CASE REPORT

Isolated rupture of teres major in a goalkeeper

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SUMMARY

A complete rupture of the teres major is an extremely rare injury and rarely described in the literature. We report the first case of an isolated rupture of the teres major in a professional football goalkeeper. The diagnosis requires a high degree of suspicion and complementation by image examinations. Conservative treatment has a high success rate with early return to sport.

BACKGROUND

The teres major composes the shoulder posterior musculature, performing adduction, extension and internal rotation, often in conjunction with the latissimus dorsi.^{1–3}

A variety of injuries has been described in athletes who use their upper limbs. However, isolated injuries of the teres major are extremely rare and there are few cases described in the literature, occurring predominantly in baseball players.^{2 4 5}

The objective of this case report is to present the first description of an isolated rupture of the teres major in a professional football goalkeeper, as well as the procedures performed for diagnosis and treatment of this injury.

CASE PRESENTATION

A 33-year-old man, a right-handed professional football goalkeeper, presented with pain in the posteroinferior aspect of the right shoulder after throwing a ball during a football match (figure 1). He remained playing until the end of the match with pain exacerbation and mild limitation of movements.

The next day he sought medical attention. He had no history of previous injuries or symptoms before the current injury in the right shoulder.

Physical examination revealed swelling and slight ecchymosis in the posteroinferior aspect of the shoulder. The range of motion was preserved; functional tests of the right shoulder rotator cuff were normal. No evidence of shoulder instability was found. However, sensitivity and pain during palpation in the scapular region radiating to the axilla and during resisted extension were present (figure 2).

Based on the clinical history and physical examination findings, the diagnostic hypothesis of a teres major injury was made.

Radiographic trauma series for shoulder demonstrated no evidence of injuries or bone avulsion. MRI of the chest with bilateral shoulder inclusion revealed a complete teres major tendon rupture,

with myotendinous retraction. No latissimus dorsi injury was demonstrated (figure 3).

Conservative treatment with PRICE protocol (protection, rest, ice, compression and elevation) was initiated and, after 1 week, the patient presented with exacerbated local oedema. Ultrasonography (US) showed mild bruising in the affected area (figure 4). US-guided puncturing aspirated approximately 38 cc of blood (figure 5). This was followed by rehabilitation with physiotherapy to gain range of motion and strength.

In the second week of the rehabilitation programme, the patient did not have pain, and had good mobility and recovery of strength. We performed an US evaluation, which showed reduction of haematoma and teres major muscle stabilisation (figure 6).

The patient returned to competition level football, with no pain and no functional limitation, after 18 days.

INVESTIGATIONS

Radiographic trauma series for the shoulders demonstrated no evidence of injuries or bone avulsion. US allowed dynamic shoulder images as well as clinical follow-up of the injury. MRI of the chest with bilateral shoulder inclusion is the golden standard for this type of muscular injury. US for clinical control after 2 weeks showed a decrease of haematoma and stabilisation of the muscle stump.

DIFFERENTIAL DIAGNOSIS

A professional football goalkeeper, presenting with pain, swelling and slight ecchymosis in the posteroinferior aspect of the right shoulder after throwing a ball during a football match, may have a muscular injury, such as tearing or stretching, or rotator cuff tear. Clinical history details, physical examination and appropriate imaging studies determined an accurate diagnosis. The choice between conservative or surgical treatment will impact directly on the athlete's performance and his return to sport. Therefore the correct diagnosis and early treatment allows better outcome in these patients.

TREATMENT

Conservative treatment with PRICE protocol and early rehabilitation protocol with physiotherapy helped our patient gain range of motion and strength.

The rehabilitation protocol for muscle injuries was conducted in four stages. Initially, it was a short period of immobilisation using a sling. This rest period allowed the scar tissue to reconnect with the muscle failure (5 days). The second phase

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Figure 1 Exact moment of injury—goalkeeper-throwing mechanism.

began with early mobilisation, which induced an increase in local vascularisation in the lesion area, better regeneration of the muscle fibres and better parallelism of regenerated myofibril orientation, in relation to movement restrictions. The evolution of the mobilisation phase occurred during the first week, using isometric contraction, passing by the isotonic contraction and ending with isokinetics. At the third stage, there was unrestricted functional participation with the goal of increasing strength, power, endurance and neuromuscular control. Finally, in the last phase there was a return to activities with sport-specific functional movements.

OUTCOME AND FOLLOW-UP

The patient returned to the competition level with no pain or functional limitation within a period of 18 days.

US was performed after 2 weeks, showing a decrease of haematoma and stabilisation of the muscle stump.

At 1-year clinical follow-up, the patient had no functional limitations or pain.

DISCUSSION

The teres major muscle is part of the girdle of the posterior shoulder muscles. It has a rectangular form and arises from the dorsal surface of the inferior angle of the scapula and is inserted in the medial edge of the bicipital groove in the posterior

portion of the humerus. The lower subscapular nerve (C5 and C6) supplies the innervation, and its blood source is derived from branches of the subscapular artery.¹ The teres major has its muscle fibres often confluent with the latissimus dorsi, especially near its insertion in the humerus. Functional muscle individualisation is difficult and it is sometimes considered to be a conjoined tendon.²

Electromyography studies have analysed and documented the function of the latissimus dorsi during sports activities. This muscle has maximum activity during the initial acceleration phase in baseball pitch preparation and culminates with the release of the baseball by the pitcher, or in contact of the racket with the ball in tennis. However, no previous study has been conducted to evaluate the function of the teres major during sports movement. Action is considered analogous to the latissimus dorsi given the anatomical relationship and the identical function of these muscles; as in adduction, extension and internal rotation are only present in movement against resistance, and are synergistic to movements performed by the latissimus dorsi, making the activity of these muscles analogous to a single motor unit.^{3 4}

A full and isolated rupture of the teres major is an extremely rare injury with few cases reported in the literature, occurring in baseball players—mostly pitchers.^{2 5–7} The tight anatomical relationship between latissimus dorsi and teres major makes the

Figure 2 Physical examination: (A) anterior aspect of the shoulder and (B) posterior aspect of the shoulder, showing some deformity (arrows).

Figure 3 T2 fat-suppressed MRI after injury. (A) Increased signal in the body of the teres major (arrow) demonstrating hypersignal on posterior medial region of humerus to bicipital groove on the axial sequence. (B) Angled coronal MRI showing a hypersignal on the myotendinous region of the teres major with muscle retraction (arrow).

Figure 4 Ultrasonography: myotendinous tear of the teres major (arrow) and cavity from retracted fibres fills with blood/haematoma (H).

distinction between the injuries of these two muscles hard, occurring more frequently in the latissimus dorsi or simultaneously.⁶

Malcolm *et al*² first described an isolated teres major injury in a baseball player. Conservative treatment was proposed and the athlete underwent serial MRI demonstrating persistent retraction of the tendon and the absence of healing. However, 6 months after the injury, the athlete returned to compete at his previous level without pain and with no sequelae. Schickendantz *et al*⁶ reported a series of 10 professional baseball athletes with teres major or latissimus dorsi injury. All the patients underwent conservative treatment, returning to the sport after proper rehabilitation protocol. Other isolated injury cases have been reported in different sports activities, one in a tennis player,⁸ one in a professional boxer,⁸ and the two other lesions in jet-skiers.⁵⁻⁷ However, there have been no reports of this type of injury in football goalkeepers.

The initial presentation of these injuries was similar in all the descriptions, including in that presented in this case report. The clinical presentation begins with a sudden and severe pain in the posteroinferior region of the shoulder radiating to the axilla after a sudden movement without the occurrence of prodromal symptoms. On physical examination, there is an oedema in the muscle topography possibly due to the presence of bruising in the axillary region. There is a decrease in the range of motion with pain during active movement. Muscular tests in extension, adduction and internal rotation against resistance demonstrate the functional inability of the latissimus dorsi and teres major. Palpable tumours in the region may be present due to muscle retraction. The remaining physical examination of the upper limb for rotator cuff injury, instability and glenohumeral pathology is normal. There is no specific test to confirm the diagnosis yet, making it necessary to proceed with imaging testing.⁵⁻⁹

Figure 5 Ultrasonography-guided puncturing.

The diagnosis is confirmed using imaging, which must be performed to exclude other possible aetiologies. A radiography trauma series is used to exclude bone avulsion injuries.¹⁰ US provides important information at low cost, has easy availability and allows dynamic shoulder images as well as clinical follow-up of the injury. Finally, the examination most chosen for muscle injuries is MRI. It is important to know that the examination request on their standard protocol may confuse or even harm the diagnosis, considering that the injured muscle is located on the periphery of the resonance sections and may not show the injury. Therefore, upper chest MRI including the shoulders bilaterally and without contrast should be the examination required to make the diagnosis.¹¹ Leland *et al*¹² believe that the low prevalence of these injuries may be due to their difficult visualisation in the examination requested within standard shoulder injury protocol.

Owing to the low prevalence of isolated injuries of the teres major, there is no consensus for the treatment performed. Only two surgical cases have been reported in the literature, and in the first case, the author does not recommend surgery once good functional outcome has been obtained.¹⁰⁻¹² The majority of the cases have shown excellent results with conservative treatment, with a short break and analgesia followed by a variety of rehabilitation protocols and progressive training of athletic gestures.²⁻⁶⁻⁷ A return to sport came to the pre-injury level within approximately 3 months.⁶⁻¹²

Figure 6 Ultrasonography after 2 weeks showing the decrease of haematoma and stabilisation of the muscle stump (arrow).

We chose non-surgical treatment with PRICE protocol for 1 week. Thus, we noticed a moderate exacerbation in the oedema and persistent pain during shoulder range of motion. An aspiration of haematic liquid aided by a dynamic US was performed. We continued with our rehabilitation protocol in four stages, and the patient returned to competition level without pain and with no functional limitation in 18 days.

Learning points

- Request the appropriate examinations based on shoulder injury.
- Conservative treatment with PRICE protocol (protection, rest, ice, compression and elevation) in complete muscular injury gives a good clinical result.
- Early rehabilitation of athletes with physiotherapy to gain range of motion and strength allowing return to sports with the same level of competition is essential.

Competing interests None declared.

Patient consent Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

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