A Systematic Review of Acute Irreducible Shoulder Dislocations in the 21st Century

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Background: Rarely, closed reduction cannot be achieved in patients with acute shoulder dislocation, necessitating open management. A paucity of literature exists regarding these cases.

Purpose: To perform a systematic review on the mechanism, management, and outcome data of acute irreducible shoulder dislocations.

Study Design: Systematic review; Level of evidence, 4.

Methods: A systematic review of the literature was performed using the Cochrane Database of Systematic Reviews, the Cochrane Central Register of Controlled Trials, PubMed, and MEDLINE between 2000 and 2020. Inclusion criteria were as follows: human participants, acute irreducible shoulder dislocation requiring open management, English language, and publication within the past 20 years. We excluded basic science articles, technique articles, reviews, editorials, and studies of chronic shoulder dislocations or dislocations with ipsilateral humeral shaft fractures.

Results: Twelve articles fit the inclusion criteria and were considered for review. All studies were single case reports (level 4 evidence). Ten of the 12 studies were of male patients. The direction of dislocation included 7 anterior/anteroinferior, 2 posterior, 1 inferior, 1 bilateral inferior, and 1 superolateral. Most dislocations were irreducible owing to a mechanical block to reduction. The most common type of block was an incarcerated long head of the biceps tendon, followed by interposition of 1 of the rotator cuff tendons. The axillary and musculocutaneous nerves, displaced fracture fragments, and Hill-Sachs and bony Bankart lesions were other causes of blocks to reduction. Eleven patients were treated with open surgery, while 1 patient was treated arthroscopically. Procedures performed were dependent on concurrent pathology. Final follow-up ranged from 6 weeks to 2 years, with no repeat dislocation episodes reported. Complications after open reduction included 1 case of brachial plexopathy (posterior cord) and 1 case of musculocutaneous nerve palsy.

Conclusion: There is a paucity of literature on the management of irreducible acute shoulder dislocations. The most common irreducible dislocation found in this systematic review was anterior with a mechanical block attributed to interposition of the long head of the biceps tendon. When patients were treated with an open or arthroscopic procedure, recurrence was low, with none reporting recurrent dislocation in limited follow-up.

Keywords: shoulder; dislocation; irreducible; fracture dislocation

The glenohumeral joint of the shoulder is the most commonly dislocated joint, with an overall US incidence of 23.9 dislocations per 100,000 person-years.[31] Shoulder dislocations are more than twice as common in male than female patients and occur most often in the third decade of life.[31] Recent literature has suggested good results with operative treatment of first-time shoulder dislocations.[16,23] However, acute shoulder dislocations are usually treated urgently and initially with closed reduction and physical therapy.

The majority of shoulder dislocations are anterior (95%) and can be reduced by using closed manipulation techniques with local injection or conscious sedation.[17] Similar success rates and outcomes have been reported between local injection and sedation.[19] In the acute setting, several reduction techniques have been described with similar success rates as high as 97.8%.[1,11] The majority of failed initial reductions are subsequently successful when a different technique is used.[11] Repeated attempts at closed reduction rarely fail, requiring closed reduction under general anesthesia or possibly open reduction. Currently, the incidence, risk factors, and causes of acute irreducible dislocations are not well defined. Additionally, no comprehensive overview for the treatment of irreducible shoulder dislocations exists.

The purpose of this study was to review the recent literature for cases of irreducible shoulder dislocations, focusing on associated injuries, blocks to reduction, and operative

treatment strategies. The secondary aims were to examine the redislocation rate and patient outcomes after the index procedure.

METHODS

Article Selection

This study was conducted in accordance with the 2009 PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) statement.[20] A systematic review of the literature regarding diagnosis, risk factors, management, and outcomes of irreducible acute shoulder dislocations was performed using the Cochrane Database of Systematic Reviews, the Cochrane Central Register of Controlled Trials, PubMed, and MEDLINE. The queries were performed in April 2020.

The literature search strategy included the following criteria: ("irreducible" [All Fields]) AND ("shoulder" [All Fields] OR "glenohumeral" [All Fields]). Inclusion criteria were as follows: human participants, acute irreducible shoulder dislocations requiring open management, English language, and studies between 2000 and 2020. Exclusion criteria consisted of basic science articles, technique articles, reviews, editorials, studies of chronic shoulder dislocations, studies of dislocations with ipsilateral humeral shaft fractures, and studies published >20 years before the query.

Three investigators (D.J.L., J.E.G., and E.J.N.) reviewed the abstracts from all identified articles and applied the inclusion and exclusion criteria independently. When an abstract did not provide enough information to determine inclusion, the full-text article was reviewed. Any discrepancies were reconciled via consensus among the 3 reviewers before final article inclusion.

Data Collection

The 3 investigators reviewed the full text of the qualified articles. Each article was assigned a level of evidence according to the classification by Wright et al.[29] Patient data were collected: characteristics, injury characteristics (direction of dislocation, associated fractures), attempts at closed reduction, preoperative imaging, surgical technique, blocks to reduction, follow-up, objective and subjective outcomes, and complications (including redislocations). Data were manually recorded using a custom Microsoft Excel spreadsheet by each of the investigators.

Risk of Bias

Studies classified as having an evidence level of 3, 4, or 5 can be affected by selection and performance bias because of the lack of randomization or prospective comparative control groups. Therefore, the 3 investigators extracted the data individually and then analyzed them for accuracy and consistency. Discrepancies were resolved via consensus and the majority with the help of additional authors (S.S. and K.H.S.) for reconciliation.

RESULTS

Study Selection

The search query identified 58 articles from the PubMed/MEDLINE databases, 0 articles from the Cochrane Central Register of Controlled Trials, and 0 articles from the Cochrane Database of Systematic Reviews. There were no duplicate articles. After screening based on the abstract, 17 articles were reviewed for inclusion. After review, 12 articles fit our inclusion criteria (Figure 1).[5-10,15,18,22,24,25,30] All studies were single case reports (level 4 evidence).

Patient Characteristics

All studies were retrospective and included 13 shoulders in 12 patients with an age range of 34 to 87 years. Follow-up ranged from 6 weeks to 2 years. Two studies[6,7] did not report time of follow-up. Six patients had dislocations on the right; 4, on the left; and 1, bilaterally. One study[5] did not indicate the affected side. Seven dislocations were anterior/anteroinferior; 3, inferior; 2, posterior; and 1, superolateral. Mechanisms of injury consisted of 7 falls, 2 motorcycle or motor vehicle collisions, and 2 crush injuries. One mechanism was unknown, and another was not reported.Data are summarized in Table 1.

Injury Characteristics

Five of the 13 shoulders had an associated injury of a Hill-Sachs lesion. Attempted closed reduction was reported in all 12 studies. In 7 studies,[7,8,10,22,24,25,30] attempts at closed reduction were performed with conscious sedation, and 4 studies[8,10,22,24] included attempts with general anesthesia. Nine patients underwent advanced imaging before operative reduction: 4 had magnetic resonance imaging, and 5 had a computed tomography scan. Injuries and associated lesions are listed in Table 2.

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Operative Data

Eleven of 12 patients underwent open reduction, and 1 underwent arthroscopic reduction. In 1 study,[5] the patient initially underwent diagnostic arthroscopy that was converted to an open procedure. The most commonly performed approach was deltopectoral (n = 8), and the most commonly performed procedures in addition to open reduction were biceps tenotomy or tenodesis (n = 7), rotator cuff
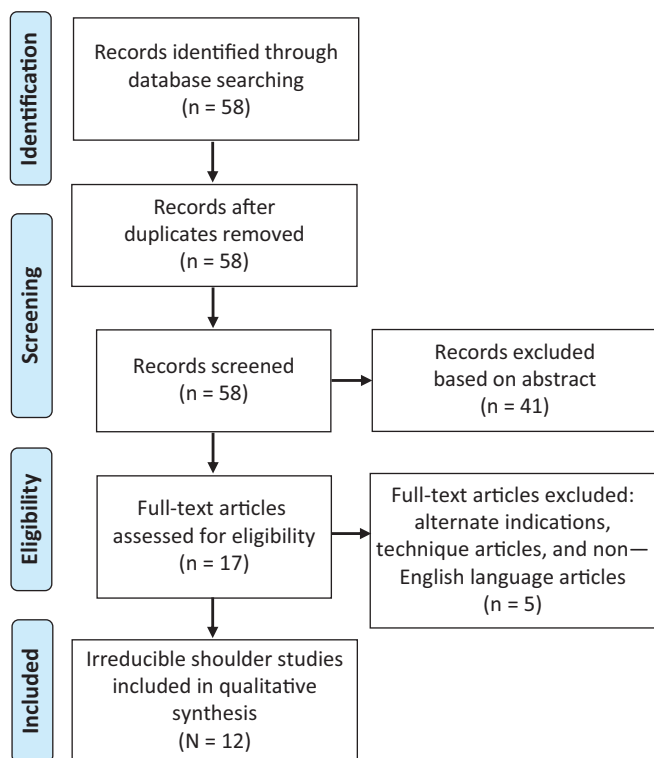
repair (n = 7), and internal fixation of the greater tuberosity (n = 4). The most common block to reduction was an incarcerated biceps tendon (n = 7). Other blocks to reduction included buttonholing of the humeral head through the joint capsule or deltoid, as well as glenoid impaction in the humeral head. Blocks to reduction are summarized in Table 2. Operative management data are summarized in Table 3.

Outcomes

Two studies[22,25] cited validated outcome scores at final follow-up but no preoperative outcome scores. Three studies[8,15,24] reported quantitative range of motion assessments, while 3 studies[9,22,25] reported qualitative assessments. Last, 1 study[10] found limited range of motion in the patient owing to the presence of a humeral head defect. No study reported recurrent instability. Out of the 6 studies[8,9,15,22,24,25] that assessed postoperative range of motion, all reported "full" or gave parameters that fell within functional range of motion.

Complications

Complications occurred in 4 of 12 patients. The most common complication was persistent rotator cuff dysfunction (n = 2).[5,9] Connolly et al[5] reported that although the subscapularis tendon was repaired, the massive rotator cuff tear was irreparable. Similarly, Gudena et al[9] reported a massive rotator cuff tear that could not be repaired. There were 3 nerve palsies at the time of presentation: 1 axillary, 1 radial, and 1 musculocutaneous.[8,9] All resolved spontaneously within 3 to 6 months. Outcome data are summarized in Table 4.

DISCUSSION

The most important findings of this study are that irreducible shoulder dislocations are infrequently reported and there is little available literature supporting clinical

Figure 1. PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) flowchart demonstrating the selection of the studies based on the given search criteria.

TABLE 1
Patient Descriptive Information of the 12 Included Studies[a]

Lead Author (Year)	Patient Age (Sex)	Side Affected	Mechanism of Injury	Follow-up
Seo (2020)[25]	57 y (male)	Left	Motorcycle crash	6 mo
Scholten (2017)[24]	34 y (male)	Right	Fall off mountain bicycle	1 y
Pantazis (2017)[22]	57 y (male)	Right	Struck by car while riding bicycle	1 y
Khedr (2017)[15]	35 y (male)	Bilateral	Fall from 15 m	6 mo
Wyatt (2015)[30]	53 y (male)	Right	Fall from pickup truck and run over by 1000-lb compressor	6 wk
Frank (2012)[8]	57 y (male)	Right	400-lb object fell on patient	18 mo
Gudena (2011)[9]	62 y (male)	Right (dominant)	Fall down flight of stairs	1 y
Day (2010)[7]	57 y (female)	Left	Unknown	NR
Connolly (2008)[5]	87 y (male)	NR	Fall	2 y
Guha (2004)[10,b]	61 y (male)	Left (nondominant)	Fall off scaffolding	3 mo
Davies (2000)[6]	38 y (NR)	Left	Fall off bicycle	NR
Mihata (2000)[18]	55 y (male)	Right	Fall	1.5 y

[a]All studies were single-patient case reports (level 4 evidence). NR, not reported.
[b]The same shoulder had been dislocated 18 months earlier, but the first dislocation was reduced easily with closed reduction.

TABLE 2
Shoulder Dislocation Injury Characteristics and Concomitant Pathology[a]

Lead Author (Year)	Direction of Dislocation	Attempt at Closed Reduction?	Associated Fractures	Preoperative Imaging	Block to Reduction	Intraoperative Findings
Seo (2020)[25]	Posterior	Failed in ED under conscious sedation	Scapular body	CT, MRI	Incarcerated LHBT	Massive full-thickness RC tear involving subscap, suprasp, and infrasp with disruption of superior capsule; biceps tendon incarcerated in glenohumeral joint
Scholten (2017)[24]	Posterior	Failed at outside ED, failed under general anesthesia in OR	GT and lesser tuberosity	CT, MRI	Infrasp and LHBT interposition	Interposition of infrasp tendon in glenohumeral joint and dislocation of LHBT; large bony fragment containing all 4 RC tendons
Pantazis (2017)[22]	Anterior	Failed in ED under conscious sedation and in OR under general anesthesia	GT; H-S lesion	CT unavailable	Incarcerated LHBT and GT fracture	Posterolateral entrapment of the biceps tendon between humeral head and GT fragment; large H-S lesion
Khedr (2017)[15]	Inferior (bilateral)	Failed with traction-countertraction, sedation NR	GT (left side)	CT	Humeral head buttonhole through inferior joint capsule	Bilateral humeral heads buttonholed through inferior joint capsule and surrounding soft tissue envelope
Wyatt (2015)[30]	Superolateral	Failed in ED under conscious sedation	Anterolateral tip of the acromion	MRI	Humeral head buttonholed through the deltoid; interposition of the LHBT and macerated RC	Complete avulsion of suprasp, infrasp, and subscap off insertional footprints; full-thickness tear of teres minor at musculotendinous junction; inferior labral tear
Frank (2012)[8]	Inferior	Failed in ED under conscious sedation, failed under general anesthesia in OR	Ipsilateral radial and ulnar shaft with compartment syndrome; anteroinferior bony Bankart lesion	NR	Aberrant position of axillary nerve	Bony Bankart involving 15% of anteroinferior glenoid; rupture of the LHBT; sleeve avulsion of superior portion of subscap and entirety of suprasp, infrasp, and teres minor. Axillary nerve was identified anterior to the humeral neck instead of usual posteroinferior aspect, blocking reduction.
Gudena (2011)[9]	Anterior	Yes, methodology NR	None	NR	Musculocutaneous nerve, LHBT	Humeral head buttonholed through "anterior glenohumeral ligament"; musculocutaneous nerve wrapped around surgical neck of humerus; massive complete tears of suprasp, infrasp, and teres minor
Day (2010)[7]	Anterior	Failed multiple attempts under conscious sedation	H-S lesion	CT	Incarcerated LHBT	Biceps tendon incarcerated in the glenohumeral joint

TABLE 2 (continued)

Lead Author (Year)	Direction of Dislocation	Attempt at Closed Reduction?	Associated Fractures	Preoperative Imaging	Block to Reduction	Intraoperative Findings
Connolly (2008)[5]	Anterior	Yes, methodology NR	Nondisplaced bony Bankart lesion	MRI	Incarcerated subscap and LHBT	Complete absence of suprasp and infrasp tendons; subscap and LHBT incarcerated within the joint space, preventing reduction
Guha (2004)[10]	Anteroinferior	Failed in ED under conscious sedation, failed under general anesthesia in OR	H-S lesion	NR	Glenoid impaction of humeral head	Inferior lip of glenoid embedded into superior aspect of humeral head; subscap stretched across humeral neck; suprasp tendon frayed
Davies (2000)[6]	Anterior	NR	GT; compressed in the manner of H-S lesion (intraoperative finding)	NR	Glenoid impaction of GT/humeral head	H-S type lesion involving GT
Mihata (2000)[18]	Anterior	Yes, methodology NR	Fracture fragment interposed between humeral head and glenoid fossa; H-S lesion	CT	Incarceration of bony Bankart lesion in glenohumeral joint	Massive tear of suprasp, infrasp, and subscap tendons

[a]CT, computed tomography; ED, emergency department; GT, greater tuberosity; H-S, Hill-Sachs; infrasp, infraspinatus; LHBT, long head of the biceps tendon; MRI, magnetic resonance imaging; NR, not reported; OR, operating room; RC, rotator cuff; subscap, subscapularis; suprasp, supraspinatus.

TABLE 3
Operative and Postoperative Management[a]

Lead Author (Year)	Surgical Approach	Procedure Description	Implant	Immobilization
Seo (2020)[25]	Arthroscopic, lateral decubitus	(1) Arthroscopic in situ superior capsular reconstruction using the LHBT (2) Arthroscopic double-row rotator cuff repair	(1) 2 suture anchors	Shoulder immobilizer in 30° of ER for 6 wk
Scholten (2017)[24]	Open, deltopectoral	(1) ORIF greater and lesser tuberosities with suture repair of supraspinatus and subscapularis tendons (2) Open biceps tenodesis	(1) 4 4.5-mm cannulated screws with washers (2) Suture anchor	45° abduction brace for 6 wk
Pantazis (2017)[22]	Open, deltopectoral	(1) Biceps tenotomy and tenodesis after reduction (2) Open reduction of glenohumeral joint through subscapularis tenotomy and repair (3) Transosseous repair of greater tuberosity fracture	(1) Suture anchor (2) NA (3) Sutures NR	None
Khedr (2017)[15]	Open, deltopectoral (bilateral)	(1) Bilateral inferior capsulotomies through buttonholed joint capsules (2) ORIF of left greater tuberosity fracture	(1) NA (2) 4 partially threaded cannulated screws (size NR) with washers	Immobilized in adduction for 4 wk

(continued)

TABLE 3 (continued)

Lead Author (Year)	Surgical Approach	Procedure Description	Implant	Immobilization
Wyatt (2015)[30]	Open, deltopectoral	(1) Open biceps tenotomy (2) Open repair of subscapularis and supraspinatus Surgery aborted owing to hemodynamic instability and returned to OR at unspecified later date to perform open repair of posterior aspect of cuff.	(1) NA (2) Suture type NR	6 wk
Frank (2012)[8]	Open, deltopectoral; release of conjoint tendon and superior portion of pectoralis major	(1) Open reduction of shoulder joint with the use of a Steinmann pin in anterolateral aspect of proximal humerus for mechanical leverage to uncoil proximal humerus from nerve. An intact axillary nerve was identified anterior to the humeral neck instead of usual posteroinferior location. (2) Open repair of rotator cuff (superior portion subscapularis and sleeve avulsion of supraspinatus, infraspinatus, and teres minor)	(1) NR (2) No. 5 ultrahigh molecular weight polyethylene sutures (Arthrex) through greater tuberosity bone tunnels	Gunslinger sling for 6 wk
Gudena (2011)[9]	Open, deltopectoral	(1) Completion of biceps tenotomy and tenodesis after reduction (2) Open reduction of right shoulder around tethered musculocutaneous nerve (3) Nonoperative treatment of massive irreparable rotator cuff tear	(1) NR (2) NA (3) NA	Comfort immobilization with immediate PT-guided passive ROM and active-assisted ROM
Day (2010)[7]	Open, deltopectoral	(1) Tenotomy of incarcerated biceps tendon and soft tissue tenodesis to pectoralis major tendon (2) Open reduction of glenohumeral joint (3) Repair of subscapularis and capsulolabral complex	(1) Suture repair (2) NA (3) No. 2 FiberWire (Arthrex)	Immobilization for 2 wk; passive ROM at 2 wk; active IR at 4 wk
Connolly (2008)[5]	Arthroscopic, converted to open (approach NR)	(1) Biceps tenotomy and tenodesis after open reduction (2) Repair of subscapularis tendon Absence of supraspinatus and infraspinatus	(1) NR (2) 2 suture anchors (manufacturer NR)	NR
Guha (2004)[10]	Open (approach NR)	(1) Open reduction of glenohumeral joint (2) Repair of subscapularis and supraspinatus	NR	Immobilization for 2 wk, then ROM with PT
Davies (2000)[6]	Open, lateral deltoid splitting	(1) Open reduction of greater tuberosity with reduction of glenohumeral joint (2) Intraosseous suture repair of greater tuberosity fracture	(1) NA (2) NR	NR
Mihata (2000)[18]	Open, deltopectoral with coracoid osteotomy	(1) Open reduction of incarcerated anterior inferior glenoid rim and glenohumeral joint (2) Bony Bankart repair (3) Repair of supraspinatus tendon (4) Nonoperative treatment of supraspinatus and infraspinatus	(1) NA (2) 2 Herbert screws (manufacturer NR) (3) NR (4) NA	Immobilization for 2 wk; ROM exercises with PT started at 2 wk

*a*ER, external rotation; IR, internal rotation; LHBT, long head of the biceps tendon; NA, not applicable; NR, not reported; OR, operating room; ORIF, open reduction and internal fixation; PT, physical therapy; ROM, range of motion.

TABLE 4
Outcomes and Complications[a]

Lead Author (Year)	Complications	Redislocation	ROM	PROM Scores
Seo (2020)[25]	None	No	"Full"	VAS: 2 ASES: 85 KSS: 88
Scholten (2017)[24]	None	No	FF, 180°; Abd, 180°; ER, 80°; IR, to T11	NR
Pantazis (2017)[22]	None	No	"Full"	Constant: 90
Khedr (2017)[15]	None	No	"Full" ER bilaterally Abd: 170° (right), 160° (left)	NR
Wyatt (2015)[30]	NR	NR	NR	NR
Frank (2012)[8]	Perioperative: axillary and radial nerve palsy Postoperative: ■ 6 wk: marked atrophy of supra- and infraspinatus ■ 8 wk: EMG with brachial plexopathy involving posterior cord without any signs of activity ■ 5 mo: deltoid with active contractions ■ 6 mo: EMG with deltoid and triceps activity ■ 9 mo: posttraumatic arthritis of glenohumeral joint ■ 18 mo: active ROM same as passive ROM	NR	FF, 90°; Abd, 90°; ER, 40°; IR, 70° 4+/5 motor in all muscle groups Full active elbow ROM 30° of wrist extension	NR
Gudena (2011)[9]	Musculocutaneous nerve palsy fully recovered at 3 mo ROM deficiency attributed to absent rotator cuff	No	"Full functional" shoulder ROM	NR
Day (2010)[7]	NR	NR	NR	NR
Connolly (2008)[5]	Dysfunction attributed to rotator cuff insufficiency but no subjective pain or instability	No	NR	NR
Guha (2004)[10]	Limited Abd attributed to humeral head defect. No further operative intervention	No	At 3-mo follow-up: "stable shoulder" with 60° of Abd and functional ROM	NR
Davies (2000)[6]	NR	NR	NR	NR
Mihata (2000)[18]	NR	No	NR	NR

[a]Of note, 10 of 12 studies reported on complications and/or patient-reported outcome data. Abd, abduction; ASES, American Shoulder and Elbow Surgeons; EMG, electromyogram; ER, external rotation; FF, forward flexion; IR, internal rotation; KSS, Korean Shoulder Score; NR, not reported; PROM, patient-reported outcome measure; ROM, range of motion; VAS, visual analog scale.

decision making. While relatively uncommon, they carry significant risk to patient recovery if not properly managed. The only available literature dedicated to acute irreducible shoulder dislocations is in the form of individual patient case reports. The paucity of data guiding their management highlights an opportunity to review this condition retrospectively or prospectively in high-volume trauma centers.

Irreducible shoulder dislocations are heterogeneous in presentation and pathology. In the literature, male patients account for approximately 70%, with a fall as the most common mechanism of injury.[27] These findings are reflected in our study, in which 10 of 12 patients were men and the mechanism of injury was a fall in 7 of 12 patients. In our series, high- and low-energy mechanisms of injury were observed. The age range of our patient population was 34-87 years; no reports involving children were found.

The most common direction of shoulder dislocation was anterior (Table 2), which is reflective of all shoulder dislocations.[4,27] The direction of shoulder dislocation, however, was not predictive of the mechanical block to reduction, specifically the long head of the biceps tendon. Multiple anatomic structures may block reduction, including the long head of the biceps, labrum, rotator cuff, and axillary and musculocutaneous nerves, as well as displaced fracture fragments and Hill-Sachs and bony Bankart lesions. In this review, the long head of the biceps was the most common block to reduction, as seen in 7 of the 12 case reports. In addition to soft tissue blocks, mechanical block by the greater tuberosity should be considered. In 2 studies, arthroscopically assisted reduction was attempted.[5,25] If arthroscopically assisted reduction is to be attempted, we recommended careful assessment of the long head of the biceps tendon, greater tuberosity, and anteroinferior joint capsule.

The majority of closed reduction attempts are successful. Therefore, if a validated reduction attempted by an experienced provider fails, an anatomic block should be suspected. In this case, attempting multiple reductions may not be advisable, as they may propagate or lead to iatrogenic proximal humeral fractures.[13,32]

After failed closed reduction, all 12 patients in our study underwent surgical intervention. Eight had preoperative computed tomography, magnetic resonance imaging, or both to identify the possible block to reduction and associated pathology. In several cases, however, the intraoperative

findings were often more extensive than indicated by the preoperative imaging, which may challenge the value of advanced imaging in these cases. Currently, there are insufficient data to recommend for or against preoperative advanced imaging in the patient with the dislocated shoulder.

The most common surgical option for managing irreducible shoulder dislocations is open reduction of the joint and repair of structures as needed. Arthroscopy may be a valid option as a stand-alone treatment[10] or a diagnostic procedure.[5] Our findings are consistent with prior studies that reported an overall rate between 7% and 32% for rotator cuff tear associated with an anterior shoulder dislocation.[4,14,26] The rate of rotator cuff tear increases substantially with increasing age,[5,26] and repair should be considered at the time of acute operative reduction.

As this review included only case reports, there was substantial variability with reporting of patient outcomes. Three studies reported range of motion measurements, while 3 additional studies indicate "full" functional shoulder range of motion (Table 3). Additionally, just 2 studies cited functional outcome scores. Short- and long-term shoulder dysfunction was, however, noted in the setting of nerve palsies and irreparable rotator cuff tears, respectively. When patients are counseled on the expected outcome of an operatively treated irreducible shoulder dislocation, the pathology specific to the injury should be considered.

There were no cases of recurrent shoulder dislocation. The reason for this may be multifactorial. Namely, with an age range of 34 to 87 years, the patients in this review were older than the typical young and active population. Additionally, all patients in this study required repair of additional structures (e.g. rotator cuff) rather than simple labral repair. Of note, 11 of 12 patients underwent repair via an open approach, which may have played a factor in reducing the incidence of postoperative instability.

Complications were noted in 4 of the 12 patients in this series. These consisted of nerve palsies, rotator cuff dysfunction, and poor range of motion. Axillary, radial, and musculocutaneous nerve palsies were observed, and all resolved over time. This finding is consistent with prior reports, which indicated an overall prevalence of 15.8% to 48% for nerve injuries associated with shoulder dislocations.[2,12,27,28] The axillary nerve is the most common nerve involved, and the risk of nerve injury increases with age.[12] As noted in a review by Avis and Power,[3] most axillary nerve injuries after dislocation resolve spontaneously.

Limitations

There were several limitations to this study. The primary limitation was the small number of patients included, given the rare incidence of irreducible shoulder dislocation. As previously noted, this study included only single-patient case reports. Another limitation was the heterogeneity of patient characteristics, associated injuries, and surgical interventions performed. Certainly, further studies are warranted with adequate follow-up and outcome data. This study searched and analyzed articles in the English language from the Cochrane Database of Systematic Reviews, the Cochrane Central Register of Controlled Trials, PubMed, and MEDLINE in the past 20 years. Additional articles may exist if the language and search within other databases (eg, Embase) were expanded. While older articles may exist, this study aimed to examine current management of the dislocated shoulder. Finally, technique articles were excluded, which may have included clinical data. Among technique articles, 1 was identified that included clinical cases of closed shoulder reduction on 4 patients.[21] However, these cases were successful reductions and therefore did not meet inclusion criteria.

CONCLUSION

A paucity of literature continues to exist on irreducible shoulder dislocations. While we acknowledge that irreducible shoulder dislocation is rare, there was substantial heterogeneity of patient characteristics, clinical course, and postoperative outcomes. Among the studies, the long head of the biceps tendon appears to be the most common block to reduction. When an irreducible dislocation is encountered, we recommend (1) confirming the presence of a block to reduction (eg, soft tissue or bony structure) and (2) considering operative treatment. Better understanding of potential underlying causes of failed closed reduction can help better prepare surgeons for expectations during open reduction and common complications.

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