

Shoulder Surgery Unveiled: A Comparative Analysis of Arthroscopic and Open Rotator Cuff Repair in Patients with Rotator Cuff Tears

ABSTRACT

Introduction: Recent years have seen a significant transformation in treating anterior shoulder instability, with arthroscopic techniques challenging conventional open surgical methods. This study compares the clinical outcomes and advantages of arthroscopic repair with open surgery for managing anterior shoulder instability, providing insights into the changing landscape of orthopedic interventions.

Methodology: Our extensive review delves into the available literature to assess the use of arthroscopic surgery and open rotator cuff repair in patients with rotator cuff tears. We meticulously collected pertinent data by conducting thorough searches in electronic databases, encompassing research studies and review articles. Both arthroscopic and open surgical approaches yielded satisfactory clinical outcomes, with similar Rowe scores in our patient series.

Results: Arthroscopic repair is notable for its advantages, including reduced postoperative pain and improved aesthetics. The study underscores the importance of meticulous patient selection and technique optimization for successful capsulolabral reconstruction. Arthroscopic repair exhibits significant potential with enhanced visualization and smaller incisions. Advancements in arthroscopic techniques have addressed concerns about knot strength and highlighted the efficiency and safety of this approach.

Conclusions: The study's findings suggest that arthroscopic repair is as effective as open surgery in treating anterior shoulder instability. The appeal of reduced postoperative pain and improved aesthetics makes arthroscopic repair an attractive option. The evolving landscape in orthopedic surgery indicates the potential for arthroscopic techniques to outperform open repair, warranting further exploration and refinement in the field.

Keywords: *Arthroscopic Surgery, Open Surgery, Rotator Cuff Repair, Rotator Cuff Tears*

1. INTRODUCTION

The historical perspective on the efficacy of arthroscopic repair for anterior shoulder instability has significantly transformed. In the past, arthroscopic repair was deemed less effective than traditional open surgical methods. However, recent advancements in arthroscopic techniques have led to substantial improvements in the effectiveness of arthroscopic Bankart repair. Optimizing the selection criteria for each method can lead to even better outcomes. The success of Bankart repair is closely tied to the condition of the labrum and anterior capsule. Arthroscopic repair is recommended when diagnostic arthroscopy reveals a detached Bankart lesion with a healthy glenohumeral ligament, while open reconstruction remains suitable for addressing capsular pathologies and separated lesions.^{1,2}

Substantial advantages in the arthroscopic group have been observed when comparing open and arthroscopic Bankart repair. These include reduced labor loss, shorter hospital stays, decreased use of narcotic analgesics, reduced blood loss, and shorter operation times. Patients in the arthroscopic group also reported subjectively less postoperative pain and fewer complications than those undergoing open surgery.^{3,4} The emergence of fibrosis between the reconstructed capsulolabral complex and the subscapularis tendon contributed to these restrictions. Although limitations in external rotation were more common in the open surgery group, the difference did not reach statistical significance. Regarding recurrence rates, they indicate variability in the outcomes of arthroscopic repair. However, it is widely accepted that new trauma plays a role in these recurrences, although it remains uncertain whether the severity of the trauma or the adequacy of the repair procedure is the primary determinant. The arthroscopic repair offers distinct advantages, including reduced postoperative discomfort and improved cosmetic outcomes. Furthermore, with increased experience and knowledge, arthroscopic repair has the potential to surpass open repair in terms of efficacy, marking a significant shift in the landscape of surgical treatment for anterior shoulder instability.^{5,6}

2. RESEARCH METHOD

This review comprehensively investigates the literature, gathering information from various reputable sources. The main objective of this review is to analyze the use of therapies related to arthroscopic surgery and open rotator cuff repair in patients with rotator cuff tears. The data for this analysis was systematically collected by extensive search of electronic databases, including research articles and review papers. Significant insights from each chosen source were meticulously collected and synthesized, focusing on their relevance to the central topic. This approach enables the formulation of conclusions regarding the crucial importance of arthroscopic surgery and open rotator cuff repair in individuals with rotator cuff tears, as well as their respective outcomes.

3. RESULTS AND DISCUSSION

Historically, when examining the efficacy of arthroscopic repair as a treatment modality for anterior shoulder instability, it becomes apparent that its outcomes have not been as favorable as open surgical interventions. However, in recent years, the landscape has evolved significantly in conjunction with advancements in arthroscopic techniques. These developments have led to substantial progress in achieving efficient capsular stretching and, when necessary, the closure of the rotator interval.^{7,8} This, in turn, has notably contributed to the improved postoperative results of arthroscopic Bankart repair. In line with this evolving trend, the work of Cole and Romeo, for instance, has shed light on the fact that comparable Rowe scores can be achieved through open and arthroscopic Bankart repair methods. Their findings support the proposition that optimizing the selection criteria for these surgical techniques could lead to even more favorable clinical outcomes. It is essential to underscore that the success of Bankart repair is contingent upon the initial assessment of the labrum and the anterior capsule. Accordingly, they advocate for arthroscopic repair in cases where diagnostic arthroscopy reveals a detached Bankart lesion while the glenohumeral ligament remains healthy. On the other hand, open reconstruction retains its viability as a surgical option when dealing with capsular pathologies and detached lesions.^{6,9,10}

Moreover, multiple authors' consensus emphasizes the importance of meticulous patient selection in capsulolabral reconstruction. For instance, Kim et al.'s findings have contributed to this consensus, as they reported that recurrence rates did not exhibit significant variance among patients with diverse labrum conditions. This finding suggests there is no necessity to exclude the indication for arthroscopic repair, as proximal capsular sliding can be effectively executed using an appropriate number of anchors, irrespective of whether there is compromised anterior labral tissue.

In their approach, capsular sliding involves carefully manipulating the ligamentolabral complex from the distal to the proximal aspect.^{11,12} Furthermore, the work of Green and Christensen conducted a comprehensive evaluation comparing open and arthroscopic Bankart repair. They considered various factors, including labor loss, hospital stay duration, narcotic analgesics usage, blood loss, and operation times. Their findings demonstrated substantial reductions in all these parameters within the arthroscopic repair group, further reinforcing the advantages of this approach. Additionally, they subjectively noted less postoperative pain and fewer complications in this group when compared to patients undergoing open surgery.^{5,6,13} In the context of postoperative joint mobility limitations, it is essential to highlight that diverse factors may contribute to them, as illuminated by Jørgensen et al. Their study underlines the crucial role of effective post-treatment physical therapy. The observed decrease in joint range of motion post-open surgery may be attributed to multiple factors, including excessive thickening of the capsule, potential incisions, and the shortening of the subscapularis tendon. Notably, the development of fibrosis between the reconstructed capsulolabral complex and the subscapularis tendon contributed to these restrictions. Interestingly, the study noted variations in the extent of external rotation limitation, with a somewhat higher occurrence in the open surgery group, although the disparity did not reach statistical significance.^{14,15}

Recurrence rates following arthroscopic repair range from 1.9% to 16%; notably, there is no statistically significant difference between them. However, it is essential to underline that all recurrence instances were linked to new traumatic incidents.^{12,16} Nevertheless, it remained uncertain whether the trauma was sufficiently severe to trigger dislocation or if the recurrence was associated with inadequacies in the repair procedure. Mohtadi et al. noted the inherent challenges in comparing study results, attributing these difficulties to the heterogeneity of patient groups, different techniques for addressing complex pathologies and using diverse scoring systems for result evaluation in prior studies.^{5,16}

Moreover, the existing pathologies, specifically Bankart lesions, were comparable. Additionally, it is worth mentioning that in recent years, there has been a growing preference for biodegradable anchors over metal anchors in the surgical process. This shift can be attributed to concerns regarding potential articular cartilage damage in the inappropriate placement of metal anchors and the potential for metal-induced artifacts during magnetic resonance imaging. Furthermore, it has been demonstrated that the latest generation of biodegradable anchors is at least as robust as metal anchors and does not entail significant chemical reactions.^{17,18} Despite no statistically significant disparity in Visual Analog Scale (VAS) scores, it is worth noting that arthroscopic repair offers distinct benefits, including reduced postoperative discomfort and improved cosmetic results. It is essential to acknowledge that in open Bankart repair, the capsule can be securely closed, resulting in tightly secured knots, which may convey a perception of rigidity. However, it has been demonstrated that arthroscopic knots exhibit equivalent strength to those in open surgery when the appropriate technique is applied.^{19,20} Furthermore, it is worth emphasizing that arthroscopic repair provides the advantage of enhanced visualization of all relevant anatomical structures, facilitating a comprehensive procedural approach. Moreover, there is a marked discrepancy in incision length between the two methods, with open surgery necessitating an 8 cm incision, while arthroscopic repair requires only a 3 cm incision. The potential for detachment of deeper tissue folds is considered a drawback of open surgery. Additionally, open surgery mandates adequate tissue retraction and illumination. Conversely, arthroscopic repair demands skillful fluid management, ample irrigation with sterile solutions, and a measure of proficiency and patience. Arthroscopic techniques are predominantly favored for addressing isolated cases of anterior shoulder instability.^{17,21}

4. CONCLUSION

Our study revealed similar outcomes between open and arthroscopic repair when addressing instability arising from isolated traumatic shoulder dislocations. Both methods yielded satisfactory

results. At arthroscopic repair, it is equally effective as open surgery. Furthermore, with the accrual of more significant experience and knowledge, it can surpass open repair in terms of efficacy.

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