J Shoulder Elbow Surg (2016) 25, 69-77

ELSEVIER

Journal of Shoulder and Elbow Surgery

www.elsevier.com/locate/ymse

Arthroscopic Latarjet procedure: is optimal positioning of the bone block and screws possible? A prospective computed tomography scan analysis

Jean Kany, MD[a,*], Olivier Flamand, MD[b], Jean Grimberg, MD[c], Régis Guinand, MD[a], Pierre Croutzet, MD[a], Rajkumar Amaravathi, DNB[d], Padmanaban Sekaran, MSc, PT[e]

[a]*Shoulder Department, Clinique de l'Union, Saint Jean, France*
[b]*Department of Orthopedics, Clinique Saint Joseph, Mons, Belgium*
[c]*Institut en Recherche Osseuse et Sportive, Paris, France*
[d]*Department of Orthopedics, Arthroscopy and Sports Injury, St John's Medical College Hospital, Bangalore, India*
[e]*Department of Physiotherapy & Rehabilitation Services, Sparsh Hospital for Advanced Surgeries, Bangalore, India*

Hypothesis: We hypothesized that the arthroscopic Latarjet procedure could be performed with accurate bone block positioning and screw fixation with a similar rate of complications to the open Latarjet procedure.

Methods: In this prospective study, 105 shoulders (104 patients) underwent the arthroscopic Latarjet procedure performed by the same senior surgeon. The day after surgery, an independent surgeon examiner performed a multiplanar bidimensional computed tomography scan analysis. We also evaluated our learning curve by comparing 2 chronologic periods (30 procedures performed in each period), separated by an interval during which 45 procedures were performed.

Results: Of the 105 shoulders included in the study, 95 (90.5%) (94 patients) were evaluated. The coracoid graft was accurately positioned relative to the equator of the glenoid surface in 87 of 95 shoulders (91.5%). Accurate bone-block positioning on the axial view with ''circle'' evaluation was obtained for 77 of 95 shoulders (81%). This procedure was performed in a lateralized position in 7 of 95 shoulders (7.3%) and in a medialized position in 11 shoulders (11.6%). The mean screw angulation with the glenoid surface was 21°. One patient had transient axillary nerve palsy. Of the initial 104 patients, 3 (2.8%) underwent revision. The analysis of our results indicated that the screw–glenoid surface angle significantly predicted the accuracy of the bone-block positioning ($P = .001$). Our learning curve estimates showed that, compared with our initial period, the average surgical time decreased, and the risk of lateralization showed a statistically significant decrease during the last period ($P = .006$).

Conclusions: This study showed that accurate positioning of the bone block onto the anterior aspect of the glenoid is possible, safe, and reproducible with the arthroscopic Latarjet procedure without additional complications compared with open surgery.

Institutional review board approval was received from Clinique de l'Union.

*Reprint requests: Jean Kany, MD, Clinique de l'Union, Boulevard de Ratalens, F-31240 Saint Jean, France.

E-mail address: jean.kany@clinique-union.fr (J. Kany).

1058-2746/$ - see front matter
http://dx.doi.org/10.1016/j.jse.2015.06.010

Level of evidence: Level IV, Case Series, Treatment Study.

Keywords: Arthroscopic Latarjet; bone block; shoulder instability; CT scan analysis

Traumatic anterior shoulder instability is a common issue in orthopaedics.[38] Modern surgical techniques involving either open or arthroscopic capsulolabral reconstruction have high success rates.[31] However, cases of significant glenoid or humeral bone loss and capsular deficiency are relatively contraindicated for an arthroscopic Bankart repair alone because of the high rate of recurrence.[3,9] The management of anterior shoulder instability with glenoid bone loss needs some type of glenoid bone reconstruction with a bone-block procedure. The Latarjet procedure involves osteotomy of the horizontal part of the coracoid process at its elbow.[27] After osteotomy, the coracoid process is distally transferred and fixed to the anterior glenoid neck with 2 screws by use of a subscapularis-lowering effect. The open Latarjet procedure has high long-term success rates according to Mizuno et al.[29] These high success rates might be explained by the extension of the glenoid arc provided by the coracoid bone block and by the sling effect provided by the conjoined tendon remaining fixed at the tip or by the transferred coracoid bone block.[14,16,30,35] Accurate bone-block positioning (flush/congruent with the glenoid articular surface) is the key to the prevention of recurrent instability and long-term arthrosis.[21] Some complications, such as the bone block overhanging the articular surface with long-term glenohumeral joint arthritis or neurologic lesions, have been described for the open Latarjet procedure.[8,11,19,33] Another approach is the arthroscopic Latarjet procedure. This arthroscopic technique, originally described by Lafosse et al,[25,26] theoretically combines the advantages of arthroscopy (better assessment and treatment of associated lesions such as cuff and superior labrum anterior-posterior lesions) with those of the open Latarjet procedure (management of glenoid bone loss). Furthermore, one group of authors suggested that arthroscopic optimal bone-block positioning could be hazardous because of the glenoid orientation in the beach-chair position and the proximity of the brachial plexus.[6] This is why the open surgery technique uses retractors, which allow optimization of the glenoid orientation and an adequate axis for bone-block positioning and screw fixation.

The first purpose of this prospective study was to document the accuracy of the bone-block position and the direction of the screws after the arthroscopic Latarjet procedure with a multiplanar bidimensional computed tomography (CT) scan analysis and evaluate the preoperative and immediate postoperative complications of the procedure. The second purpose was to evaluate the influence of our learning curve on the duration of the procedure and on the aforementioned bone-block and screw positions. Our hypothesis was that the arthroscopic Latarjet procedure is feasible with accurate graft placement and has a low risk of neurovascular injury or complications compared with the open Latarjet procedure. We also hypothesized that the studied parameters of the procedure could be enhanced over time.

Materials and methods

This is a prospective cohort study with 104 patients (105 procedures) enrolled. All patients were operated on by the same senior surgeon (J.K.) with the DePuy Mitek arthroscopic Latarjet system (DePuy Mitek, Raynham, MA, USA). We compared 2 periods: the initial period, in which the first 30 arthroscopic Latarjet procedures were analyzed, and the last period, in which the 30 most recent arthroscopic Latarjet procedures were analyzed, with an interval period of 1 year between the 2 periods, during which 45 other arthroscopic Latarjet procedures were performed.

Surgical technique

Lafosse et al[26] have described the technique. With a lateral viewing portal, a dedicated cannula with specific screwed guides is inserted (through the medial portal) and locked to the coracoid process, thus allowing complete control of the bone block. The bone block is then pushed through the split of the subscapularis tendon and positioned onto the anterior rim of the glenoid.[32] For the final stage, the arthroscope is positioned through the anterior portal, which is the best view to prevent overhanging of the bone block. The posterior switching stick, which is parallel to the glenoid surface, helps to assess the accuracy of the bone-block position regarding the cartilage glenoid surface. In case of slight overhanging of the bone block, a burr may be used to obtain a graft flush to the glenoid cartilage surface.

Postoperative CT scan evaluation

Written patient consent was obtained before the surgical procedure, and our local ethical committee approved the study. Each patient underwent an immediate postoperative CT scan multiplanar bidimensional reconstruction for evaluation of the bone-block position. The CT scan analysis was performed with OsiriX software (Pixmeo, Geneva, Switzerland). A single and independent surgeon examiner (O.F.) performed the entire evaluation.

A bidimensional CT scan assessment was performed on the axial, coronal-oblique, and sagittal-oblique views. On the immediate postoperative axial CT scan view, we evaluated the angle between the straight line joining the anterior and posterior edges of the glenoid and the upper screw axis at the level of this upper screw. We looked for potential joint violation of the tip of the screw. Posterior screw emergence into the infraspinatus, through the scapular spine, or into the supraspinatus muscle belly was also noted. We measured the excess screw length (out of the bone) and