Trauma Case Reports 28 (2020) 100312

Contents lists available at ScienceDirect

Trauma Case Reports

journal homepage: www.elsevier.com/locate/tcr

Case Report

Posterior shoulder instability due to isolated reverse HAGL lesion in a young gymnast: A rare mechanism of injury and surgical technique

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ARTICLE INFO

Keywords:
Shoulder
Arthroscopy
Reverse HAGL
Instability

ABSTRACT

Humeral avulsion of the inferior glenohumeral ligament (HAGL) is a relatively important cause of shoulder instability, becoming a field of interest in the literature. Reverse HAGL lesions, a rare pathology compared to anterior disruptions; have been documented in only few cases as a notable cause of posterior instability. We describe in detail the mechanism of injury, diagnosis, arthroscopic repair and results.

Introduction

Posterior shoulder instability accounts for only 2% to 10% of cases of shoulder instability reported. Often, acute or repetitive trauma will lead to development of symptoms, and athletes have been described as particular groups at risk [1].

Symptoms are nonspecific and may involve aching pain along the posterior joint line. Rarely, HAGL lesions are in isolation, up to 60% are combined with other pathologies that can delay diagnosis [2].

The term "humeral avulsion of glenohumeral ligaments (HAGL)," was coined by Wolf et al. in 1995 [3]. The humerus is stabilized by various static and dynamic stabilizers of which the most important for anteroposterior stability is the inferior glenohumeral ligament (IGHL) which has the ability to change shape with different positions [4,5].

West Point classification was created by Bui-Mansfield et al. [6] to describe anterior and posterior injuries to the IGHL in 2007: Reverse humeral avulsion of the glenohumeral ligament (PHAGL), posterior bony humeral avulsion of the glenohumeral ligament (PBHAGL) and floating PHAGL.

The diagnosis of reverse HAGL lesion is difficult because of the atypical presentation in our case, unknown mechanism of injury. Concerning the treatment, it is debatable between arthroscopic management or not.

Case report

We present a unique case of a reverse HAGL lesion of the right shoulder in a 26 y.o. previously healthy female pole dancer, caused by a rare mechanism of injury, which was well documented (Fig. 1), due to hyperabduction, traction, and rotation.

Following her injury, she complains of a vague pain in the posterior aspect of the shoulder exacerbated by anterior elevation with scapular pain. A systematic physical exam for laxity and instability was performed and both shoulders were tested for comparison.

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https://doi.org/10.1016/j.tcr.2020.100312
Accepted 16 May 2020

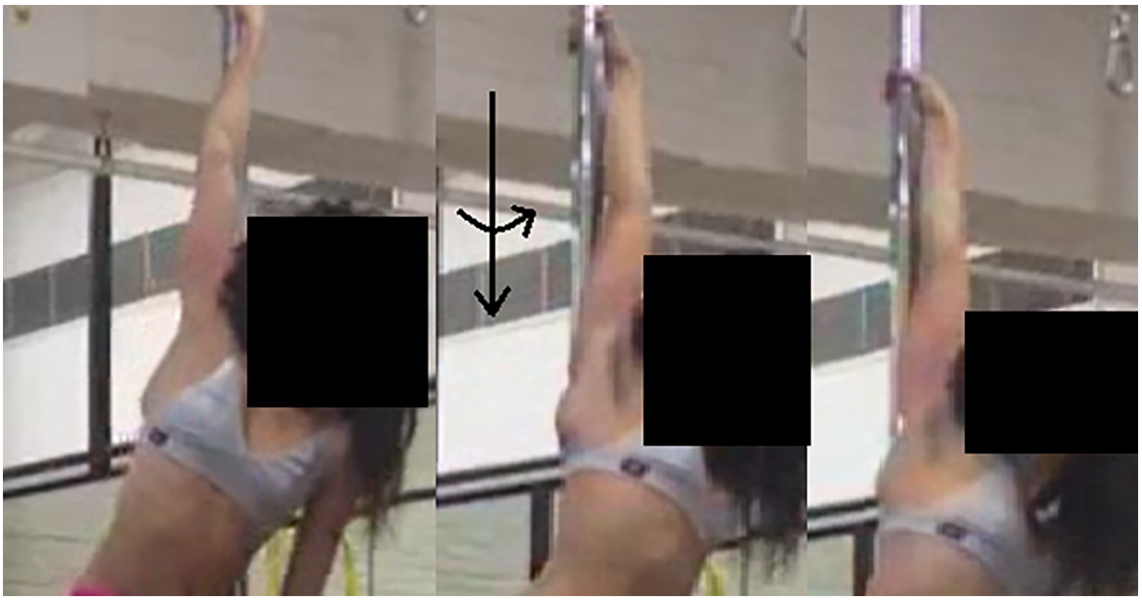

Fig. 1. Mechanism of injury showing hyperabduction, traction and rotation forces applied on the right shoulder moments before injury.

We used the modified Hawkin's classification as modified by Edward Mcfarland; Type A, defined as can reach the rim of glenoid. Type B, defined as can subluxate over the rim. The results were anterior drawer test B, posterior drawer B, O'brien test positive, Jobe test positive, anterior apprehension negative, Neer test negative, Hawkin's test negative, sulcus sign positive. X-rays (Fig. 2) and arthro-MRI (Fig. 3) were done and showed fluid extravasation and posterior (or reverse) HAGL lesion.

Patient underwent forty sessions of physical therapy with no improvement. Therefore, decision to opt for arthroscopic anatomical repair of the posterior inferior glenohumeral ligament was taken.

In the beach chair position, the posterior viewing portal is used followed by the anterior portal. Then an accessory posteroinferior portal is inserted. After identification of the posterior HAGL lesion which was the only lesion in the shoulder, appropriate visualization is necessary of IGHL complex in its entirety, glenoid and humeral head. It was decided to prepare by debridement of the posteroinferior capsule edges and preparation of the humeral footprint with shaver and burr. It was decided not to use a cannula to reach a maximum degree of freedom using the instruments. A double loaded 4.5 mm metallic suture anchor was placed at the footprint.

A spectrum lasso 45° was used to repair the capsule through the accessory portal and through the posterior portal (Video).

The major technical problem is the failure of the remnants ligaments. The anchor stitches were shuttled with PDS because of the

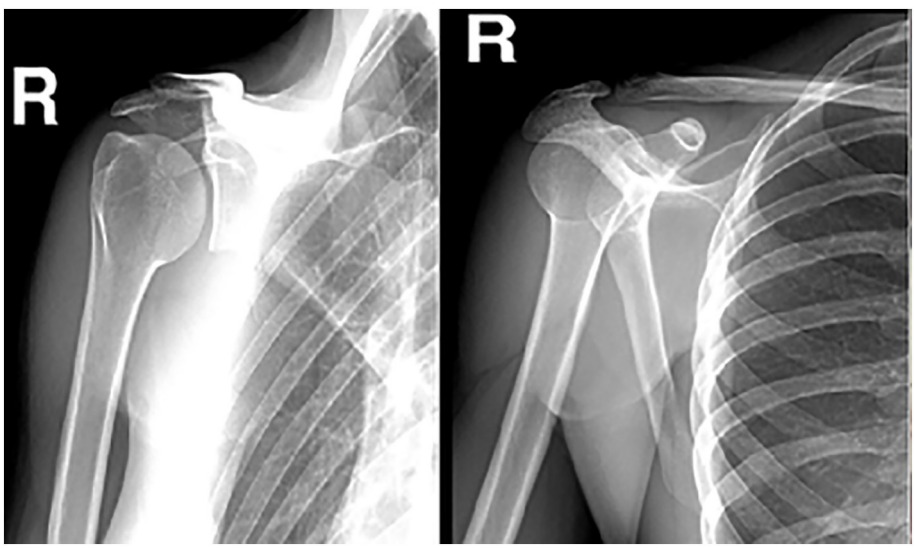

Fig. 2. Pre-operative radiographs of the right shoulder in AP and scapular views showing no bony abnormalities.

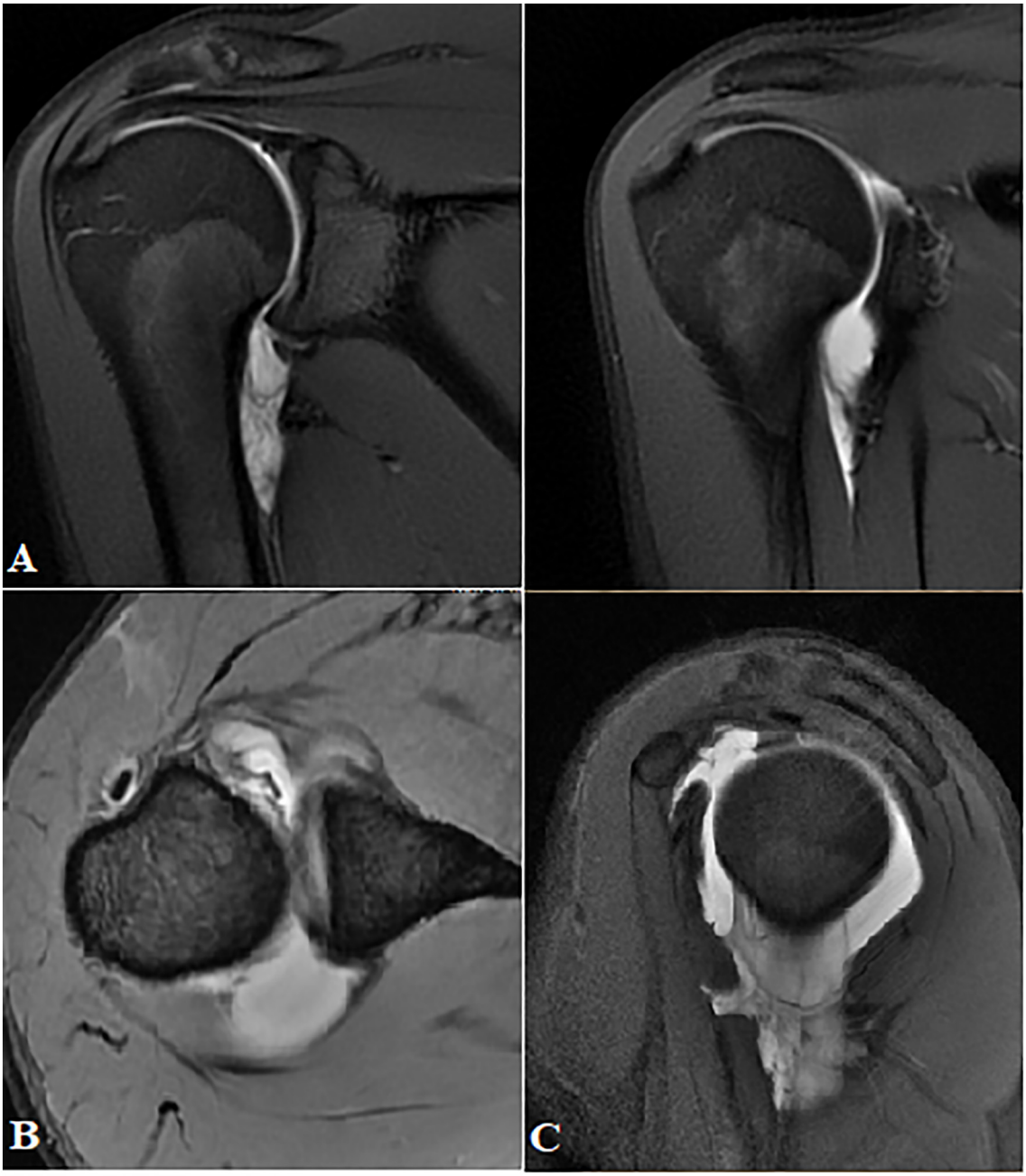

Fig. 3. Arthro-MRI (A) coronal, (B) axial and (C) sagittal cuts showing reverse hagl lesion with extravasation of fluid.

weakness of the tissue. We opted to pass the stitch in transverse plane meaning parallel to the plane of the ligament. This makes the reduction to the bone very difficult and we overtensioned the posterior capsule with two stitches.

Skin was sutured with nylon and patient placed in shoulder immobilizer in adduction and neutral rotation for six weeks.

Physical therapy was initiated at three weeks with progressive passive range of motion with care to avoid posterior loading to protect the repair. Active range of motion was started at six weeks followed by strengthening regimen at eight weeks.

Patient reported minimal numbness over the posterior aspect of the shoulder that recovered progressively. Post-operative X-rays done on six months follow up showed stability of anchor construct on multiple ROM positions (Fig. 4).

Clinically, the patient regained satisfactory ROM of her affected shoulder, is currently asymptomatic and back to normal daily activities (Fig. 5).

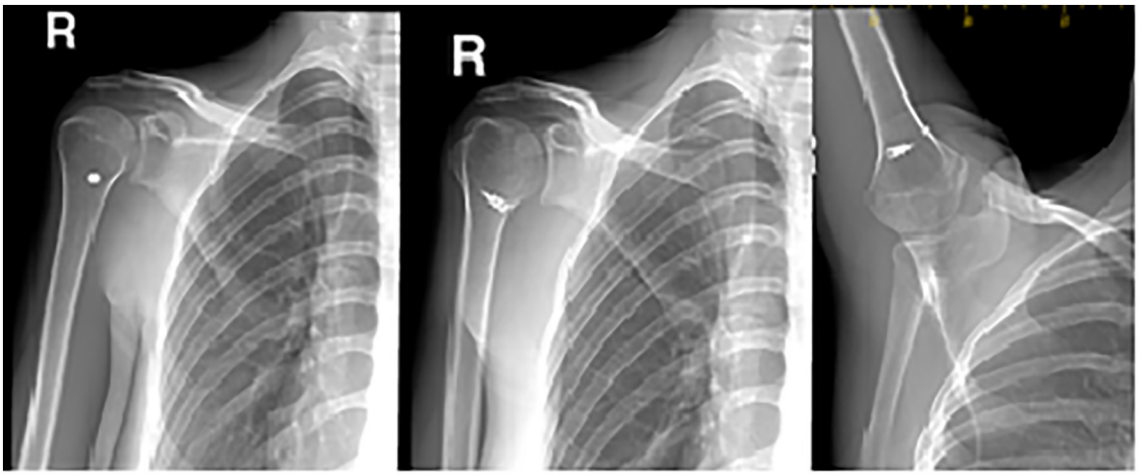

Fig. 4. Follow up X-rays of the right shoulder showing construct and anchor stability on multiple ROM positions.

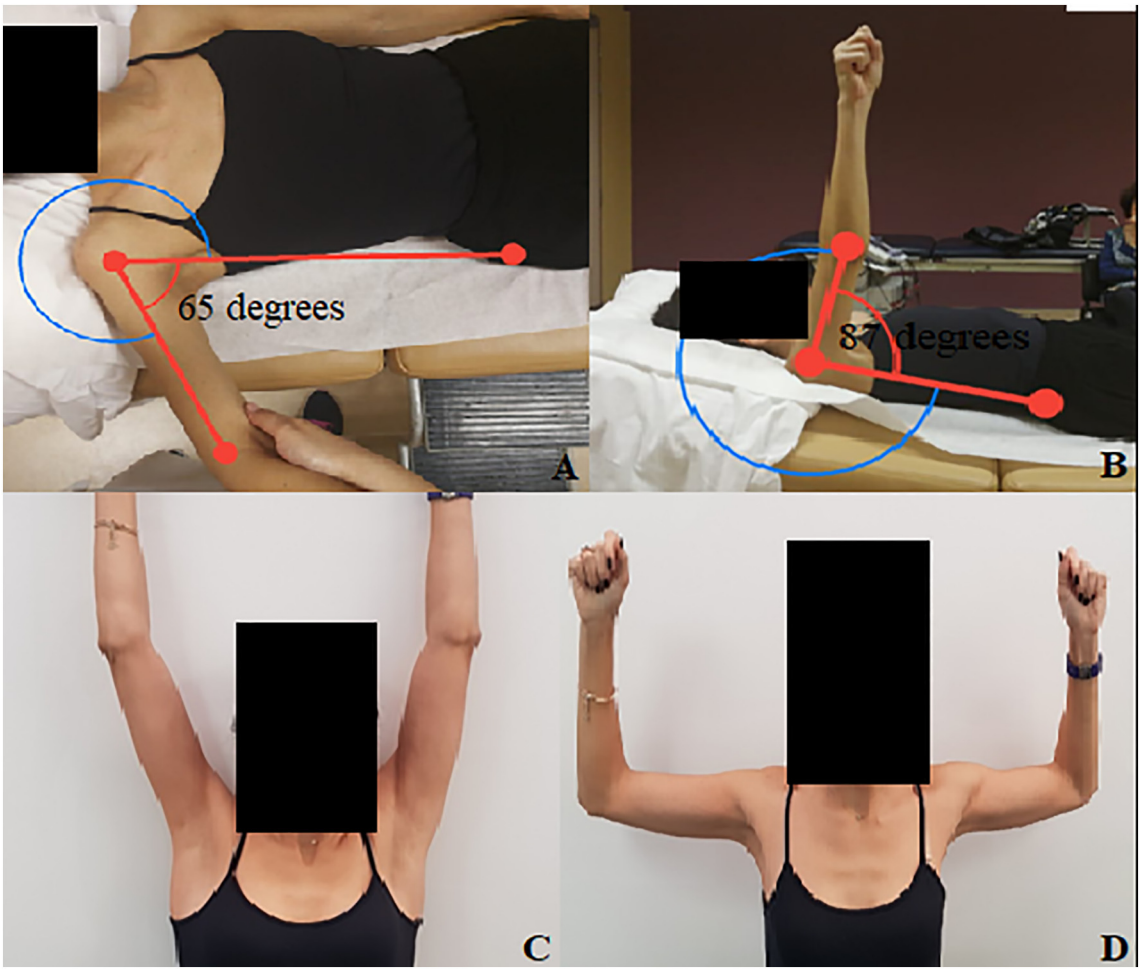

Fig. 5. Six months post op follow up showing important clinical improvement with return of almost full ROM of the shoulder.

Discussion

The HAGL lesion is a source of instability and pain which causes frequently instability in the anterior position more often than posterior [7]. The main clinical presentation on physical exam is posterior shoulder pain remains inconclusive. Originally described by Wolf et al. [3] as humeral avulsion of the glenohumeral ligament, now is more recognized due to advances in arthroscopy and imaging techniques. Reverse HAGL lesions remain scarcely reported in the literature. Bui-Mansfield et al. [6] created the West Point classification system to describe HAGL lesions which are divided into 1 of 6 categories based on anterior or posterior involvement, the presence or absence of bony avulsion, and the presence of associated labral pathology.

Bigliani et al. [8] assessed the tensile properties of the IGHL in a cadaveric model, which concluded that the posterior band is the weakest of the complex. This was confirmed as well by another study by Ticker et al. [9]. Due to its association with other injuries, the diagnosis is often difficult to make on MRI, and it is recommended to use arthro-MRI with gadolinium [10]. In the literature, it is recommended to do arthroscopic repair of reverse HAGL lesions, especially if posterior capsule weakness is present, as it is superior to conservative therapy. In our case, we were able to repair the defect with three arthroscopic portals despite the tight space in the posterolateral shoulder.

Conclusion

In conclusion, a high level of suspicion should be maintained for a posterior HAGL lesion, even though it is uncommon, that may present with vague shoulder pain after a traumatic injury in a young athletic patient. ArthroMRI with contrast is necessary to make the diagnosis. Surgical repair is advised in a young, active patient to optimize shoulder stability. A minimally invasive arthroscopic repair has minimal disadvantages, including difficulty of visualization. The repair can be performed in an open manner but it would necessitate an extensive exposure and has high risk of injury of neurovascular structures, particularly the axillary nerve in the quadrangular space.

Supplementary data to this article can be found online at https://doi.org/10.1016/j.tcr.2020.100312.

Declaration of competing interest

All the authors declare no conflict of interest regarding the publication of this article.

References

[1] B.D. Owens, M.L. Duffey, B.J. Nelson, et al., The incidence and characteristics of shoulder instability at the United States Military Academy, Am. J. Sports Med. 35 (7) (2007) 1168–1173.
[2] T. Brown, R. Shane Barton, F.H. Savoie, Reverse humeral avulsion glenohumeral ligament and infraspinatus rupture with arthroscopic repair: a case report, Am. J. Sports Med. 35 (2007) 2135–2139.
[3] E.M. Wolf, J.C. Cheng, K. Dickson, Humeral avulsion of glenohumeral ligaments as a cause of anterior shoulder instability, Arthroscopy. 11 (1995) 600–607.
[4] S.J. Turkel, M.W. Panio, J.L. Marshall, F.G. Girgis, Stabilizing mechanisms preventing anterior dislocation of the glenohumeral joint, J. Bone Joint Surg. 63A (1981) 1208–1217.
[5] N. Pouliart, O. Gagey, Reconciling arthroscopic and anatomic morphology of the humeral insertion of the inferior glenohumeral ligament, Arthroscopy. 21 (2005) 979–984.
[6] L.T. Bui-Mansfield, K.P. Banks, D.C. Taylor, Humeral avulsion of the glenohumeral ligaments: the HAGL lesion, Am. J. Sports Med. 35 (2007) 1960–1966.
[7] M.S. George, M. Khazzam, J.E. Kuhn, Humeral avulsion ofglenohumeral ligaments, J. Am. Acad. Orthop. Surg. 19 (2011) 127–133.
[8] L.U. Bigliani, R.G. Pollock, L.J. Soslowsky, et al., Tensile properties of the inferior glenohumeral ligament, J. Orthop. Res. 10 (2) (1992) 187–197.
[9] J.B. Ticker, L.U. Bigliani, L.J. Soslowsky, et al., Inferior glenohumeral ligament: geometric and strain-rate dependent properties, J. Shoulder Elb. Surg. 5 (4) (1996) 269–279.
[10] B.J. Rebolledo, B.U. Nwachukwu, G.P. Konin, S.H. Coleman, H.G. Potter, R.F. Warren, Posterior humeral avulsion of the glenohumeral ligament and associated injuries: assessment using magnetic resonance imaging, Am. J. Sports Med. 43 (2015) 2913–2917.