Sonographic findings of extensor digiti minimi triggering caused by thickened extensor retinaculum

Jyoti Panwar · Binu P. Thomas · Raveendran Sreekanth

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Abstract Trigger finger is a common well recognized condition and involves the flexor tendons at the A1 pulley in the palm. Triggering of the extensor tendons is a very rare clinical entity. We report a rare case of extensor triggering of little finger caused by constriction of the extensor digiti minimi by a markedly thickened extensor retinaculum (ER) at the wrist, well delineated dynamically by real-time high-resolution ultrasound. The patient underwent release of thickened ER and was asymptomatic immediately.

Keywords Extensor · Tendon · Trigger · Retinaculum · Ultrasound

Sommario Il dito a scatto è una condizione frequente, ben riconosciuta, che coinvolge i tendini flessori a livello della puleggia A1. A livello dei tendini estensori è un'entità clinica molto rara. Riportiamo un raro caso di dito a scatto dell'estensore del mignolo causato da un marcato ispessimento del retinacolo degli estensori (ER) a livello del polso, ben evidenziato con ecografia dinamicamente ad alta risoluzione. Il paziente è stato sottoposto a intervento con

resezione dell'ER ispessito con conseguente, completa, risoluzione della patologia.

Introduction

Trigger finger is a painful or painless snapping or locking of fingers of hand sometimes associated with audible pop [1]. In most of the cases, thickened and inflamed A1 pulley cause blockage of the flexor tendons at the level of metacarpal head [1, 2]. Triggering caused by involvement of extensor tendon is very rare. Only few case reports describe the impingement of an extensor tendon within the extensor retinaculum (ER) resulting in trigger [3–5]. There are a few reports on sonographic evaluation of trigger fingers describing only about the flexor tendon involvement [6]. We have not come across any report in the literature on real-time ultrasound (US) imaging in the diagnosis of extensor tendon triggering. So we report the real-time sonographic findings of extensor triggering of little finger, where the impingement of the extensor digiti minimi tendon on the localized thickened ER at the wrist was identified. Localization of the site of constriction by this method allowed the hand surgeons to surgically correct the problem by dividing the ER at the site of constriction.

Case report

A 30-year-old man presented to our hand surgery OPD with an audible and painful “pop” when he attempted to extend his little finger. The symptoms progressively worsened over the course of 3 months when the patient came to the hand surgery clinic. On examination, the A1

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J. Panwar (✉)
Department of Radiology, Christian Medical College and Hospital, Vellore 632004, Tamil Nadu, India
e-mail: drjyotimch@rediffmail.com

B. P. Thomas · R. Sreekanth
Department of Hand and Leprosy Reconstructive Surgery (HLRS), Christian Medical College and Hospital, Vellore, Tamil Nadu, India

pulley was found neither thickened nor tender. On palpation, a poorly localized snap could be felt over the dorsum of the hand. With the diagnosis of an extensor tendon triggering in mind, an ultrasound was ordered, along with blood glucose levels, rheumatology work-up and radiographs of the hand. The blood investigation and radiographs were normal.

US of left hand was performed using a high-frequency US scanner with a dedicated 5–14 MHz probe (ACUSON S1000™, Siemens Medical Solutions, USA). Systematic evaluation of flexor tendons and pulley system, extensor tendons with their tendon sheath and overlying ER was performed. Focal marked thickening and hypoechogenicity of the ER overlying the extensor digiti minimi were seen. The thickening measured 2.5 mm in maximum thickness (Fig. 1). There was no increased vascularity of the ER on power Doppler imaging. Two tendons of extensor digiti minimi with mild thickening were seen when compared to normal side (Fig. 2). The normal fibrillar echogenic pattern of involved tendon was maintained. Then the patient was

Fig. 1 Sagittal sonographic view of a trigger little finger showing focal marked thickening of the extensor retinaculum (ER) (white arrows) causing constriction of extensor digiti minimi tendon (T)

Fig. 2 Transverse sonographic views of a normal right (a) and trigger left little finger (b) at the level of dorsal wrist showing focal thickening of ER (arrows) in image b as compare to normal in a, impinging upon the extensor digiti minimi tendons (T). There is

asked to reproduce the snap and while the patient was performing the exact movement that usually leads to the snap, the probe was held against the 5th extensor compartment. This dynamic real-time US was performed in both transverse and longitudinal planes and it showed an abnormal displacement of the extensor digiti minimi tendon against the thickened ER which was narrowing the available space for the tendon (Video clips 1, 2). Thus the dynamic US helped in making the final diagnosis of extensor digiti minimi triggering by thickened ER and the level of the lesion was identified.

The patient underwent release of thickened ER with a 2-cm transverse incision over the site of triggering under “awake” local anaesthesia (Fig. 3). The thickened sheath was “de-roofed” and synovial proliferation removed, freeing the two extensor tendons of the 5th extensor compartment. Following de-roofing of the retinaculum, the patient immediately became asymptomatic as was confirmed by asking the patient to extend the finger on table itself. The incision was closed with 5-0 Ethilon™ (Ethicon, Johnson & Johnson, Aurangabad) and a temporary wrist splint applied. The patient underwent regular hand therapy for a week after which the splint was discontinued and sutures removed. The patient remains asymptomatic on follow-up.

Discussion

Trigger finger is a relatively common condition encountered by hand surgeons and rheumatologists [2]. It generally causes painful locking of fingers on frequent flexion and extension movements of the fingers [1]. When there is discrepancy between the volume of tendon sheath and its contents, it leads to narrowing of passage of tendon and resultant restricted movement of the tendon through the

downward extension of thickened ER (star) in between the tendons. Note the presence of two tendons of extensor digiti minimi bilaterally, slightly thickened or prominent tendons on left side in image b

Fig. 3 Intraoperative photograph of left little trigger finger showing thickened extensor retinaculum lifted by forceps

tendon sheath or pulley or retinaculum [2]. It is commonly described with flexor tendons. Triggering of extensor tendon is a rare clinical entity; only few case reports have been described in literature [3–5]. The aetiology of trigger finger is often multifactorial [1, 3]. Usually, it occurs as an isolated condition but can be associated with underlying systemic and autoimmune conditions, such as diabetes, rheumatoid arthritis, psoriatic arthritis, hypothyroidism, renal disease, and amyloidosis, can cause morphological changes in the pulley and/or the tendon sheath to cause triggering [7–9].

Usually, trigger finger is diagnosed on clinical examination and imaging is not commonly performed in typical cases. However, increasingly, high-resolution US imaging is being used to complement the clinical assessment in the diagnosis and management of trigger fingers. It allows the direct visualization of the A1 pulley–flexor tendon complex in cases of flexor tendon involvement [6, 9–11]. US can show combination of findings including thickening, hypoechogenicity and hyper-vascularization of A1 pulley that overlies the metacarpal heads, alteration in echotexture of the flexor tendons that pass through the digital tunnel and synovial sheath effusion around the tendons [6, 9–11].

US imaging appearance of triggering of extensor tendon has not been described in literature. The patient we have presented had triggering of the extensor tendon on the ER as a result of segmental inflammation and thickening of ER. US demonstrated the impingement and abrupt movement of the extensor digit minimi tendon under the thickened ER in real-time during the dynamic manoeuvres. Thus the dynamic real-time US provided the functional information and exact site of extensor triggering. With the

transducer oriented transversally and longitudinally to the tendon, dynamic imaging in finger flexion and extension demonstrates the impingement of tendon with lack of smooth gliding motion during patient movement. In this case, dynamic real-time high-resolution US helped to detect the subtle abnormality which has caused the snapping, which was difficult to detect clinically as well as on static imaging. US can also delineate or rule out the other causes of triggering of extensor tendon on the ER like anomalous muscle, intratendinous lesion, tenosynovitis and tendinosis. It also helps in delineating the underlying anatomic variations of extensor tendon compartments which can predispose to impingement. The extensor tendon compartments containing multiple tendons, specifically digits like index and little fingers with dual extensor system share a limited space and are prone to development of tenosynovitis, impingement of tendon leading to extensor triggering [3, 5] as seen in our case. Localizing the site of the pathology enables the surgeon to accurately release the offending anatomical structure as was seen in this case.

Conclusion

In conclusion, dynamic US imaging allows direct visualization of cause for trigger finger and also localized the site of the lesion. Dynamic imaging has advantage over the static imaging in confirming the existence of a snap and correlating the abnormal behaviour of an attributed structure with patient symptoms. We believe, in the future, that this dynamic real-time high-resolution US may contribute to the detection of subtle abnormality which can cause snapping that has so far been difficult to detect clinically and on static imaging. So, referring physicians and surgeons should be aware of importance of real-time high-resolution US imaging.

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Conflict of interest Authors declare that they have no conflict of interest.

Human and animal studies The study described in this article does not contain studies with human or animal subjects performed by any of the authors.

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