Original article

Outpatient Latarjet surgery for gleno-humeral instability: Prospective comparative assessment of feasibility and safety

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A B S T R A C T

Background: Some surgical procedures are rarely done on an outpatient basis. The primary objective of this study was to assess the safety of outpatient surgical shoulder stabilisation using the Latarjet procedure.

Hypothesis: The Latarjet procedure is safe when performed on an outpatient basis provided the patients are managed according to a specifically designed programme starting at the decision to undergo surgery and ending at the end of the early postoperative period.

Patients and methods: Consecutive patients with unidirectional anterior shoulder instability managed in 2013–2014 by primary open, minimally invasive surgery involving coracoid process transfer as described by Latarjet was included prospectively. One of the surgeons routinely offered outpatient surgery to patients who met none of the usual exclusion criteria (age> 60 years, ASA 3–4, and long distance from home to hospital). Standardised protocols were applied for anaesthesia and analgesia. The primary evaluation criterion was failure of the admission modality, defined as inpatient admission of a patient after outpatient surgery either without prior discharge or within 1 week after discharge. Secondary evaluation criteria were early postoperative symptoms and functional outcomes after at least 1 year. All self-reported criteria were entered online by the patients.

Results: Of 46 included patients, 17 had outpatient surgery and 29 inpatient surgery. There were 41 males and 5 females, with a mean age of 25.3 ± 6.4 years. No significant baseline differences were found between the two groups. None of the outpatients required inpatient admission or readmission. No postoperative complications were recorded. After a mean follow-up of 18.5 ± 5.2 months, the two groups showed no significant differences for return to sports, apprehension, avoidance behaviours, or functional outcomes. Most patients were satisfied with their management and outcomes.

Conclusion: No serious adverse events were recorded in this first French prospective evaluation of the safety of open, minimally invasive shoulder stabilisation by the Latarjet procedure performed on an outpatient basis. Thus, in selected patients, the risks of outpatient surgery are similar to those of inpatient surgery.

Level of evidence: III, prospective, comparative, non-randomised study.

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1. Introduction

After a first episode of shoulder dislocation, recurrences are common, and in 4 patients eventually requires surgical treatment [1]. The procedure may involve the soft tissues (Bankart repair [2]) or consist of fashioning a bone block, as in the Latarjet procedure [3]. Creation of a bone block is indicated in patients at high risk for recurrent dislocation [4], as well as after failure of arthroscopic Bankart repair [5,6].

Among American orthopaedic surgeons attending the 2009 meeting of the Arthroscopy Association of North America (AANA), 58% reported never using the Latarjet procedure for shoulder stabilisation [7]. Another study, however, showed that the number of open coracoid process transfer procedures done in the US increased significantly between 2007 and 2009 (0.17/10,000 vs. 0.40/10,000, P<0.0001) [8].

Outpatient surgery provides benefits to patients, including greater satisfaction [9] and less exposure to nosocomial infections.
to healthcare facilities via optimisation of resource utilisation; and to health insurance systems, as direct costs are 25% [11] to 68% [12] lower depending on the procedure. At present, the Bankart procedure is usually done on an outpatient basis, with arthroscopic assistance [13,14]. In France, although surgeons seem to prefer inpatient admission for the Latarjet procedure, outpatient surgery is steadily gaining ground. According to the ATIH (Agence technique de l’Information sur l’Hospitalisation, www.atih.sante.fr [Technical agency of Information on Hospitalization]), the medical act MEMA005 “Construction of a glenoid block by coracoid graft, by direct approach” was performed as an outpatient procedure (Groupe Homogène de Malades 08C35J) in 3.4% (205/6036) of cases in 2013 and 7.2% (430/5981) in 2014.

To our knowledge, the feasibility of this technique as an outpatient procedure has never been studied. The primary objective of this study was to evaluate the safety of shoulder stabilisation by the minimally invasive Latarjet procedure performed on an outpatient basis. The main hypothesis was that this treatment strategy was safe provided the patients were managed according to a specifically designed programme starting at the decision to undergo surgery and ending at the end of the early postoperative period.

2. Material and methods

This prospective comparative non-randomised study was conducted in 2013–2014. The appropriate ethics committee approved the research project as a study of standard care. Informed consent was obtained from all patients.

The study patients underwent primary surgery for unidirectional anterior shoulder instability, using coracoid process transfer as described by Latarjet, via a minimally invasive approach. The preoperative Instability Severity Index Score (ISIS) [4] was greater than 3 in all patients. Three senior surgeons performed the procedures. One of them routinely offered outpatient surgery to patients who had none of the usual exclusion criteria, namely, age > 60 years, ASA score of 3 or 4, long distance from home to hospital, isolation, or a health condition warranting admission (history of bloodstream infection or clotting disorder). The other two surgeons routinely admitted their patients. Two groups were compared, one composed of patients who accepted outpatient surgery and the other of patients managed on an inpatient basis because they refused or were not offered outpatient surgery.

2.1. Outpatient management protocol

A standardised protocol was followed in the outpatients.

The absence of exclusion criteria for outpatient surgery was checked preoperatively by the surgeon then by the anaesthesiologist. The anaesthesiologist checked that patients accepting outpatient surgery were committed to follow all steps of the management protocol. The procedure was scheduled and the primary-care physician informed by mail. The preoperative anaesthesiology visit was conducted according to standard care. Special attention was directed to informing the patient about the multimodal postoperative analgesia protocol.

Outpatients arrived at the surgical clinic at 7:30 a.m., after an overnight fast, and had surgery before noon. Inpatients arrived either on the day before or on the morning of the procedure. After surgery, all patients stayed for 30–60 minutes in the postanaesthesia care unit; the patients then returned either to the outpatient clinic or to the inpatient ward.

The surgeon and anaesthesiologist checked the list of criteria usually applied in the clinic to make discharge decisions after outpatient anaesthesia and surgery [15]. The patient was then given a further dose of analgesics (paracetamol, 500 mg; tramadol–paracetamol, 37.5 mg/325 mg; and naproxen, 500 mg in the absence of contra-indications to non-steroidal anti-inflammatory drugs [NSAIDs]). Persistent effects of the interscalene block did not contra-indicate discharge. Immobilisation was with a splint maintaining the elbow by the side. Departure from the outpatient clinic was at about 7:00 p.m., with an escort able to drive the patient home. Patients were not discharged if they had severe pain requiring morphine therapy or postoperative complications requiring close monitoring or surgical treatment.

The outpatients were then interviewed by telephone on two occasions, on the evening of the procedure by the study anaesthesiologist and on the next day by the surgeon. These interviews served to assess the tolerance of the analgesics and to look for adverse events and complications.

2.2. Operative technique

An open minimally invasive technique was used, with appropriate instrumentation (Glenoid Bone Loss Instrument Set, Arthrex, Naples, FL, USA). The coracoid process was exposed via a mini-deltoid muscle approach, taking care to protect the cephalic vein and the brachial plexus medially. An osteotomy was performed at the base of the coracoid process to detach the process along with the conjoined tendon (biceps brachii and coracobrachialis). The subscapularis fibres were dissected horizontally and the joint cavity was then opened. The antero-inferior rim of the glenoid and the inferior aspect of the coracoid process were freshened then attached to each other by two titanium cancellous bone screws. Cannulated drill bits were used to position the coracoid process flush with the lateral glenoid rim, with no overhang. The lateral capsule was then sutured to the acromio-clavicular ligament to ensure further anterior stabilisation of the shoulder. The wound was closed in layers with a continuous absorbable skin suture. Most patients had a suction drain inserted; the drain was removed before discharge in the outpatients and on the day after surgery in the inpatients.

2.3. Anaesthesia protocol

A standardised general anaesthesia protocol was followed. Premedication was with oral pregabalin (75 mg) and induction with propofol (3 mg/kg), sufentanil (0.2–0.3 μg/kg), and atracurium (0.5 mg/kg). Maintenance was either with inhaled sevoflurane (1 MAC) and an O2:N2O mixture (50/50) or with intravenous propofol and further sufentanil injections. Prophylactic antibiotic therapy was given 1 hour before the procedure, with cefazolin or, if this drug was contra-indicated, vancomycin/gentamicin. An interscalene block was administered preoperatively under ultrasound guidance. An in-plane approach was used first, with a 50-mm neurostimulation needle. The injection was monitored to determine whether the anaesthetic diffused to both the posterior and anterior parts of the compartment. If posterior diffusion was limited, global diffusion was achieved by needling: a single bolus of 20 mL of 0.75% ropivacaine was given by the anaesthesiologist. The effectiveness of the block was checked before starting surgery. To enhance the effect, an intravenous injection of dexamethasone 5 to 20 mg depending on body weight was administered while the block was being performed. At the end of the surgical procedure, the surgeon injected four 10-mL vials of 2% ropivacaine into the edges of the wound.

2.4. Analgesia protocol

Analgesics were given routinely in the post-anaesthesia care unit (paracetamol 1 g IV, ketoprofen 100 mg IV in patients without contra-indications to NSAIDs, and tramadol 100 mg IV or
nefopam IV 2 mL). At discharge, each patient was given a prescription for 72 hours of analgesic therapy with oral paracetamol 1 g every 6 hours; oral tramadol 37.5 mg + paracetamol 325 mg tablets, 1–2 per dose and up to 6 per day; or sustained-release ketoprofen 100 mg tablets, 1 bid (in patients without contra-indications to NSAIDs) together with the proton pump inhibitor pantoprazole 20 mg, 1 tablet in the evening. Inpatients with severe pain (score > 3/10) received morphine on demand.

2.5. Evaluation criteria

The primary evaluation criterion was failure of the type of admission, defined as a need for inpatient care either without discharge in the interval or within 1 week after discharge.

Secondary evaluation criteria relevant to the early postoperative period were the rate of postoperative complications related to the surgical procedure or interscalene block, postoperative pain intensity measured on day (D) 0 and D1 using a 0–10 numerical scale (0, no pain; 10, worst pain imaginable), nocturnal awakenings due to pain on D0, analgesic consumption on D0 and D1, postoperative discomfort (nausea/vomiting, dizziness, faintness, abdominal pain) on D1, and patient satisfaction with management on D1 (very satisfied, satisfied, somewhat satisfied, or dissatisfied).

The other secondary evaluation criteria were recorded after at least 1 year of follow-up and consisted of return to sports; apprehension; avoidance behaviours; shoulder pain during activities, rated on a 0–10 scale; functional outcome as assessed using the Western Ontario Shoulder Instability Index (WOSI, from 0 [excellent] to 2100 [very poor]) [16], and patient satisfaction with the functional outcome (very satisfied, satisfied, somewhat satisfied, or dissatisfied).

All self-reported evaluation criteria were entered by the patient into an electronic form using WebSurvey software (websurvey.fr).

2.6. Statistical analyses

The statistical analyses were run using Stata/IC version 10.0 (StataCorp LP, College Station, TX, USA). No published data on readmission rates after outpatient Latarjet procedures were available for estimating the sample size. We therefore included consecutive patients managed by the three study surgeons over a 1-year period. Non-parametric tests were used: for quantitative criteria, the Mann–Whitney test and, for qualitative criteria, the Kruskal–Wallis for more than two groups or Fisher’s exact test. Values of \( P \) lower than 0.05 were considered statistically significant.

3. Results

Forty-six patients were included, 17 scheduled for outpatient and 29 for inpatient surgery (Fig. 1). All patients who were offered this option accepted outpatient surgery. The two groups were comparable at baseline (Table 1). Mean hospital stay duration in the inpatient group was 2.2 ± 0.7 days. Of the 46 patients, 42 (91.3%) engaged regularly in sports, of which the most widely practised was rugby (15/46, 32.6%).

No admissions or re-admissions occurred in the outpatient group. No postoperative complications related to the interscalene block or surgical procedure was recorded in either group.

Pain scores in the inpatient group were significantly lower on the evening of D0 (0.2 ± 0.7 vs. 4.3 ± 3, \( P < 0.00001 \)) but significantly
median pain scores on the day of surgery (D0) and the following day (D1). Higher on D1 (2.6 ± 1.6 vs. 1.2 ± 1.4, P = 0.002) (Fig. 2). During the night of D0, the two groups showed no significant differences for the pain score (1.5 ± 2.1 vs. 2 ± 3.2, P = 0.72) or proportion of patients reporting awakenings due to pain (25% vs. 27.6%, P = 1). The outpatient group used significantly larger amounts of morphine (P = 0.0001) but did not use any analgesics (P = 0.0001) but did not use any morphine (Fig. 3). Significantly fewer outpatients than inpatients had signs of postoperative discomfort (1/16 [6.2%] vs. 11/24 [45.8%], P = 0.01) (Fig. 4). On D1, all patients were satisfied or very satisfied with their management, with no significant difference between the two groups.

After a mean follow-up of 18.5 ± 5.2 months, no patient had experienced further dislocation episodes, although 1 outpatient had had over 10 episodes of subluxation, P = 0.37, or 2.2% for the entire series. Of the 42 sports participants, 37 (88.1%) had returned to sports including 14/16 (87.5%) outpatients and 23/26 (88.5%) inpatients (P = 1). In most cases, the return was to the previous sport (13/16 [81.2%] vs. 19/26 [73.1%], P = 0.90), at the same level or at a higher level (12/16 [75%] vs. 16/26 [61.5%], P = 0.14). The operated shoulder was the main reason for stopping sports participation in 3/5 patients and for switching to another sport in 4/5 patients. The time to sports resumption was significantly shorter in the outpatient group (4.3 ± 1.7 months vs. 5.9 ± 2.9 months in the inpatient group).
Table 2
Secondary evaluation criteria at least 1 year after surgery.

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Outpatients (n = 17)</th>
<th>Inpatients (n = 29)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>No apprehension</td>
<td>(9.3%)</td>
<td>(12 (41.4%)</td>
<td>0.76</td>
</tr>
<tr>
<td>Moderate apprehension (10)</td>
<td>3.2 ± 3.4</td>
<td>2.7 ± 3.1</td>
<td>0.59</td>
</tr>
<tr>
<td>No avoidance behaviour</td>
<td>6 (35.3%)</td>
<td>10 (34.5%)</td>
<td>1</td>
</tr>
<tr>
<td>No shoulder pain score (NRS = 0)</td>
<td>5 (29.4%)</td>
<td>8 (27.6%)</td>
<td>1</td>
</tr>
<tr>
<td>Mean shoulder pain score (NRS)</td>
<td>2.5 ± 2.6</td>
<td>2 ± 2</td>
<td>0.49</td>
</tr>
</tbody>
</table>

| Satisfaction with outcomes    | Very satisfied       | Very satisfied      | 0.67    |
|                               | 11 (64.7%)           | 17 (58.6%)          |         |
|                               | Satisfied 3          | Satisfied 9         |         |
|                               | 11 (64.7%)           | (31%)               |         |
|                               | Somewhat satisfied 2 | Satisfied 2         |         |
|                               | 11 (64.7%)           | (65.9%)             |         |
|                               | Dissatisfied 1       | Satisfied 1         |         |
|                               | 5 (29.4%)            | (3.4%)              |         |

NR: Numerical Rating Scale.

No complications due to the interscalene block were recorded. In earlier studies, only about 0.63% patients experienced complications [21], which occurred during the early postoperative period and consisted of arm pain, diaphragmatic pain, diaphragmatic palsy, and hypotension. Lenters et al. [22] demonstrated that the risk of complications related to an interscalene block correlated closely with operator experience, i.e., with the number of blocks performed previously by the operator. The growth of outpatient surgery, particularly in the USA, is increasing the need for anaesthesiologists with expertise in peripheral nerve blocks [23].

In a study by Jain et al. [18], age above 55 years was among the factors associated with re-admission after outpatient shoulder surgery, perhaps due to lesser effectiveness of analgesics in the older age group. None of our outpatients required admission or re-admission after discharge, but mean age was young in our study.

No patient experienced complications due to the surgical technique. The complications of the Latarjet procedure were evaluated in a recent meta-analysis [24], which showed a low short-term morbidity rate, apart from the risks inherent in hospital admission, surgery, and anaesthesia. Haematomas and infections were each seen in less than 1% of patients. Neurological complications occurred in 1.8% of patients and consisted of transient anaesthesia of the musculo-cutaneous nerve, circumflex nerve, or median nerve. The most common problems were technical, such as fracturing of the coracoid process and bone block (1.5%). Adverse outcomes in the mid-term included restricted lateral shoulder rotation; dislocation (2.9%) and recurrent subluxation (5.8%), with 73% of the episodes occurring within 1 year after surgery, and non-union between the transferred coracoid process and the glenoid rim (9.4%). Arthroscopic surgery was associated with greater restriction of lateral rotation and with a slightly higher rate of recurrent dislocation [24]. None of our patients experienced complications and only 1 (2.2%) had recurrent subluxation episodes within the first postoperative year.

All patients were satisfied with the management modalities during the early postoperative period and most were satisfied with the outcomes after at least 1 year, with no significant differences between the two groups. Most of the patients returned to their previous sport, at the same level. The time to sports resumption was significantly shorter in the outpatient group. This finding is challenging to interpret as time to sports resumption was only a secondary evaluation criterion and the number of outpatients was limited. We believe the most likely hypothesis is a difference in patient mind-set between outpatient and inpatient surgery. Outpatients are more actively involved with their management and self-sufficient from the very first day. Moreover, the standardised management protocol may serve to reassure them regarding their shoulder function.

This study has several strong points. A prospective comparative design was used. The patients were evaluated both in the very short-term and at least 1 year after surgery. Three senior surgeons performed the procedures according to the same protocol in both the outpatients and the inpatients. Major limitations to our study must also be acknowledged. Randomisation was not feasible because a single surgeon agreed to perform the procedure on an outpatient basis. As a result, the number of outpatients was small.

4. Discussion

This study established that shoulder stabilisation by an open minimally invasive Latarjet procedure was safe when performed on an outpatient basis. Compared to inpatient surgery, no loss of chance in the immediate postoperative period or short-term was noted. The usual criteria for excluding individuals from outpatient surgery were scrupulously applied. In addition, a standardised management protocol, including two telephone interviews shortly after surgery was followed.

Shoulder surgery causes severe pain, even when a minimally invasive approach is used [17]. The quality of the postoperative analgesia governs to a large extent the chances of successfully completing outpatient surgery and of obtaining good patient satisfaction [18]. The interscalene block is the most widely used method. With ultrasound guidance, smaller amounts of anaesthetics can be injected and the risk of adverse events is therefore diminished [19]. Conroy et al. [17] reported that the interscalene block provided complete pain relief for a mean of 10.5 hours. The use of an indwelling catheter for 48 hours at home has been advocated [20]. In our study, the outpatients were discharged with no catheter but with a prescription for routine treatment with class 1 and 2 analgesics. The outpatients used no morphine but had significantly higher levels of class 1 and 2 analgesic consumption compared to the inpatients. Pain intensity on the evening of D0 was significantly lower in the outpatient group, perhaps due to the routine prescription of class 1 and 2 analgesics at regular intervals, whereas the inpatients were offered morphine therapy by the nurses only if their pain score was greater than 3/10. Pain exacerbation on D1 was noted in both groups but was significantly more marked in the outpatients. The inpatients had significantly higher rates of signs of postoperative discomfort, particularly nausea and vomiting probably related to the use of morphine.

5. Conclusion

This prospective study evaluated the safety of the open minimally invasive Latarjet procedure for shoulder stabilisation performed on an outpatient basis. No serious events were recorded. Compared to inpatients, outpatients experienced no loss of chance in the immediate postoperative or short-term period. In selected
References