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BANKART WITH REMPLISSAGE AS AN ALTERNATIVE TO LATARJET IN CASES OF FAILED BANKART SURGERY.

Orthopaedics

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KEYWORDS

Introduction:

Management of recurrent shoulder dislocations have seen a tremendous change after increasing popularity of promising arthroscopic procedures of which Bankart repair has been most common common. [1,2] Despite excellent results at trained hands, cases of failure have been reported due to increasing high demand contact sports and high velocity road traffic accidents. Recurrent shoulder instability has also been documented as a known complication after arthroscopic labral repair.[3]

Inadequate fixation, improper anchor placement, poor surgical expertise, under-appreciation of bony defects pre & per-operatively, improper suture configuration, poor quality capsule & failure to recognize capsular laxity remain most important causes of failure.[4,5]

Failure to address humeral osseous defects during arthroscopic stabilization surgery for gleno-humeral instability is also an important cause.[6] Since glenoid bony loss is common in failed cases, laterjet procedure has been variedly discussed in literature with regards to surgical procedure and its outcomes. Cases with glenoid loss of more than 25% have been classically treated using Latarjet procedure.[7]

Although cases reporting an isolated glenoid loss of <25% or humeral head loss or various combination of both have been treated with different modalities but no defined protocol has been established. The cases with failed bankart repair have been treated with various surgical revision procedures depending of indications and surgeon preferences of which open/ arthroscopic Latarjet, Bankart repair & Bankart with Ramplissage have been most common. [8]

Authors have also documented successful results in cases of failed bankart without significant glenoid loss using latarjet as a revision surgery.[4,9] The study proposes to present arthroscopic bankart with ramplissage as a modality of treatment in cases of failed bankart surgery with glenoid loss <25% and its long-term results.

Material & methods:

The prospective trial study included 58 patients who reported with recurrence of symptoms after primary arthroscopic bankart surgery at various institutes. All the patient included were in the age group of 20-30 years with dominant shoulder involvement.

Inclusion criteria: Patients with radiological & clinical evidence of failed arthroscopic bankart surgery with a glenoid bone loss of <25% and an engaging/Off-Track Hill-Sachs' lesion were included after an informed written consent. Glenoid loss & humeral loss was assessed in all cases using a computed tomography & MRI.[10]

Exclusion criteria: The patients treated with an open approach primarily, multi directional instability, glenoid defect of >25%, evidence of degenerative arthritis, glenoid dysplasia, bipolar bone loss, concurrent fractures, rotator cuff tears and neuromuscular disorders were excluded from the study. All patients were pre-operatively assessed as per Beighton's score to rule out hyper laxity. The patients were followed up for a mean of 24 months with Rowe, WOSI & UCLA scores, clinical examination & return to sports time. Paired t-test was used to assess pre and post-operative scores. Subjective satisfaction for the revision surgery was documented using a Likert scale.[8-11] (Table 1)

Surgical technique:

All surgeries were performed by the same surgical team in a lateral decubitus position with table tilted 15 degree for orienting the glenoid horizontal with the floor and arm held in dual traction after examination under anesthesia. Standard posterior, antero-superior-lateral & anterio-inferior portals are established and diagnostic arthroscopic evaluation was done. Quality of the labral and capsular tissue was assessed. In cases of remnant suture/fiber wire from previous surgery were removed. An additional accessory portal was made by outside in technique after ensuring that the needle was perpendicular to the Humeral lesion. Remplissage was done using two single loaded metallic anchors. Before applying final mattress sutures for completion of remplissage, bankart lesion was addressed. the capsule-labral tissue was completely released from the glenoid rim and bony bed was prepared. Three sequential single loaded anchors were placed at 6'oclock, 5'o clock and 3'oclock positions respectively in the same order. The labral fixation was ensured by applying sliding knot and three alternate half-hitches

Shoulder immobilizer is given for 6 weeks in internal rotation with only elbow flexion/extension, forearm strengthening and gentle scapular glides for 6 weeks. This is followed by isotonic wrist, forearm, and scapular exercises & proprioceptive training. From 8 week onwards, the aim is to achieve upto 80% of normal ROM. After 3 months of surgical procedure, emphasis is laid on strength and endurance training followed by conditioning to sports at 6 months onwards. Meticulous rehabilitation remains the key to success.

Results:

The study included 58 patients with a mean age of 28.2 years with all males in study population. The mean time delay in undergoing revision surgery was about 1.2 months' post injury. The mean time between primary surgery and re-dislocation was 7.3 months. The dominant shoulder was involved in all cases. Mean follow up was 24 months.

All cases were pre operatively assessed using MRI and CT scan for assessment of bony loss at glenoid and/or humeral head. All the cases reported history of single or multiple dislocations before re-surgery & were clinically examined using apprehension, relocation & sulcus sign. The patients were intra operatively assessed under anesthesia using the load shift test and all patients were found to be positive at 70 & 90 degrees. All included cases had an engaging Hill-Sach's lesion on arthroscopic evaluation.

The mean Rowe, WOSI & UCLA scores improved from 20.17 to 90 ($p<0.05$), 58.13% to 7.25% ($p<0.05$) & 8.85 to 28.96 ($p<0.05$) respectively. The difference in the scores were found to be statistically significant at 24 months. All patients had a negative apprehension & Relocation test with no evidence of residual instability. All patients except one were able to return to sports. The subjective satisfaction for revision surgery was documented using a Likert scale which showed a mean Likert score of 8.17 suggesting high rates of satisfactory results. On clinical examination at final follow up, the mean decrease in external rotation was about 6 degrees as compared to normal side. Mean return to sports time in 58 patients was about 18 months after rehabilitation & physiotherapy.

Discussion:

Revision Bankart surgery has become more common in developing world due to increasing demand in contact sports. Open approach to

primary bankart surgery has almost lost to minimally invasive arthroscopic approach. Although reports of meta-analysis states that open repair has lesser chances of re dislocations, the mean loss of external rotation is higher due to damage to subscapularis and arthroscopic repair for primary surgery has become the choice of treatment.[15-18]

Although, in cases of revision bankart repair with glenoid bone loss (>25%) open latarjet is still practiced by surgeons as arthro-latarjet has a long learning curve & is technically challenging .[19]Latarjet procedure uses transfer of coracoid bone block though subscapularis which by increasing glenoid track width, dynamic anterior inferior sling function and subscapularis tenodesis prevents further dislocation. The use of coracoid transfer has been well popularized in cases with a significant glenoid loss but few surgeons practice it as a procedure of choice with in-significant or no glenoid loss. [20]

Revision bankart surgery with or without remplissage is popular treatment of failed bankart surgery. The important need is identification of patients needing remplissage as an additive procedure to bankart surgery. In addition to this, pre-operative assessment of soft tissue status, bone loss and per operative management of associated lesions is critical for successful repair & complete alleviation of pain and symptoms.[21] Along with the soft tissue repair, the concept of bipolar loss has gained importance because inability to identify bony loss in form of Hill-Sachs' lesion or glenoid loss has been proposed to cause higher incidence of failure in primary bankart surgeries. The humeral loss is classically described as on track/non-engaging or an off-track/engaging lesion. Original work by Giacomo et. al described a significant bone defect to be an engaging Hill-Sachs lesion, oriented in such a way that it engaged the anterior glenoid in a position of athletic function. It is needless to re-emphasize that identifying traumatic bone deficiency is as important as adequate soft tissue fixation in these cases.[22]

The loss at humeral head predisposes to recurrent dislocation. Evaluation of glenoid track shows us that restoring the track to its natural width should be among the surgeon's first priority in restoring shoulder stability because engagement is dependent on the medial most margin of the humeral loss. [23] In cases where glenoid loss is less than 25%, addressing only humeral head loss along with labral repair can suffice.Itoi et. al have categorized the patients into four classes and have proposed treatment protocol. Patients reporting with a glenoid loss of <25% with on track/non-engaging HSL have been proposed to be treated with bankart repair. The patients with glenoid loss of <25% but off-track/engaging HSL have been treated with ramplissage in addition to bankart surgery. Patients with glenoid loss >25% alone classically have been treated with a bony procedure in form of Latarjet with (type 4) or without (Type 3) remplissage/bony procedure for humeral head loss depending on off/on track nature of lesion after glenoid reconstruction respectively. Patient selection & pre-operative planning remain important in deciding the outcome of surgery.[22,23]

Evaluation of bone loss at the time of primary or secondary repair is key to a successful surgery. The importance of radiological evidence of glenoid & humeral loss is imperative. A bony procedure becomes the treatment of choice for most cases of glenoid loss >25% and associated off-track humeral loss which can been addressed with supplementation with various methods as per surgeon choice. The soft tissue augmentation procedure of choice remains remplissage.

Wolf et al introduced the concept in 2007 as an adjunct to the arthroscopic bankart to address a large off-track humeral head defect.[24] Classically described was posterior capsule-tenodesis in cases with HSL. [25] The basic principle was derived from the word remplissage which in French meant 'to fill up'. The posterior capsule is tied down using suture anchors with parachute technique into the HSL on humeral head. The technique converts the engaging HSL into an extra articular defect and also fills it up. Although, the indications have not been clearly delineated of when to supplement the bankart repair, a fair outline states that an engaging hill sachs lesion should be addressed by this technique in all cases. Although a limitation in external rotation was observed, there was no decrease in mean muscle strength in comparison to the opposite side even at two years follow up..

The purpose of this study was to evaluate the long-term outcome and role of arthroscopic bankart repair with ramplissage in cases of failed bankart surgery in cases of Hill-sachs' lesion. The patients who underwent arthroscopic revision surgery in the form of Bankart with Remplissage showed good to excellent results with statistically significant difference between the pre & post-operative scores. Author wishes to re-emphasize the importance of identifying patients with higher demand and hyper laxity and stress should be laid on adequate number, technique & placement of anchors, assessment of bone loss at both surfaces, post-operative immobilization, meticulous rehabilitation and choice of patients for bankart versus latarjet procedure.[26-28] Biomechanical studies have also supported the role of remplissage with bankart repair in cases of recurrent shoulder dislocation.[29]In comparison to isolated Bankart repair, remplissage has been, a superior option for recurrent instability patients with large Hill-Sachs lesions in cases of primary surgery and also failed bankart with large Hill-Sachs lesion.[30-33]

Although authors have documented good to excellent long term follow up of latarjet as a procedure in trained hands for cases of insignificant glenoid loss also, but authors propose the minimally invasive method to be superior to an open technique with regards to short term complications of open procedure and complications related to graft.[34,35]

Conclusion:

Addition of remplissage with bankart is an established paradigm for addressing bone loss in recurrent instability with established results. It remains imperative to assess bipolar bone loss and quantify them pre & per-operatively for deciding choice of surgical procedure. Remplissage may be considered an effective way to convert engaging Hill-Sachs lesion to a non-engaging one in cases of insignificant glenoid loss. Being minimally invasive, the complications of open techniques viz a viz latarjet procedure can be avoided. Meticulous rehabilitation remains key to a successful outcome.

Table 1: Pre & Post-operative functional scores, likert response & return to sports

S No.	Rowe Score		Ucla Score		Wosi Score (%)		Likert Response	Return To Sports (months)
	Pre	Post (24m)	Pre	Post (24m)	Pre	Post (24m)		
1	35	80	7	26	55.8	10.2	7	20
2	15	85	9	27	49.2	12.4	8	17
3	35	90	12	29	46.3	7.3	9	18
4	35	100	5	31	55.2	4.4	9	15
5	25	90	10	32	44.3	5.8	9	16
6	20	85	6	30	54.5	11.2	7	18
7	35	100	16	31	45.3	4.3	8	15
8	15	90	8	29	66.5	5.8	8	17
9	10	95	8	27	67.4	5.3	9	16
10	25	90	10	26	59.2	8.9	8	19
11	5	90	7	29	73.4	8.5	7	20
12	15	95	8	30	62.3	4.8	9	15
13	15	100	9	31	65.5	4.1	8	15
14	25	95	6	28	58.7	5.3	9	17
15	10	80	7	27	64.4	7.9	8	18
16	30	90	13	26	47.1	7.3	8	17
17	20	85	12	29	59.3	8.8	8	19
18	15	80	9	27	63.1	11.2	7	NA
19	15	90	7	29	62.8	7.2	9	16
20	20	90	11	26	56.9	6.1	9	18
21	25	90	14	29	53.4	6.3	9	19
22	25	85	12	30	57.4	10.4	8	20
23	15	85	9	31	61.0	6.9	7	21
24	10	95	8	31	66.1	5.3	8	18
25	20	90	6	28	57.4	7.4	9	17
26	25	100	7	34	55.8	4.2	8	15
27	15	90	5	30	60.3	7.5	9	19
28	10	85	7	28	59.2	8.2	7	19
29	15	90	8	29	66.5	5.1	8	17
30	10	95	8	27	67.4	5.2	9	16
31	25	93	10	26	59.2	8.4	8	19
32	5	95	7	29	73.4	8.5	7	20
33	15	97	8	30	62.3	4.6	9	15
34	15	100	9	31	65.5	4.7	8	15

35	25	92	6	28	58.7	5.7	9	17
36	25	92	10	32	44.3	5.8	9	16
37	20	86	6	30	54.5	11.3	7	18
38	35	100	16	31	45.3	4.4	8	15
39	15	90	8	29	66.5	5.5	8	17
40	15	91	7	29	62.2	7.1	9	16
41	20	93	11	26	56.7	6.2	9	18
42	25	92	14	29	53.8	6.7	9	19
43	25	83	12	30	57.1	10.3	8	20
44	15	87	9	31	61.4	6.6	7	21
45	15	93	9	31	65.8	4.7	8	15
46	25	93	6	28	58.6	5.8	9	17
47	35	100	16	31	45.5	4.8	8	15
48	15	91	8	29	66.3	5.6	8	17
49	15	93	7	29	62.7	7.3	9	16
50	20	90	11	26	56.9	6.4	9	18
51	25	92	14	29	53.2	6.2	9	19
52	25	87	12	30	57.4	10.7	8	20
53	15	83	9	31	61.6	6.8	7	21
54	15	98	9	31	65.4	4.2	8	15
55	15	86	9	31	61.3	6.4	7	21
56	10	92	8	31	66.5	5.0	8	18
57	20	92	6	28	57.7	7.1	9	17
58	25	100	7	34	55.5	4.4	8	15

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