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Management of Recurrent Anterior Shoulder Instability After Failed Latarjet by Eden–Hybinette Procedure: About Three Cases

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Abstract

Introduction: Recurrent anterior shoulder instability after a failed Latarjet procedure represents a challenging surgical problem due to the alteration of native stabilizing structures and potential bone loss. The modified Eden–Hybinette procedure using autologous iliac crest graft remains a preferred revision technique to restore glenoid anatomy and joint stability.

Methods: We performed a retrospective study of three male patients who underwent a modified Eden–Hybinette procedure as a revision technique for recurrent anterior shoulder instability after failed Latarjet. The average interval to recurrence after the primary Latarjet was 52 months. Preoperative evaluation included clinical and radiologic assessment with CT quantification of glenoid bone loss. All procedures were performed through an open deltopectoral approach. An autologous iliac crest bone graft was used to reconstruct the anterior glenoid rim and was secured with two 3.5 mm cortical screws. Functional outcomes were assessed at a mean follow-up of 15 months using the modified Rowe score.

Results: the trauma was identified as the precipitating factor in one patient, preoperative imaging showed coracoid graft osteolysis in two patients and pseudarthrosis in one. Postoperatively, no recurrence of instability or major complications occurred. All grafts achieved radiographic union, and the mean modified Rowe score was 79, indicating good shoulder stability and function.

Conclusion: The modified Eden–Hybinette procedure provides a reliable and effective revision option for recurrent instability after failed Latarjet, particularly in cases with significant bone loss. Despite promising short-term outcomes, long-term follow-up is warranted to evaluate graft durability and potential degenerative changes.

Keywords: Eden-Hybinette; Failed Latarjet; Recurrent instability; Revision; Iliac crest

1. Introduction

Anterior shoulder instability is the most common complication following a traumatic shoulder disclocation, various soft-tissue and bony procedures have been outlined for managing anterior shoulder instability, however the optimal technique remain controversial.

The Latarjet procedure continues to be a valid surgical option and yields satisfactory results, although several complications may occur with recurrence representing a significant concern. Recurrent shoulder instability after a

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Latarjet procedure is a significant complication and revision surgery may be outstandingly challenging even more with the alteration of native stabilizing structures. Modified Eden-Hybinette procedure usinig autologous iliac crest graft, is the most common surgical technique for revision of failed Bristow-Latarjet, as it can also reconstruct the glenoid in cases of important bone defect (1) The aim of our study was to assess the factors linked to recurrent instability and to analyze the functional outcomes of modified Eden-Hybinette as a revision procedure.

2. Material and methods

We performed a retrospective study of 3 male patients who had undergone a modified Eden-Hybinette procedure as a revision technique for recurrent anterior shoulder instability after a Latarjet procedure, the analysis was conducted within the Traumatology and Orthopedic department of CHU MOHAMMED VI in Oujda, over a period of 6 years, from January 2019 to January 2025. The mean age of the patients was 26.3 years, the dominant side was affected in all cases and the average interval to the onset of the recurrence of instability after the primary Latarjet procedure was 52 months. All our patients underwent a preoperative clinical assessment complemented by a comprehensive radiological evaluation, which included standard radiographs (anteroposterior, Lamy, and Bernageau views) as well as a CT scan of the shoulder in order to identify potential causes related to persistent instability after the Latarjet procedure.

2.1. Surgical revision technique

The patient is positioned in the beach chair position, the procedure is performed through a deltopectoral approach using the pre-existing scar incision, the intermuscular plane between the pectoralis major and the medial border of the deltoid is developed with careful preservation of the cephalic vein. The conjoined tendon of the coracobrachialis and the short head of the biceps is identified, a blunt dissection of the subscapularis is carried out without visualizing the axillary nerve then the anterior capsule if found is incised longitudinally. Subsequently, the screw and the remnant coracoid fragment previously used as a bony block were removed. and a bicortical autologous iliac crest bone graft was harvested. Its dimensions were verified intraoperatively by provisional placement on the glenoid to ensure that the smooth, concave inner surface sat flush with the anterior glenoid rim (Figure 1) and was congruent with the native articular surface. Then the final fixation was achieved with two 3.5 mm cortical screws and washers (Figure 2). The residual capsular tissue was reattached to the graft, followed by subscapularis repair using U-stitches. After surgery, the arm was immobilized in a universal shoulder immobilizer for six weeks. Passive range of motion and pendulum exercises were initiated after 3 weeks, and active range of motion was permitted after 45 days.

3. Results

All of our patients underwent preoperative clinical assessment, the clinical presentation of recurrent instability consisted of multiple shoulder dislocation episodes with a mean of 7.3 dislocations.

Patient history documented trauma as the precipitating factor for recurrent instability in one patient. In the other two cases, no identifiable triggering factor was found. Moreover, there was no history of epilepsy, generalized ligamentous laxity, or bilateral shoulder instability.

On clinical examination, all patients had positive apprehension and Jobe relocation tests, two also showed a positive anterior drawer sign.

Regarding preoperative imaging, two patients had osteolysis of the coracoid bone block (Figure 3) and one presented with graft pseudarthrosis, the evaluation of glenoid bone loss showed an average of 19%.

Postoperatively patients were reviewed after a mean follow up of 15 months, the clinical examination included pain assessment, range of motion, instability tests, and testing of the rotator cuff with an evaluation of functional outcomes based on the modified Rowe score.

At the last follow-up, there was no evidence of persistent instability, range of movement was satisfactory overall, the mean score on the modified Rowe scale was 79, with all three patients achieving a good outcome. Postoperative radiographs were obtained for all patients and confirmed union of the iliac-crest bone graft (Figure 4).

No radiographic evidence of glenohumeral osteoarthritis was identified, and no major postoperative complications were reported, apart from minor donor-site morbidity at the iliac crest in one case, which did not compromise functional recovery.

4. Discussion

Despite being a complex reconstruction, Eden–Hybinette shows favorable clinical and functional outcomes, high return-to-sport rates, and low radiographic morbidity, even in the revision context following Latarjet failure. Primarily employed as a revision technique after failed Latarjet, additional surgical indications for the Eden–Hybinette procedure include anterior shoulder instability with glenoid bone loss exceeding 40% coracoid anatomy that precludes a Latarjet transfer, and a nonreconstructible bony Bankart fracture in the setting of abnormal coracoid morphology (2).

Recurrent instability after the Latarjet procedure is uncommon but clinically meaningful, and management starts with defining the etiology of the primary operation's failure. Published contributors include technical errors with the coracoid bone block, persistent soft-tissue insufficiency, unfavorable biomechanics of bipolar bone defects, patient-related factors, and postoperative trauma.

The most frequent technical etiology is coracoid malposition, as medialization or superior placement relative to the glenoid rim compromises the buttress effect and significantly increases the risk of recurrence.

Graft-related complications such as nonunion, resorption, or fracture further eliminate the anterior bony constraint and permit renewed anterior translation. Inadequate fixation, including the use of monocortical constructs or insufficient compression with cannulated screws (3), may predispose to graft failure, residual instability can still occur due to factors such as persistent soft-tissue laxity or extensive capsulolabral injury (4)

Several authors have emphasized that patient-related factors and incomplete initial assessment may predispose to recurrence after the Latarjet procedure. Giacomo et al. demonstrated that patients with atraumatic instability are significantly more likely to experience recurrent episodes compared with those with a traumatic onset. Similarly, bilateral shoulder involvement has been associated with an increased risk of failure (5). These observations highlight the importance of a thorough preoperative evaluation, not only to confirm the primary diagnosis but also to identify concomitant conditions, such as posterior instability or associated labral lesions, including SLAP and posterior labral tears. Recognizing and addressing these factors at the index procedure is essential to reduce the risk of persistent or recurrent instability and to improve long-term outcomes (4).

In our series, the preoperative radioclinical evaluation proved essential in elucidating the underlying causes of recurrence. Trauma was identified as the precipitating factor in a single patient, while coracoid bone-block osteolysis accounted for two cases. In the remaining case, graft nonunion was established as the primary etiological factor. This highlights the importance of systematic preoperative assessment in guiding both diagnostic accuracy and therapeutic decision-making.

Arthroscopic soft-tissue stabilization has emerged as a valuable alternative for selected patients, particularly when bone stock is adequately preserved. Beyond restoring capsulolabral integrity, this technique enables the management of associated soft-tissue lesions that often contribute to recurrent instability. Moreover, by avoiding anterior dissection around the glenoid, the arthroscopic approach may decrease the risk of neurovascular injury (4), Boileau et al. (6) described a cohort of 12 patients who developed recurrent instability after failed open anterior stabilization of the shoulder. Revision was performed arthroscopically with Bankart repair, combined with inferior capsular plication or rotator interval closure when excessive inferior or anterior laxity was present. After a mean follow-up of 43 months, outcomes were favorable, with recurrent instability observed in only one case (5%), underscoring the potential efficacy of arthroscopic revision in carefully selected patients.

The Eden–Hybinette procedure has been employed both as a primary option for recurrent anterior shoulder instability with significant glenoid bone loss and as a revision technique after failed stabilization procedures (2). Overall, published series have reported encouraging outcomes despite the technical complexity of the procedure. Lunn et al. observed that among 34 patients undergoing revision from a failed Latarjet with an open Eden–Hybinette technique, 88% achieved a stable shoulder defined as the absence of recurrent dislocation although 38% reported a positive apprehension sign, nonetheless, patient satisfaction reached 88% at a mean follow-up of 6.8 years (7) . Similarly, Warner et al. reported a series of 11 patients managed with the Eden–Hybinette procedure, including nine who had previously undergone unsuccessful stabilization surgery. Postoperatively, patients demonstrated significant improvements in ASES, UCLA, and Rowe scores, with all patients returning to their preinjury level of sport and none experiencing apprehension or recurrent instability (8).

More recently, arthroscopic adaptations of the Eden–Hybinette have demonstrated promising results. Giannakos et al. found that 8 of 12 patients achieved good or excellent outcomes, 7 returned to their preinjury sport level, and functional scores, including Rowe and Walch–Duplay, showed marked improvement (9).

Nevertheless, certain limitations must be acknowledged, the procedure remains technically challenging and requires significant surgical expertise, with a steep learning curve, furthermore, factors such as the cost of specialized instrumentation and the risk of graft non-union or displacement should also be considered. In this context, appropriate patient selection plays a pivotal role in optimizing surgical outcomes.

The potential for postoperative osteoarthritis remains a concern following the Eden-Hybinette procedure. The absence of articular cartilage on the graft surface may predispose the joint to degenerative changes over time. Moreover, the nonanatomic nature of the graft may further contribute to altered joint mechanics and subsequent cartilage wear. To date, no long-term data are available regarding the incidence of osteoarthritis after Latarjet revision using the Eden-Hybinette technique. However, studies evaluating primary Eden-Hybinette procedures have reported a relatively high prevalence of osteoarthritic changes. Wildner *et al.* observed a 79% rate of osteoarthritis after a mean follow-up of 15 years (10), while Rahme *et al.* reported a 47% rate after a mean follow-up of 29 years (11). These findings highlight the need for long-term monitoring and underscore the importance of preserving joint congruence and soft-tissue balance during reconstruction.

Failure of graft incorporation or the occurrence of graft lysis remains one of the major complications following the Eden–Hybinette procedure, and it may occur to varying degrees. However, its impact in revision settings is less well documented, mainly due to the paucity of long-term studies (4).

Figure 1 Intraoperative image showing the preparation and fixation of the bicortical iliac crest graft

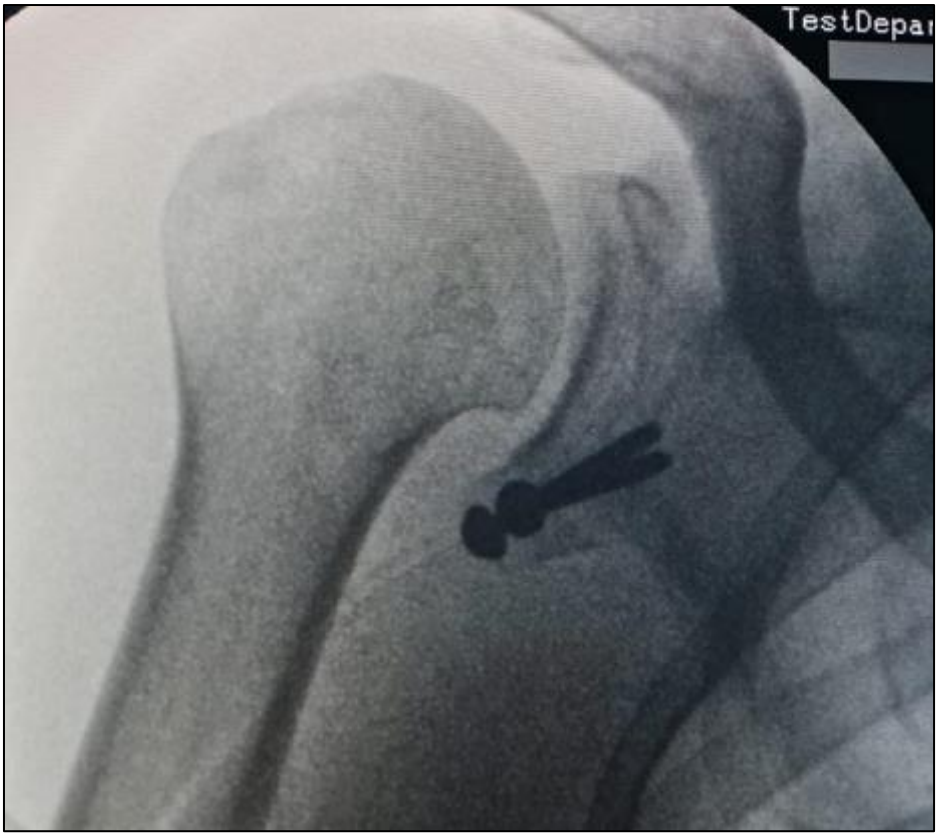

Figure 2 Intraoperative fluoroscopy demonstrating positioning of the autologous iliac crest bone graft.

Complete graft lysis clearly indicates reconstruction failure, whereas partial resorption represents a more complex situation, as it can be difficult to determine whether the remaining bone fragment is sufficiently integrated and stable to ensure shoulder stability (12). Given these potential complications, particular attention should be paid to the technical aspects of the procedure. Optimal graft positioning flush with the glenoid surface, rigid fixation, the use of fresh autograft, and meticulous handling of the bone block are essential to promote osteointegration and minimize the risk of graft lysis.

Figure 3 Preoperative CT scan of the right shoulder showing osteolysis of the coracoid bone block

Figure 4 Bernageau lateral radiographic view at 12 months postoperatively confirming complete union of the autologous iliac crest bone graft

In our series, no major postoperative complications were observed. Specifically, there were no cases of persistent instability, graft nonunion, or development of glenohumeral osteoarthritis during follow-up. Functional outcomes were also satisfactory, with a mean modified Rowe score of 79, reflecting good shoulder function and satisfactory joint stability.. These favorable results may be partly explained by the limited number of cases included and the relatively short to mid-term follow-up period, which may not fully capture potential long-term complications.

5. Conclusion

The Eden Hybinette procedure remains an effective and reliable option for managing recurrent anterior shoulder instability following failed Latarjet procedures, especially in case of significant glenoid bone loss or graft resorption. The outcomes of this revision technique are generally satisfactory, with low recurrence rates and good functional recovery. However, longer-term studies focusing on osteoarthritis development and graft union after revision surgery with the Eden Hybinette technique are necessary to better assess the durability of this challenging technique and to elucidate its long-term biomechanical and clinical outcomes.

Compliance with ethical standards

Disclosure of conflict of interest

We declare that no author has any conflict of interest in relation to this manuscript.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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