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## Case Report

# Benign Schwannoma of the Thumb; a diagnostic challenge ☆☆☆★

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## ABSTRACT

Benign Schwannomas are one of the less frequently encountered soft tissue tumours of the hand. We report an interesting case of an 80-year-old gentleman with a painful soft tissue swelling on the radial aspect of his thumb. Ultrasound revealed a well-defined lesion separate from bone and tendon, with mixed echogenicity and moderate internal vascularity. Magnetic resonance imaging demonstrated a 15 × 10 × 23mm lesion with low signal on T1 and high signal on T2. Following surgical excision, histology confirmed benign schwannoma.

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## Introduction

Soft tissue tumours of the hand account for 15% of all soft tissue tumours found in the body, for which an extensive list of differentials exists [1]. Importantly, in the absence of skin involvement, 95% of soft tissue hand tumours are benign [2]. Magnetic resonance and ultrasound imaging are commonly used in conjunction with clinical examination findings to form a likely diagnosis and tailor management accordingly. However, soft tissue tumours of the hand remain diagnostically challenging, with histology often needed to confirm diagnosis.

Schwannomas are benign tumours which originate from the nerve sheaths of the peripheral nervous system [3,4].

These peripheral nerve sheath tumours are a rare cause of tumour in the hand accounting for approximately 2%-5% of all upper extremity tumours [5,6]. We focus this case report on the radiological findings appreciated prior to surgical management and subsequent histological confirmation.

## Case report

An 80-year-old gentleman presented with a 12 to 18-month history of swelling over the radial aspect of the thumb, located along the proximal aspect of the interphalangeal joint (IPJ) crease. This soft tissue swelling, which was initially painless, had started to cause pain over the site of the swelling, especially when performing tasks involving leaning the hand

IPJ, Interphalangeal Joint; MCPJ, Metacarpophalangeal Joint.

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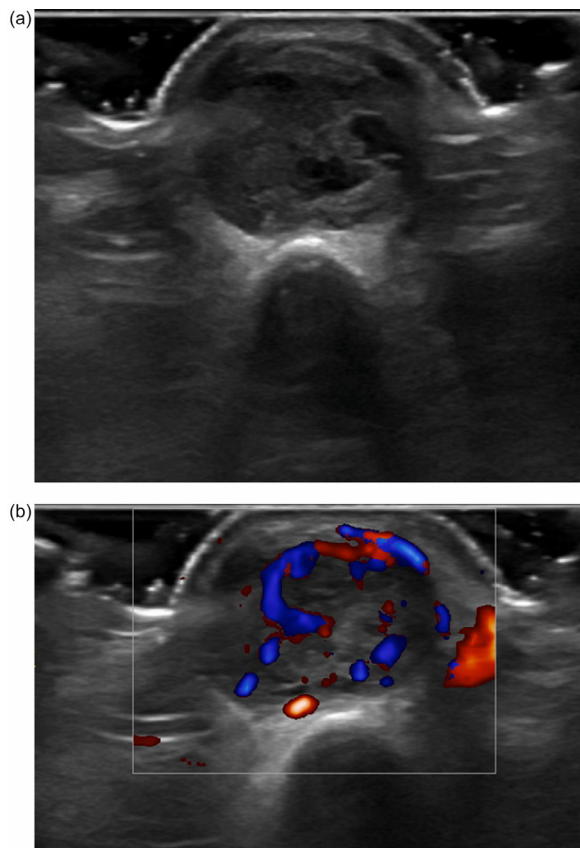
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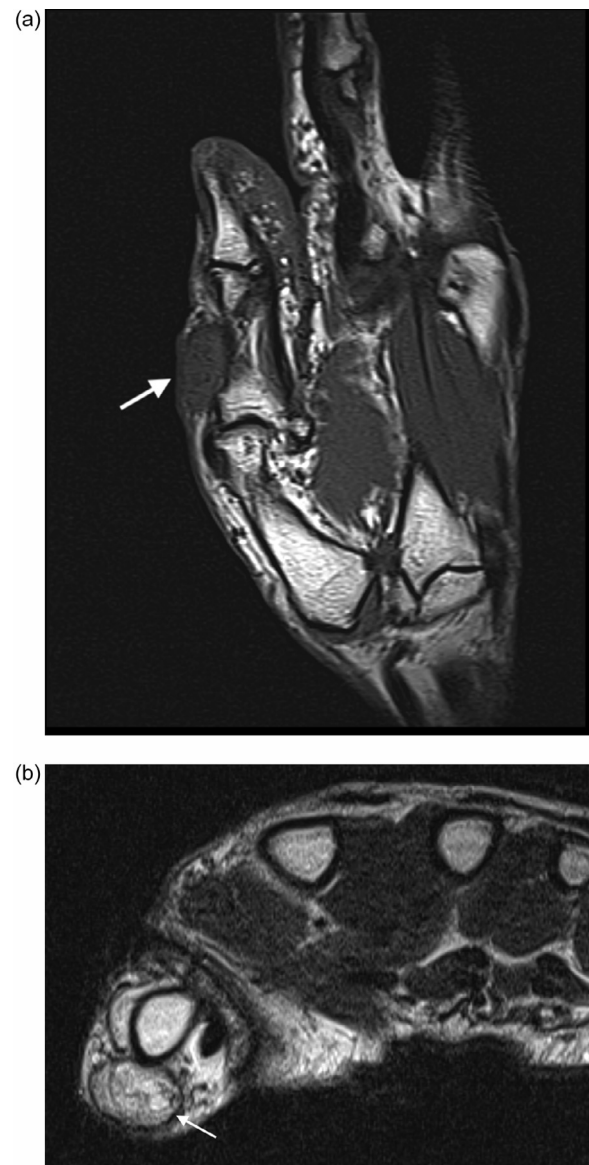


**Fig. 1 – A** Ultrasound image showing a well-defined oval mass with mixed echogenicity. The mass measures 20mm x 9mm x 13mm. **b** Colour Doppler ultrasound image of the soft tissue lesion on the thumb, demonstrating moderate internal vascularity

against a hard surface. On examination, a firm nodular mass was visible and palpable at the location described. The thumb retained a good range of movement with no movement of the described mass on movement of the thumb.

Ultrasound demonstrated a 20mm x 9mm x 13mm non compressible lesion with mixed echogenicity and moderate internal vascularity (Fig. 1). The IPJ and MCPJ of the thumb appeared unremarkable as did the tendons. MRI of the thumb was performed for surgical planning purposes revealing a well defined lesion with a low signal capsule and heterogeneous contents isoechoic with muscle on T1 (Fig. 2A) and slightly hyperintense on T2 (Fig. 2B). The underlying bone and tendons appear separate to the lesion (Fig. 3). The long axis of the lesion runs along the connective tissue of the thumb.

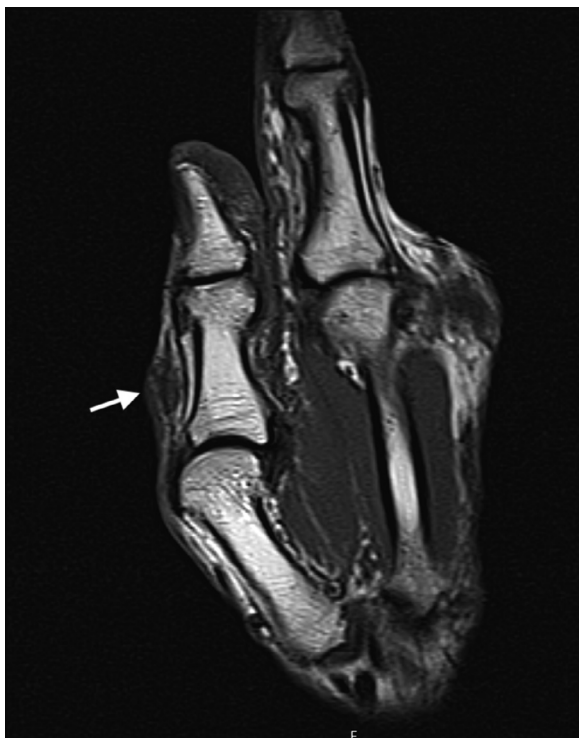
The patient underwent a surgical excision of the lesion, preserving the underlying neurovascular structures. The excised lesion was sent for histology and follow up arranged one month post operation. At time of follow up, the patient reported resolution of presenting symptoms and had retained good range of motion of the thumb with no pain or sensory deficit noted. Histology revealed a well-circumscribed tumour with appearances consistent with a benign schwannoma.



**Fig. 2 – Magnetic resonance imaging of the right thumb. (A)** Coronal T1 weighted sequence demonstrates an oval well defined mass with hypointense T1 signal. This finding is highlighted within the image with a white arrow. **(B)** Axial T2 weighted sequence demonstrates hyperintense T2 signal at the site of the lesion highlighted with a white arrow. The mass is eccentrically located in relation to the underlying digital nerve

## Discussion

Given the superficial location of soft tissue tumours of the hand, ultrasound is a useful imaging modality for the initial assessment of the lesion identified on clinical examination. Ultrasound allows assessment of the: size; relationship to surrounding anatomy; density characteristics and vascularity. Characteristic findings of Schwannoma on ultrasound include, a well-defined mass which orientates its long axis



**Fig. 3 – Magnetic resonance imaging of the right thumb. A white arrow identifies the site of the lesion. Coronal T1 weighted sequence revealing hypointense mass which is well defined and separate to the underlying bone and tendon**

parallel to the direction of the nerve [7]. The mass is typically hypoechoic with well-defined borders and usually demonstrates internal vascularity on Doppler imaging [7]. Figure 1A demonstrates these features, measuring a long axis length of 20mm running parallel and anatomically closely related to the digital nerve on the radial aspect of the thumb. Moderate internal and peripheral neovascularity demonstrated on Figure 1B with no evidence of aggressive infiltration into surrounding tissue (Fig. 1A) are sonographic features overall consistent with a benign schwannoma. Heterogeneity seen on image 1a can more commonly be appreciated in larger schwannomas, secondary to cystic degeneration or internal haemorrhage [3].

To further investigate the lesion, magnetic resonance imaging (MRI) can be used to interrogate the soft tissue structures and surrounding anatomy. As seen on Figs. 2-3, schwannomas are typically well-defined lesions which do not invade surrounding tissues (Fig. 3) [8]. Surrounding tissues are often displaced, which may result in sensory symptoms along the distribution of the digital nerve. Tenels sign may assist examination were percussion of the mass triggers pain or sensory symptoms along the affected nerve distribution [1]. The signal characteristics on MRI Figs 2A and 2B are reliably seen in schwannomas. Typically, T1 weighted sequences demonstrates a low to intermediate signal with high signal seen on T2 weighted sequences [8].

Further imaging features on MRI are sometimes appreciated which may suggest, however are not specific to, benign schwannoma. These features are not seen on images presented in this case report and may represent differentials such as neurofibromas or malignant PNSTs. Examples of these additional features include: the target sign which occurs when peripheral high signal (myxoid tissue) and internal low signal (fibrous tissue) is observed on T2 weighted imaging; the split fat sign seen were a peripheral rim of fat can be visualised on non-fat suppressed sequences and the fascicular sign, were multiple ring like structures are evident, a similar appearance to viewing normal peripheral nerves in cross section [8].

Ultimately, despite radiological features suggestive of a benign schwannoma, distinguishing from other benign or malignant soft tissue tumours poses a diagnostic challenge. Our case outlines common imaging modalities used and relevant radiographic features of benign schwannoma. Despite the recognition of these common radiographic findings in the images presented, diagnosis remains difficult on appearance alone. Surgical excision is often performed, and tissue sent for histology. Benign schwannomas, given their well-defined nature and eccentric location can be surgically excised with adequate margins, often preserving the function of the nerve [9]. Once excised recurrence is rare [9].

## Conclusion

In summary, we describe the clinical presentation and investigation of a benign schwannoma of the thumb with a focus on the imaging modalities used and radiographic features observed. It is often necessary to excise the lesion for histology to confirm the diagnosis.

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