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MRI Findings in Long Head Biceps Tendon Rupture with Popeye Deformity

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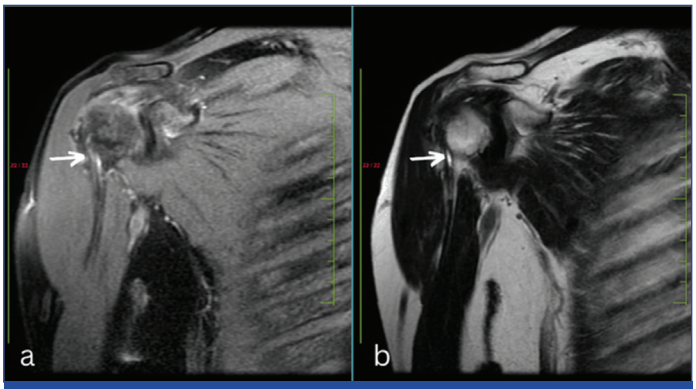
A 56-year-old woman presented to the orthopaedic outpatient clinic with acute pain and a visible bulge in her right upper arm following a heavy lifting incident two days prior. On clinical examination, there was weakness during elbow flexion and a prominent soft-tissue swelling that became more pronounced with flexion, suggestive of Popeye's sign [Table/Fig-1]. The Hook test for distal biceps tendon rupture was negative. Plain radiographs were unremarkable.

MRI was performed on a 3T scanner using T1-weighted, T2-weighted, and Proton Density Fat-Saturated (PDFS) sequences in axial, coronal, and sagittal planes. The Long Head of the Biceps Tendon (LHBT) was thinned with hyperintensity within the tendon substance in the bicipital groove, suggesting a partial tear with minimal peritendinous fluid [Table/Fig-2]. The short head of the biceps tendon appeared intact [Table/Fig-3]. Additional findings included a hyperintense signal in the distal subscapularis tendon proximal to its insertion, consistent with a sprain [Table/Fig-4a]. The supraspinatus tendon exhibited signal changes and mild peritendinous fluid, suggestive of tendinosis or partial tearing [Table/Fig-4b]. The infraspinatus muscle showed fatty atrophy with volume loss [Table/Fig-5]. Osteophytes and subchondral cysts were noted at the greater tuberosity [Table/Fig-6].

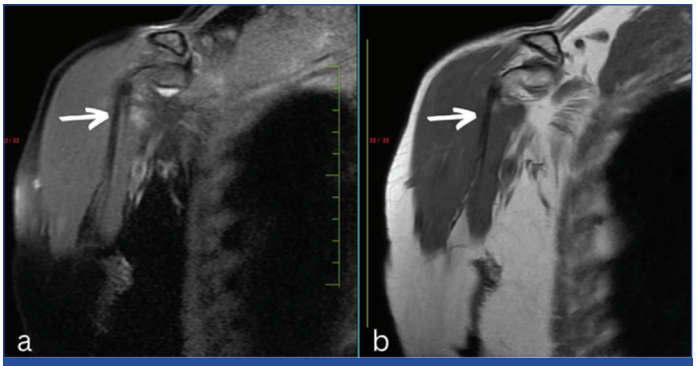
[Table/Fig-1]: Patient is in sleeping position with a semi flexed right shoulder and elbow showing a swollen deformity in the arm (Popeye's sign).

The patient was managed conservatively with NSAIDs, physiotherapy, and shoulder-strengthening exercises. Surgical repair was deferred in light of mild symptoms and patient preference. The patient was followed up six months later, there was significant symptomatic improvement with resolution of pain and restoration of functional use of the arm in daily activities. On clinical examination, the Popeye's sign persisted as a visible cosmetic deformity; however, there was no associated weakness in elbow flexion or forearm supination, and the patient regained almost complete range of motion.

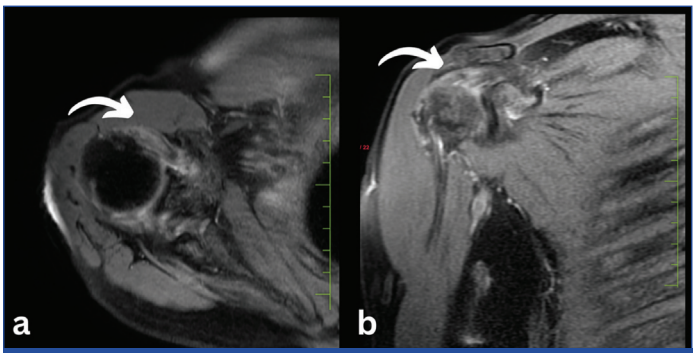
Popeye's sign is a well-recognised clinical deformity that often causes more concern to physicians than patients, typically indicating a rupture of the LHBT [1].



[Table/Fig-2]: MRI: Proton density fat saturated: a) and T2WI; b) Coronal sections showing thinning of the long head of biceps tendon and intra substance hyperintensity in its proximal part and minimal peritendinous fluid.

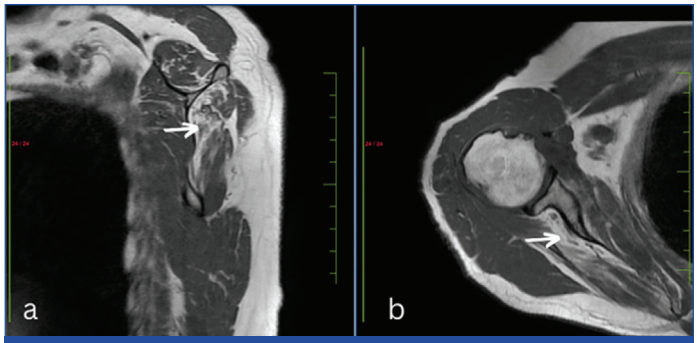


[Table/Fig-3]: MR: Proton density fat saturated: a) and T1WI; b) coronal sections showing a normal tendon of short head of biceps brachii muscle arising from the apex of coracoid process with no intra substance or peritendinous hyperintensity.

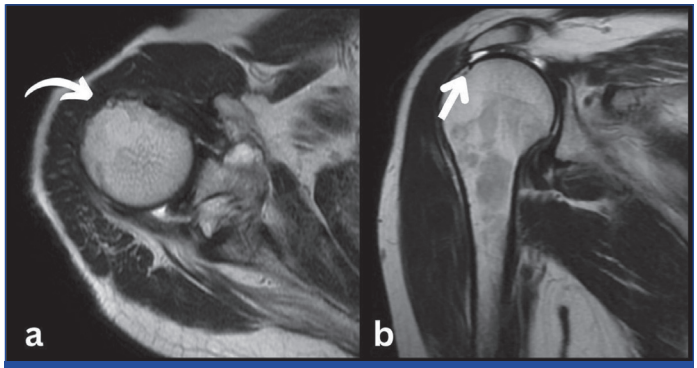


[Table/Fig-4]: a) MRI Proton Density Fat-Saturated (PDFS) axial image showing hyperintensity in the distal part of subscapularis tendon proximal to its insertion into the lesser tubercle of humerus indicative of a sprain; b) MRI PDFS coronal section showing hyperintensity at the insertion of supraspinatus muscle tendon in the greater tubercle of the humerus.

Several differential diagnoses must be considered when evaluating anterior arm swelling. These include rupture of the short head of the biceps, muscle belly tears, haematoma, and soft-tissue tumours [1]. In our case, MRI showed an intact short head muscle and



[Table/Fig-5]: MRI T1W sagittal: and b) axial images demonstrating the fatty atrophy of the infraspinatus muscle.



[Table/Fig-6]: MRI T2W a) axial and b) coronal images demonstrating the sub-chondral cyst (curved arrow) and osteophytes along the greater tubercle.

tendon, excluding this differential. Haematomas typically appear as heterogeneous fluid collections following blunt trauma [2]. MRI is the gold standard for tendon evaluation due to its high soft-tissue contrast, multiplanar capability, and ability to assess adjacent rotator cuff structures. Partial LHBT tears present as thinning, increased intrasubstance signal, and peritendinous fluid without discontinuity, whereas full-thickness tears show tendon retraction or absence [3].

In this case, the patient responded well to conservative treatment. At 6-month follow-up, she had no pain or strength deficit, and MRI was not repeated due to clinical resolution.

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