



Shoulder Surgery Unveiled: A Comparative Analysis of Arthroscopic and Open Surgery in Patients with Anterior Shoulder Instability

Prajnya Kamila Ramadhanty ^{a*}, Anna Rahmania Sari ^a,
Natasha Anggraeni ^b, Edwin Destra ^b and Probodjati ^c

^a Faculty of Medicine, Islamic University of Bandung, Bandung, Indonesia.

^b Faculty of Medicine, Tarumanagara University, Jakarta, Indonesia.

^c Orthopedic Surgeon, Mitra Siaga Hospital, Tegal Regency, Indonesia.

Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

Article Information

Open Peer Review History:

This journal follows the Advanced Open Peer Review policy. Identity of the Reviewers, Editor(s) and additional Reviewers, peer review comments, different versions of the manuscript, comments of the editors, etc are available here: <https://www.sdiarticle5.com/review-history/108713>

Review Article

Received: 02/09/2023

Accepted: 09/11/2023

Published: 09/11/2023

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

*Corresponding author: Email: prajnyakamilar@gmail.com;

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; anterior shoulder instability.

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. METHODS

The review exhaustively explores a spectrum of literature, consolidating insights from diverse reputable sources. It is primarily dedicated to examining therapeutic approaches associated with arthroscopic surgery and open repair techniques for addressing rotator cuff tears in patients. This inquiry methodically gathered data through a comprehensive search of electronic databases, encompassing research studies and review articles. Noteworthy findings from each selected source were methodically gathered and integrated, with a specific focus on their pertinence to the central theme. Through this method, conclusions were drawn emphasizing the pivotal role of arthroscopic surgery and open repair procedures in individuals afflicted with rotator cuff tears and their respective impacts on 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.

CONSENT AND ETHICAL APPROVAL

It is not applicable.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Godinho PC, Godinho AC, Rondon JV de CG, Oliveira Neto FC de, Alves T de A, Godinho GG. Cirurgia de Bankart artroscópica: Resultados clínicos com seguimento mínimo de 10 anos. *Rev Bras Ortop* [Internet]. 2022;57(03):462–6.

Available:<http://www.thieme-connect.de/DOI/DOI?10.1055/s-0041-1731418>

2. Bondar KJ, Damodar D, Schiller NC, McCormick JR, Condrón NB, Verma NN, et al. The 50 most-cited papers on bankart lesions. *Arthrosc Sport Med Rehabil* [Internet]. 2021;3(3):e881–91. Available:<https://linkinghub.elsevier.com/retrieve/pii/S2666061X21000481>
3. Iannotti JP, Deutsch A, Green A, Rudicel S, Christensen J, Marraffino S, et al. Time to failure after rotator cuff repair. *J Bone Jt Surg* [Internet]. 2013;95(11):965–71. Available:<https://journals.lww.com/00004623-201306050-00002>
4. Bayle X, Pham TT, Faruch M, Gobet A, Mansat P, Bonnevalle N. No difference in outcome for open versus arthroscopic rotator cuff repair: a prospective comparative trial. *Arch Orthop Trauma Surg* [Internet]. 2017;137(12):1707–12. Available:<http://link.springer.com/10.1007/s00402-017-2796-6>
5. Barlow JD, Grosel T, Higgins J, Everhart JS, Magnussen RA. Surgical treatment outcomes after primary vs recurrent anterior shoulder instability. *J Clin Orthop Trauma* [Internet]. 2019;10(2):222–30. Available:<https://linkinghub.elsevier.com/retrieve/pii/S0976566218303916>
6. Alkaduhimi H, Saariq A, van der Linde JA, Willigenburg NW, van Deurzen DFP, van den Bekerom MPJ. An assessment of quality of randomized controlled trials in shoulder instability surgery using a modification of the clear CLEAR-NPT score. *Shoulder Elb* [Internet]. 2018 Oct 31;10(4):238–49. Available:<http://journals.sagepub.com/doi/10.1177/1758573218754370>
7. Kanji F, Naoya N, Taishi U, Hiroaki T. Arthroscopic superior capsule reconstruction for irreparable rotator cuff tear and axillary nerve palsy associated with anterior dislocation of the shoulder. *J Orthop Case Reports* [Internet]. 2018; 8(2):100–3. Available:<http://www.ncbi.nlm.nih.gov/pubmed/30167425>
8. Minkus M, Wolke J, Akgün D, Scheibel M. Mid- to long-term results of postoperative immobilization in internal vs. external rotation after arthroscopic anterior shoulder stabilization. *JSES Int* [Internet]. 2021; 5(6):960–6.

- Available:<https://linkinghub.elsevier.com/retrieve/pii/S2666638321001900>
9. Akhtar M, Wen J, Razick D, Shehabat M, Saeed A, Baig O, et al. Mid- to long-term outcomes of arthroscopic shoulder stabilization in athletes: A systematic review. *J Clin Med* [Internet]. 2023;12(17):5730. Available:<https://www.mdpi.com/2077-0383/12/17/5730>
 10. Cole BJ, Romeo AA. Arthroscopic shoulder stabilization with suture anchors: Technique, technology, and pitfalls. *Clin Orthop Relat Res* [Internet]. 2001;390:17–30. Available:<http://journals.lww.com/00003086-200109000-00005>
 11. Kim SH, Ha KI, Kim SH. Bankart repair in traumatic anterior shoulder instability. *Arthrosc J Arthrosc Relat Surg* [Internet]. 2002;18(7):755–63. Available:<https://linkinghub.elsevier.com/retrieve/pii/S0749806302000294>
 12. Kim JH, Hong IT, Ryu KJ, Bong ST, Lee YS, Kim JH. Retear rate in the late postoperative period after arthroscopic rotator cuff repair. *Am J Sports Med* [Internet]. 2014;42(11):2606–13. Available:<http://journals.sagepub.com/doi/10.1177/0363546514547177>
 13. Green MR, Christensen KP. Arthroscopic versus open bankart procedures: A comparison of early morbidity and complications. *Arthrosc J Arthrosc Relat Surg* [Internet]. 1993;9(4):371–4. Available:<https://linkinghub.elsevier.com/retrieve/pii/S0749806305803081>
 14. Jørgensen U, Svend-Hansen H, Bak K, Pedersen I. Recurrent post-traumatic anterior shoulder dislocation - open versus arthroscopic repair. *Knee Surgery, Sport Traumatol Arthrosc* [Internet]. 1999;7(2):118–24. Available:<http://link.springer.com/10.1007/s001670050133>
 15. Bitar AC, Medina G, Ribas L, Smid J, Adoni T. Arthroscopic reverse remplissage in a bilateral seizure-related posterior shoulder dislocation: Technique description and 3-year follow-up case report. *Arch bone Jt Surg* [Internet]. 2021;9(3):350–4. Available:<http://www.ncbi.nlm.nih.gov/pubmed/34239964>
 16. Sommaire C, Penz C, Clavert P, Klouche S, Hardy P, Kempf JF. Recurrence after arthroscopic Bankart repair: Is quantitative radiological analysis of bone loss of any predictive value? *Orthop Traumatol Surg Res* [Internet]. 2012;98(5):514–9. Available:<https://linkinghub.elsevier.com/retrieve/pii/S1877056812001223>
 17. Kataoka T, Kokubu T, Muto T, Mifune Y, Inui A, Sakata R, et al. Rotator cuff tear healing process with graft augmentation of fascia lata in a rabbit model. *J Orthop Surg Res* [Internet]. 2018;13(1):200. Available:<https://jorsonline.biomedcentral.com/articles/10.1186/s13018-018-0900-4>
 18. Ryösä A, Laimi K, Äärimaa V, Lehtimäki K, Kukkonen J, Saltychev M. Surgery or conservative treatment for rotator cuff tear: A meta-analysis. *Disabil Rehabil* [Internet]. 2017;39(14):1357–63. Available:<https://www.tandfonline.com/doi/full/10.1080/09638288.2016.1198431>
 19. Fountzoulas K, Hassan S, Khoriaty A, Achraf, Chiang CH, Little N, Patel V. Arthroscopic stabilisation for shoulder instability. *J Clin Orthop Trauma* [Internet]. 2020;11:S402–11. Available:<https://linkinghub.elsevier.com/retrieve/pii/S0976566218304119>
 20. Yoo JC, Lim TK, Kim DH, Koh KH. Comparison between the patients with surgery and without surgery after recommendation of surgical repair for symptomatic rotator cuff tear. *J Orthop Sci* [Internet]. 2018;23(1):64–9. Available:<https://linkinghub.elsevier.com/retrieve/pii/S094926581730249X>
 21. Osti L, Buda M, Andreotti M, Gerace E, Osti R, Massari L, et al. Arthroscopic-assisted latissimus dorsi transfer for massive rotator cuff tear: A systematic review. *Br Med Bull* [Internet]. 2018;128(1):23–35. Available:<https://academic.oup.com/bmb/article/128/1/23/5076212>

© 2023 Ramadhanty et al.; This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Peer-review history:
The peer review history for this paper can be accessed here:
<https://www.sdiarticle5.com/review-history/108713>