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Cytomorphological study of Giant cell tumor of tendon sheath

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Abstract
Giant cell tumors of tendon sheath is the second most common tumor of hand next to ganglion cyst, with high recurrence rate. They can occur at any age but are most commonly seen in 3rd to 5th decade with female predominance. The majority of cases are of unknown etiology, but the possible etiological factors include trauma, inflammation and neoplastic trigger. A diagnosis can be made with the help of imaging studies and fine needle aspiration cytology. Here we present a retrospective review of 25 cases of Giant cell tumors of tendon sheath (GCTTS), for which Fine needle aspiration cytology (FNAC) was performed. The image screening like X-rays and USG along with FNAC play an important role in preoperative diagnosis. The cellularity and giant cell population are seen to correlate with the duration of the swelling.
Keywords: *Gaint cell tumor, tendon sheath, cytology.*

Introduction

Giant cell tumor of tendon sheath was first described by Chasaignacc in 18th century[1]. It is most commonly seen in the age group between 30 and 50 years and is found more common in women[2]. GCTTS is the second most common tumor in the hand shows highest occurrence in index finger, followed by thumb, the ring and then with little finger. It can also occur in other parts of body including spine, ankle, knee and feet[3]. The local recurrence rate of GCTTS after excision is upto 45%[3]. Fine-needle aspiration (FNA) cytology plays an important role in making an early, accurate preoperative pathological diagnosis[4].

Materials and Method

The present retrospective observational study was conducted in the Department of Pathology, Trichy SRM Medical College Hospital and Research centre. All the 25cases of GCTTS reported on FNAC from January 2015 to Dec 2018 were studied. The cases were reviewed for various cytomorphological features, which were correlated with follow- up histopathology wherever available. All data were compiled from medical records including the age, gender, tumor location, presentation, size and correlation with clinical features and image screening were done. FNAC on all the cases was performed at the cytology department using 21 gauge needle. Smear was made and stained with Giemsa stain and analysed. Details of smear adequacy and cytomorphological features were tabulated. (Table-4). Out of 25 cases, 10 cases underwent wide local excision and specimen was received in 10% formalin. Routine tissue processing was

performed on the tissue to prepare paraffin block. The histopathological slide was prepared and stained with hematoxylin and eosin stain. Sections were further examined under the microscope.

Microscopy

The FNA smears studied showed predominantly moderate cellularity with mixture of mononuclear cells with osteoclastic type giant cells(fig-1,2).Smear also showed increased in the number of giant cells compared with mononuclear cells in long standing cases.

Excision Biopsy

The average mean size of tumors was 3.5 cm. External surface of all the lesions appears well-circumscribed, capsulated, lobulated and cut surface shows homogenous grey white, firm in consistency .

Microscopic

Microscopy examination shows abundant giant cells admixed with mononuclear cells with round to oval nuclei. Also noted fibrohistiocytic proliferation, and fibrocollagenous tissue. Mitotic activity 4/10 hpf was reported in one case.

Results

Of the total 25 cases that were studied, 10 were females and 15 were males, with male to female ratio is 1.5:1(Table-1).The age group ranged from 5 years to 80 yrs. The peak incidence was noted between 30 to 40 yrs (Table-2).The most common site of involvement was the left little finger followed by left index finger. Also noted, large joint involvement in 7 cases and multiple joint involvement in 3 cases (Table-3).Most of them are presented with painless swellings, though few of them gave a history of pain associated with swelling. Duration of lesion ranged from 6 month to 5 yrs. The size of lesions ranged between 1 cm to 5 cm. The image screening were done in all cases and reveal soft tissue lesion without adjacent bone involvement.

Table 1: sex wise distribution of GCTTS (n=25).

sex	No of cases (%)
Male	15(60)
Female	10(40)

Table 2: Age wise distribution of GCTTS (n=25)

Age (yrs)	No of cases(%)
1-10	2(8)
11-20	2(8)
21-30	6(24)
31-40	8(32)
41-50	2(8)
51-60	2(8)
61 and above	3(12)

Table 3: Anatomical distribution of GCTTS (n=25)

Location	n(%)
Index finger	7(28)
Middle finger	5(20)
Ring finger	4(16)
Thumb	1(4)
Toe	1(4)
Hip	1(4)
Knee	2(8)
Elbow	2(8)
wrist	2(8)

Table 4: Cytohistopathological correlation of all case

Cases	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**
Duration	8Mon	5yrs	1.5yrs	9mon	1.2yrs	2.8yrs	10mon	8mon	1.8yrs	8mon	1yr	8mon	3mon	6mon	4yrs	1yr	6mon	2.2yrs	10mon	1yr	8mon	4mon	11mon	1yr	8mon
FNAC																									
Aspirate	Ad	Ad	Ad	S	Ad	S	Ad	S	Ad	Ad	Ad	Ad	Ad	S	Ad	Ad	Ad	Ad	Ad	Ad	S	Ad	S	Ad	Ad
Cellularity	M	M	H	S	H	S	M	S	M	H	H	M	H	S	M	H	M	M	M	M	S	M	S	M	M
Giant cells%	20	80	25	20	25	60	30	30	40	20	20	20	20	20	75	20	20	65	20	20	20	15	20	20	15
Stromal cells%	80	20	75	80	75	40	70	70	60	80	80	80	80	80	25	80	80	35	80	80	80	85	80	80	85
Background	hem	nil	I	nil	hem	I	I	nil	nil	hem	nil	I	I	hem	I	I	hem	nil	I	hem	hem	hem	hem	hem	hem
Histopathology	NA	A	NA	A	NA	NA	A	NA	NA	A	NA	NA	A	NA	A	A	NA	A	NA	A	NA	NA	NA	NA	A
Giant cells		75		25			30			25			25		80	25		70		20					20
Stomal cells		25		75			70			75			75		20	75		30		80					80
Mitosis		nil		nil			4/10 hpf			nil			nil		nil	nil		nil		nil					nil

(Mon-month; yr-year;H-high;S-scanty;M-moderate;Hem-hemmorhagic;I-inflammatory; A-available; NA-not available)

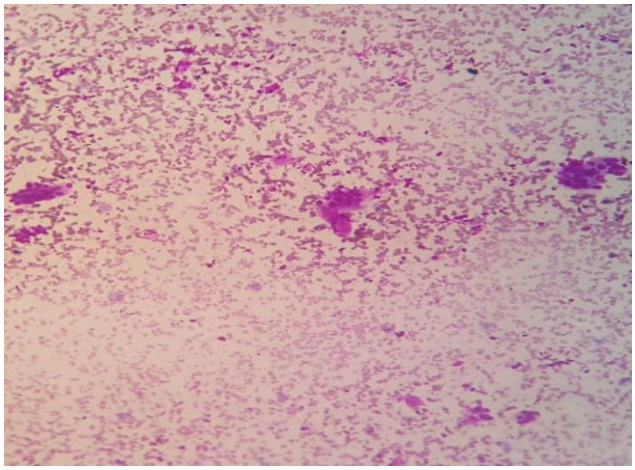

Fig 1: FNAC smear showing mononuclear stromal cells and giant cells (Gimesa 10X)

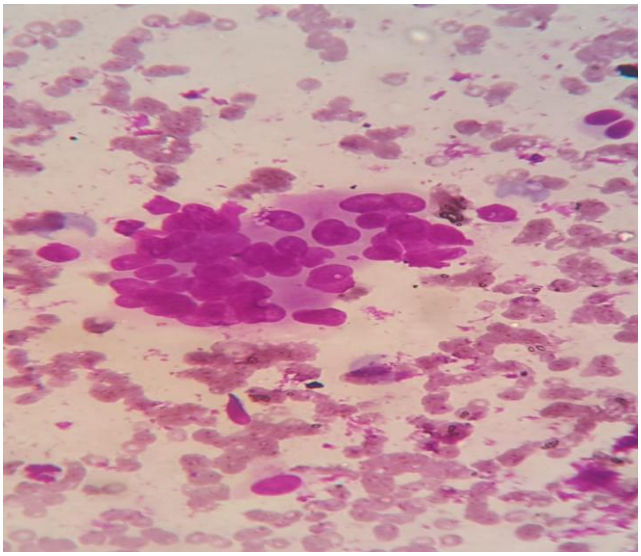

Fig 2: Smear shows giant cells with 15-20 nuclei (Gimesa stain 40X)

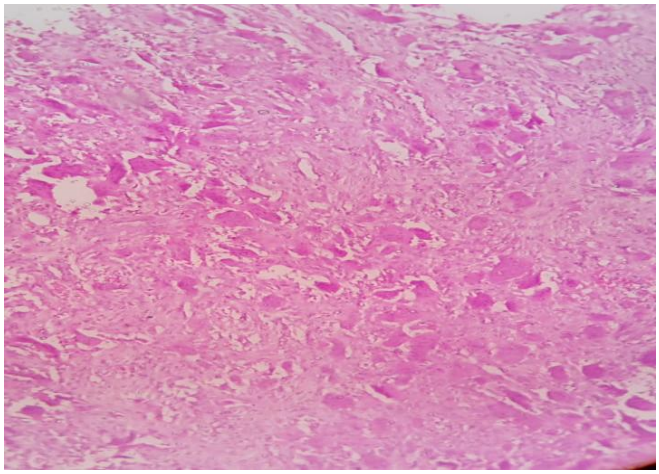

Fig 3: Low power showing many oval shaped stromal cells surrounded by giant cells and large cleft like spaces lined by synovial cells (H&E 10 X)

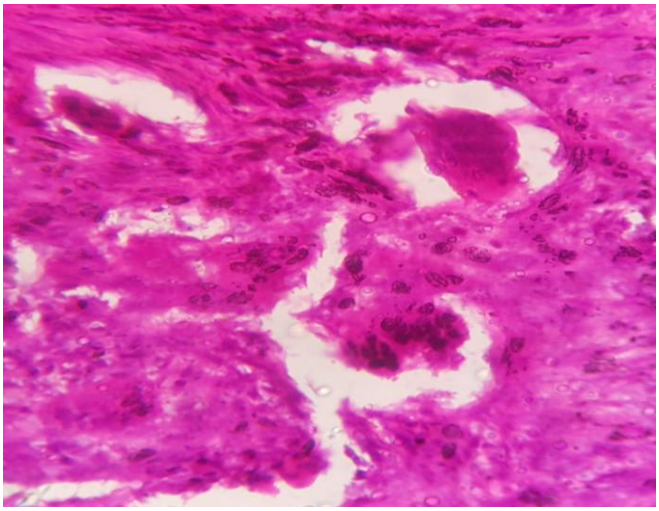

Fig 4: High power view of giant cells, some of them showing pigment deposition (H&E 40X)

Discussion

During our study we found that the parameters like age, site and presenting symptoms were correlating with other studies.

In a study conducted by Arpana et al[5], they described that GCTTS affects more often in male compared to female with ratio being 1.5:1. The mean age ranged from 20 to 40 yrs which is correlating with our study[6].

Darwish et al[7] and arpana et al studied that most of the tumors were located in hand with the digits most commonly involved.

Our study also revealed that hand was the most common location with the left index finger being commonly involved. However, 7 cases presented with large joint involvement like hip and knee joint. 3 cases presented with multiple joint involvement.

X ray revealed soft tissue lesion in all cases without bony involvement[8,9]. USG and MRI play an important role in surgical planning and post operative follow-up[10].

FNAC plays an important role in preoperative diagnosis of the lesions[11]. However, the other differential diagnosis like giant cell tumor of bone, benign fibrohistiocytoma and aneurysmal bone cyst should be considered[12,13]. Hence, diagnosis of GCTTS should be made in correlation with clinical and image screening.

GCTTS is found in the subcutaneous plane arising from tendon sheath with extension into adjacent structures. This characteristic makes the complete excision of the lesions difficult and hence leads to recurrence of the tumor[13].

Conclusion

Giant cell tumor of tendon sheath is a benign, locally aggressive lesion which arise from tendon sheath. The most common site of involvement is hand, However it can even arises from large joint with multiple site. A definite preoperative diagnosis is possible by FNAC in correlation with image screening. The wide local excision is best treatment modality to prevent recurrence.

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