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REVIEW

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ORIGINAL ARTICLE**Retrospective Cohort Study**

Papaioannou M, Vagiana E, Kotoulas SC, Sileli M, Manika K, Tsantos A, Kapravelos N. Tracheostomy-related data from an intensive care unit for two consecutive years before the COVID-19 pandemic. *World J Methodol* 2024; 14(2): 91868 [DOI: [10.5662/wjm.v14.i2.91868](https://doi.org/10.5662/wjm.v14.i2.91868)]

Retrospective Study

Gupta PK, Khanna V, Agrawal N, Gupta P. Minimum 10-year follow-up outcomes of arthroscopic Bankart's repair with metallic anchors: Reliable results with low redislocation rates. *World J Methodol* 2024; 14(2): 90280 [DOI: [10.5662/wjm.v14.i2.90280](https://doi.org/10.5662/wjm.v14.i2.90280)]

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META-ANALYSIS

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Retrospective Study

Minimum 10-year follow-up outcomes of arthroscopic Bankart's repair with metallic anchors: Reliable results with low redislocation rates

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With stiff competition from alternative albeit more expensive counterparts, it has become important to establish the applicability of metallic anchors for shoulder instability in the modern era. This can be accomplished, in part, by analysing long-term outcomes.

AIM

To analyse minimum 10-year outcomes from 30 patients following arthroscopic anterior stabilisation using metallic anchors.

METHODS

Prospectively collected data from arthroscopic Bankart repairs performed using metal anchors during 2007P-2010 were retrospectively analysed in this single-surgeon study. Comprehensive data collection included historical and clinical findings, dislocation details, operative specifics, and follow-up radiological and clinical findings including shoulder scores. The primary outcomes were patient-reported scores (Constant, American Shoulder and Elbow Surgeons [ASES], and Rowe scores) and pain and instability on a visual analogue scale (VAS).

RESULTS

A 3% recurrence rate of dislocation was noted at the final follow-up. Total constant scores at 10 years postoperatively measured between 76 and 100 (mean 89) were significantly better than preoperative scores (mean 62.7). Congruous improvements were also noted in the Rowe and ASES scores and VAS at the 10-year review.

CONCLUSION

Reliable long-term outcomes with metallic anchors in surgery for shoulder instability can be expected. Our results provide additional evidence of their continued, cost-effective presence in the modern scenario.

Key Words: Long-term outcomes; Arthroscopic Bankart repair; Metallic anchors; Low failure rates

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Core Tip: This paper describes reliable long-term outcomes with metallic anchors in arthroscopic shoulder stabilisation procedures. In an era where newer bioabsorbable alternatives are increasingly become more prevalent in shoulder surgery, it is important not to undermine the established role of metallic anchors. The present study contributes to the literature with evidence of successful long-term outcomes of at least 10 years in managing shoulder instability with metallic suture anchors.

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INTRODUCTION

In 1923, Bankart described a lesion named after him in anteriorly dislocated shoulders wherein the capsule was said to have detached from the fibrocartilage. The technique described by him was based on 4 patients, and the defect was repaired by interrupted silkworm gut sutures[1]. These have evolved from open procedures to arthroscopic techniques with remarkable and ever-improving success rates[2,3]. The popularity of arthroscopic repair is demonstrated by a 90% preference in shoulder surgeons, and this has been on the rise[4]. This comes despite a prevailing heterogeneity in the long-term outcomes with rates of recurrent instability ranging from 3% to 41%[5]. Perhaps a learning curve is responsible, among other factors, for these figures as recurrent dislocation has improved from 30% in 2000-2005[6] to 7.6% in 2004-2008[2]. A paucity of data also exist on the patient-reported clinical outcomes and scores after surgery and their correlation with redislocation rates[7].

Among arthroscopic stabilisation techniques, the use of metallic *vs* bioabsorbable anchors has also been an area of controversy. With prospective randomised studies suggesting no difference in 2-year outcomes, the case for continued employability of the more cost-efficient metallic anchors stands strong[8]. Evidence on survival and outcomes of shoulder stabilisation with metallic anchors for recurrent shoulder dislocation remains sparse. Although bioabsorbable screws have emerged as popular alternatives to avoiding drawbacks with their metallic counterparts, they have not quite phased out the latter.

The present study was designed to evaluate the long-term results of arthroscopic Bankart repair with metallic anchors in shoulder stabilisation for anterior dislocation. We hypothesised that satisfactory outcomes would be seen in the majority of patients undergoing this procedure using these implants.

MATERIALS AND METHODS

Study design

Prospectively collected data of 33 consecutive patients who underwent arthroscopic Bankart repair during 2007-2010 were retrospectively analysed. All patients were between 15 years and 45 years of age and had a diagnosis of recurrent (≥ 2 episodes) traumatic anterior shoulder dislocation. Those with atraumatic dislocations, bony Bankart lesions, multi-directional instability, generalised laxity, co-existing cuff tears, and habitual dislocation were excluded. The single-surgeon study was performed at a tertiary care teaching centre.

Clinical data

Findings from historical and clinical assessments were recorded including demographics, socioeconomics, mode of injury, profession, and hand dominance. Details of each dislocation before and after the Bankart repair, including the need for hospital admission, were also included for analysis. Operative details were assessed from anaesthetic charts, and positioning and operative details including any additional procedures recorded. Data collected at follow-up included a

full upper limb examination including range of movement and tests for shoulder stability. The visual analogue scale (VAS) was used for grading patient satisfaction, and shoulder scores employed for data collection were the Constant score, American Shoulder and Elbow Surgeons (ASES) score, and Rowe score[9-11]. Patients reporting symptoms of pain and stability were also recorded on the VAS with scores of 1 representing the worst pain and instability and 10 representing no persistent symptoms. Radiographs were obtained at sequential reviews and included standard anteroposterior, lateral, outlet, and Stryker notch views.

RESULTS

Among the 33 patients meeting the inclusion criteria, 3 were lost to long-term follow-up. The mean patient age was 25 years with a striking preponderance for the male sex and the dominant arm (Tables 1-3).

Less than half of the patients had between two and five dislocations prior to the stabilisation procedure, while the majority had six or more episodes (Table 4). The time taken to receive surgery was more than 1 year since the first dislocation in the majority of patients (60%) (Table 5).

Sports-related injuries were seen in most patients (80%), while the remaining injuries were divided between motor vehicle accidents and miscellaneous injuries (Table 6).

General anaesthesia was routinely employed for all patients in addition to standard lateral positioning with the arm in abduction holders. Posterior portals were primarily used for viewing, while anteroinferior and anterosuperior portals were used as working portals.

In 80% of patients, the lesion observed intraoperatively was a Bankart between the 3 and 5 o'clock position. An associated non-engaging Hill Sachs lesion was seen in 60% of patients. These were deemed to be small and were not surgically addressed. The use of two metallic anchors was deemed satisfactory intraoperatively in the majority (86.7%) of patients. The others required three anchors. Capsular plication was necessitated in 3 cases.

At a mean of 10 years postoperatively, 3% of patients had a recurrence of dislocation. Among outcomes, total constant scores at 1 year measured between 76 and 100 with a mean score of 85.7, while at 10 years postoperatively these again measured between 76 and 100 with an average of 89 for all 30 patients. These were considerably improved from preoperatively recorded scores (mean 62.7) (Tables 7 and 8).

Similar outcomes were shown by the total Rowe and ASES scores (Tables 9 and 10). When separately evaluated, the ASES score for function displayed a stepped pattern in progressive improvement in the follow-up phase leading up to a mean of 10 years (Table 11).

Overall, most patients were also satisfied at 10 years when asked about symptoms including pain and stability on the VAS scale (Table 12).

At the most recent visits to the clinic (≥ 10 years postoperatively), all patients were negative for clinically apparent drawer, relocation, and load shift tests. Radiographic evaluation at a mean of 10 years did not reveal osteolysis, loosening, failure, or any hardware migration in any of the patients. None of the patients had inadvertent events such as fractures or intraarticular penetration.

Our hypotheses of satisfactory outcomes in the majority of patients undergoing arthroscopic Bankart repair with metal anchors proved accurate.

DISCUSSION

The present study showed reliable long-term results with metallic anchors for anterior shoulder instability. These have faced stiff competition from bioabsorbable screws in arthroscopic shoulder surgery despite no significant differences between the two implants in short- and mid-term outcomes in case-control studies[12]. Metal anchors can, however, potentially result in loosening and prominent hardware in shoulder surgery lest inaccuracies in surgical technique occur [13,14]. Analysing 28 reoperated shoulders with a mean 2.9 anchors per patient, Godinho *et al*[13] reported inadequate anchor positioning in 57% of patients. To obviate complications, a stepwise intraoperative approach starting with the restoration of capsular tension anteroinferiorly with subchondral anchors has been suggested. Also, an appropriate distance of 1-2 mm from the articular margin along a 45° slope has been recommended[15].

Among factors predisposing to early failure, recent research has revealed interesting findings. These factors can be roughly grouped as technical/surgical, patient- and injury-related. Long-term results from 65 arthroscopically stabilised shoulders showed a dislocation rate of 35% in a series by van der Linde *et al*[16]. The authors reported the use of fewer than three anchors and the presence of Hill Sachs lesions as being predictive of redislocation[16]. In a more detailed review, Ho *et al*[17] categorically described patient-related factors responsible for failure as younger male patients with a higher number of preoperative dislocations. Technique-associated errors with recurrences have included superiorised and medialised glenoid anchors, ≤ 2 in number with a poor suturing configuration. Among the missed injuries, Hill Sachs, anterior glenoid defects, humeral avulsion of glenohumeral ligament lesions, and capsular laxity were common causes of failure of stabilisation procedures. Literature suggesting the occurrence of large engaging Hill Sachs lesions has fortunately shown a lower overall incidence of 7% among anterior dislocators[18]. Typically, non-engaging Hill Sachs have been managed non-surgically with good effects and minimal impact on outcomes[19,20]. In the present series, a Hill Sachs lesion was seen in 60% of patients, all of which were non-engaging. The milder severity of these lesions could be one of the reasons for the very low (3%) postoperative recurrence rate of instability in our study at the long-term 10-year follow-ups.

Table 1 Age distribution

Age group in yr	Number of patients	Percentage
< 20	6	20
21-25	10	33.3
26-30	6	20
> 30	8	26.7

Table 2 Sex distribution

Sex	Number of patients	Percentage
Male	28	93.3
Female	2	6.7

Table 3 Hand dominance

Side	Number of patients	Percentage
Dominant	22	73.3
Non-dominant	8	26.7

Table 4 Number of dislocations prior to surgery

Dislocation number	Number of patients	Percentage
< 2	-	-
2-5	14	46.7
6-10	10	33.3
> 10	6	20

Table 5 Time between index dislocation and surgery

Time interval in mo	Number of patients	Percentage
< 2	-	-
2-6	-	-
6-12	12	40
> 12	18	60

Table 6 Mode of injury

Injury mode	Number of patients	Percentage
Road traffic accidents	4	13.3
High energy sports	24	80
Others, miscellaneous	2	6.7

Table 7 Mean shoulder scores

Score	Preoperatively	1-yr postoperatively	10-yr postoperatively
Constant	62.7	85.7	89
Rowe	58	92	98.7
ASES	71.3	90.6	92.4

ASES: American Shoulder and Elbow Surgeons.

Table 8 Constant scores

Score	Number of patients		
	Preoperatively	1-yr postoperatively	10-yr postoperatively
ADLs			
< 5	-	-	-
5-10	-	-	-
11-15	18	-	-
16-20	12	30	30
ROM			
< 25	-	-	-
26-30	4	-	-
31-35	16	-	-
36-40	10	30	30
Total			
< 25	-	-	-
26-50	6	-	-
51-75	24	-	-
76-100	-	30	30

ADLs: Activities of daily living; ROM: Range of movement.

Table 9 Total Rowe scores

Score	Preoperatively	1-yr postoperatively	10-yr postoperatively
< 25	-	-	-
26-50	-	-	-
51-75	14	-	-
76-100	16	30	30

Data are *n*.

In the present paper, good long-term outcomes were achieved with two anchors in almost 90% of patients. Emerging evidence has helped clarify the long-held contention of needing > two anchors for success after shoulder stabilisation. In a recent paper from Halifax, Witney-Lagen *et al*[21] demonstrated among 114 postoperative patients no significant differences in recurrent instability and Oxford Instability Scores at mean 4-year follow-ups between recipients of 1 (62.3%), 2 (35.1%), and 3 (2.6%) anchors ($P > 0.05$). Our findings are in accordance with these results.

Higher than expected recurrence rates of 19.1% at 33 mo of follow-up have surfaced from Brazil with the use of metal anchors for shoulder instability in 47 patients. Young age (≤ 20 years) was implicated as the only significant correlator for recurrence[22]. These findings are in contrast to highly satisfactory outcomes reported even with massive 270-degree labral tears at 10 years in young patients (mean age 27.1 years)[23]. We observed similar improvements in Rowe and ASES scores and the VAS at 1- and 10-year follow-ups in the present series (Table 13). Recently published Turkish data

Table 10 Total American Shoulder and Elbow Surgeons scores

Score	Preoperatively	1-yr postoperatively	10-yr postoperatively
< 25	-	-	-
26-50	-	-	-
51-75	14	-	-
76-100	16	30	30

Data are *n*.**Table 11 American shoulder and elbow surgeons score-function**

Score	Preoperatively	1-yr postoperatively	10-yr postoperatively
< 30	-	-	-
31-35	-	-	-
36-40	20	-	-
41-45	8	18	4
46-50	2	12	26

Data are *n*.**Table 12 Visual analogue scale scores**

Score	Preoperatively	1-yr postoperatively	10-yr postoperatively
< 3	-	-	-
4-7	22	-	-
8-10	8	30	30

Data are *n*.**Table 13 Evidence table – comparing outcomes with relevant literature**

Ref.	Number of patients	Year of study	Implants	Follow-up	Recurrence of dislocation, %	Comments
Martel <i>et al</i> [22], 2016	47	2010-2012	Metal anchors	33 mo (mean)	19.1	Significant correlation of postoperative recurrence with age ≤ 20 at first dislocation at surgery
Berthold <i>et al</i> [23], 2021	21	2003-2010	PEEK	10-yr (minimum)	14.3	Good outcomes with of extensive (270 degree) tears
Uluyardımcı <i>et al</i> [24], 2021	67	2009-2016	Metal and all-suture	41 mo (mean)	3	Comparable and reliable outcomes with all-suture anchors and metal anchors
Present study, 2022	30	2007-2010	Metal anchors	10-yr (minimum)	3	Reliable long-term outcomes of Bankart repair with metal anchors

from a mean of 41-mo follow-ups of 67 patients also demonstrated significant improvements in patient-reported outcomes (Rowe, Constant score) with low (3%) redislocation rates, in agreement with present study (3%)[24]. Interestingly, the outcomes published by Uluyardımcı *et al*[24] showed no differences between all-suture and metal anchors used in their study group.

In a systematic review comparatively evaluating the outcomes and complications of absorbable and metallic anchors, Papalia included four randomised studies, two prospective cohort studies, and four case series. The results from this large body of evidence could not offer a superiority of one device over another leaving us with the conclusion of choosing

from the two options largely based on cost-effectiveness[25]. A lateral thought process continuing from the above also questions whether the “drift” to bioabsorbable sutures from the economically viable metallic sutures has actually been driven by scientific evidence[26]. Others have also suggested cognizance towards potential benefits vis a vis cost-effectiveness between newer and time-tested implant materials in shoulder surgery[27].

While we have addressed the lacuna in literature on long-term outcomes of shoulder stabilisation with metallic anchors, we acknowledge the limitations as a part of our research work. These include a relatively small sample size which, however, is very comparable to published literature on long-term 10-year outcomes in shoulder surgery. Also, the non-comparative nature of the paper could not directly draw comparisons between bioabsorbable and metallic anchors which could be addressed in another study design. Despite these limitations, the present research is one of the few if not the first to determine the long-term trustworthiness of repairs with metal anchors for Bankart repairs.

CONCLUSION

The purpose of this research was to illustrate outcomes and results at 10 years following anterior shoulder stabilisation with arthroscopic repair of Bankart lesions with metallic suture anchors. With satisfactory long-term outcomes, we conclude that clinically reliable results can be expected from the surgery provided there is adherence to a consistent technique and routine.

ARTICLE HIGHLIGHTS

Research background

Arthroscopic shoulder surgery is considered the gold standard for anterior and posterior shoulder stability. Among several options of repairing the avulsed labrum, metallic and bio-absorbable anchors are chief competitors. While the latter are considered relatively newer concepts, metallic anchors have stood the test of time. Notwithstanding this, there is a tendency to undermine the role of metallic anchors in the current scenario. This, in part, can be due to the lack of long-term outcomes following stabilisation surgery.

Research motivation

There is no clear evidence of the inferiority of long-term outcomes of metallic anchors vis-a-vis bioabsorbable anchors in shoulder surgery. This gap in literature was the driving force behind the present paper attempting to highlight long-term outcomes of shoulder stabilisation surgeries performed arthroscopically with metallic anchors.

Research objectives

We reported minimum 10-year outcomes off arthroscopic Bankart repair with metal anchors among 30 patients.

Research methods

A thorough evaluation of minimum 10-year results comprising clinical findings, patient-reported scores and radiological reviews was performed in this single-surgeon study.

Research results

Excellent overall outcomes were reported in most patients with only a 3% re-dislocation rate. All of these surgeries were performed using metallic anchors for shoulder stabilisation.

Research conclusions

The findings of this paper provide additional evidence of the role of metallic anchors and their ability to provide reliable outcomes in the long run.

Research perspectives

Further research with even longer follow-up periods, and perhaps a comparative analysis with bio-absorbable counterparts, may be useful for determining the cost-effectiveness of implants in an increasingly cost-conscious global health economy.

FOOTNOTES

Author contributions: Gupta P, Khanna V, Agrawal N, and Gupta P contributed equally to this work; Gupta P, Khanna V, Agrawal N, and Gupta P designed the research; Gupta P and Agrawal N performed the research; Khanna V and Gupta P performed the analyses and wrote the manuscript; All authors have read and approved the final manuscript.

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