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REVIEW ARTICLE

Management of Neglected Posterior Shoulder Dislocation: Systematic Review and Meta-Analysis

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Abstract The shoulder's glenohumeral joint is one of the most often displaced joints in the human body. The most prevalent cause of this painful condition, which has several known origins, is the involuntary contraction of muscles, as in epileptic convulsions, electric shock, or electroconvulsive therapy. To perform a comprehensive analysis of current methods for treating posterior shoulder dislocations that go untreated. The Orthopaedic Surgery Department of Ain Shams University's School of Medicine performed this meta-analysis and systematic review. Inclusion criteria comprised all research, including patients whose posterior shoulder dislocations had been disregarded. A total of 13 studies reporting the management of neglected posterior shoulder dislocation were selected for this study, which includes a total of 136 shoulders of 133 patients. The management was delayed in all cases for more than 3 weeks, either due to missed diagnosis or delayed patient presentation. The delay time was reported in nine studies, ranging from 1.3 to 16.8 months. Postoperative immobilization in a sling, cast, or brace was advised for 3–8 weeks in 15–30^{o} abduction with external or neutral rotation. Passive movements were initiated either immediately or within 2–8 weeks postoperatively. Only external rotation and/or pendulum exercises were allowed. Different management processes of posterior shoulder dislocation are effective options for treatment through substantial enhancements in cases comfort, range of motion, and pain management. We still require additional research involving a larger number of cases in order to validate our conclusions.

Keywords Glenohumeral joint instability, Posterior shoulder dislocation, Neglected shoulder dislocation.

INTRODUCTION

Shoulder glenohumeral joint dislocation is the most common joint dislocation [1]. Various mechanisms have been explained to clarify this traumatic event, with forced muscle contraction, like in electroconvulsive therapy or epileptic episodes. Furthermore, significant trauma, like motor vehicle accidents or other incidents involving axial compression of the arm in an adducted, flexed, and internally rotated position, can also result in posterior shoulder dislocation [2].

With an occurrence rate of less than 4%, posterior shoulder dislocation is an uncommon injury. On initial examination, this injury is frequently misdiagnosed (60–70% of the time), hence the clinical significance of posterior shoulder dislocation resulting in delay in proper management and leading to permanent disability [3,4].

Delays of up to 10 years between injury and diagnosis have been recorded [4].

Negative consequences, like degenerative shoulder disease and avascular necrosis of the humoral head, are more likely to occur in cases with posterior shoulder dislocation that are not properly diagnosed and appropriately treated.

Early detection necessitates proper physical examination, detailed medical history, and appropriate

radiographs, in addition to a considerable degree of suspicion [5].

In this study, we aim to provide a comprehensive analysis of current practices for treating neglected posterior shoulder dislocations.

SUBJECTS AND METHODS

This research was carried out in a university-setting hospital, as a systematic review study, for a period of 1 year.

We are including the following research types: case–control research, case report research, and retrospective case follow-up are examples of recent clinical trials.

Following an initial manual screening, the search results were imported into the systematic review management program. The search results and inclusion/exclusion criteria were depicted using a PRISMA flowchart (Figure 1).

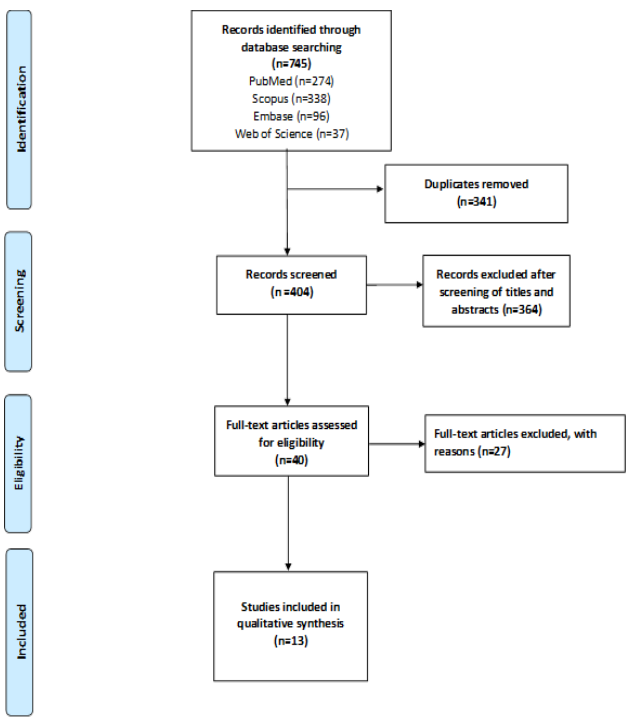

Figure 1: PRISMA flow diagram of the research selection process.

All studies that involve patients with neglected posterior shoulder dislocation with any possible management are included.

PATIENT CRITERIA

We considered all studies in the English language, published at any time up to date, an examination of the treatment approaches for untreated posterior shoulder dislocation.

(1) Surgical management (open and arthroscopic).

(2) Nonsurgical management.

The study considered articles focusing on the care of untreated dislocations of the posterior shoulder, ensuring adequate clinical and radiographic follow-up until satisfactory outcomes were achieved for a minimum of 6 months after the intervention.

SAMPLE SIZE

Every article that meets the inclusion criteria up to 2024.

We excluded the following:

(1) Languages other than English.

(2) Duplicates.

(3) Nonclinical outcome research.

(4) Book chapters.

(5) Editorials.

(6) Textbooks.

INTERVENTIONS

The review considered studies that evaluated various management strategies for neglected posterior shoulder dislocation. Interventions included both surgical and nonsurgical approaches, such as closed reduction, open reduction, arthroscopic reduction, capsular plication, and rehabilitation protocols. Studies examining the effectiveness of different surgical techniques, implant choices, and postoperative care were included.

OUTCOMES OF THE STUDY

The review incorporated research that comprised the subsequent outcomes.

Functional outcomes include range of motion (ROM), muscle strength, measurement of pain relief, joint stability, complications, patient satisfaction, and radiographic outcomes.

SEARCH STRATEGY FOR IDENTIFICATION OF STUDY

The investigation was performed utilizing the following databases: PubMed, Google Scholar, Cochrane Database of Systematic Reviews, EMBASE & Science Direct, Wiley Online Library, The Journal of Ankle & Foot Surgery, and

Clinical Key database, with no limitations on publication type or location. The search was performed using the following keywords and terms: "Neglected," "Shoulder," "Dislocation" AND "Management" AND ("Surgery" OR "Non-operative" OR "Rehabilitation") AND ("Outcomes" OR "Complications" OR "Satisfaction").

ETHICAL CONSIDERATIONS

As permitted by the Ain Shams University committee.

STUDY PROCEDURE

The research approached with an article search utilizing the MeSH ("Neglected," "Shoulder," "Dislocation" AND "Management") AND ("Surgery" OR "Non-operative" OR "Rehabilitation") AND ("Outcomes" OR "Complications" OR "Satisfaction") Subsequently, papers that meet exclusion criteria are excluded, while those that satisfy the inclusion criteria are downloaded. The supervisors reviewed these publications to ensure that the appropriate data sources were identified. I then began collaborating with the statistical supervisor to enter the data into R-based software for meta-analysis and to initiate the research.

DIRECT META-ANALYSIS

All of the continuous results from the "Management of Neglected Posterior Shoulder Dislocation" were averaged out using the inverse variance approach and presented as mean difference or standardized mean difference. With the use of the Mantel–Haenszel procedure, we were able to combine binary results into a single relative risk. We assumed that there was substantial clinical and methodological heterogeneity thus we utilized the random-effects technique. The statistical analyses were carried out using either Open Meta-analyst for Windows or Review Manager (RevMan) 5.3.

RESULTS

Regarding patient characteristics, the participant's age was reported, ranging from 26 to 54 years. The majority of participants were males, ranging from 67 to 100%. The right-wing was engaged in 32 (67%) shoulders, and the left side was engaged in 16 (33%) shoulders. The most commonly reported cause of posterior shoulder dislocation was epileptic seizures, representing 56%.

The current investigation demonstrated that the management was delayed in all cases for more than 3 weeks, either due to missed diagnosis or delayed patient presentation. The delay time was reported, ranging from 1.3 to 16.8 months. A reverse Hill–Sachs lesion was reported as a CT finding in all patients. The defect size ranged from 10 to 50%.

Our current study showed that postoperative rehabilitation protocols were adopted by different authors. Postoperative immobilization in a sling, cast, or brace was advised for 3–8 weeks in 15–30° abduction with external or neutral rotation. Passive movements were initiated either immediately or within 2–8 weeks postoperatively. Only external rotation and/or pendulum exercises were allowed. No internal rotation was allowed at this stage. Active-assisted ROM and rotator cuff strengthening exercises were initiated in 4^{th}–12^{th} week. Return to full activity was allowed in 12^{th} week.

The present study showed that regarding ROM, the pooled postoperative flexion ranged from 117 to 180°, with a pooled estimate of 158 [95% confidence interval (CI): 151–166]. The pooled postoperative abduction ranged from 106 to 160°, with a pooled estimate of 140 (95% CI: 131–149). The pooled postoperative external rotation ranged from 60 to 90°, with a pooled estimate of 71 (95% CI: 66–75). The pooled postoperative internal rotation ranged from 43 to 80°, with a pooled estimate of 56 (95% CI: 42–96). There was a statistically significant improvement in ROM postoperatively.

Our results showed that, regarding complications, all studies reported postoperative complications. A fixed effect model was used for analysis as no significant heterogeneity was detected (I^2=33%, p=0.122). The pooled complication rate 95% CI was 0.19 (0.12–0.28).

A total of 13 studies reporting the management of neglected posterior shoulder dislocation were chosen for this investigation, involving a total of 136 shoulders of 133 patients. The number of enrolled patients ranged from five patients by Kokkalis *et al*., [9] to 17 patients by El-Shewy *et al*., [11]. Research that were considered for inclusion had their baseline characteristics shown in (Table 1).

The management was delayed in all cases for more than 3 weeks, either due to missed diagnosis or delayed patient presentation. The delay time was reported in nine studies, ranging from 1.3 to 16.8 months. A reverse Hill–Sachs lesion was reported as a CT finding in all patients. The average defect size was more than 25%, except for El-Shewy *et al*., [11]. In the remaining articles, the defect size ranged from 10 to 50%. A summary of the baseline case characteristics is provided in (Table 2).

Magu *et al*., [10] adopted a Check Rein technique via an open deltopectoral approach and achieved defect reconstruction using the osteotomized coracoid process and conjoint tendon fixed by screws. Surgical details are provided in (Table 3).

Postoperative immobilization in a sling, cast, or brace was advised for 3–8 weeks in 15–30° abduction with external or neutral rotation. Passive movements

were initiated either immediately or within 2–8 weeks postoperatively. Only external rotation and/or pendulum exercises were allowed. No internal rotation was allowed at this stage. Active-assisted ROM and rotator cuff strengthening exercises were initiated in the 4th to 12th week. Return to full activity was allowed in the 12th week. The postoperative rehabilitation protocols adopted by different authors are summarized in (Table 4).

Observational retrospective and prospective studies were evaluated by the modified Newcastle-Ottawa Scale. A maximum of seven stars could be assigned to each study. All assessed studies had a score of ≥4, denoting moderate to high quality, except for Sahu *et al*., [14]. The average quality score was 4.2, ranging from 3 to 5 (Table 5).

Details of postoperative complications reported by included studies were summarized in (Table 6).

Table 1: Study characteristics (*N*=133 patients, 136 shoulders)

				Study period		Sample size	
First Author	**Year**	**Country**	**Design**	**From**	**To**	**Patients**	**Shoulder**
Aparicio [12]	2000	Spain	Retrospective	1992	1997	6	7
El-Shewy. [11]	2008	Egypt	Retrospective	1997	2002	17	17
Diklic [13]	2010	Serbia	Retrospective	1998	2002	13	13
Sahu [14]	2012	Bulgaria	Retrospective	2005	2011	12	12
Kokkalis [9]	2013	Greece	Retrospective	2010	2012	5	6
Martinez [15]	2013	Spain	Retrospective	1998	2002	6	6
Abdel-Hameed [6]	2015	Egypt	Prospective	2009	2012	9	9
Magu [10]	2016	India	Prospective	2005	2013	7	7
Shams [8]	2016	Egypt	Prospective	2011	2013	11	11
Demirel [7]	2017	Turkey	Retrospective	2009	2012	13	13
Khira [16]	2017	Egypt	Prospective	2011	2015	12	12
Arafa [5]	2019	Egypt	Retrospective	2013	2017	12	13
Brilakis [17]	2019	Greece	Retrospective	2009	2012	10	10

Table 2: Patient characteristics (*N*=133 patients, 136 shoulders)

			Sex		Side			
First author	**Age (years)**	**Follow-up (months)**	**Male**	**Female**	**Right**	**Left**	**Delay time (months)**	**Defect size (%)**
Aparicio [12]	54	42	67	33	NA	NA	NA	23
El-Shewy [11]	49	94	82	18	NA	NA	2.6	< 25
Diklic [13]	42	54	77	23	NA	NA	4	40
Sahu [14]	NA	36	67	33	NA	NA	4.5	30
Kokkalis [9]	53	20	80	20	67	33	2	38
Martinez [15]	32	122	NA	NA	NA	NA	NA	40
Abdel-Hameed [6]	29.5	18	78	22	67	33	NA	40
Magu [10]	32	42	NA	NA	NA	NA	16.8	> 25
Shams [8]	39	29	82	18	73	27	2.2	35
Demirel [7]	39.3	30	100	0	NA	NA	NA	27
Khira [16]	26	30	83	17	75	25	2	40
Arafa [5]	36	13	100	0	NA	NA	1.3	26.9
Brilakis [17]	50	77	100	0	50	50	2.7	39

NA, Data not available.

Table 3: Surgical characteristics (*N*=133 patients, 136 shoulders)

First author	Surgical approach	Technique	Defect reconstruction	Fixation
Aparicio [12]	Deltopectoral	Modified McLaughlin	Osteotomized LT and subscapularis	K-wires
	Percutaneous	None	None	
El-Shewy [11]	Deltoid splitting	Neer	None	None
Diklic [13]	Deltopectoral	NA	Femoral head allograft	Screws
Sahu [14]	Arthroscopic	McLaughlin	Subscapularis	Anchors
Kokkalis [9]	Deltopectoral	Modified McLaughlin	Osteotomized LT and subscapularis and morselized femoral head allograft	Anchors
Martinez [15]	Deltopectoral	NA	Femoral head allograft	Screws
Abdel-Hameed [6]	Deltopectoral	Modified McLaughlin	Osteotomized LT and subscapularis	Ethibond Sutures
Magu [10]	Deltopectoral	Check rein	Osteotomised coracoid process and conjoint tendon	Screws
Shams [8]	Deltopectoral	Modified McLaughlin	Osteotomized LT and subscapularis	Ethibond sutures
Demirel [7]	Deltopectoral	Modified McLaughlin	Osteotomized LT and subscapularis	Screws
Khira [16]	Deltopectoral	NA	Iliac crest autograft	Screws
Arafa [5]	Deltopectoral	Dual subscapularis	Osteotomized LT and subscapularis	Screws/anchors
Brilakis [17]	Arthroscopic	McLaughlin	Subscapularis	Anchors

LT, lesser tubercle; NA, data not available.

Table 4: Postoperative protocol (*N*=133 patients, 136 shoulders)

	Immobilization			Passive movements		Active assisted		
First author	Duration	Method	Position	Timing	Allowed	ROM	Strength	Full activity
Aparicio [12]	3–6 weeks	Sling	NA	NA	Pendulum exercises	NA	NA	NA
El-Shewy [11]	6–8 weeks	Cast	Ext/40° ER	8th week	ER	12th weeks	12th weeks	NA
Diklic [13]	6 weeks	Sling	AB/ER	Immediately	ER/Flex	6th week	12th week	NA
Sahu [14]	4 weeks	Sling	15°AB/NR/10°Flex	5th week	Pendulum exercises	6th week	8th week	NA
Kokkalis [9]	6 weeks	Brace	ER	Immediately	NA	6th week	6th week	12th week
Martinez [15]	4 week	Brace	NR	4th week	NA	6th week	6th week	NA
Abdel-Hameed [6]	4 weeks	Sling	30°AB/NR	Immediately	ER	NA	NA	12th week
Magu [10]	6 weeks	Brace	ER	Immediately	NA	6th week	6th week	12th week
Shams [8]	4 weeks	Sling	ER	Immediately	ER	4th week	4th week	12th week
Demirel [7]	6 weeks	Sling	30°AB/NR	Immediately	ER	6th week	6th week	12th week
Khira [16]	6 weeks	Sling	30°AB/NR	2nd week	ER	6th week	6th week	NA
Arafa [5]	8 weeks	Sling	ER	Immediately	ER and pendulum exercises	8th week	8th week	10th week
Brilakis [17]	6 week	Sling	30°AB/NR	Immediately	Pendulum exercises	3rd week	8th week	12th week

ER, external rotation; Ext, extension; Flex, flexion; NA, data not available; NR, neutral rotation; ROM, range of motion.

Table 5: Newcastle-Ottawa scale quality assessment

First author	Selection parameter	Comparability parameter	Outcome parameter	Total score	Quality
Aparicio [12]	***	–	**	5	High
El-Shewy [11]	***	–	**	5	High
Diklic [13]	***	–	*	4	Moderate
Sahu [14]	**	–	*	3	Low
Kokkalis [9]	***	–	*	4	Moderate
Martinez [15]	**	–	**	4	Moderate
Abdel-Hameed [6]	***	–	*	4	Moderate
Magu [10]	***	–	**	5	High
Shams [8]	**	–	**	4	Moderate
Demirel [7]	***	–	*	4	Moderate
Khira [16]	***	–	**	5	High
Arafa [5]	***	–	*	4	Moderate
Brilakis [17]	**	–	**	4	Moderate

Table 6: Postoperative complications

First author	No.	Complications
Aparicio [12]	1	Moderate pain
	1	Subluxation
	6	OA
El-Shewy [11]	1	Superficial SSI
	3	OA
	1	Revision to arthroplasty
Diklic [13]	1	Spontaneous osteonecrosis of the humeral head and collapse of the graft with moderate pain, limited ROM, and poor function
Sahu [14]	1	OA
	1	Limited external rotation
Kokkalis [9]	0	None
Martinez [15]	3	Pain, clicking, catching, stiffness, and revision arthroplasty due to OA, ON, and graft collapse
Abdel-Hameed [6]	1	Moderate pain, moderate limitation with positive apprehension
	1	Constant pain, stiffness, and recurrent subluxation
Magu [10]	0	None
Shams [8]	1	Mild to moderate disabling pain, slightly limited ROM, moderate limitation of daily activity
	1	Constant disabling pain, restrictions on his daily activities and shoulder mobility
Demirel [7]	0	None
Khira [16]	2	Moderate joint stiffness, pain, and instability with positive apprehension
Arafa [5]	1	Not satisfied
Brilakis [17]	0	None

DISCUSSION

The main results of this research were as follows:

In the research conducted by Abdel-Hameed *et al*., [6], it was found that nine instances (two females) of locked posterior shoulder dislocation were treated. These patients had anteromedial humeral head abnormalities ranging from 30 to 50% of the head size, which aligns with our findings. Reconstruction of the humeral head defect involves open reduction of the dislocation and subsequent transfer of the lesser tuberosity and subscapularis tendon. Eleven individuals (seven men and two women) had damage to their right shoulder. The patient's average age was 29.50 years (interval: 22–46 years). Pain and restricted external rotation were the primary complaints of every patient. Cause-and-effect trauma was as follows: fall from height in four patients; seizure caused by epileptic episodes in

two patients; electric shock in one case; and two cases, the precise cause remained unknown.

Our findings were corroborated by research on Demirel *et al*., [7] 13 male cases (average age: 39.3 years; age range of 28–72 years) who received diminished tuberosity transfer as a result of reverse Hill–Sachs lesions were included in the study. The mean dimension of the defects derived from the axial computed tomography (CT) sets was 27% (with a SD of 20–40%), according to their findings.

In addition, Shams *et al*., [8] 11 cases with reverse Hill–Sachs defects and locked chronic posterior shoulder dislocation that fell within the objective range (25–50% of the head size) were provided. The average time between the injury and surgery was 9 weeks (range: 3–18 weeks). Reconstructing the reverse Hill–Sachs defect required an open reduction of the displaced head, transfer of the subscapularis tendon, and attachment of the smaller tuberosity.

In the research of Kokkalis *et al*., [9] For individuals suffering from untreated locked posterior dislocation of the shoulder, they introduced a variant of the McLaughlin method. Postoperatively, the patient's shoulder was immobilized for 6 months using an UltraSling, an external rotation brace. During this time, you were not to turn your shoulders inside; instead, you were to focus on strengthening your wrists and hands. ROM and rotator cuff strengthening exercises, as well as active-assisted and more active versions, were incorporated into the physical therapy program. It was safe to resume all activities 12 weeks after surgery.

In research conducted by Arafa and Abdelbadie [5]. They provided evidence that the series exhibited a satisfactory ROM and absence of discomfort 6 months following the procedure.

We found similar outcomes to research on Magu *et al*., [10] because they documented zero instances of infection, graft pullout, or nonunion at the graft site.

CONCLUSION

Different management processes of posterior shoulder dislocation are effective options for treatment with notable enhancements to pain levels, mobility, and case contentment. To confirm our findings, more investigations with larger case numbers are required..

CONFLICTS OF INTEREST

There are no conflicts of interest.

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