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CLINICAL AND FUNCTIONAL OUTCOMES OF OPEN REPAIR OF FULL-THICKNESS ROTATOR CUFF TEARS: A RETROSPECTIVE SERIES OF 30 PATIENTS

Jihad Radi, Ahmed Boutoub *, Kamal Lahrach, Amine Marzouki and Faouzi Boutayeb

Department of Trauma and Orthopaedic Surgery A, Hassan II University Hospital, Faculty of Medicine, Pharmacy and Dental Medicine, Sidi Mohamed Ben Abdellah University, Fez, Morocco.
* Corresponding Author; Email: boutoubahmed@gmail.com

ORCID Details
Jihad Radi: https://orcid.org/0009-0007-3826-350X

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ABSTRACT

Rotator cuff tears are a common cause of shoulder pain and functional impairment. This study aimed to evaluate clinical and functional outcomes after open repair of full-thickness rotator cuff tears. A retrospective descriptive study included 30 patients treated between January 2015 and January 2023. Mean age was 56 years (range, 35–73), and 20 patients were women. Twenty-three tears were post-traumatic and were treated within 3 months of injury; 7 were degenerative. All tears were full-thickness. Twenty-eight patients underwent complete anchor-based double-row repair, and 2 massive U-shaped tears underwent partial repair with side-to-side sutures. Acromioplasty was performed in all patients. Mean follow-up was 22 months (range, 6–36). The mean Constant–Murley score increased from approximately 30 preoperatively to 87 at final follow-up. Twenty-five patients were pain-free, and 5 reported minimal exertional pain. Active shoulder mobility was normal in 10 patients, slightly reduced in 15, and reduced in 5. One superficial surgical-site infection was managed with local debridement for microbiological sampling and antibiotic therapy, with a favorable outcome. No postoperative stiffness or clinically documented retear was reported; however, postoperative imaging was not routinely performed. Open repair was associated with favorable clinical and functional outcomes in this series. These findings require cautious interpretation because of the retrospective design, small sample size, absence of a comparison group, and lack of systematic postoperative imaging.

Keywords: Rotator cuff tear; Open repair; Constant–Murley score; Double-row repair; Partial repair; Shoulder surgery

1 INTRODUCTION

Full-thickness rotator cuff tears may cause persistent shoulder pain, weakness, and functional limitation. Treatment planning requires consideration of symptoms, functional demands, tear morphology, tendon retraction, and muscle quality. Healing after repair is influenced by several patient- and tear-related factors, including age, tear size, and fatty infiltration [1].

Surgical repair may be performed using open or arthroscopic techniques. Although arthroscopy is widely used, open repair remains a relevant surgical option. The UK Rotator Cuff Surgery (UKUFF) randomized trial found no significant difference in clinical effectiveness between open and arthroscopic repair at 2 years in patients older than 50 years with degenerative tears. These findings support the continued role of open repair without establishing that either approach is preferable for every patient or tear pattern [2].

The objective of this study was to evaluate clinical and functional outcomes after open repair of full-thickness rotator cuff tears in a retrospective series of 30 patients. Secondary objectives were to describe tear morphology, associated pathology of the long head of the biceps (LHB), surgical procedures, and postoperative complications.

2 MATERIALS AND METHODS

2.1 Study design and setting

This retrospective descriptive study was conducted in the Department of Trauma and Orthopaedic Surgery A at Hassan II University Hospital, Fez, Morocco. Thirty patients who underwent open surgical treatment of a rotator cuff tear between January 2015 and January 2023 were included. Mean postoperative follow-up was 22 months (range, 6–36).

2.2 Eligibility criteria

Patients were eligible when a rotator cuff tear had been confirmed by preoperative imaging and operative findings and when medical records and postoperative follow-up data were available. Although the eligibility criteria allowed partial- or full-thickness tears, all tears in the analyzed cohort were full-thickness.

Exclusion criteria were incomplete medical records, loss to follow-up, cuff tear arthropathy, adhesive capsulitis, and a pseudoparalytic shoulder. Patients with tears that had evolved for more than 6 months without previous medical evaluation were also excluded.

2.3 Preoperative assessment

Preoperative assessment included the clinical history, pain, active shoulder mobility, strength, and specific shoulder examination tests. Functional status was assessed using the Constant–Murley score [3].

Standard shoulder radiographs were obtained in all patients. Additional investigations included ultrasonography, magnetic resonance imaging (MRI), and computed tomography (CT) arthrography. Tendon retraction was recorded using the Patte classification [4].

Tear patterns were determined from imaging and operative findings. Associated LHB pathology and the feasibility of complete repair were recorded.

2.4 Surgical management

All procedures were performed using an open approach. A superolateral approach was used in 22 patients and a deltopectoral approach in 8.

Twenty-eight patients underwent complete anchor-based repair using a double-row configuration. Two patients with massive U-shaped tears underwent partial repair using side-to-side sutures. Acromioplasty was performed in all 30 patients.

LHB pathology was identified in 18 patients and treated by tenotomy alone or tenotomy combined with tenodesis. No preference between the two procedures was reported, and their numerical distribution was not available in the summarized dataset.

2.5 Postoperative management

The operated upper limb was immobilized with the elbow against the body for 3 weeks. Rehabilitation subsequently began with passive mobilization, followed by active mobilization. The exact timing of progression to active exercises and strengthening was not available in the summarized records.

2.6 Outcome assessment

The principal functional outcome was the change in the mean Constant–Murley score between the preoperative assessment and final follow-up.

Additional outcomes included pain, active shoulder mobility, surgical-site infection, postoperative stiffness, and clinically documented retear. Postoperative ultrasonography or MRI was not routinely performed; therefore, tendon integrity was not systematically assessed.

2.7 Statistical analysis

The analysis was descriptive. Categorical variables were summarized as counts and percentages. Continuous variables were reported as means and ranges when available.

Only aggregate mean Constant–Murley scores were available. Individual paired scores and measures of dispersion were unavailable; consequently, no paired statistical testing, confidence intervals, or inferential analysis of functional improvement were performed.

2.8 Ethical considerations

Authorization to conduct this retrospective study was obtained from the Department of Trauma and Orthopaedic Surgery A, Hassan II University Hospital, Fez, Morocco. Informed consent was obtained from all patients included in the study.

3 RESULTS

3.1 Patient characteristics

The series included 30 patients: 20 women and 10 men. Mean age was 56 years (range, 35–73). The dominant shoulder was involved in the majority of cases, although the exact number was unavailable. The main demographic and clinical characteristics are summarized in Table 1.

Twenty-three patients had post-traumatic tears and underwent surgery within 3 months of injury. Seven patients had atraumatic degenerative tears. All patients with degenerative tears had received medical treatment and rehabilitation before surgery.

Pain was present in all patients. Limitation of shoulder movement and weakness were also reported. The Jobe test was positive in 27 patients, the Neer test in 5, the Hawkins test in 3, and the Yocum test in 10.

Table 1: Demographic and clinical characteristics (n = 30)

Characteristic	Result
Mean age, years (range)	56 (35–73)
Women, n (%)	20 (66.7)
Men, n (%)	10 (33.3)
Post-traumatic tears, n (%)	23 (76.7)
Degenerative tears, n (%)	7 (23.3)
Full-thickness tears, n (%)	30 (100)
Mean follow-up, months (range)	22 (6–36)

3.2 Imaging findings

Standard shoulder radiographs were obtained in all patients and were reported as normal in 10. Acromial abnormalities were identified in 14 patients.

Ultrasonography was performed in 14 patients, CT arthrography in 5, and MRI in 13. Some patients underwent more than one imaging modality. Advanced fatty infiltration, recorded as grades III–IV, was reported in 4 patients who underwent MRI.

Tendon retraction was classified as Patte stage II in 24 patients (80.0%) and stage III in 6 (20.0%).

3.3 Anatomical distribution of tears

All tears were full-thickness. Eighteen patients had isolated supraspinatus tears, and 4 had combined supraspinatus and infraspinatus tears. Four patients had isolated subscapularis tears. Two had combined subscapularis and supraspinatus tears with associated comma tissue involvement (Table 2).

The remaining 2 patients had massive U-shaped tears requiring partial repair. These were recorded as a separate operative category; their individual tendon components were not specified in the summarized dataset. No isolated infraspinatus tear was recorded.

Table 2: Anatomical distribution of rotator cuff tears (n = 30)

Tear pattern	n	%
Isolated supraspinatus tear	18	60.0
Combined supraspinatus and infraspinatus tear	4	13.3
Isolated subscapularis tear	4	13.3
Combined subscapularis and supraspinatus tear with comma tissue involvement	2	6.7
Massive U-shaped tear requiring partial repair	2	6.7
Total	30	100

3.4 Surgical procedures

A superolateral approach was used in 22 patients and a deltopectoral approach in 8. Twenty-eight patients underwent complete anchor-based double-row repair. Two massive U-shaped tears underwent partial repair using side-to-side sutures (Table 3).

Acromioplasty was performed in every patient. LHB pathology was identified in 18 patients and treated by tenotomy alone or tenotomy with tenodesis.

Table 3: Surgical management (n = 30)

Procedure or operative finding	n	%
Superolateral approach	22	73.3
Deltopectoral approach	8	26.7
Complete anchor-based double-row repair	28	93.3
Partial repair of a massive U-shaped tear	2	6.7
Acromioplasty	30	100
Associated LHB pathology	18	60.0

LHB: long head of the biceps.

3.5 Clinical and functional outcomes

The mean Constant–Murley score increased from approximately 30 preoperatively to 87 at final follow-up, representing an approximate increase of 57 points. Because the preoperative mean was approximate and individual paired scores were unavailable, the change was interpreted descriptively (Table 4).

Twenty-five patients were pain-free, while 5 reported minimal pain during exertion.

Active shoulder mobility was normal in 10 patients, slightly reduced in 15, and reduced in 5. These categories were qualitative; measurements in degrees were unavailable. The recorded limitations concerned active mobility and were not classified as postoperative shoulder stiffness.

Table 4: Clinical and functional outcomes at final follow-up (n = 30)

Outcome	Result
Mean preoperative Constant–Murley score	Approximately 30
Mean postoperative Constant–Murley score	87
Pain-free patients, n (%)	25 (83.3)
Minimal exertional pain, n (%)	5 (16.7)
Normal active mobility, n (%)	10 (33.3)
Slightly reduced active mobility, n (%)	15 (50.0)
Reduced active mobility, n (%)	5 (16.7)

Only aggregate mean Constant–Murley scores were available; measures of dispersion could not be calculated.

3.6 Complications

One superficial surgical-site infection occurred in a patient who had undergone partial repair of a massive tear without implanted fixation material. Local wound debridement was performed to obtain microbiological samples. Empirical antibiotic therapy was initiated and subsequently adjusted according to the microbiological results, with a favorable clinical outcome.

No postoperative shoulder stiffness was reported. No clinically documented retear was reported during follow-up. However, because postoperative imaging was not systematic, asymptomatic retears and incomplete tendon healing could not be excluded.

4 DISCUSSION

4.1 Principal findings

This retrospective series showed improvement in pain and function after open repair of full-thickness rotator cuff tears. The mean Constant–Murley score increased from approximately 30 to 87, and 25 of 30 patients were pain-free at final follow-up.

These findings describe favorable outcomes among the included patients but do not establish the comparative effectiveness of open repair. The absence of a control group, retrospective data collection, and availability of only aggregate functional scores limit interpretation. The study cannot determine the independent contribution of the operative approach, fixation method, acromioplasty, biceps procedure, or rehabilitation protocol.

4.2 Role of open repair

All patients underwent open surgery. The observed results are consistent with evidence that open repair can provide favorable clinical outcomes in appropriately selected patients.

The UKUFF trial found no significant difference in clinical effectiveness between open and arthroscopic repair at 2 years in patients older than 50 years with degenerative tears. Direct comparison with the present series nevertheless requires caution because most tears in our cohort were post-traumatic, and the populations and outcome measures differed [2].

Our results support the feasibility of open repair in this clinical setting rather than its superiority over arthroscopic techniques.

4.3 Tear morphology and reparability

The cohort included isolated and combined tendon tears, with Patte stage II retraction in 24 patients and stage III retraction in 6. Complete repair was achieved in 28 patients, whereas 2 massive U-shaped tears underwent partial repair.

Tear size, retraction, and muscle quality are relevant to repair planning and structural healing. A systematic review and meta-analysis identified age, tear size, and fatty infiltration among the factors associated with retear after rotator cuff repair [1].

However, the present study did not analyze the relationships between these factors and individual outcomes. Consequently, age, tendon retraction, and fatty infiltration cannot be presented as independently demonstrated prognostic factors in this cohort.

4.4 Partial repair of massive U-shaped tears

The 2 massive U-shaped tears were managed by partial repair using side-to-side sutures. These procedures differed from the 28 complete anchor-based repairs and should be considered separately when interpreting the overall results.

Published evidence indicates that partial repair may improve pain and function in selected patients with massive irreparable tears, although structural failure remains a concern. Clinical improvement after partial repair should therefore not be interpreted as evidence of complete anatomical restoration [5].

Only 2 patients in this series underwent partial repair, and their individual functional scores were unavailable. No comparison between complete and partial repair was therefore possible.

4.5 Subscapularis and long head of the biceps pathology

Six patients had subscapularis involvement: 4 isolated tears and 2 combined subscapularis and supraspinatus tears with comma tissue involvement.

The comma tissue is an anatomical landmark associated with the torn subscapularis. Its identification facilitates recognition and mobilization of the tendon and helps characterize the anatomy of associated anterosuperior cuff lesions [6].

LHB pathology was identified in 18 patients and treated by tenotomy alone or tenotomy with tenodesis. Because the numerical distribution and individual outcomes of these procedures were unavailable, the study cannot compare the two strategies or determine their separate contributions to recovery.

4.6 Postoperative rehabilitation

All patients underwent 3 weeks of immobilization, followed by passive and subsequently active mobilization. No postoperative stiffness was reported, although residual limitations of active mobility persisted in some patients.

Rehabilitation must balance protection of the repair with recovery of movement. A systematic review of randomized trials found broadly similar pain and functional outcomes between early and delayed rehabilitation, with some advantages in movement recovery after early rehabilitation and no clear difference in repair integrity [7].

The present study did not compare rehabilitation protocols, and the timing of progression between rehabilitation phases was insufficiently documented to evaluate its influence on outcomes.

4.7 Complications and tendon integrity

One superficial surgical-site infection required local debridement for microbiological sampling and antibiotic therapy, with a favorable outcome. The infection occurred after partial repair of a massive tear without implanted fixation material. The absence of material is a descriptive feature of this case; the study cannot establish its influence on the clinical course.

No clinically documented retear was reported. Nevertheless, the absence of systematic postoperative imaging is an important limitation. Clinical recovery and structural tendon integrity are distinct outcomes, and this study cannot provide an imaging-confirmed healing or retear rate. Structural failures after repair are well documented and are influenced by multiple patient- and tear-related factors [1].

4.8 Strengths and limitations

This study describes the clinical experience of a single institution with open repair of full-thickness rotator cuff tears. It documents tear patterns, tendon retraction, associated LHB pathology, operative management, and postoperative clinical outcomes.

Several limitations should be acknowledged. First, the retrospective design introduces potential selection and information bias. Second, the sample size was small and no comparison group was available. Third, the cohort included heterogeneous tear patterns and both traumatic and degenerative lesions.

Follow-up ranged from 6 to 36 months, so patients were assessed at different stages of recovery. Only aggregate Constant–Murley means were available, preventing assessment of variability and paired statistical testing. Active mobility was categorized qualitatively rather than measured in degrees.

MRI was not performed in every patient, limiting standardized assessment of muscle quality. Postoperative tendon integrity was not systematically evaluated. The numbers of biceps tenotomies and tenodeses were unavailable. Finally, excluding patients with incomplete records or loss to follow-up may have influenced the observed outcomes.

These limitations warrant cautious interpretation and support further prospective studies with standardized clinical assessment and postoperative imaging.

5 CONCLUSION

Open repair of full-thickness rotator cuff tears was associated with improved pain and shoulder function in this retrospective series of 30 patients. The mean Constant–Murley score increased from approximately 30 preoperatively to 87 at a mean follow-up of 22 months, and 83.3% of patients were pain-free.

The findings support open repair as a surgical option in this setting but do not establish superiority over other approaches or confirm structural tendon healing. Larger prospective studies with individual functional outcome data and standardized imaging follow-up are needed to better characterize recovery and repair integrity.

STATEMENTS ON COMPLIANCE WITH ETHICAL STANDARDS

Disclosure of conflict of interest

The authors declare no conflicts of interest.

Statement of ethical approval

Authorization to conduct this retrospective study was obtained from the Department of Trauma and Orthopaedic Surgery A, Hassan II University Hospital, Fez, Morocco.

Statement of informed consent

Informed consent was obtained from all patients included in the study.

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