Mid-term satisfaction and outcome of open Latarjet procedure – a retrospective analysis of 90 operated patients

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Leikkaushoito uusiutuvan olkapään epävakauden hoidossa on useimmiten kannattavaa parantamaan sekä olkapään toimintakykyä että vakautta, mutta myös välttämään myöhempi lapaluun ja olkaluun välisen nivelen kuluma, joka aiheuttaa potilaalle oireita. Pehmytkudokseen kohdistuvissa toimenpiteissä, kuten Bankartin toimenpiteessä, on suuri riski hoidon epäonnistumiselle ja olkapään uudelleen sijoiltaanmenolle, erityisesti nuorilla ja fyysisesti aktiivisilla potilailla. Michael Latarjet kuvasi 1954 toimenpiteen olkapään epävakauden hoidossa, jossa korppilisäkkeen siirto saisi aikaan aiempaa paremman vakauden olkapäähän. Siitä lähtien Latarjetin toimenpide on todettu tehokkaaksi ja yhä jatkuvasti suositummaksi leikkausmenetelmäksi, ja siitä on edelleen kehitetty useita edistyksellisempiä leikkaustekniikoita.

Latarjetin operaatiossa korppilisäke katkaistaan ja siirretään yhdessä m. biceps brachiin sekä m. brachialiksen muodostaman jänteen kanssa m. subscapulariksen läpi lapaluun kaulaan, ja kiinnitetään lapaluun nivelkuopan eli glenoidan reunan viereen. Tämä uudenlainen rakenne saa aikaan vakaamman vaikutuksen perustuen sekä luiseen että pehmytkudoksiseen rakenteeseen. Latarjetin epäanatominen luonne on kuitenkin nostanut esiin huolen sen pitkäaikaisvaikutuksista lapaluun ja olkaluun välisen nivelen rappeumaan. Lisäksi potilaiden tyytyväisyys tulokseen sekä toimenpiteen vakauttavan vaikutuksen kesto on kyseenalaistettu.

Tämän tutkimuksen tarkoitus oli arvioida keskipitkän seuranta-ajan jälkeen potilaiden tyytyväisyyttä sekä uusia sijoiltaanmenoja avoimen Latarjetin leikkauksen jälkeen. Arvioimme sekä kliinisiä että radiologisia tuloksia. Tutkimuksen hypoteesi oli, että potilastyytyväisyys olisi korkea sekä uusintaluksaatioiden määrä matala.

Tutkimuksen aineisto koottiin Turun yliopistollisessa keskussairaalassa vuosina 2007-2018 avoimella Latarjet toimenpiteellä hoidetuista potilaista sekä heille mahdollisesti tehdyistä aikaisemmista ja uusintaleikkauksista. Potilaista arvioitiin kliinisiä sekä radiologisia hoidon tuloksia.

Latarjet toimenpiteitä suoritettiin tuona aikana 123, joista 90 potilasta (91 olkapäätä) olivat saatavilla vastaamaan seurantakyselyyn. Potilaiden iän keskiarvo Latarjet toimenpiteen aikaan oli 33,6 (keskihajonta 13,0) ja keskimääräinen seuranta-aika oli 7,9 (keskihajonta 2,8) vuotta. 39 (43 %) näistä toimenpiteistä suoritettiin revisioina jonkin tähystyksellisen pehmytkudosleikkauksen jälkeen hoitamaan epävakautta olkapäässä. 88 (97 %) potilaista kertoi olevansa erittäin tyytyväinen hoidon tulokseen. 5 (5 %) potilaista raportoi kokeneensa uudelleen sijoiltaanmenon olkapäässä seuranta-ajan aikana. Seuranta-ajan VAS keskiarvo oli 0,4 (keskihajonta 1,1), SSV keskiarvo 7,5 (keskihajonta 1,1) sekä WOSI 82,1 (keskihajonta 19,2). Kontrollikuvat osoittivat merkittävää nivelrikkoa seurannassa 8 (9 %) potilaalla, joista 5 (5 %) potilaalla oli

tapahtunut merkittävää etenemistä nivelrikossa verrattuna preoperatiiviseen kuvaan. Korppilisäkkeen asemointi oli hyvä 65 (71 %) potilaalla, mediaalisesti siirtynyt 1 (1 %) potilaalla sekä lateraalisesti siirtynyt 0 potilaalla seurantakuvassa.

Tutkimuksen päätelmäksi saimme, että hoidettaessa olkapään anterioinferiorista epävakautta Latarjetin toimenpiteellä, on se yhteydessä korkeaan potilastyytyväisyyteen sekä matalaan riskiin uudelleen sijoiltaanmenoon keskimittaisen seuranta-ajan jälkeen.

Avainsanat: Latarjet, shoulder

Mid-term satisfaction and outcome of open Latarjet procedure – a retrospective analysis of 90 operated patients

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ABSTRACT

Background: Latarjet operation has gained growing popularity in treating anteroinferior shoulder instability. The aim of this study was to evaluate clinical and radiological outcomes after an open Latarjet procedure.

Materials and methods: Patient data regarding open Latarjet operation at Turku University Hospital between 2007 and 2018 was retrieved together with data on possible prior and/or revision surgeries. The patients were called for a follow-up visit where clinical and radiological treatment outcome were evaluated.

Results: 123 Latarjet operations were performed during the 12 year period, and 90 patients (91 shoulders) were available for questionnaire follow-up (drop-out rate 26 %) at mean 7.9 years (SD 2.8) follow-up. The mean age of the patients at index operation was 33.6 (SD 13.0). 39 (43 %) operations were performed as a revision to a prior arthroscopic soft tissue operation to treat instability. 88 (98 %) patients were very satisfied or satisfied to treatment outcome at follow-up. 5 (6 %) of the patients reported re-dislocation during the follow-up. The mean VAS score at follow-up was 0.4 (SD 1.1), SSV 7.5 (SD 1.1), and WOSI 82.1 (SD 19.2). Control radiographs were available in 66 shoulders. Radiographs showed osteoarthritis of the glenohumeral joint at follow-up in 8 patients with a progression in 5 patients when compared to preoperative imaging. The transferred coracoid was radiologically flush, medial, or lateral in 65 (71 %), 1 (1 %) and 0 patients, respectively.

Conclusion: Latarjet operation in the treatment of anteroinferior instability of the shoulder is associated with high patient satisfaction and low risk of re-dislocation in mid-term follow-up.

Introduction

Operative treatment of shoulder instability is generally advocated not only to improve functionality and shoulder stability but also to avoid later symptomatic osteoarthritis (OA) of the glenohumeral joint. However, soft-tissue procedures such as Bankart operation carry a significant risk of failure and redislocation especially in young and physically active patients. (1-3) The idea of a potentially more stable coracoid transfer to treat shoulder instability was first described by Michel Latarjet in 1954. (4) Since then, Latarjet operation has proven to be an effective and increasingly popular treatment method. (5-9)

In Latarjet operation the coracoid process together with conjoined tendon is transferred through the splitted subscapularis onto the neck of scapula along the edge of the glenoid joint surface. This neo-stucture provides an increased stabilizing effect based on both bony (coracoid) and soft tissues (conjoined tendon crossing the lower subscapularis). (10) The non-anatomical nature of Latarjet operation has raised concerns over its long-term impact on joint degeneration. Furthermore, patient satisfaction and durability of the stabilizing effect has been questioned.

The aim of this study was to evaluate the mid-term patient satisfaction and incidence of redislocation after an open Latarjet procedure. We hypothesised that patient satisfaction would remain high and number of redislocations low.

Materials and Methods

An institutional approval for this study was granted by the Hospital District of Southwest Finland. Data of all patients operated with an open Latarjet procedure between 10.9.2007 and 28.5.2018 were retrieved together with data on possible prior and/or revision surgeries based on operative coding. The medical charts were examined for age, gender, primary dislocation and sports participation. The pre-operative radiographs were evaluated for both humeral (Hill-Sachs (yes/no)) and glenoid (bony Bankart lesion (yes/no)) bone deficiency and for signs of osteoarthritis (OA) of the glenohumeral joint according to modified Samilson-Prieto (0-1= no marked OA, 2-3= marked OA). (11)

The Latarjet procedures were performed by four shoulder surgeons using a standardized open technique. The patients were placed in a beach chair position in general anesthesia and a deltopectoral approach was utilized. The coracoacromial ligament and the pectoralis minor were detached from the coracoid process. The coracoid process together with conjoined tendon was detached with a chisel, and ventral side of the coracoid process was decorticated. The coracoid process was then re-attached with two 4.0 mm lag-screws and washers through a mid-subscapular spilt to the roughened neck of the glenoid flush to the glenoid joint surface. After the operation the arm was placed on sling for three weeks. The patient was given guidance to free passive range of motion exercises at physiotherapy appointment three weeks postoperatively. At six weeks active range of motion exercises and strengthening program were begun. Participation in contact sports was allowed at the earliest three months after surgery.

The patients were called for a follow-up visit and satisfaction (very satisfied, satisfied, undecided, unsatisfied, very unsatisfied) to treatment outcome together with information regarding feelings of instability at any time after the operation (no, subluxation, dislocation) were recorded. Potential complications (infection, nerve injury) related to index operation were recorded. Control radiographs (oblique antero-posterior projection along the glenoid joint surface) were obtained, and signs of glenohumeral OA were evaluated, together with signs of graft malpositioning (> 2 mm medial or lateral) or screw breakage or loosening. The patients were also asked to complete the Visual Analogue Scale (VAS) for pain (12), Subjective Shoulder Value (SSV) (13) and Western Ontario Shoulder Instability Index (WOSI) (14) scores at follow-up.

A linear regression was used to analyze the continuous variables. Binary or ordinal logistic regression were used to model dichotomic and ordered categorical variables, respectively. Two sets of models were fitted to the data, one set where each response variable was adjusted only for age and one other covariate at a time, and second set with full model adjusting for age, sex, working status, level of sports, previous surgery before index surgery, number of surgeries, operator, time from the Latarjet operation, humeral (Hill-Sachs) and glenoid (bony Bankart lesion) bone deficiencies. Magnitude of possible multicollinearity was checked using variance inflation factor (VIF). Working status was removed from the full model of re-dislocations with high VIF > 100. The frequency distribution was found to be sparse supporting the removal from the model. The number of surgeries was removed from the full model of WOSI score with VIF > 5 and moderate to high correlation with previous surgery before index surgery. No other VIF > 5 were observed. In the statistical analyses a P value less than 0.05 was considered as statistically significant. Statistical analysis was performed using R version 4.1.2 (R Core Team, R Foundation for Statistical Computing, 2021).

Results

There were 123 open Latarjet operations performed in 122 patients. 90 patients and 91 shoulders were available for questionnaire follow-up (drop-out rate 26 %). A flow chart of the study is presented in Figure 1. The mean age of the patients at index operation was 33.6 (SD 13.0) years and mean follow-up time 7.9 (SD 2.8) years. The demographic features of the cohort are presented in Table 1. 39 (43 %) operations were performed as revisions.

88 (98 %) of the patients were very satisfied or satisfied to treatment outcome at follow-up (Table 2). There was only one recorded transient superficial infection and one permanent sensory nerve injury complication after the index operation. The mean follow-up VAS score was 0.4 (SD 1.1), SSV 7.5 (SD 1.1), and WOSI 82.1 (SD 19.2). 22 (24 %) patients reported having experienced a subluxation at some point of time after the operation. 5 (6 %) of the patients reported experienced re-dislocation and 3 of them underwent a subsequent revision procedure for instability after the index operation. There were 66 (73 %) control radiographs available at follow-up. Control radiographs showed marked OA at follow-up in 8 shoulders with a marked (one stage or more) progression in 5 of them when compared to preoperative imaging. The coracoid positioning was radiologically flush, medial, or lateral in 65 (98 %), 1 (2 %), and 0 shoulders, respectively. Figure 2. There were 2 (3 %) patients with visible screw loosening and 1 (2 %) shoulder with screw breakage.

Patients with previous soft tissue instability surgery had significantly higher follow-up VAS score and lower WOSI score compared to patients with no previous surgery (full model b = 1.10 (95 % CI 0.24-1.96) p = 0.0143 and b = -19.28 (95 % CI -33.94 - -4.61) p = 0.0154, respectively). However, patient satisfaction at follow-up was essentially similar between these two groups (p= 0.5615). No statistically significant correlations based on full models could be detected between residual instability and other studied parameters. Similarly, no statistically significant correlations based on full models could be detected between progression of OA and other studied radiographic parameters.

Discussion

The main finding of this study was that the mid-term satisfaction to treatment outcome after an open Latarjet procedure remained high after a mean eight years of follow-up. The number of redislocations was accordingly low and in agreement with previous reports with long term survival after this procedure. (15)

To our knowledge there are only two randomized controlled clinical trials comparing the outcome of Latarjet to a different type of operative procedure. A previous randomized controlled trial comparing clinical and radiological outcome of Latarjet and iliac crest bone graft procedure showed essentially similar results between the two groups at two-year follow-up. (16) In a recent randomized controlled trial Latarjet outperformed arthroscopic Bankart procedure in the incidence of redislocations and residual instability in early 2-year follow-up. (9) The results of our study further corroborate the safe use of a Latarjet procedure as a primary procedure with longstanding good results to treat disabling anteroinferior shoulder instability.

Clearly inferior outcomes have been reported after a revision Latarjet procedure in patients who have previously undergone an arthroscopic soft tissue instability surgery when compared to outcomes after a primary Latarjet operation. (17 18) In our study a primary Latarjet operation yielded significantly better WOSI and VAS scores when compared to a revision Latarjet. However, patient satisfaction and other measured parameters were essentially similar after both primary and revision procedure. This finding is in accordance with the report by Yapp et al 2020 (19) and open Latarjet may be regarded as a safe and effective revision option to treat recurrent instability if needed. (20)

A shoulder dislocation poses a direct trauma on the glenohumeral joint surface and there are reports on the positive correlation between the number of preoperative dislocation episodes and degree of detected OA. (21) Accordingly, patients with persisting clinical shoulder instability should be offered surgical treatment early and counseled on the risk of recurrent instability of different surgical treatment methods. Based on a recent systematic review the risk of developing severe glenohumeral joint degeneration and OA after a Latarjet operation is relatively small. (22) In our study 9 % of patients had marked OA at follow-up, which is comparable to previously reported prevalence of glenohumeral OA in non-operated patients. (23) Therefore, it can be argued that OA is mostly related to the preoperative pathologic state and is not a result of the Latarjet procedure. Nevertheless, it should be noted that any mechanical failures during surgery, such as graft malpositioning, may compromise the joint longevity. (22)

In older age a traumatic shoulder dislocation and resultant instability may be due to a significant rotator cuff tear, which should be then considered target of surgical intervention. (24) Furthermore, in case of an irreparable, posterosuperiorly cuff-deficient and upward migrated unstable humeral head a Trillat procedure may be considered. (25) Even so, there are also some older individuals with shoulder instability without cuff involvement. (26) In our study the mean age of patients was 34 years. Despite the potential concerns over eg. decreased healing potential, a favorable outcome of a Latarjet procedure in a population over 40 years of age has been previously reported. (27 28) However, it is noteworthy that the age-related risk of progressive osteoarthritis and arthropathy is increased in elderly patient population.

The main strength of the study is a large consecutive patient cohort operated at the same hospital by shoulder surgeons with a standardized and meticulous technique. Another strength of the study is the follow-up period of nearly eight years. The main weaknesses are the retrospective manner of heterogeneous data collection and a quite high drop-out rate. Patients with shoulder instability may be noncompliant to follow-ups due to their young age and active lifestyle. We could not obtain radiographs from all patients at follow-up, only 66 images were available. The use of radiographs only is also a crude method of assessing the healing/positioning of the coracoid graft or development of degenerative changes in the glenohumeral joint.

Conclusion

Anteroinferior instability of the glenohumeral joint treated with Latarjet procedure is associated with high patient satisfaction and low risk of redislocation in mid-term follow-up.

Appendices

Table 1. Patient demographics at the time of index surgery

Age (years), Mean ± SD	33,6 ± 13,0
Sex Male Female	 74 (81,3 %) 17 (18,7 %)
Previous surgery before index surgery Yes No	 39 (42,9 %) 52 (57,1 %)
Preoperative Hill-Sachs lesion Yes No	 56 (61,5 %) 35 (38,5 %)
Preoperative bony Bankart lesion Yes No	 60 (65,9 %) 31 (34,1 %)

Table 2. Clinical results at follow-up

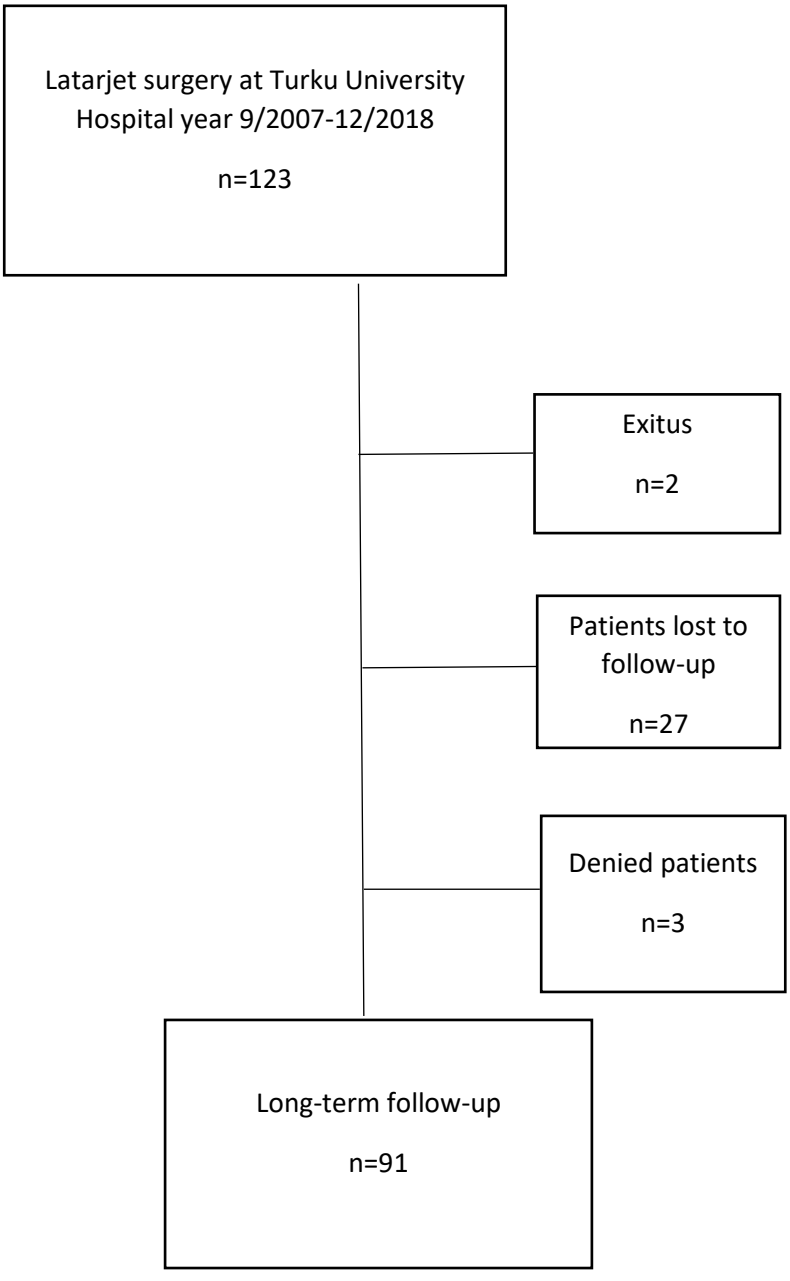
Satisfaction Very satisfied Satisfied Undecided Unsatisfied Very unsatisfied	 62 (68,1 %) 26 (28,6 %) 2 (2,2 %) 1 (1,1 %) 0
WOSI index%	82,1
SSV	7,5
pain VAS	0,4
Re-dislocation during follow-up No Subluxation Yes	 64 (70,3 %) 22 (24,2 %) 5 (5,5 %)
Complications after surgery No Superficial infection Transient sensory loss Permanent nerve injury (sensory loss)	 88 (96,7 %) 1 (1,1 %) 2 (2,2 %) 1 (1,1 %)
Surgery after index surgery No Yes	 88 (96,7 %) 3 (3,3 %)

WOSI= Western Ontario Shoulder Instability Index
SSV= Subjective Shoulder Value
pain VAS= the Visual Analogue Scale for pain

Table 3. Radiological results at follow-up

Osteoarthrosis	
Grade 0	40 (60,6 %)
Grade I	18 (27,3 %)
Grade II	8 (12,1 %)
Grade III	0
Coracoidgraft position	
Flush	65 (98,5 %)
> 0,5 cm medially	1 (1,5 %)
Lateral	0
Screw complications	
No	63 (95,5 %)
Loosening	2 (3,0 %)
Screw breakage	1 (1,5 %)

Figure 1. Flow chart



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