

Practical use of ultrasonography for a trigger wrist – a case report

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Summary

We report a case of trigger wrist diagnosed by ultrasonography. The ultrasound findings showed the mass around the flexor tendon triggering at the transverse carpal ligament during finger flexion. The operative findings were consistent with the ultrasonographic findings. This is practical not only to confirm the diagnosis but also to help preoperative planning.

Key words

fibroma – ultrasonography – triggering – trigger finger disorder – flexor tendon

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Introduction

Trigger wrist is a relatively rare condition [1]. The main causes are mass lesions or anomalous muscle belly in the carpal region. The pathology of trigger wrist can be described as follows: during the fingers motion, the flexor tendons are not able to glide through the carpal tunnel smoothly due to mass lesions or an anomalous muscle belly, which causes the snapping condition like a trigger finger. It is sometimes difficult to differentiate a trigger wrist from a trigger finger because patients complain of pain and discomfort not in the wrist but in the fingers. To avoid misdiagnosis, symptoms such as snapping or triggering at the wrist should be clinically differentiated from a trigger finger. Recently, ultrasonography has been gaining importance in evaluation of soft tissues of the hand. Ultrasound examination has an advantage over MRI or other imaging techniques, as it can be performed in clinical settings at the

same time as the physical examination. To our knowledge, there were only a few reports about the ultrasonographic

evaluation of trigger wrist [2,3]. We report a case of trigger wrist confirmed by ultrasonography, which was caused

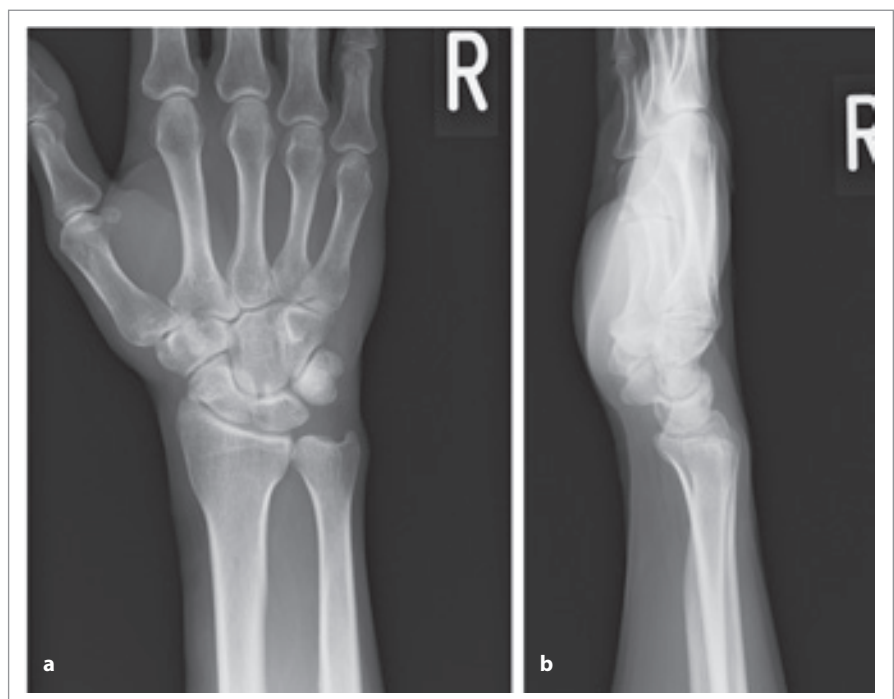


Fig. 1. Preoperative X-rays of the wrist. a) Anteroposterior view; b) lateral view.

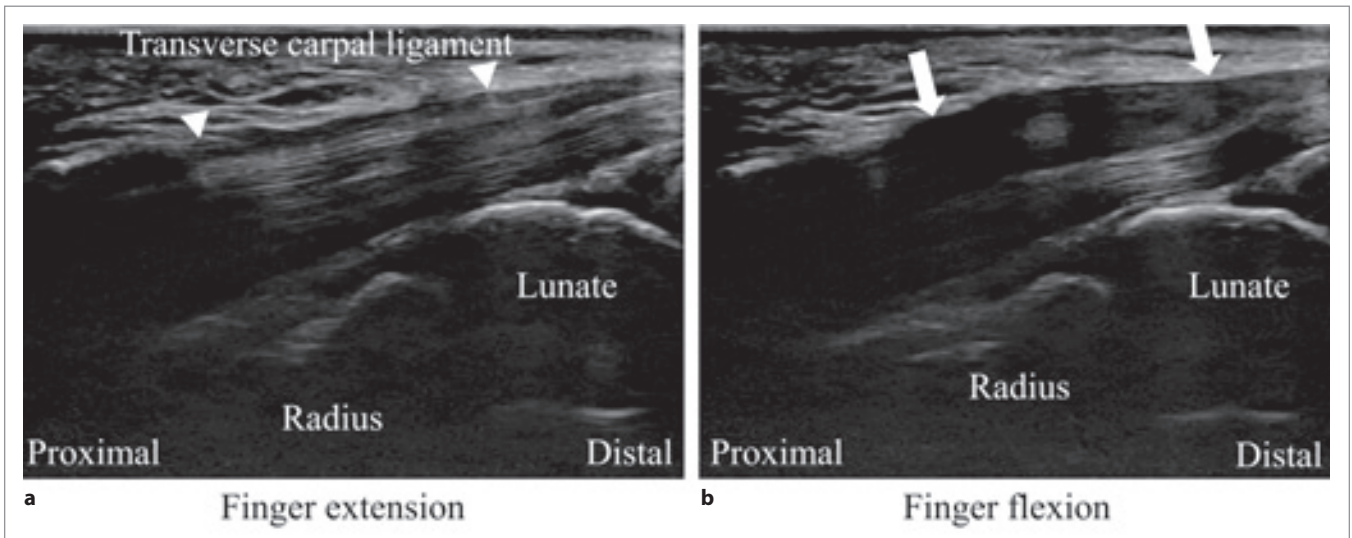


Fig. 2. Preoperative ultrasonographic findings (short axis image). a) At finger extension, white triangles indicated the transverse carpal ligament; b) at finger flexion, white arrows indicated the mass of the flexor tendon sheath. The mass around the flexor tendon was obstructed in the transverse carpal ligament during finger flexion.

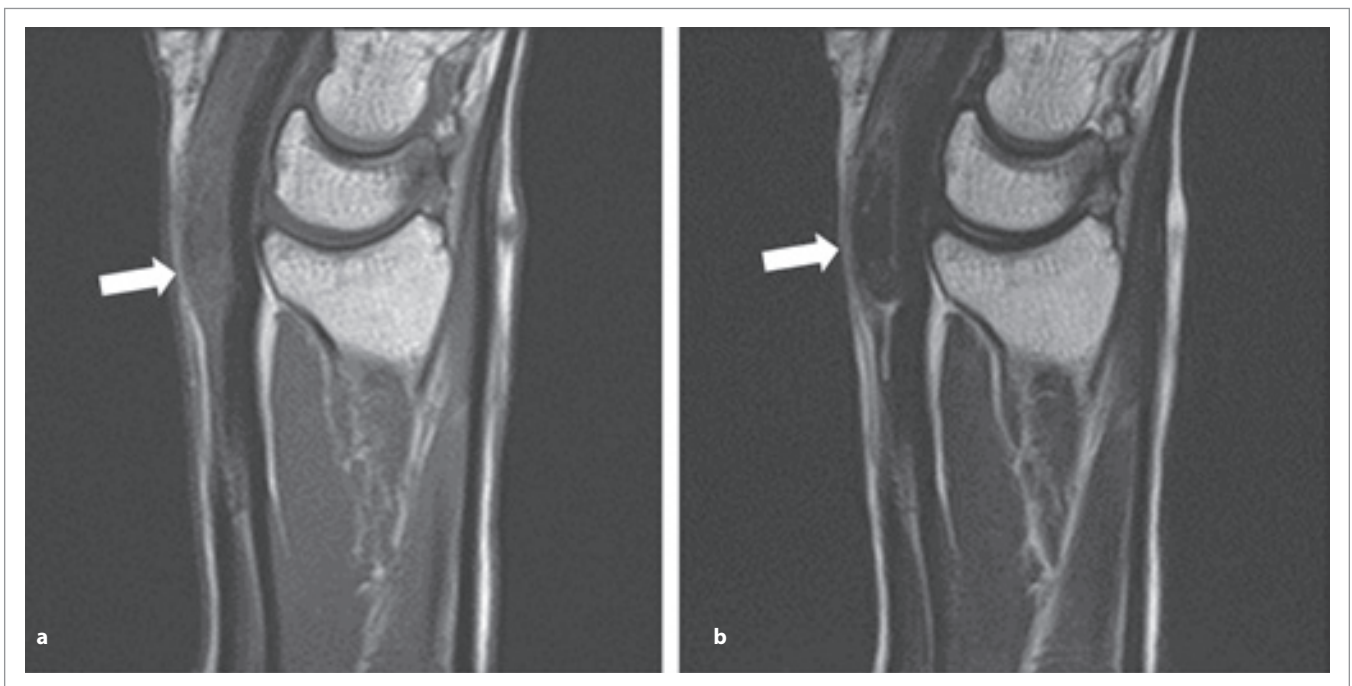


Fig. 3. Preoperative MRI. a) T1-weighted image; b) T2-weighted image. The sagittal image of the wrist showed soft tissue mass around the flexor tendon sheath (white arrow).

by fibroma of the flexor tendon sheath, with a comparison of operative and ultrasonographic findings.

Description of the case

We report a 49-year-old male with a small palpable mass on the palmar side of his right wrist. He complained of

snapping during finger flexion without numbness over the previous 2 years at the initial visit. The Tinel’s sign and the Phalen test were both negative. There was no tenderness above the A1 pulleys of all fingers and no abnormal findings on X-rays (Fig. 1). The electromyography did not show median nerve neuropa-

thy. The ultrasound findings of the wrist showed the mass around the flexor tendon of middle finger causing triggering of the tendon at the transverse carpal ligament during finger flexion (Fig. 2). The mass presented as hypoechoic and posterior echo enhancement. MRI showed a well-defined soft tissue mass attached

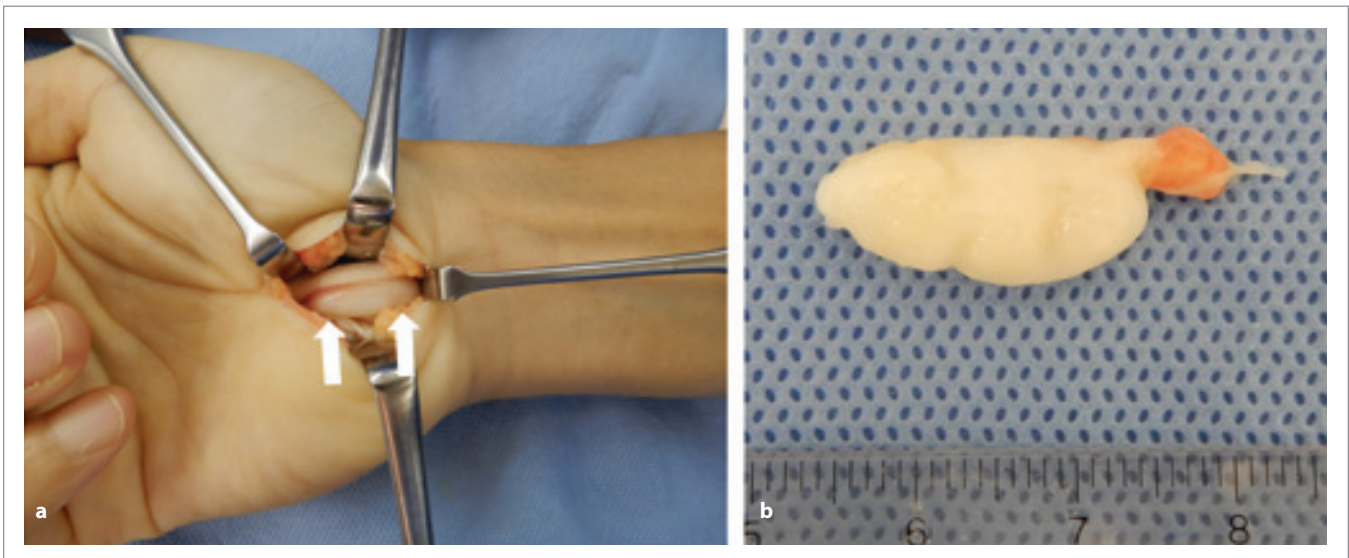


Fig. 4. Photographs of intraoperative findings. a) Macroscopic view. Intraoperatively, a white colored mass was identified around the flexor digitorum profundus tendon of the middle finger (white arrow); b) the excised tissue.

around the flexor tendon sheath from the carpal tunnel to the radiocarpal joint level (Fig. 3). These were identical to the ultrasonographic findings. A trigger wrist was diagnosed, and surgery was performed. During the operation, snapping of the middle finger was confirmed visually when the mass passed through the carpal tunnel by passive motion (Fig. 4), which was also consistent with the ultrasonographic findings. The symptoms entirely ceased after excision of the mass combined with carpal tunnel release. The pathological histology of the mass was fibroma. The patient's postoperative course was uneventful at a follow-up period of one year postoperatively.

Discussion

A trigger wrist is a rare condition in which the snapping occurs in the wrist joint during the motion of wrist or fingers [1]. It is necessary to differentiate it clinically from a trigger finger despite the similarity of the symptoms, as the location of the abnormality impacts the treatment. Moreover, patients often complain of vague pain or discomfort not in the wrist but in the fingers, which could lead to poorly targeted treatment or surgery.

The main causes of trigger wrist are mass lesions in the carpal region. Moreover, the mass of flexor tenosynovitis or tumors inside the carpal tunnel often causes median nerve neuropathy. However, if this condition is not correctly diagnosed, only carpal tunnel release could be performed and the triggering could remain. Therefore, identifying the pathology of trigger wrist is essential.

For diagnosis, firstly, a careful physical examination is carried out. Secondly, image studies, such as ultrasonographic evaluation and/or MRI, should be performed. Lychagin et al. reported that despite a careful physical examination, the findings were insufficient to differentiate between a trigger wrist and a trigger finger [4]. In their report, carpal tunnel syndrome was present and triggering at the wrist was detected during flexion and extension of the radiocarpal joint. MRI did not reveal any pathological masses in the wrist area. Carpal tunnel release was performed and an oval-shaped fibroma sized $1 \times 2.5 \text{ cm}^2$ was found in the carpal tunnel. Histology carried out during the surgery confirmed a fibroma. It is routine these days to perform ultrasonographic evaluation in both long- and short- axis scans, done in both the static

and dynamic states. We suggest that ultrasonography might be useful in such cases, as it has the advantage of being able to present the real dynamic findings and it is easy to repeat in a real time until the pathology is clarified, compared to CT and MRI. Further, the advancement in resolution of ultrasonography increased its opportunity to be utilized in the field of hand diagnosis and treatment.

The main causes of trigger wrist are tenosynovitis, nodule of rheumatoid arthritis or a tumor. Tenosynovitis is presents as an abnormal hypoechoic/anechoic thickened tissue in the tendon sheath with or without the doppler activity and peritendinous subcutaneous edema by ultrasonography. In rheumatoid arthritis patients, ultrasonographic images show synovitis and erosion. Power doppler ultrasound gives better diagnostic test accuracy than gray scale ultrasound. The nodules with clear boundaries are hypoechoic and have posterior echo enhancement in the fibroma. They showed a focal nodule adjacent to a tendon sheath with homogeneous hypoechogenicity and various amounts of blood flow [5]. In our case, the mass presented as hypoechoic and posterior echo enhancement, which

suggested fibroma. Furthermore, ultrasonography helps in assessing the mass size, internal structure, relation to adjacent structures, and internal vascularity, and biopsy can be used [6]. Ultrasonography is a readily available imaging technique that can detect and assess masses of the wrist and hand. Together with standard radiography, ultrasonography can be used as a first-line radiographic technique in the diagnosis of these masses.

Suematsu et al. classified the cause of trigger wrist into three categories [7]. Class A trigger wrist is due to a tumor or nodule occurring on the flexor tendon sheath, which causes tendon triggering at the carpal tunnel. Class B trigger wrist is due to anomalous muscle belly (including an abnormal lumbrical muscle or abnormal muscle belly of the flexor digitorum superficialis). Class C trigger wrist is a combination of classes A and B. It has been reported that class A is the most prevalent and our case was categorized as class A. They recommend excision of mass with carpal tunnel release for a trigger wrist diagnosed as class A. In our case, the mass around the flexor tendon sheath was located proximal to the carpal tunnel and snapping occurred at the transverse ligament during finger flexion

detected by ultrasonography. We also found this imaging helpful to demonstrate to the pathology of trigger wrist to the patient. In the case suggesting a trigger wrist, we recommend performing ultrasonography rather than CT and MRI.

Conclusion

Ultrasonography provides the physician with pathology of trigger wrist by furnishing dynamic real-time images. The clinical differentiation of trigger wrist from a trigger finger is possible by using ultrasonographic images. This not only confirms the diagnosis but also helps with preoperative planning.

Roles of authors

Issei Nagura and Takako Kanatani conceived of the report and carried out this report. Takako Kanatani made major contributions to the writing of the manuscript. Atsuyuki Inui, Yutaka Mifune, Ryosuke Kuroda and Stefano Lucchina participated in the design of the study. All authors read and approved the final manuscript.

Conflict of interests

The authors declare that there is no conflict of interests regarding the publication of this paper.

Ethics approval and consent to participate

Approval was obtained from the ethics committee of our institution and this research was conducted in accordance with Helsinki declaration. Consent for publication has been granted by the patient.

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