IMAGING FINDINGS IN PIGMENTED VILLONODULAR TENOSYNOVITIS–A CASE REPORT

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ABSTRACT

Pigmented Villonodular Tenosynovitis (PVNTS) also known as Giant Cell Tumors of The Tendon Sheath (GCTTS) are part of a spectrum of benign proliferative lesions of synovial origin, characterized by villous and nodular overgrowths of the synovial membrane of the tendon sheath. Here we are reporting imaging findings in a case of pigmented villonodular tenosynovitis, arising from the flexor tendon sheath of fifth finger in right hand.

KEYWORDS

Pigmented Villonodular Tenosynovitis, Giant Cell Tumors of The Tendon Sheath, MRI, US.

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INTRODUCTION

Pigmented Villonodular Synovitis (PVNS) is a benign tissue proliferation which presents as a borderline case between a reactive and a neoplastic process and emanates from the tendosynovial layers, joint capsule or the synovial bursa.¹ Two forms of PVNS can be differentiated macroscopically. The diffuse form, which involves the entire synovia is of a joint and often occurs in large joints; the localized nodular form with isolated circumscribed or pedunculated tissue masses in the synovial of the tendon sheaths.²

The localized nodular form also known as Pigmented Villonodular Tenosynovitis (PVNTS), extra-articular pigmented villonodular synovitis or Giant Cell Tumor of The Tendon Sheath (GCTTS) is uncommon. Imaging plays a vital role in assessing the pathological characteristic of these lesions.

CASE REPORT

A 23-year-old female complained of restricted flexion movement of fifth finger with weakness of grip. On examination, a palpable swelling noted in palmar aspect of hand which was not moving with flexion and extension movements of fingers. There was no history of wrist injury. All laboratory tests were within normal range.

No soft tissue mass or bony erosion was appreciated with plain x-ray hand.

Ultrasound (US) examination (Fig. 1a and b) revealed an uneven solid mass of about 2.6cm arising from the flexor tendon sheath of fifth finger and displacing the tendons. Color and power Doppler US showed predominant peripheral vascularity.

Patient underwent Magnetic Resonance Imaging (MRI) of right hand. T1-weighted MR images (Fig. 2a) demonstrated a well-defined lobulated soft tissue mass of low-to-intermediate signal intensity with peripheral hypointense rim, extending along the tendon sheath of the fifth finger, exhibited hypointense foci within the lesion.

On fat suppression (Fig. 2b) accentuation of hypointense foci noted. Predominantly isointense lesion with more pronounced hypointense foci and low signal intensity rim at periphery was noted in T2 weighted MR images (Fig. 3a and b). Moderate heterogeneous enhancement noted after gadolinium injection (Fig. 4a and b).

On basis of imaging characteristics, the provisional diagnosis of pigmented villonodular tenosynovitis was given. The patient subsequently underwent surgical excision; histopathological analysis of the surgical specimen confirmed PVNTS.

DISCUSSION

In 1941 Pigmented Villonodular Tenosynovitis (PVNTS) was first described by Jaffe et al.³ PVNTS are the second most common soft tissue mass of the hand after ganglionic cyst.⁴⁻⁵ It usually appears as a localized, solitary, subcutaneous nodule and most commonly grows on the tendon sheath of the digits.⁶ It is a benign process that has been seen to involve the surrounding structures and soft tissue and it may erode bony structures as it grows in a confined space.⁷ Peak age is the third to fifth decades of life and it commonly affects the index and middle fingers involving the volar aspect twice as frequently as the dorsal aspect.⁸

Radiographic findings are normal in up to 20% of cases. Overall, osseous abnormalities are present in 15%–25% of cases. Extrinsic erosion often with well-defined sclerotic margins of the underlying bone is the most common osseous abnormality seen in 9%–25% of cases.⁵

MRI features of GCTTS reflect the histological characteristics of this group of lesions. The presence of hemosiderin-laden tissue exerts a paramagnetic effect that shortens T1- and T2-relaxation times resulting in low-to-intermediate signal intensity on T1- and T2-weighted spin-echo sequences.

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On STIR sequences (Fat suppression), the effect is exaggerated due to increased magnetic susceptibility resulting in areas of very high signal intensity.⁸ Use of gradient echo pulse sequences allows confirmation of the presence of hemosiderin, which appears as a prominent “Blooming” of low signal intensity due to magnetic susceptibility artefact.⁵

Lesions often show moderate enhancement following intravenous gadolinium-diethylenetriamine penta-acetic acid (Gd-DTPA) administration due to the numerous proliferative capillaries in the collagenous stroma.⁸⁻⁹

US pattern of PVNTS has been described as hypo- or hyperechoic, heterogeneous and homogeneous soft tissue masses. Typically, a PVNTS shows increased vascularity on color and power Doppler US. US can also provide information about the extent of contact and circumferential involvement of the tendon that can be helpful in the surgical planning.⁷

Surgical removal is the standard treatment of GCTTS; removal of the entire lesion is important in order to reduce chances of recurrence, which is common if the lesion is not completely removed. US have a role in the initial screening and assessment, which may sometimes suggest the diagnosis. MR imaging is a valuable tool for preoperative diagnosis, surgical planning and postoperative follow-up of GCTTS. However, final diagnosis requires pathological evaluation.

CONCLUSION

PVNTS represents an uncommon benign neoplastic process. Presence of fibrous tissue and hemosiderin deposition gives characteristic imaging appearances to the lesion. Understandings of these imaging appearances allow improved patient assessment and are important to optimize clinical management.

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Fig. 1a

Fig. 1b

Sagittal and axial ultrasound images of right hand (Fig.1a & b) showing a well defined heterogeneously hypoechoic soft tissue lesion extending along the flexor tendon sheath of fifth digit in the region of hypothenar eminence, exhibiting peripheral vascularity.

Fig. 2a

Fig. 2b

Coronal T1 Weighted MR image (Fig. 2a) showing a well defined low-to-intermediate signal intensity soft tissue lesion with hypointense foci consistent with hemosiderin deposition and thin hypointense capsule. On fat suppression (Fig. 2b) accentuation of hypointense foci noted.

Fig. 3a

Fig. 3b

Axial and coronal T2 Weighted MR images (Fig 3a & b) showing a well-defined isointense soft tissue lesion extending along the flexor tendon sheath exhibiting hypointense foci with thin hypointense capsule.

Fig. 4a

Fig. 4b

Post contrast study showing Heterogenous Enhancement (Fig. 4a & b)