CASE REPORT

Traumatic rupture of the brachialis muscle in a 52-year-old man

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SUMMARY

The authors report an isolated rupture of the brachialis muscle in a 52-year-old man who suffered a hyperextension injury to his left elbow after a fall. Clinical examination combined with conventional radiographs, ultrasound and MRI, confirmed the diagnosis. The patient was treated conservatively and had a return to full function.

BACKGROUND

Isolated tears of the brachialis muscle are rare injuries and have not been well documented.¹ Our review of the literature revealed only nine cases of post-traumatic rupture. The extreme rarity causes misdiagnosis of this injury² and the consequent mistake with rupture of the distal insertion of the biceps brachii.^{3 4} We briefly provide a review of the current literature reporting clinical presentation, imagiological features, recommended treatment, anatomy of the brachialis muscle and the previously reported cases.

CASE PRESENTATION

We present a case of a right-handed 52-year-old man, a photographer, who presented to our emergency department with pain in the left elbow after a fall with hyperextension of the elbow a week prior. At the time of injury, he felt a sudden snapping in his left elbow with immediate pain and weakness. On presentation, the patient denied any associated symptoms such as numbness or paraesthesia of the left upper extremity, or the existence of previous injuries to the elbow.

An ecchymosis and a mass on the medial surface of the distal aspect of the arm and the proximal forearm (figure 1) were observed. A firm, mobile and not pulsating mass measuring about 20 mm was also observed in the distal arm. The examination revealed a full range of motion of the upper extremities, but with enhanced pain on the medial aspect of the elbow with resisted flexion and supination of the elbow, and on extension beyond 30°. No neurological or vascular abnormalities were found. Motor examination showed strength of 5/5 throughout, except for flexion of the elbow, which was rated 4/5. The remaining physical examination was normal.

INVESTIGATIONS

Plain radiographs of the elbow revealed no fracture, dislocation or joint effusion. Ultrasound demonstrated a non-homogeneous structure of low echogenicity at the humeral attachment of the brachialis

Figure 1 Ecchymosis in the medial surface of the arm and elbow, caused by rupture of the brachialis muscle.

muscle, measuring about 43.5 mm (figure 2). MRI without contrast medium demonstrated a linear defect in the proximal brachialis muscle with decreased signal on T1-weighted images, and corresponding to the plane of cleavage and the retracted muscle fibres (figures 3A and 4). A small fracture of the tip of the coronoid process of the ulna that could not be seen on the radiographs was also demonstrated by MRI (figure 3B).

DIFFERENTIAL DIAGNOSIS

The biceps brachii, triceps and pronator teres muscles were intact.

TREATMENT

Treatment was non-operative, with the affected arm immobilised for 2 weeks using a Mesh Arm Sling. Subsequently, the patient began a progressive ROM and strengthening programme.

OUTCOME AND FOLLOW-UP

Outpatient follow-up showed a gradual decrease in pain and improvement in function of the arm with full strength recovery 12 weeks after the traumatic event. At that time, the mass size was unchanged but with no tenderness or erythema. One year after the initial presentation, the mass was smaller (about 10 mm) and non-tender, and the findings on physical examination were otherwise normal.

DISCUSSION

Muscle injuries are common and can usually be diagnosed on the basis of medical history and physical examination.⁵ Opinion is divided among authors and no consensus has been reached on the morphology and anatomy of the brachialis muscle,

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Figure 2 Ultrasound demonstrating a non-homogeneous structure of low echogenicity at the humeral attachment of the brachialis muscle, measuring 43.5 mm×10.1 mm in the greatest transverse dimensions.

Figure 3 Sagittal T1-weighted MRI showing a rupture of the brachialis muscle, measuring 40 mm in greatest diameter (A), and a fracture of the tip of the coronoid (B).

or even on its function. Loukas *et al*⁶ and Ishizawa *et al*⁷ describe medial, lateral and accessory or anomalous heads that lie behind the biceps brachii and a distal portion that inserts on the anterior surface of the coronoid process of the ulna. Leonello *et al* differ from the current literature by demonstrating the consistent presence of two heads of the brachialis: a superficial and a deep head. The first has the mechanical advantage of a more proximal origin and a more distal insertion, which may enable it to provide the bulk of flexion strength. The deep head has a more anterior insertion on the coronoid, which may facilitate the initiation of elbow flexion from full extension.⁸ However, injury to the brachialis muscle is rare, and a seldom discussed cause of elbow pain. The rarity of injury, the conflicting thoughts about the function and the normal anatomy of this muscle make the diagnosis of these lesions a tough challenge.⁹ Some reports, such as on isolated necrosis of the brachialis due to exercise,¹⁰ atraumatic rupture,^{11–13} and tuberculous abscess of both the brachialis and biceps¹⁴ muscles, have been described, but, to the best of our knowledge, only nine cases of traumatic rupture are reported in the literature.^{1 2 13–17} We report a case of a rupture in a 52-year-old man who presented with pain, a palpable mass and a decrease on flexion strength of the elbow after a fall on his outstretched arm. The diagnosis of

Figure 4 Intermediate-weighted axial MRI through the upper arm showing haemorrhage within the deep portion of the brachialis muscle.

brachial rupture was made by ultrasound and MRI. Follow-up showed a gradual decrease in pain and improvement in function of the arm with full strength recovery 12 weeks after the traumatic event. Ruptures of the brachialis muscle, although uncommon, should be considered in the differential diagnosis for post-traumatic elbow pain. The presentation may mimic other injuries such as distal tears of the biceps brachii.^{3 4} Ultrasound is the first modality of choice for diagnosing tendon or muscular ruptures and, in equivocal cases, MRI, which can demonstrate acute as well as chronic muscle tears, can be carried out for the definitive diagnosis. Although there are very few cases reported in the literature, we believe that most brachialis muscle ruptures can be treated conservatively with early mobilisation.

Learning points

- Isolated tears of the brachialis muscle are extremely rare.
- Clinical examination combined with conventional radiographs, ultrasound and MRI, are essential to the correct diagnosis.
- The treatment is non-operative, with full recovery.

Competing interests None declared.

Patient consent Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

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