

Giant cell tumour of tendon sheath: experience with 52 cases

Darwish F M, Haddad W H

ABSTRACT

Introduction: The aim of this retrospective study was to study the clinical presentation, investigations, histopathological findings, and the best ways of treatment of the giant cell tumour of the tendon sheath (GCTTS).

Methods: The medical records of all patients diagnosed to have GCTTS during the period 1994–2001 were reviewed, and follow-up was for three to ten years.

Results: The total number of patients was 52, of whom 36 were females, and the mean age was 32.4 years. All the tumours except one were located in the hand and wrist area, with the thumb being the most affected finger. Painless swelling was the most common presentation. All of them were treated surgically and the recurrence rate was 24 percent.

Conclusion: After reviewing the literature and comparing with our results, we conclude that GCTTS is a true benign tumour with local aggressive behaviour in some cases, and the best way of treatment is wide local excision.

Keywords: giant cell tumour of the tendon sheath, hand tumours, nodular synovitis, pigmented nodular synovitis, synovial tumours, wrist tumours

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INTRODUCTION

Giant cell tumour of the tendon sheath (GCTTS), fibrous histiocytoma of synovium, pigmented nodular synovitis, tenosynovial giant cell tumour, localised nodular tenosynovitis, benign synovioma, and fibrous xanthoma of the synovium are all names for the same disease. Each one reflects a certain pathological feature.⁽¹⁻⁴⁾

GCTTS is the second common benign tumour of the hand after ganglion, and can recur after excision.^(1,5) Sites, such as the feet, knees and others,⁽⁶⁻⁸⁾ can also be involved. The high recurrence rate^(9,10) and intraosseous

Table I. Age distribution of patients with GCTTS.

Age (years)	No. of patients
0–9	1
10–19	7
20–29	17
30–39	8
40–49	12
50–59	4
60–69	3
Total	52

* Mean age (range) is 32.04 (6–65) years.

involvement⁽¹¹⁾ indicate that the pathological nature of this disease is still controversial – some authors accept the neoplastic nature of the disease,^(6,12) while others believe it is a non-neoplastic tumour.⁽¹³⁾ We reviewed a series of 52 cases to try to determine the epidemiological and clinical features of the disease. At the same time, we reviewed the literature and analysed the available information on GCTTS.

METHODS

The medical records of all patients diagnosed to have GCTTS by our histopathology department during the period 1994–2001 were reviewed. 52 patients were included in this study. The variables looked at were: the age of patients, gender, location, presenting symptoms, duration of symptoms, investigations, treatment modality, histopathological reports, and recurrence rate. Most of these patients' follow-up information was recorded but some of them were followed-up by phone. The follow-up period ranged from three to ten years. Microsoft Excel was used for analysis of the simple statistical data.

RESULTS

The age of the patients ranged from six to 65 years, with a mean age of 32.04 years. The peak incidence was between 20 and 29 years, with a second peak observed at 40–49 years (Table I). The location of the lesions and gender involvement are shown in Table II. The thumb is the most affected finger, followed by the index finger. The female-to-male ratio was 2:1. All tumours except one were located in the hands, and the right hand was affected more than the left. 45 patients presented with painless swelling, while seven patients had painful swelling. The

Department of Orthopedics, Faculty of Medicine, Jordan University of Science and Technology, PO Box 211557, Amman 11121, Jordan

Darwish FM, FRCS Assistant Professor

Haddad WH, MD Assistant Professor

Correspondence to: Dr Faye M Darwish
Tel: (962) 6506 2834
Fax: (962) 2709 5777
Email: faye_d@yahoo.com

Table II. Lesion distribution.

No. of lesions	Right (n = 30)		Left (n = 22)		Total
	Male	Female	Male	Female	
Thumb	7	4	3	5	19
Index	1	4	1	4	10
Middle finger	–	2	–	3	5
Ring finger	1	2	–	2	5
Little finger	2	4	–	1	7
Palm	–	2	–	3	5
Foot	1	–	–	–	1
Total	12	18	4	18	52

Table III. List of differential diagnoses.

Vascular
- Haemangioma*
- Glomus tumour
Osseous
- Enchondroma
- Osteoid osteoma
- Osteoblastoma
- Giant cell tumours of bone
- Periosteal chondroma
- Synovial chondromatosis
Neural lesions
- Schwannoma or neurilemmoma
- Fibrolipomatous hamartoma
- Neurofibromas
Cutaneous lesions
- Mucous cysts
- Nodular fasciitis
- Pyogenic granuloma
- Scar tissue
- Circumscribed fibromatosis
Soft tissue lesions
- Ganglion*
- Giant cell tumour of the tendon sheath*
- Lipoma
- Fibroma of tendon sheath
- Foreign body granuloma
- Tophaceous gout

* most common lesions

duration of symptoms ranged between one and ten years, with a mean of two years. Radiographs were the single investigation done for all patients and it was abnormal in five patients. Three of them had cortical compression of the distal phalanx of the index finger, while the other two had cortical compression of the proximal phalanx of the thumb. The treatment offered was complete excision of the lesion. All lesions were described as a well-circumscribed, capsulated, lobulated or multinodular mass, the size of which ranged between 0.5 and 2 cm (Fig. 1). Microscopical examination was characterised by synovial cell hyperplasia, the accumulation of histiocytes, and the presence of multinucleated giant cells, haemosiderin-laden macrophages and collagen strands. No mitotic activity was reported (Fig. 2). The recurrence rate was nearly 24% (12 patients).

DISCUSSION

We found that most of the epidemiological parameters, such as the mean age, gender, site, side and the presenting symptoms with their duration, are in keeping with other statistics.^(14,15) Trauma was blamed by some to be a cause of GCTTS,⁽¹⁶⁾ but none of our patients had a definite history of trauma. The presenting symptom in most of our patients was painless swelling for many years. This is consistent with the fact that when GCTTS affects the hand, it is painless, but when it affects other sites it is painful.⁽⁹⁾ We did not encounter cases with numbness or joint stiffness. Many lesions in the hand and wrist present as a painless swelling, and because of the complexity of the hand and wrist structures, the differential diagnosis is extensive (Table III). The vast majority of these lesions are benign and many have distinctive radiological and clinical appearances. It is a known fact that GCTTS is the second most common mass of the hand after ganglion cysts.⁽¹⁻³⁴⁾ With proper history taking, careful clinical examination and proper investigation, one can be confident in making a reasonable diagnosis.

Every effort must be made to reach a preoperative diagnosis; this will help the surgeon to plan the surgery. Radiographs, which was the only investigation done for our patients, are important because they can show abnormal features either in the form of cortical compression (five of our patients) or intraosseous involvement.^(11,17) Magnetic resonance (MR) imaging is the most conclusive preoperative tool as GCTTS show characteristic features which are of low signal intensity on both T1- and T2-weighted images, equal to that of skeletal muscle.⁽¹⁷⁻¹⁹⁾ Recently, Kitagawa et al stated that MR imaging is able to depict the characteristic internal signal of GCTTS. Moreover, it can accurately assess the tumour size and degree of extent around the phalanx, which can affect the type of surgical approach.⁽³⁵⁾ On ultrasonography, GCTTS appears as a solid homogeneous hypoechoic mass. Ultrasonography can provide useful information about the tumour vascularity, size and its relationship with the surrounding tissue, meaning that it



Fig. 1 Operative photograph shows the macroscopic appearance of GCTTS.

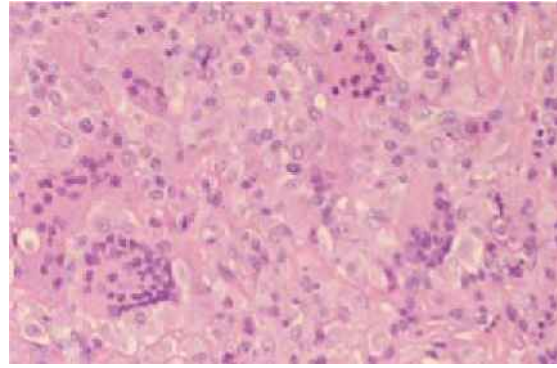


Fig. 2 Photomicrograph of the GCTTS shows the synovial cell hyperplasia, accumulation of histiocytes, presence of multinucleated giant cells and collagen strands (Haematoxylin & eosin, $\times 20$).

can be used as the first method to diagnose GCTTS.⁽²⁰⁾ Mackie, in his work on scintigraphy, stated that when thallium (Tl-201) activity is detected in a lesion in the hand or foot, GCTTS should be considered.⁽³⁶⁾ Fine-needle aspiration biopsy is used to reach a tissue diagnosis preoperatively.⁽²¹⁾

Regarding the treatment of GCTTS, most agree that the best way to avoid recurrence is to perform complete surgical excision.^(1,29,30) GCTTS is found in the subcutaneous plane arising from the tendon sheath, and often has extensions that go around and under several structures including the neurovascular bundle. This makes it difficult for the lesion to be excised and could be the reason for the high recurrence rate. Before embarking on surgical treatment, one should know the exact topography of the tumour, aided by the above investigations. Surgical incisions should be planned in such a way that allows the surgeon to reach the tumour extensions both dorsally and ventrally. The tumour itself must be dissected gently without allowing any seedling, and one should not hesitate to remove a cuff of tendon sheath, part of a capsule, periosteum or even part of a tendon,⁽²¹⁾ to make sure that all pathological tissue is removed. All patients should be warned about possible complications, such as high recurrence rate, numbness, joint stiffness, painful scar and skin necrosis.

GCTTS remains a lesion of unknown nature.^(22,23) Pathologists continue to look at it from different angles in an attempt to answer questions, such as whether it is neoplastic⁽³⁾ or non-neoplastic,⁽¹³⁾ what are its morphological and ultrastructural features,⁽²⁴⁾ its relation with pigmented villonodular synovitis, fibroma, and giant cell tumour of the bone.⁽²⁵⁻²⁷⁾ Many immunohistochemical studies have been carried out to shed light on the nature of this lesion.^(28,29) The importance of GCTTS lies in the fact that it has a high recurrence rate, which could be as high as 30%.^(9,10,30,31) Our recurrence rate was nearly 24% (12

patients). The known risk factors which are associated with the high recurrence rate include: proximity to the arthritic joint, proximity to the distal interphalangeal joints of the fingers, proximity to the interphalangeal joint of the thumb, and radiological osseous erosions.⁽¹⁰⁾ Some authors relate recurrence to the types of cells,⁽³²⁾ mitotic rate,^(1,22) capsular involvement,⁽³³⁾ and incomplete excision of the lesion.⁽³²⁾ Postoperative radiotherapy has been advocated by some to reduce the recurrence rate.⁽³⁴⁾ We conclude that GCTTS should be considered by surgeons when they are faced with a hand swelling. A definite preoperative diagnosis will help in the planning of surgical treatment, and complete local excision is probably the only way to prevent recurrence.

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