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Original Research Paper

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COMPARISON OF OPEN VERSUS ARTHROSCOPIC SURGICAL MANAGEMENT FOR RECURRENT ANTERIOR INSTABILITY OF THE SHOULDER: A STUDY DONE AT A TERTIARY MEDICAL COLLEGE OF BIHAR

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ABSTRACT The term anterior shoulder instability refers to a shoulder in which soft tissue or bony insult allows the humeral head to sublux or dislocate from the glenoid fossa. It is an injury to the gleno humeral joint(GHJ). Methodology: This is a Prospective, open-label and comparative study conducted at Department of Orthopedics, ANMMCH, Gaya, Bihar. between August 2020 to July 2021. Results: In our study, 35 patients were included in each group, making a total of 70 patients. Most of the recurrent anterior instability of the shoulder were between the age group of 21-40 years. Overall, most common mechanism of injury was direct fall over shoulder joint (34.3%), followed by road traffic accident (30%). Sports injury comprised of 21.4% and rest were while heavy weight lifting or injury while working in fields. Conclusions: Open surgery is more invasive than the arthroscopic Bankart surgery, it should still be considered for some patients due to its effect on long term stability of the shoulder joint.

KEYWORDS : Recurrent Anterior Instability Of The Shoulder, Open Versus Arthroscopic Surgical Management

Introduction

The term anterior shoulder instability refers to a shoulder in which soft tissue or bony insult allows the humeral head to sublux or dislocate from the glenoid fossa. [1]It is an injury to the gleno humeral joint(GHJ) where the humerus is displaced from its normal position in the center of the glenoid fossa and the joint surfaces no longer touch each other. [2] The GHJ(multi-axial spheroidal joint) is one of the largest and most complex joints in the body.It has the greatest range of movement of any joint, but this leaves it inherently unstable and with the highest chance of dislocation of all the body's joints. [3] The GHJ is formed where the humeral head fits in to the glenoid fossa, an irregular oval shape, which is an extension of the scapula, like a ball and socket,although only 25% of the humeral head makes contact with the glenoid fossa at any time. [4]The shoulder is the most commonly dislocated major joint,with a reported incidence of 1.7%. Symptomatic instability following dislocation is common, especially in young, active people.[5]Recurrent instability, occurring in 50% to 96% of patients who first dislocate under theage of 20years and in40% to 74% of patients between the ages of 20 and 40 years, limits range of movement of the joint, requires multiple hospital and emergency department admissions for treatment, and often calls for surgical procedures to prevent further dislocation.[6]

Prior to arthroscopy, recurrent dislocations were managed by open repair, and the results of this approach, with only a 4% failure rate, were initially published by Dickson and Devas in 1957. [7]There have been many studies documenting low recurrence rates ranging from 0% to11% after open Bankart stabilization.[8]The high incidence of recurrent dislocation has implications for the individual and for society because chronic instability of the joint may prevent the individual from gaining employment orworking at his or her potential. [9]Moreover, with the growth in the number of orthopedic surgeons specializing in shoulder surgery and sports injuries, as well as the advancement inarthroscopic techniques and sports medicine devices, there has been height enedinterestin minimally invasive shoulder surgery for recurrent anterior instability. [10]

Thus, the comparison of arthroscopic versus open surgery for recurrent anterior shoulder instability is an area necessitating scrupulous study. Despite the proponents for both methods, it is unclear whether arthroscopic techniques equal the success of open techniques for the treatment of recurrent instability.

Methodology

This is a Prospective, open-label and comparative study conducted at Department of Orthopedics, ANMMCH, Gaya, Bihar. between August 2020 to July 2021.

Inclusion criteria:

History and physical examination consistent with atraumaticanterior instability.Bankart injury was confirmed by MRI analysis. Confirmation of a Bankart lesion (avulsion of the anterior-inferior glenoid labrum) on diagnostic arthroscopy. Patient has adequate overall health status to receive surgical treatment.

Exclusion criteria:

No history of prior shoulder surgery, and patients with unidirectional anterior instability and a confirmed Bankart lesion were excluded. Patients having associated rotator cuff tear, habitual dislocations, and high-risk groups were excluded. Refused toparticipate in the study and pay regular visits to the clinic after the surgery.

Group A: Patients were treated with either open surgery using suture anchors and capsular shift Group B: Arthroscopic surgery with suture anchors and suture capsulorrhaphy as per the surgeon's preference.

Statistical analysis- The collected data was compiled in MS Excel sheet for analysis. Data analyzed in Statistical Package for the Social Sciences (SPSS) version 20 was applied. The results expressed as mean, range percentages and using tables as appropriate. Duration of the disease, intraoperative time, hemorrhage, total stay inhospital,time of recurrence dislocation, visual analogscale(VAS)pain scores, and Rowe stability scores before and after the surgery, and the last follow-up were recorded and compared between the two groups using unpaired 't' test. p value <0.05 indicates statistically significant.

Results

In our study, 35 patients were included in each group, making a total of 70 patients. Most of the recurrent anterior instability of the shoulder were between the age group of 21-40 years i.e.,

24 out of 35, followed by 1-20 years, i.e., 9 out of 35 in Group A (opensurgery). Mean age of the patients in this group was 24.7 years with a SD of 6.5 years. In Group B (arthroscopic surgery), youngest patients were observed 23 out of 35 werefollowed by 1-20 years and least were 41-60 years. Mean age of the patients in this age group was 25.6 with a SD of 5.3 years. In group A, male to female ratio was 4 while in group B, this ratio was 4.9. Overall, maximum number of patients were male. Overall, most common mechanism of injury was direct fall over shoulder joint (34.3%), followed by road traffic accident (30%). Sports injury comprised of 21.4% and rest were while heavy weight lifting or injury while working in fields. In both the groups, most common mechanism of injury was direct fall over shoulder joint.

Mean time (in minutes) of surgery in group A and B were 66.3 ± 7.4 and 93.1 ± 8.5, respectively. Blood loss (in ml) was 153.0±13.4 and 16.1±2.2, respectively for group A and B. Hospital stay (in days) after the surgery was 8.3±1.9 and 4.1±1.2, respectively for group A and B. Blood loss and hospital stay were better in group B patients that was during arthroscopic surgery and this difference was significant statistically, though mean time of surgery was lesser in group A patients.

Various parameters were noted before and after the surgery. The result has been depicted in following tables.

Parameter	Group A	Group B
Before	7.31±1.84	6.72±1.54
After	3.9 ± 0.52	2.1 ± 0.41
Last	3.1 ± 0.94	2.2±0.83

Table 1: VAS pain scores after the surgery was significantly higher in the open surgery group than the arthroscopic surgery group (P > 0.05)

Parameter	Group A	Group B
Before	39.31 ± 4.32	36.21 ± 3.43
After	71.3 ± 7.34	55.4 ± 5.37

Table 2: Increase in Rowe score after the surgery was significantly higher in the open surgery group than the arthroscopicsurgery group (P < 0.05)

Number of instability episodes	Group A	Group B
Dislocations	3	3
Sub-laxation	0	4
Total	3	7

Table 3: Recurrent dislocation were computed for each group (P < 0.05)

Discussion

Traumatic anterior shoulder instability classically results from a fallor collision with the arm in an externally rotated and abducted position. This may result in the classic Bankart lesion in which the anteroinferior capsulolabral complex detaches from the glenoid, there by disrupting the primary static stabilizer of the glenohumeral joint in the externally rotated and abducted position. Other pathologies that may also contribute to anterior instability include capsular laxity, rotator intervallaxity, a humeral avulsion of the glenohumeral ligament (HAGL), and glenoid bone deficiency either from acute fracture or bony erosion from recurrent instability events. The prevalence of glenoid bone loss has been found in up to 22% of patients after the initial dislocation event, between 0 and 90% of patients with recurrent instability, and up to 89% of patients with recurrent instability after failed stabilization. [11]

In open technique, 24 patients with range 21-40 years. In arthroscopic technique, the most of the patient belonged to the age group of 21-40 years in both the groups. Lenters TR et al., noted that age between 21 and 30 years was at risk factor for recurrence in a retrospective series of 180 patients, and Zhang AL et al., confirmed the results in a prospective study of 255 patients (257shoulders) with a 25 year follow up. [12,13]In our study, at the time of dislocation, there is a sex-specific difference in recurrence rate following non-operative treatment with male patients demonstrating a greater than female, recurrence rate well in to their middle to latetwentiesas compared with females,who reach a 50% recurrence rate in their late teens. [14]The operative time was significantly shorter for the arthroscopic surgery compared with the open surgery. In addition, loss of blood and hospital stay is also less with arthroscopic instability repair compared with open surgery. Similar result noted by randomized controlled trials by Fabbriciani etal and Bottoni et al. [15,16]In our study, safety of a surgical procedure is often measure by the incidence of surgery related complications. In the current study, there were differences between two groups concerning the incidence of postoperative wound infection. One patient in group experienced dysesthesia after the surgery, which was healed within six months during postoperative follow-up.There were 2 patients in the open surgery group with superficial surgical site infection, all of which were healed with the application of antibiotics and changing of dressing. Damage of vascular or neural structures could also be avoided by sufficient preoperative planning and meticulous surgical manipulation.In our study, open surgery, only 3 patients showed dislocation and in arthroscopic surgery 3 patients had dislocations.

However, with the development of arthroscopic surgical technique, stability of the shoulder can be further enhanced in the future studies. [17]Further more, recent data from a study of 3854 active-duty military patients who underwent Bankart repair revealed a 4.5% rate of recurrence afterarthroscopic stabilization and a 7.7% rateof recurrence after open stabilization[18].While arthroscopic single-row techniques are commonly employed for primary surgical management in patients with capsulolabral avulsions. Recent cadaveric studies have shown that double-row fixation may better restore normal anatomy. [18] This is true even in the setting of small (25% of loss of the glenoid surface area) osseous Bankart lesions as well. Arthroscopic approaches to shoulder stabilization may benefit from the application of these principles in the clinical setting. [19,20]Possible benefits of arthroscopic stabilization include decreased length of hospital or outpatient surgery center stay, decreased postoperative pain, and improved range of motion(ROM). Initial arthroscopic fixation was performed by staple capsulorrhaphy. Additional methods of arthroscopic stabilization have included transglenoid suturing, and bioabsorbable tack fixation. Newer techniques for arthroscopic stabilization have been developed, including suture anchor fixation and capsularplication, with failure rates very less.

Conclusion

Clinical outcomes after arthroscopic and open stabilization were comparable. Arthroscopic stabilization for recurrent anterior shoulder instability can be performed safely;the clinical outcomes are comparable to those after traditional open stabilization. Open surgery is more invasive than the arthroscopic Bankart surgery, it should still be considered for some patients due to its effect on long term stability of the shoulder joint. However, arthroscopic surgery can still be prioritized to open surgery in many patients since it leads to less hemorrhage, shorter stay in hospital, smaller scarring and less pain after the surgery.

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Conflict of interest: None declared by any of the authors

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