

Nonoperative treatment usually is successful in most patients.[1,2] Several conservative treatments have shown favorable results in the management of adhesive capsulitis: physical therapy, oral corticosteroids, gleno-humeral intra-articular corticosteroid injection, hydraulic distension, suprascapular nerve blockade, and manipulation under anesthesia.[5-19] Surgical treatment is reserved for patients who do not respond to prolonged, conservative therapy.[20]

Arthroscopic capsular release has been favored over manipulation under anesthesia because it is believed to allow a more controlled and complete release of the contracted capsule, to reduce the chance of fracture, and to provide more immediate improvement.[1,2]

There is controversy in the literature as to the optimal method of release. Some authors recommended release of the subscapularis tendon,[21] inferior capsule,[22] posterior capsule,[23,24] or global capsule[25] to improve elevation and internal rotation, as well as external rotation. Moreover, although previous studies have

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suggested that patients have good short-term outcomes after extended arthroscopic capsular release for idiopathic adhesive capsulitis,[22-27] studies reporting results of isolated anteroinferior capsular release are scarce.

The purpose of this study is to report the early and midterm functional outcomes and complications of a consecutive series of patients with primary adhesive capsulitis who were treated with isolated anteroinferior arthroscopic capsular release after they were nonresponsive to conservative treatment. The hypothesis of this study was that in these patients, isolated anteroinferior capsular release provides a reliable improvement in pain and ROM that is maintained in the midterm follow-up.

Methods

This study was approved by the ethical committee of the Italian Hospital of Buenos Aires (IRB: 00003580 study protocol number 2743). From June 2007 to June 2014, all patients with recalcitrant idiopathic adhesive capsulitis were considered for inclusion in this study. All patients underwent shoulder radiographs and magnetic resonance imaging (MRI) for differential diagnosis.

Inclusion criteria for the study were as follows: recalcitrant idiopathic adhesive capsulitis, defined as no response to or worsening symptoms for a minimum of 12-week physiotherapy program, which consisted of physiotherapy and at least 1 corticosteroid injection; 18 years of age or older; restriction of passive motion of greater than 30° in 2 or more planes of movement; stage 2 of adhesive capsulitis (freezing stage) according to Hannafin and Chiaia[28]; and availability of radiographs and MRI or, if MRI was contraindicated, ultrasonography of the affected shoulder to exclude secondary causes of adhesive capsulitis.

Exclusion criteria for the study were secondary adhesive capsulitis including inflammatory or infectious arthritis, previous fracture, rotator cuff lesion, partial or full-thickness rotator cuff tear, previous surgery in the affected shoulder, diabetes, moderate-to-severe glenohumeral osteoarthritis, as well as patients who had a concomitant procedure at the time of surgery.

All patients were given a consent form, with approval from the medical ethical committee of our hospital, before their surgery and underwent the same rehabilitation protocol after their surgery. Patients were evaluated at 8 weeks and 6 months postsurgery and at the final follow-up. All patients were subjected to a standardized history and physical examination before surgery and underwent preoperative radiography and MRI. The measurements of shoulder ROM and the assessment of shoulder specific scores before and after the operation were performed and documented by 2 trained shoulder physicians (E.Z., C.C.) who were blinded to the study details.

The Constant–Murley score was used as a global outcome measure.[29] Pain was evaluated with the visual analog scale (VAS). A 10-cm scale with 0 as "no pain" and 10 cm as "the worst imaginable pain" was used for assessment. The assessment was made on the most severe pain felt by the patient during ordinary activities during a 24-hour period.

The passive ROM was measured by means of a goniometer. Forward flexion, abduction, and extension were determined with the patient in the supine position, whereas external rotation was measured with the patient's arm adducted and the elbow flexed to 90° and internal rotation was measured with the patient's shoulder abducted to 90°. Furthermore, all patients were asked to describe the subjective result of the intervention as excellent, good, the same, or poor.

Surgical Technique

After interscalene regional anesthesia, patients were positioned in the beach-chair position for arthroscopy. An arthroscopic capsular release was initiated by inserting an arthroscope into the glenohumeral joint via a standard posterior portal. An anterior portal was established under direct vision with use of a spinal needle lateral to the coracoid process. The portal was established just superior to the superior border of subscapularis. The capsular release began with the rotator cuff interval and coracohumeral ligament with a 3.0-mm 90° hooked electrode. The middle glenohumeral ligament was then released. Cautery was then used to release the anterior capsule beginning below the biceps origin, just off the glenoid rim, preserving the labrum. The subscapularis tendon was released from the anterior capsule but was not violated. The inferior capsular release was extended until the 6-o'clock position. We did not perform posterior release in any patient. After the release, the arthroscope was removed, a gentle manipulation was performed, and shoulder motion was assessed (Fig 1).

Patients were discharged on the day of the surgery with a sling. They were encouraged to discontinue the use of the sling 24 hours after surgery and start using the operated arm for activities of daily living. Beginning the week of surgery, all patients were subjected to the same standardized rehabilitation protocol supervised by a physical therapist 3 times per week until the end of treatment.

The rehabilitation protocol consisted of 3 phases. Phase 1: Passive pendulum and mild range of shoulder motion exercises. Phase 2: Active assisted range of shoulder motion exercises. Phase 3: Resisted shoulder motion exercises. Progression from one phase to another depended mainly on pain and ROM improvement. The exercises performed in the therapist's practice were complemented with a supervised home rehabilitation program explained to each patient at the first visit.