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MR IMAGING CHARACTERISTICS OF TENOSYNOVIAL GIANT CELL TUMORS

Radio-Diagnosis

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ABSTRACT

Objective: The purpose of this study is to determine the MR findings in patients with tenosynovial giant cell tumors. **Materials And Methods:** The present study reviews the MR images of six patients who were treated and histologically diagnosed as tenosynovial giant cell tumors at Government General Hospital, Rangaraya Medical College, Kakinada between June 2020 to May 2021. **Results:** Four of the six lesions were hypointense and two were isointense on T1 weighted images. On the T2 weighted images three were slightly hyperintense, two were hypointense relative to skeletal muscle and the remaining one lesion had a more heterogeneous appearance on T2 weighted images. Of six lesions two involved thumb, one involved index finger, one involved foot, one involved knee joint and one involved bilateral tendoachilles. **Conclusion:** MRI is currently the optimal modality for preoperative assessment of tumor size, extent and invasion of adjacent joint and tenosynovial space. On both T1- and T2-weighted images, giant cell tumor of the tendon sheath has a signal intensity similar to that of its pathologic counterpart, pigmented villonodular synovitis.

KEYWORDS

giant cell tumor of the tendon sheath, magnetic resonance imaging

INTRODUCTION

"Giant cell tumor of the tendon sheath (GCTTS) is a benign soft tissue tumor that was first described by Chassaignac in 1852"(1). GCTTS is also known as tenosynovial giant cell tumor, pigmented nodular tenosynovitis, xanthogranuloma, benign synovioma and fibrous xanthoma of synovium. GCTTS can be classified as localized (L-) or diffuse (D-) type. The localized form, also called nodular tenosynovitis, is a nodular or polypoid mass that usually affects the digits(1); the diffuse form, also known as florid or proliferative synovitis, is less well defined and generally develops outside the joint, growing in a multinodular pattern that is more irregular than that of localized GCTT(2-5). It typically occurs around the knee and ankle joint.

AIM

To evaluate the MRI characteristics of Giant cell tumor of tendon sheaths

MATERIALS AND METHODS

The present study reviews the MR images of six patients who were treated and histologically diagnosed as tenosynovial giant cell tumours at Government General Hospital, Rangaraya Medical College, Kakinada between June 2020 to May 2021.

Four were women and two were men; their mean age was 36 years (range, 18-62 years)

Inclusion Criteria

Patients with mass lesions whose pathological report shows dispersed multinucleated giant cells, macrophages, fibroblasts, and xanthoma cells were included in this study.

Exclusion Criteria

Patients whose lesions were intraarticular and associated with hemorrhagic or xanthochromic joint effusions and patients with diffuse involvement of the joint space were excluded because they were assumed to have PVNS.

MR IMAGING: 1.5 T (GE): T1W and T2W (at least two orthogonal planes).

Pulse sequences–
spin-echo: T1W (250-800/12-40 [TR/ TE]) and T2W (1800-3000/60-120).

Gradient-echo: (300-350/10-15, 15-degree flip angle).

FOV - 8 to 40 cm, depending on the joint evaluated.

Slice thicknesses - 3 to 6 mm, with a 15-25% interslice gap.

Matrix - 256 x 128-256.

The MR image of each lesion was evaluated to determine the site of origin, in particular the specific tendon if possible.

Lesions were evaluated to determine the size, shape, and pattern of growth.

The signal intensity of each lesion was evaluated on both T1 - and T2-weighted images.

RESULTS

Of six lesions two involved thumb, one involved index finger, one involved foot, one involved knee joint and one involved bilateral tendoachilles.

Four of the six lesions were hypointense and two were isointense on T1 weighted images.

On the T2 weighted images three were slightly hyperintense, two were hypointense relative to skeletal muscle and the remaining one lesion had a more heterogeneous appearance on T2 weighted images.

We came across a rare case of tenosynovial giant cell tumour affecting bilateral tendoachilles showing hypointensity on both T1 and T2WI.

Table – 1

Sl no	Age(yrs.)	Sex	Site of origin
1	38	F	THUMB
2	24	M	THUMB
3	43	F	INDEX FINGER
4	31	F	FOOT
5	62	M	KNEE JOINT
6	18	F	BILATERAL TENDOACHILLES

DISCUSSION

Tenosynovial giant cell tumor frequently presents as a firm, slow growing, multilobular, non-tender mass located adjacent to the tendon sheath synovium.

The tumor usually affects individuals aged 30-50 years with slight

female predominance (6,7).

Two different clinical presentations:
L-GCTTS on fingers and toes and
D-GCTTS seen around large joints

L-GCTTS is the second most common tumor of the hand following ganglion cysts, L-GCTTS primarily occurs in hands. L-GCTTS typically exhibits small, scattered foci of low signal on T1W and T2W due to the presence of hemosiderin (8).

"D-GCTTS is less well-defined when compared to L-GCTTS and seen outside the joint, growing in a multinodular irregular manner" (9).

Giant cell tumours and pigmented vilonodular synovitis have the same pathological characteristics. some lesions can be cellular and show atypical nuclei, but mitotic activity is usually absent (10). These tumors are idiopathic proliferative lesions that can cause bony erosions (11). MRI typically shows a well-defined mass adjacent to or enveloping a tendon (12). Characteristically, the mass is hypointense on T1 weighted images, approximately equal to skeletal muscle. On T2 weighted images there is usually low signal due to chronic hemorrhage with hemosiderin deposition (13).

In our study few cases of GCTTS showed hyperintense on T2WI due to variable components.

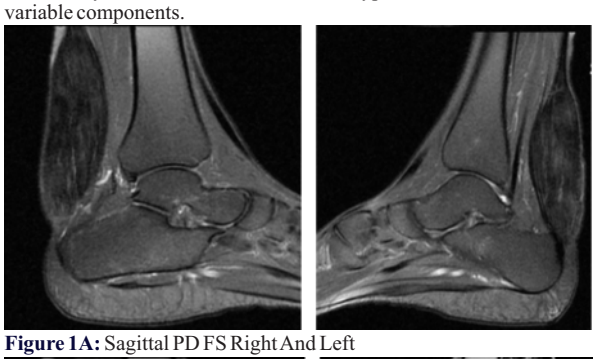

Figure 1A: Sagittal PD FS Right And Left

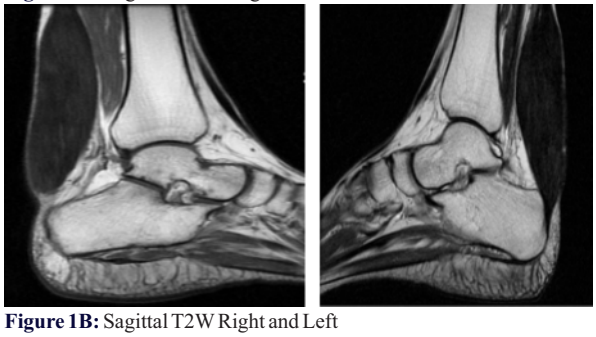

Figure 1B: Sagittal T2W Right and Left

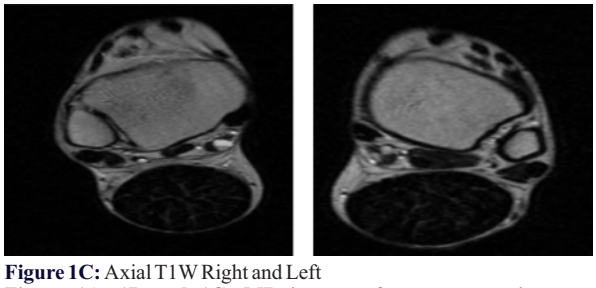

Figure 1C: Axial T1W Right and Left

Figure 1A, 1B and 1C: MR images of a representative case showing well defined T1, T2 and PD hypointense fusiform masses in bilateral tendoachilles.

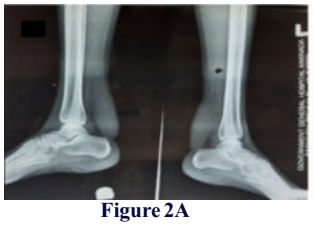

Figure 2A

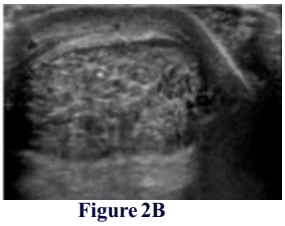

Figure 2B

Figure 2A. Lateral plain radiograph of the above case showing soft tissue density swellings in posterior aspect of both ankles causing anterior displacement of keger's fat pad. Fig 2B. Transverse high resolution ultrasonography showing mixed echogenic thickening of tendoachilles

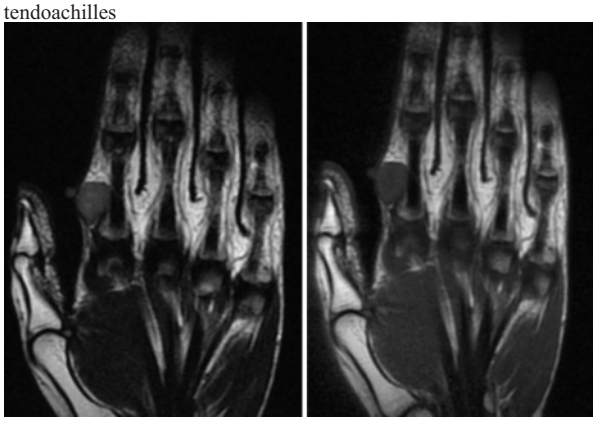

Figure 3A: T1W coronal 3B: T2W coronal

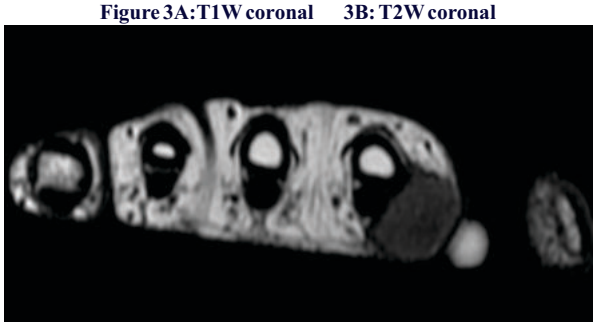

Figure 3C: Axial T1WI

Figure 3: Well defined lobulated soft tissue mass abutting the venterolateral aspect of flexor tendon sheath of index finger. The mass is hypointense on both T1- and T2W images

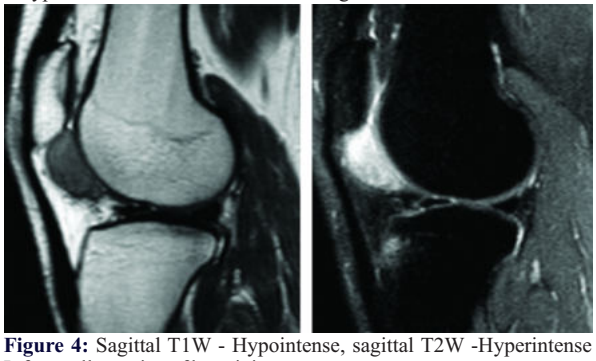

Figure 4: Sagittal T1W - Hypointense, sagittal T2W -Hyperintense Infrapatellar region of knee joint

CONCLUSION

Currently, MRI is the best method for assessing the tumor's size, extent, and invasion of the adjacent structures before surgery.

The signal intensity of a giant cell tumour of the tendon sheath on T1 and T2w images is comparable to that of pigmented villonodular synovitis.

The low signal intensity on both T1 and T2w images is an uncommon appearance of extraarticular soft-tissue masses, in particular when they are seen in extremities and this may help as to diagnose giant cell tumor of the tendon sheath.

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