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GIANT CELL TUMOUR OF THE TENDON SHEATH OF THE THUMB – A CASE REPORT

Plastic Surgery

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ABSTRACT

Giant cell tumor (GCT) of the tendon sheath is the second most common benign soft tissue tumor of the hand. Magnetic resonance imaging (MRI) is the investigative tool of choice for both diagnosis and treatment planning. The current standard treatment of choice is excision or amputation of the involved part as the recurrence rates are very high. Hence, it is necessary that the surgeon ensures complete removal of the tumor and removal of residual satellite nodules if any. There are many hypotheses proposed regarding the etiology of these lesions, but still the opinions are varied.

KEYWORDS

Giant cell, Tendon sheath, MRI, Surgery, Recurrence

INTRODUCTION

Giant cell tumor of the tendon sheath is the second most common benign tumor of the hand presenting as a slow growing painless lesion along the volar aspect of the digits.[1-9] The tumor is common in females, usually occuring in the third to fifth decade of life.[10-13] The etiopathogenesis of GCT is not clearly defined in the literature, but reactive or regenerative hyperplasia accompanied by an inflammatory process has been the most commonly accepted theory.[7-9] Recent studies have shown that most of these tumors exhibit chromosomal translocations involving chromosome 1p13.[14] A detailed history and thorough physical examination may help in the diagnosis. Plain radiographs can be helpful as these tumours may cause erosions in the cortical bone and may invade medullary spaces.[4] Magnetic resonance imaging (MRI) is the most useful diagnostic tool and is also required for surgical planning.[4,15] The current standard treatment of choice for GCT is surgical excision.[3,5,7,9,11,16] Despite its benign character, local recurrence after excision has been reported in up to 45% of cases, mostly due to incomplete excision.[17]

Case Report

26 year old female patient came with complaints of swelling in the left thumb for 1 year. She was apparently normal 1 year ago when she noticed the swelling in the left thumb. It was of spontaneous onset and gradually increasing in size associated with pain. There was no history of trauma, fever or any other co-morbid illnesses. On examination, a swelling of size 4 x 5 cm was present in left thumb both on the dorsal and volar aspect, which was not warm but tender and firm in consistency and not fixed to the underlying bone. **(Fig. 1)** A clinical diagnosis of giant cell tumour was made. Contrast MRI showed an ill-defined, lobulated mildly enhancing irregular soft tissue lesion involving the left thumb circumferentially centered on the interphalangeal (IP) joint and proximal phalanx and extending into the IP joint appearing hypointense in all sequences. The proximal and distal phalanges show surface scalloping with articular surface irregularities and marrow hyperintensities, suggestive of a neoplastic etiology like giant cell tumour of the tendon sheath**. (Fig. 2)** Tru-cut biopsy confirmed as a giant cell tumour of the tendon sheath. We planned for amputation of the affected thumb and toe transfer which the patient was not willing. Hence, disarticulation of the left thumb was planned at metacarpophalangeal (MCP) level. Under regional anaesthesia, tourniquet control and loupe magnification, a dorsal zig zag incision was made and deepened in layers. The skin flaps were elevated, tendons dissected, digital vessels ligated and thumb disarticulation done at level of MCP joint and stump was closed primarily with 3-0 nylon sutures. Histopathology was suggestive of giant cell tumour of tendon sheath. Post-operative was uneventful and the patient is on regular follow-up.

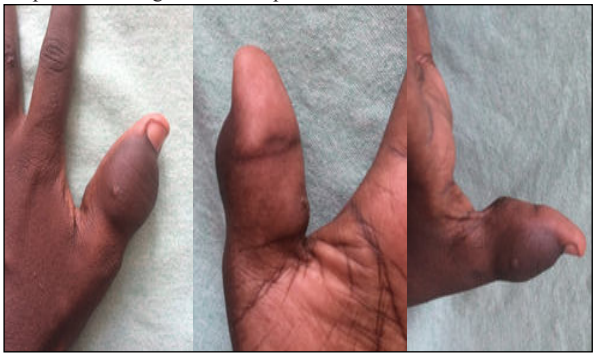

Fig. 1 – Clinical photograph showing the lesion in left thumb

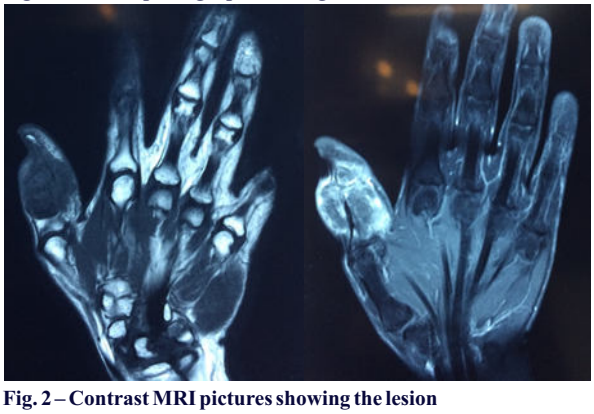

Fig. 2 – Contrast MRI pictures showing the lesion

DISCUSSION

In 1941, Jaffe was first who described GCT of the tendon sheath as a tenosynovitis, a nonneoplastic inflammatory reaction.[18] GCT is composed of multinucleated giant cells, histiocytes, polyhedral, fibrotic material and hemosiderin deposits.[19-21] Cytogenetic studies have suggested simple structural and numeric aberrations, as well as many balanced chromosomal aberrations, in particular clonal structural aberrations affecting the 1p11 to 1p13 region and trisomies of chromosomes 5 and 7.[22-24] Macrophage colony stimulating factor

(CSF1) is a secreted cytokine or hematopoietic growth factor that plays an essential role in the proliferation, differentiation, and survival of monocytes, macrophages, and related cells. It is localized to the 1p13 chromosome and appears to have a potential role in GCT.[14] Cupp et al in 2007 found a subset of cells with high CSF1 expression but with the absence of 1p13 translocation, suggesting an alternate mechanism in some tumors and this is the reason to use a tyrosine kinase receptor inhibitor such as Imatinib to treat GCT.[25-26] In 2011, Fotidias et al mentioned that GCT of the tendon sheath affects more often women with a mean age ranged from 30 to 50 years.[8] The most common location of the tumour is the index finger followed by the thumb, middle, ring and little fingers.[2,6,8,17,19,27] The majority of patients presents with a painless swelling with sensory disturbances in the digits.[2,6,9,17,19]

Ultrasonography can detect whether tumor is solid or cystic, presence of satellite lesions and also describes the relationship of the lesion to the surrounding structures.[28] Byers classified GCT of the tendon sheath into localized nodular type (common in hand) and diffuse type (common in joints).[6,27] Al-Qattan classified these lesions as type I or type II according to MRI and intraoperative findings.[6] Type 1 lesions are single round or multilobulated tumor while type II describes two or more distinctly separated tumors.[6,7] MRI shows the tumours relation to periosteum, bone invasion, joint or neurovascular structures. The treatment of these tumours is a challenge for the surgeon as it may penetrate into joints and bone cortices, extend into tendon sheaths and enclose neurovascular structures, and this causes difficulties in establishing the correct balance between a complete and aggressive tumor removal along with the preservation of vital tissues. The recurrence rate after surgical excision has been reported as high as 15–45%.[3-6,8,9,16,17] Reilly et al observed that recurrence of GCT was much higher at the thumb interphalangeal (IP) joint and digital distal interphalangeal (DIP) joints of fingers and this is due to the inherent difficulty of adequately excising the tumor distally at the IP and DIP joint levels, where the neurovascular structures are quite close to tumor margins and the surrounding soft tissue envelope is not ideal.[2,6,9,16,29]

Williams et al in 2010 reported that the high risk group was defined as tumor involvement of the extensor tendon, flexor tendon or joint capsule.[15] Type II tumors have been known to have a higher recurrence rate compared to Type I giant cell tumors probably due to an undetected satellite lesion and subsequent incomplete excision, therefore it cannot be always considered as a true recurrence.[8,27,29] The single most important factor to prevent recurrence is the complete surgical excision by an experienced hand surgeon using 4.5x magnifying loupes, magnification being of utmost importance to obtain a thorough tumor dissection from periosteum, joints, neurovascular and tendinous structures and avoiding any significant complication.[1,6,8] Kotwal et al recommended postoperative radiotherapy of 20 Gy in divided daily doses of 2 Gy when there is incomplete excision, presence of mitotic figures and bone involvement.[6,17] Ng et al in 2010 proposed the use of fine needle aspiration cytology (FNAC) as a primary diagnostic aid and helps in preoperative planning to prevent recurrence.[30]

CONCLUSION

Giant cell tumour of the tendon sheath is a common lesion of the hand with a high recurrence rate. Surgical excision is the mainstay of treatment, especially under tourniquet control and loupe magnification. Adequate surgical exposure and meticulous dissection with removal of satellite nodules may reduce the recurrence rate. Many studies with well defined protocols and the role of recent advances may play role in reducing the recurrence of this tumour.

REFERENCES

1. Darwish FM, Haddad WH. Giant cell tumour of tendon sheath: experience with 52 cases. Singapore Med J. 2008;49(11):879–882.
2. Uriburu IJF, Levy VD. Intraosseous growth of giant cell tumors of the tendon sheath (localized nodular tenosynovitis) of the digits: report of 15 cases. J Hand Surg Am. 1998;23:732–736.
3. Lucas DR. Tenosinovial giant cell tumor: case report and review. Arch Pathol Lab Med. 2012;136:901–6.
4. Gouin F, Noailles T. Localized and diffuse forms of tenosynovial giant cell tumor (formerly giant cell tumor of the tendon sheath and pigmented villonodular synovitis). Orthop Traumatol Surg Res. 2017;103:S91–7.
5. Di Grazia S, Succi G, Fraggetta F, Perrotta RE. Giant cell tumor of tendon sheath: study of 64 cases and review of literature. G Chir. 2013;34:149–52.
6. Al-Qattan MM. Giant cell tumours of tendon sheath: classification and recurrence rate. J Hand Surg Br. 2001;26:72–5.
7. Koutserimpas C, Kastanis G, Ioannidis A, Filippou D, Balalis K. Giant cell tumors of the tendon sheath of the hand: an 11-year retrospective study. J BUON. 2018;23:1546–51.
8. Fotiadis E, Papadopoulos A, Svarnas T, Akritopoulos P, Sachinis NP, Chalidis BE. Giant cell tumour of tendon sheath of the digits. A systematic review. Hand. 2011;6:244–9.
9. Reilly K, Peter MD, Stern PJ, Dale JA. Recurrent giant cell tumors of the tendon sheath. J Hand Surg Am. 1999;24:1298–302.
10. Suresh SS, Zaki H. Giant cell tumor of tendon sheath: case series and review of literature. J Hand Microsurg. 2010;2(2):67–71.
11. Garg B, Kotwal PP. Giant cell tumour of the tendon sheath of the hand. J Orthop Surg (Honk Kong) 2011;19(2):218–220.
12. Monaghan H, Salter DM, Al-Nafussi A. Giant cell tumour of tendon sheath (localized nodular tenosynovitis): clinicopathological features of 71 cases. J Clin Pathol. 2001;54:404–407.
13. Adams EL, Yoder EM, Kasdan ML. Giant cell tumor of the tendon sheath: experience with 65 cases. Eplasty. 2012;12:e50.
14. West RB, Rubin BP, Miller MA, Subramanian S, Kaygusuz G, Montgomery K, et al. A landscape effect in tenosynovial giant-cell tumor from activation of CSF1 expression by a translocation in a minority of tumor cells. Proc Natl Acad Sci U S A. 2006;17:690–5.
15. Williams J, Hodari A, Janevski P, Siddiqui A. Recurrence of giant cell tumors of the hand: a prospective study. J Hand Surg Am. 2010;35:451–6.
16. Kitagawa Y, Ito H, Yokoyama M, Sawaizumi T, Maeda S. The effect of cellular proliferative activity on recurrence and local tumour extent of localized giant cell tumour of the tendon sheath. J Hand Surg Br. 2004;29:604–7.
17. Kotwal PP, Gupta V, Malhotra R. Giant cell tumour of the tendon sheath- is radiotherapy indicated to prevent recurrence after surgery? J Bone Joint Surg. 2000;82B:571–573.
18. Jaffe H, Lichtenstein L, Sutro CJ. Pigmented villonodular synovitis, bursitis and tenosynovitis. Arch Pathol. 1941;31:731–765.
19. Ozalp T, Yercan H, Kurt C, et al. Giant cell tumor of tendon sheath of the hand. Acta Orthop Traumatol Turc. 2004;38:120–124.
20. Messoudi A, Fnini S, Labsaili N, et al. Giant cell tumors of the tendon sheath of the hand: 32 cases. Chir Main. 2007;26:165–169.
21. Liu PT. Radiological reasoning: acutely painful swollen finger. Am J Roentgenol. 2007;188:A13–S17. [22. David R, Lucas Tenosynovial Giant Cell Tumor: Case Report and Review. Archives of Pathology & Laboratory Medicine. 2012 Aug;136(8):901–906.
23. Nilsson M, Höglund M, Panagopoulos I, et al. Molecular cytogenetic mapping of recurrent chromosomal breakpoints in tenosynovial giant cell tumors. Virchows Arch. 2002;441(5):475–480.
24. Fletcher JA, Henkle C, Atkins L, Rosenberg AE, Morton CC. Trisomy 5 and trisomy 7 are nonrandom aberrations in pigmented villonodulare synovitis: confirmation of trisomy 7 in unculteredcells. Genes Chromosomes Cancer. 1992;4(3):264–266.
25. Cupp JS, Miller MA, Montgomery KD, et al. Translocation and expression of CSF1 in pigmented villonodular synovitis, tenosynovial giant cell tumor, rheumatoid arthritis and other reactive synovitides. Am J Surg Pathol. 2007;31(6):970–976.
26. Cassier PA, Gelderblom H, Stacchiotti S, et al. Efficacy of imatinib mesylate for the treatment of locally advanced and/or metastatic tenosynovial giant cell tumor/pigmented villonodular synovitis. Cancer. 2012;118(6):1649–1655.
27. Ikeda K, Osamura N, Tomita K. Giant cell tumour in the tendon sheath of the hand: importance of the type of lesion. Scand J Plast Reconstr Surg Hand Surg. 2007;41:138–142.
28. Middleton WD, Patel V, Teefey SA, et al. Giant cell tumors of the tendon sheath: an analysis of sonographic findings. Am J Roentgenol. 2004;188:A13–S17.
29. Grover R, Grobbelaar AO, Richman PI, et al. Measurement of invasive potential provides an accurate prognostic marker for giant cell tumor of tendon sheath. J Hand Surg. 1998;23B:728–731.
30. Ng VY, Thomas K, Crist M, et al. Fine needle aspiration for clinical triage of extremity soft tissue masses. Clin Orthop Rel Res. 2010;468:1120–1128.