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Arthroscopic Latarjet - Retrospective Study of 74 Patients – Technique, Indications, and Results

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Abstract

Objective: The all arthroscopic latarjet procedure was performed to manage anterior recurrent shoulder instability with bone loss. The aim of present study was to briefly describe the technique and to evaluate the results and complications following procedure.

Materials and Methods: Retrospective study of 74 patients with anterior shoulder instability since 2010–2019 conducted in a single center. Out of 74 patients, 32 patients were sportsperson who were involved in at least district level games, 14 were manual labourers and remaining were non-sportsmen. Fifty-five patients were males and 19 were females. Arthrolatarjet was done using DePuy Synthes double barrel cannula system and fixation of coracoid with 4.00 mm titanium cannulated cancellous screws with Top Hat. No capsular repair done in our cases.

Results: Out of 74 cases, two-screw fixation was possible in 98% of patients. No neurological complications seen in our series. Two patients had graft resorption and non-union. Osteolysis of the graft around upper screw is seen in eight patients post-operative computed tomography scans but clinically no complaints. Technically challenging in first 25 cases.

Conclusion: Arthrolatarjet is a safe and reproducible procedure which gives good results, better visualization of anatomy, more precise graft positioning, concomitant abnormalities that can be treated. Cadaveric workshops needed. Technically demanding.

Keywords: Arthroscopic latarjet, glenoid bone loss, humeral boneloss, double barrel cannula, depuy synthes

Introduction

Arthroscopic bankart is a gold standard for anterior shoulder instability. However, it fails in certain situations – glenoild bone defects >20% glenoild bone loss, capsular insufficiency, large engaging hill-sachs, Hagl lesion, young patients practicing overhead, or throwing sports. Arthroscopic bankart repair – in 2000, burkart showed his results of arthroscopic bankarts repair with 4% recurrence rate when no bony deficiency present and 67% recurrence rate when bone loss is present. [1,2,3,4,5]

Latarjet is the surgical procedure used to treat recurrent shoulder dislocation in which coracoid process from the front of shoulder transferred to anteroinferior aspect of glenoid first described by French surgeon, Michael Latarjet in 1954. [6, 7] It provides (1) Conjoint tendon sling effect – when arm is placed in abd. and external rotated position, the conjoint tendon in its CA ligament new position acts to reinforce the subscapularis and inferior joint capsule. (2) Bony effect – increasing or restoring the glenoid anteroposterior diameter, (3) Capsule repair effect – repair of capsule and IGHL to the ca ligament – bankart effect. [8,9]

Following the evolution of arthroscopic techniques, several authors described the all-arthroscopic latarjet procedure. Arthroscopy may allow good positioning of the coracoid process because imaging is magnified.

Arthroscopic latarjet provides superior cosmesis, minimally invasive, faster recovery and healing of wounds, less chances of post-operative stiffness, less hospital stay, less blood loss, and better visualization of anatomy – more precise graft positioning. Concomitant abnormalities can be treated same time such as cuff tears and labrum lesions. [8,9,10]

Materials and Methods

This is a retrospective study of 74 cases of arthroscopic latarjet done at our single institute from 2010 to 2019. Three live

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Figure 1: (a) Beach chair position. (b) Portal surface markings. (c) Portal D.

surgeries were included in it and were followed up for at least 18 months after the surgery. Out of 74 patients, 32 patients were sportsperson who were involved in at least district level games, 14 were manual labourers and remaining were non-sportsmen.[11] Fifty-five patients were males and 19 were females. All surgeries were performed using double barrel cannula (DePuy Synthes) and fixation of coracoid graft with titanium screws and Top Hats.

All patients were assessed by magnetic resonance imaging or 3D computed tomography (CT) scan. Patients included in the present study are 37 cases of primary anterior bankarts with glenoid bone loss >20%, 23 cases of primary anterior bankarts with glenoid bone loss >20% and large engaging hill-sachs, 13 cases of failed arthroscopic bankart (soft tissue – capsulolabral repair) with capsular deficiency, and one case of failed open bankarts repair. [12, 13, 14, 15, 16, 17, 18, 19, 20].

Surgical technique

All cases were performed in beach chair position under general anesthesia using sevoflurane along with inter scalene and suprascapular block, with a slight inclination of the head to the contralateral side, and positioning of the fields to allow more medial chest exposure. Positioning of the posterior portal, in line with the joint, is fundamental for the proper positioning of the M portal and the correct angle for graft fixation in the glenoid. The portals used were those described by Lafosse – seven portals [10, 21]. (Fig 1)

The A portal is the standard posterior viewing portal at the posterior soft-spot of the shoulder. The D portal is established at the anterolateral corner of the acromion in line with the upper border of the sub-scapularis tendon. It allows an intra-articular view during preparation of the anterior glenoid and an extra-articular view during anterior exposure. Figure 1.

The E portal is the standard anterior portal through the rotator interval. It is used as a working portal during numerous steps in the course of the procedure. The H portal ("High" portal) is necessary for preparation and osteotomy of the coracoid. It is placed directly superior to the coracoid.

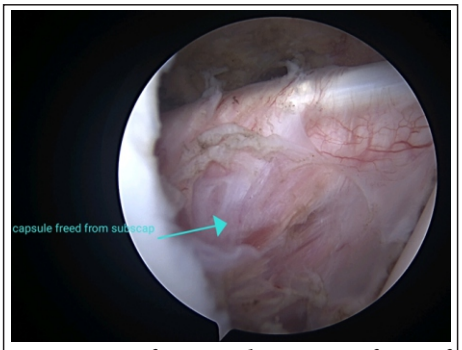

Figure 2: Soft-tissue clearance in front of glenoid.

The I portal is the standard anterior viewing portal located "Inferior" to the coracoid. The portal is located at the apex of the anterior axillary fold and established under direct vision with a spinal needle which is directed toward the coracoid.

The J portal is placed on an arc half-way between the I and D portals. It is an alternative viewing portal used during graft shaping as well as graft transfer and fixation. During coracoid preparation the portal is used for instrumentation to access the lateral edge of the coracoid.

The M portal is an instrumentation portal, "Medial" to the coracoid, in line with the joint axis. It is placed mid-way between inferior borders of pectoralis major. For safe portal placement stay anterior to the pectoralis minor. The M portal is used for pectoralis minor release, medial edge coracoid preparation, subscapularis split, and to insert the cannula. (Fig 1)

The arthroscopic latarjet procedure [10,21,22,23,24] is performed in

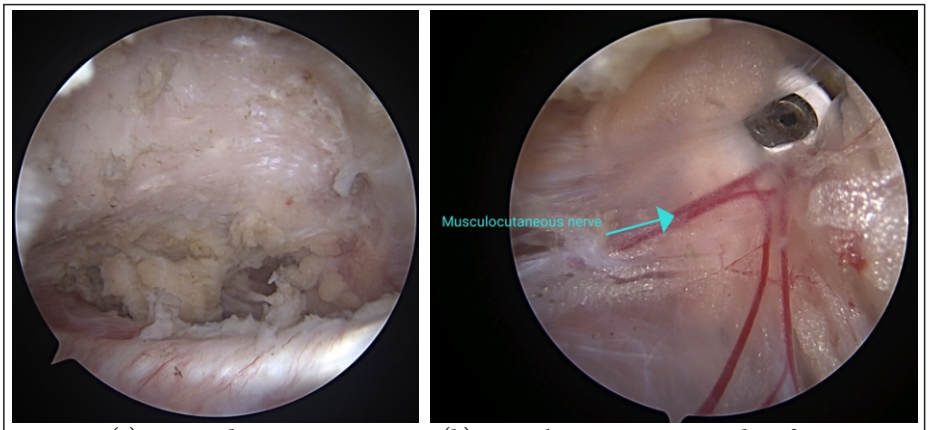

Figure 3: (a) Coracoid process preparation. (b) Musculocutaneous nerve identification.

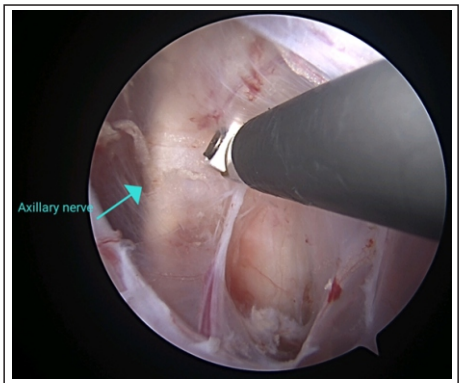

Figure 4: Axillary nerve identification.

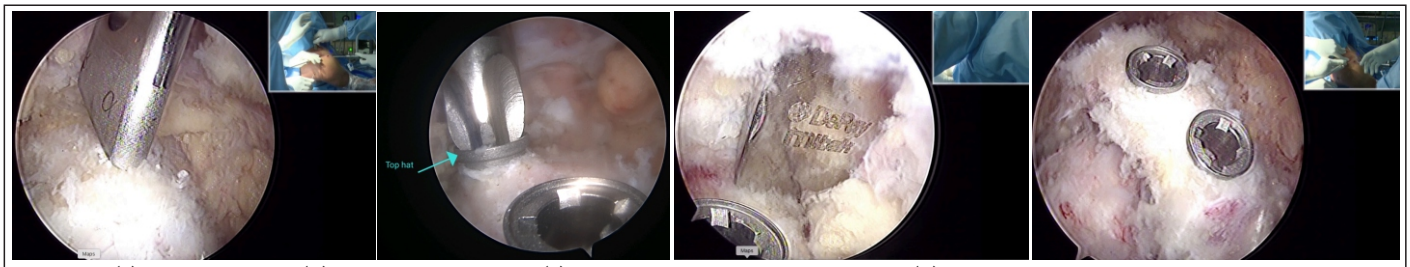

Figure 5: (a) Alpha/beta zig. (b) Top Hat application. (c) Osteotome at the base of coracoid. (d) Osteotomized coracoid.

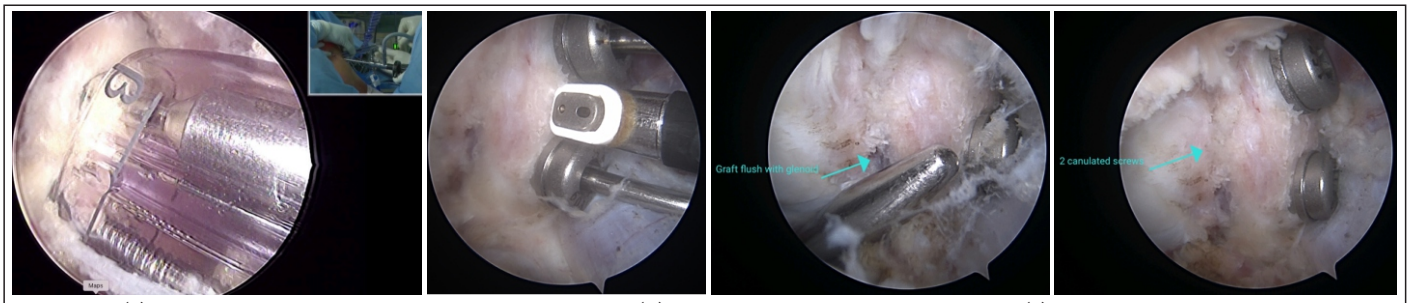

Figure 6: (a) Coracoid mounted over double barrel canulla. (b) Titanium screws over guide wire. (c) Coracoid graft flush with glenoid subchondral bone. (d) Final fixation.

following steps, as follows.

1. Bankart lesion identification and opening of the rotator space (visualization: Posterior portal; working portal: Anterior E)

The surgery begins with the posterior portal and it is important that the portal must be positioned in line with the joint. We performed bankart lesion identification, the debridement of the anterior glenoid border and the opening of the rotator gap until the lateral edge of the coracoid process is visualized. (Fig 2)

2. Preparation of the anterior glenoid border, joint tendon dissection, and conduction of midsub J/I and pectoral M portals (visualization: Anterolateral portal; work portal: Anterior E) [25,26].

In this step, we occupy the anterior space of the shoulder. Using the anterolateral portal, we prepared the anterior border of the glenoid clearing the entire residual lip and we can see the gap between the conjoint tendon and the deltoid, as well as between the conjoint tendon and the subscapularis. In this step, we identify the axillary and musculocutaneous nerves and release the lateral adhesions of the conjoint tendon. (Fig 3 & 4)

The next step was to perform the midsub portal, which is made 1.0 cm above the axillary fold and in line with the coracoid process. Through this portal, we can properly visualize the coracoid process from its lateral portion to its medial portion, as well as the tendon of the subscapularis muscle in all its craniocaudal extension. In this step, we also perform, from the inside out, the pectoral M portal through which will be made the subscapularis split and the graft passage with fixation on the anterior border of the glenoid.

This step is of fundamental importance for the proper fixation of the graft on the anterior glenoid border, since placement of the same in a too lateral position will result in a lateral position of the graft, and consequent impact on the humeral head.

3. Preparation of the Coracoid Process (visualization: Portal I or j; work portals: Pectoral and coracoid H)

Correct visualization of the coracoid process is fundamental to the process of skeletonization, releasing it from its ligament and muscle insertions. Releasing the tendon of the pectoralis minor muscle is a delicate step that must be done carefully, as the musculocutaneous nerve is immediately posterior to it. Complete release of the conjoint tendon from its adhesions and vinculas is important for its proper mobilization and transfer in the next

Figure 7: Post rehab after 3 months showing forward elevation, external rotation, internal rotation, and pushups.

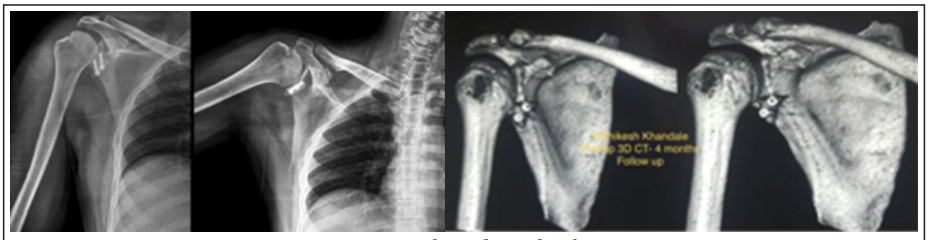

Figure 8: Postop Xray & 3D CT Scan to evaluate bone healing & Lysis

stage. Figure 3.

4. Subscapular split (view: Portal midsub; working portal: Pectoral)

The next step was the split of the subscapularis muscle to be done between the upper 2/3 and the lower 1/3, with the identification of the axillary nerve and its protection. Figure 4. [27,28,29,30].

5. Coracoid osteotomy

After the skeletonization of the coracoid process, holes were drilled in the coracoid process using alpha and beta guide (DePuy Synthes) and two sliding top hats (DePuy Synthes) were placed. These implants allow the screws to slide with compression of the coracoid process against the anterior glenoid border. After skeletonization and preparation, the coracoid process is osteotomized at its base with the use of an osteotome. Figure 5. [10,21]

6. Coracoid Process Transfer and Fixation (visualization: midsub anterolateral and posterior portals; working portal: Pectoral)

With the use of two cannulated tubular guides-double cannula, the coracoid process is fixed and thus can be mobilized as a joystick. With the stabilized coracoid process, we can transfer it through the subscapular split. Since the guides are cannulated, once the proper position is found, the graft is fixed to the anterior edge of the glenoid with two Kirschner wires. Figure 6.

This step is still performed without a proper positioning guide on the anterior edge of the glenoid. Some parameters must be obeyed, such as the parallelism between the wires passed through the graft, and the position of the graft in the anterior border of the glenoid, which should be below the equator line, aligned with the articular surface, avoiding too medial or too lateral positioned grafts. [10,21].

Once found the correct positioning of the graft in the anterior glenoid edge, the cannulated guides are removed; the drilling and passage of screws can be carried out. As the drill has a length measurement, we can measure the size of the screws to be used as soon as it crosses the posterior cortex of the glenoid. In our experience, the size of these screws varies between 32 and 36 mm, depending on patient size and glenoid placement. [10].

Post-operative protocol

It includes sling immobilization and passive mobility as soon as allowed by pain and maintained for up to 6 weeks, when strengthening begins. Patients are released for physical activity on average after 4 months, and a 3D CT to identify graft consolidation. [31] Figure 7

Results

Union rates

Union was noted in 90–100% of patients. [32,33] In our two patients, we had non-union and graft resorption, out of which in one patient, we did implant removal and arthroscopic iliac crest bone graft using double barrel cannula and two 4 mm cannulated titanium screws. [14] Smoking was the common factor in these patients. Osteolysis of the graft around upper screw is seen in eight patients' post-operative CT scans but clinically no complaints. [34,35,36]. Figure 8

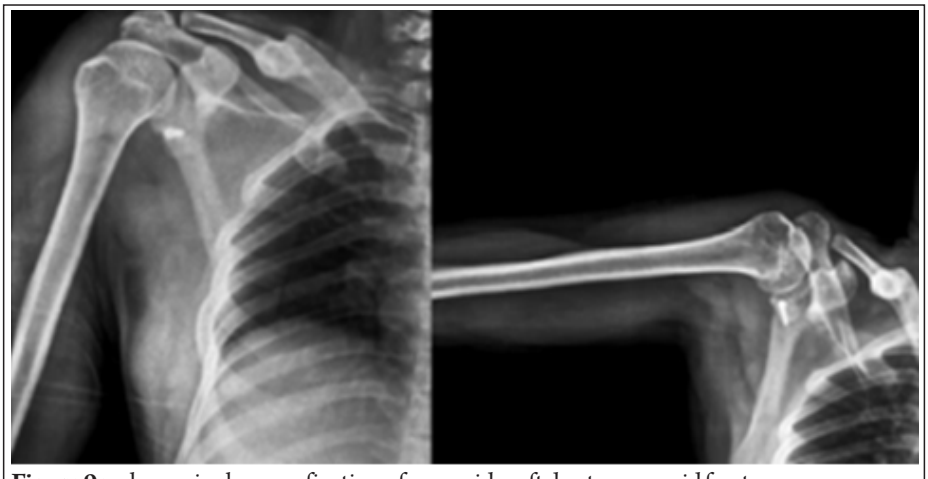

Figure 9a: shows single screw fixation of coracoid graft due to coracoid fracture

Return to sports (RTS) activity, functional scores a range of motion

Time to RTS is about 8–9 months. Out of 32 sportsperson operated, 28 patients return to their sports and four patients quit their sports activity. Excellent functional Rowe scores >90 were seen in the patients. External rotation restriction was seen in our patients ranging between 5 and 10°. Figure 7

Fracture coracoid through upper screw hole

Out of 74 cases, two-screw fixation was possible in 98% of patients and single screw was used in three patients where we fractured coracoid through upper screw hole (initial 25 cases, namely; 1, 8, and 25).

Neurological complications

There were no neurological complications in our study but altered or decreased sensations around the shoulder are seen in seven patients which subsided in 6–7 weeks. [37].

Others

In initial 10 cases, we had faced difficulties in passage of coracoid graft through subs cap split. In one patient, we have placed the graft above 4 clock. No infections/hematoma were observed. Extravasation and ballooning of shoulder were seen in all patients but resolved in 8–10 h with no clinical symptoms.

Lessons learnt

Lesson learnt from operating all three groups, namely, sportsperson, non-sportsperson and women is – coracoid graft size is a big issue in women where we get smaller size <20 mm coracoid graft

for harvesting. Zig size needs to be modified for Indian patients where distance between two screws can be decreased. Bones of Indian females were osteoporotic. Out of three patients, where we fractured coracoid through upper screw hole, two patients were females. Sportsperson were highly demanding and needs to rehab and strengthen their shoulder more vigorously. Smokers need to be counseled before surgery.

Discussion

Based on recent literature, arthrolatarjet has a risk of nerve damage between 0% and 1.6%, significantly lower than open surgery. We believe that this is due to the direct visualization of the neurovascular structures, to less need for displacement, besides less direct traction on the graft, since it is not pulled out of the joint for its preparation.

Another important point is the positioning of the graft: When placed too lateral it can lead to excessive restriction of external rotation and arthrosis, while too high or medial positioning can lead to high recurrence rates. The literature shows that graft mispositioning varies between 20% and 67% in open surgery and between 4% and 24% when the surgery is performed arthroscopically [27,33,38]. We believe that the magnified view provided by the arthroscope, and the ability to look at different angles, makes positioning more accurate in the arthroscopic technique.

Main advantage of arthrolatarjet is that it provides superior cosmesis, minimally invasive, faster recovery and healing of wounds, less chances of post-operative stiffness, less hospital stay, less blood loss, and better visualization of anatomy – more precise graft positioning. Concomitant abnormalities can be treated at same time such as cuff tears a labrum lesion.

Conclusion

Arthroscopic latarjet is safe and reproducible procedure which gives good results, better visualization of anatomy, more precise graft positioning, and concomitant abnormalities such as cuff tears and Labrum lesions etc. that can be treated. Cadaveric workshops needed. Technically challenging. [8,10,21,26].

Declaration of patient consent: The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given his consent for his images and other clinical information to be reported in the Journal. The patient understands that his name and initials will not be published, and due efforts will be made to conceal his identity, but anonymity cannot be guaranteed.

Conflict of Interest: NIL; **Source of Support:** NIL

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