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Case Series

Modified Mclaughlin procedure for neglected posterior dislocation of shoulder: short-term results

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ABSTRACT

Between 2017 to 2020, A prospective case series for assessment of short-term outcomes was carried out on 10 shoulders with 3 being bilateral cases and diagnosed as neglected posterior dislocation of shoulder at a tertiary care centre and treated with the Modified Mclaughlin procedure. All patients had articular defect ranging from 27-46% as confirmed with computerised tomography. All the surgeries were carried out by a single team of surgeons. After 24 weeks follow up of 10 shoulders with mean age 32 years, all patients were found to have excellent results in terms of ROWE and constant score. Patients had significant reduction in VAS score. Timely diagnosis of articular involvement plays a vital role in management for which computed tomography has a pivotal role. Depending upon the articular involvement, line of management is to be decided. So, it can be concluded that, in cases of articular defect >25% following posterior dislocation of shoulder, better outcomes can be achieved with modified Mclaughlin procedure in terms of radiographic union and clinical scoring.

Keywords: Posterior shoulder dislocation, Modified Mclaughlin procedure, Reverse Hill-Sachs lesion, Triple E syndrome

INTRODUCTION

Posterior shoulder dislocation accounts for 2% to 4% of shoulder dislocations.[1] Seizures, electric shock or high velocity trauma are most common aetiologies. Majority of which are missed due to critical physical examination, improper radiographic exposure or inexperienced attending physician.[2]

Reverse Hills-Sachs lesion is a frequent finding in neglected dislocations and lead to engaging instability.[3] Initial radiographs are inconclusive. So, computed tomography can help in assessing articular surface involvement and surrounding fractures.

Treatment depends upon the size of bone defect, chronicity, functional demand of patient.[4] Multiple management techniques have been described including dis-impact, elevation and bone grafting of the defect, transposition of subscapularis tendon with or without lesser tuberosity, rotational osteotomy and hemi- or total shoulder arthroplasty.[4,5] There is controversy in management in terms of humeral head defect.[5] This article presents modified Mclaughlin technique i.e., transfer of subscapularis with lesser tuberosity in neglected posterior dislocations with humeral head defect more than 25%.

CASE SERIES

Between 2017 and 2020, a prospective study was conducted including 7 patients (10 shoulders) were treated for posterior dislocation at Sapthagiri institute of medical sciences and research centre, Bangalore, India.

Computed tomography was done to evaluated the bone defect in locked dislocation cases. Adult patients with articular defect of more than 25% were included. Patients with articular defect <25% were managed conservatively after open reduction. 10 shoulders having reverse Hill-Sachs compression fracture with defect of more than 25% as shown in Figure 1. As tabulated in table 1, 74% cases were male with mean age of 32 years (range 19-40) and female subgroup had mean age of 34 years (range 22-38).

Figure 1: Computed tomography of articular defect in a bilateral posterior shoulder dislocation case.

Patient under general anaesthesia, positioned in beach chair position. Using standard deltopectoral approach shoulder joint was exposed. The subscapularis tendon and bone fragment were identified. Reduction was done giving special attention to prevent further damage to articular surface. Joint cavity was thoroughly irrigated. The defect was assessed and range of movement at which it engages was noted. At the inferomedial region of defect one 5.5 mm double loaded titanium screw anchor was inserted and lesser tuberosity fragment with attached tendon was transferred into the defect after osteotomizing if not fractured in trauma. Final construct and stability were confirmed fluoroscopically and direct visualization intra-operatively through the entire range of movement. Incision closed in layers. Mean operative time was found 75 min. Postoperatively, shoulder was immobilized in customized external rotation brace for 3 weeks. After which pendulum exercises and gentle ROM exercises were advised for next 3 weeks. After 6 weeks post op, active ROM exercises were started followed by progressive rotator cuff strengthening exercises after 3 months. Evaluated at intervals of 3 weeks, 6 weeks, 12 weeks, 24 weeks using Constant score, the Rowe Score. Subjective perception of pain was measured on visual analogue scale (VAS).

Figure 2: Customized external rotation brace used post-operatively.

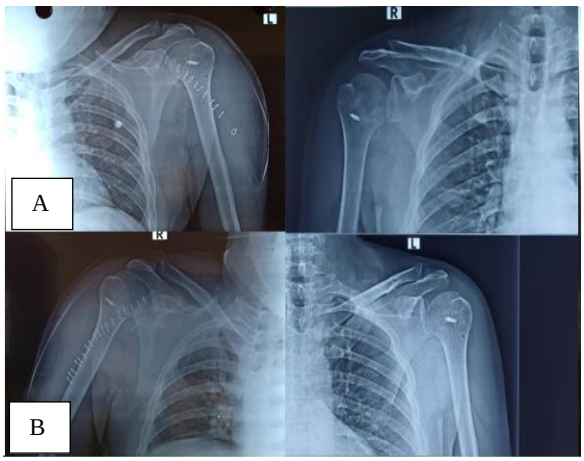


Figure 3: (A) immediate (B) day 14 post-operative radiographs of a bilateral pathology.

Table 1: Patient Details.

Patient no.	Age/sex	Shoulder side	Mechanism of injury	Time from injury, weeks	Follow Up Month	Humeral head defect %	Radiological result	Complication
1	36/M	Right	Seizures	2	6	40	United	
		Left				35	United	
2	34/F	Right	RTA	1	6	38	United	
3	26/M	Right	Self-fall	3	6	30	United	
		Left				35	United	
4	48/F	Left	RTA	2	6	45	United	Wound dehiscence
5	22/F	Left	Electrocution	1	6	40	United	
6	32/M	Right	Seizures	4	6	42	United	
		Left				27	United	
7	24/M	Right	Self-fall	2	6	46	United	

DISCUSSION

Posterior glenohumeral joint dislocation is an infrequent identity which makes it prone to misdiagnosis i.e., McLaughlin called it a diagnostic trap.[6] When it comes to aetiology, majority is because of epilepsy, electrocution and extreme trauma, also known as triple E syndrome.[7] In epileptic cases, unbalanced forceful muscle contraction leading to shoulder dislocation.

Treatment protocol depends upon the amount of defect and delay in treatment. Posterior dislocation can be misdiagnosed on anteroposterior views. Early detection is key to appropriate management. Complication includes AVN of humeral head, 2° arthritis leading to range of movement limitation.

The main stay of treatment depends upon the level of humeral head impaction. Acute defects of less than 25% articular surface can treated efficiently with closed reduction and immobilization in external rotation. While for defects more than 3 weeks results with closed reduction was found unsatisfactory. For more than 50% articular involvement, shoulder replacement is the main stay of management.[5] Hypothesis was that bone to bone will have better outcome and inferomedial placement was chosen to avoid restriction of abduction and external rotations.

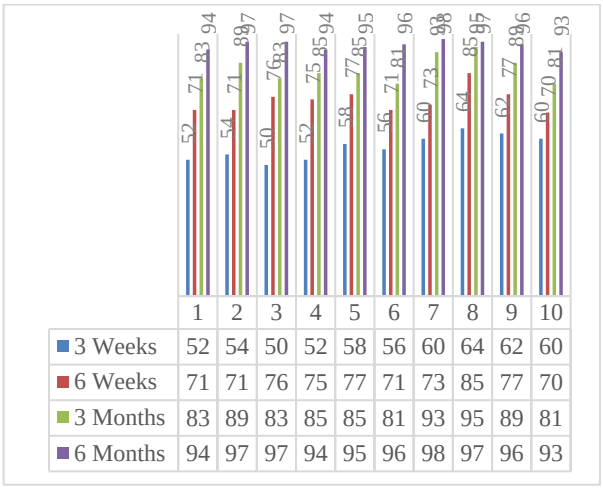
The grey area is for lesions ranging from 25-50 % humeral head defect. McLaughlin pointed out the importance of subscapularis tendon transfer into the defect in for posterior shoulder dislocation patients.

For efficient fixation of subscapularis tendon into the defect Hawkins technique can be used.[8] As per their case series, subscapularis along with its attachment i.e., lesser tuberosity can be transferred into the humeral head defect. While, in 2008, it was modified in such a way that detachment and reattachment of tendon into the defect can be avoided but plicating it with suture anchors.[9] But it can compromise the internal rotation in case of secondary shoulder replacement.

At 24 weeks of follow up, all shoulders were found to be stable and pain-free. Mean ROWE score was found to be 94.9 (range, 92-98). While, mean constant score was found to be 95.7 (range, 93-98). VAS score was found to be 0.3 (range, 0-1). Mean range of motion was 140.2° abduction (range, 130-155°), internal rotation 91.2° (range, 81-94°), external rotation 56.9° (range, 50-70°), flexion 158.3° (range, 130-175°). Radiologically union was witnessed in all cases.

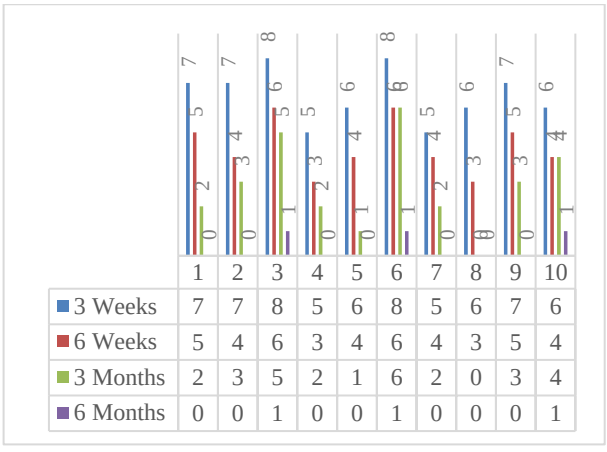
Allografting and fixation with suture anchors can lead to anatomical restoration of humeral head. Gerber got satisfactory results by using autogenous iliac bone graft in his case series to impact into the head defect for anatomic reconstruction.[10] Humeral head restoration along with posterior capsulolabral complex was suggested by Dubousset and Lambert.[11] Kokkalis et al used morselized bone graft along with suture anchors for humeral head defect filing which had better head vascularization over allograft and humeral head rotational osteotomy as used by other authors.[5,10,12]

Figure 4: Post-op range of movement on 6 weeks follow up.



	1	2	3	4	5	6	7	8	9	10
3 Weeks	52	54	50	52	58	56	60	64	62	60
6 Weeks	71	71	76	75	77	71	73	85	77	70
3 Months	83	89	83	85	85	81	93	95	89	81
6 Months	94	97	97	94	95	96	98	97	96	93

Figure 5: Constant score on 3 weeks, 6 weeks, 3 months, 6 months follow up.



	1	2	3	4	5	6	7	8	9	10
3 Weeks	7	7	8	5	6	8	5	6	7	6
6 Weeks	5	4	6	3	4	6	4	3	5	4
3 Months	2	3	5	2	1	6	2	0	3	4
6 Months	0	0	1	0	0	1	0	0	0	1

Figure 6: VAS score on 3 weeks, 6 weeks, 3 months, 6 months follow up.

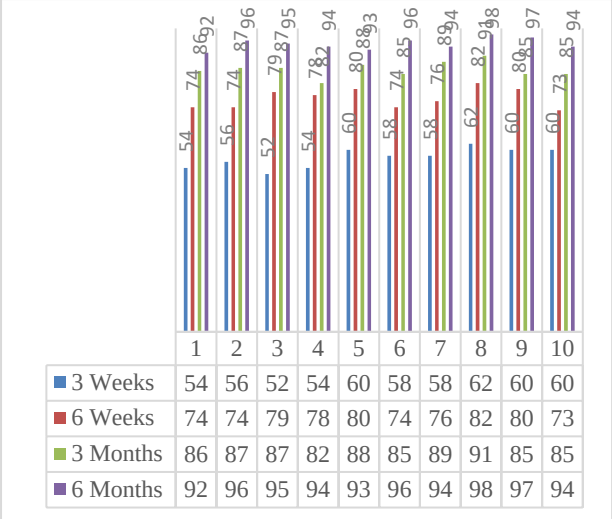


Figure 7: ROWE score on 3 weeks, 6 weeks, 3 months, 6 months follow up.

CONCLUSION

In this article, modified McLaughlin technique was used and for bilateral lesion, it was performed in same sitting. For better prognosis in posterior shoulder dislocation, it is important to diagnose it timely and adequately using tomographic scan. For cases with humeral head defect more than 25% McLaughlin procedure showed excellent radiographic and clinical outcomes.

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