

Inflammatory Myofibroblastic Tumor: A Benign Lesion with Malignant Behavior

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ABSTRACT

Inflammatory myofibroblastic tumors (IMTs) comprise a rare group of lesions. Till date, fewer than 30 cases have been described in the paranasal sinuses. The purpose of this article is to report a case of IMT in maxillary sinus which is very rare and to highlight on its clinical and histological features. We present a case of IMT in a 46-year-old female patient who presented with pain and oroantral communication few weeks after the extraction of a molar tooth. Computed tomography scan report revealed a soft tissue lesion in the right maxilla with posterolateral bone destruction. Inflammatory myofibroblastic tumors may show neoplastic features, such as persistent local growth, recurrence, and metastasis, but the overall prognosis of the lesion is excellent. Most recurrences will occur within 1 year of initial surgery, with only a few reports of late recurrences. Follow-up should be at regular intervals during the first few years.

Keywords: Inflammatory cells, Myofibroblast, Maxillary sinus, Smooth muscle actin.

How to cite this article: Rai H, Ramaraj PN, Dayakar A, Supriya H. Inflammatory Myofibroblastic Tumor: A Benign Lesion with Malignant Behavior. *Oral Maxillofac Pathol J* 2015; 6(2):650-653.

Source of support: Nil

Conflict of interest: None

INTRODUCTION

Inflammatory myofibroblastic tumors (IMTs) are clinicopathologically distinctive entities, which have been described in the lungs, abdomen, retroperitoneum, and extremities, but rarely in the head and neck region.¹ This tumor has previously been described as a plasma cell granuloma, plasma cell pseudotumor, inflammatory myofibrohistiocytic proliferation, omental mesenteric myxoid hamartoma, and inflammatory pseudotumor. The term IMT was initially proposed by Pettinato et al in

1990.² The most proper definition was given in the 1994 World Health Organization (WHO) classification of soft tissue tumors, as 'a tumor composed of myofibroblastic spindle cells usually accompanied by numerous plasma cells and/or lymphocytes.'³

It is now recognized as a neoplastic process that usually follows a rather benign clinical course after radical excision, but cases of invasive, locally recurrent, and metastatic forms have been reported.⁴

Occurrence in the maxillary sinus is unusual, and many aspects of this tumor have not been fully elucidated.³ The diagnosis of IMT is difficult to establish before surgery because of its diversified radiologic manifestations. At one extreme, advanced disease is often misdiagnosed as a malignant tumor because of extensive infiltration and bony destruction. At the other extreme, it simulates various benign lesions in its earliest stage when it is confined to the mucosa.⁴

CASE REPORT

A 46-year-old female patient reported to our institution with a complaint of pain in the upper back tooth region since few days. There was a pus discharge at the region of 17. Orthopantomograph revealed a cloudy radiopacity of the right maxillary sinus (Fig. 1) and provisionally diagnosed as chronic maxillary sinusitis and extraction of 17 was done. Patient came back after few days with pain in the same region and histopathology report of the incisional biopsy was also given as chronic maxillary sinusitis.

During the follow-up, it was noticed that there was delay in wound healing which was accompanied with pain and subsequently she developed an oroantral

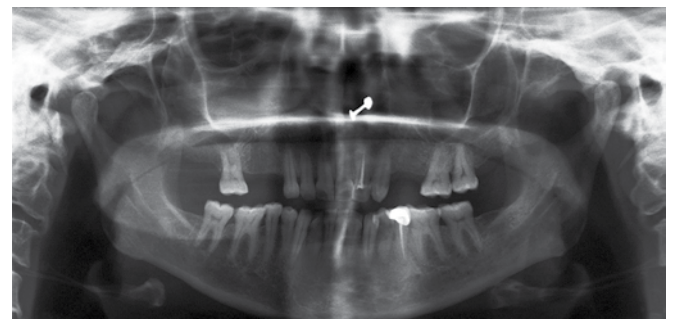


Fig. 1: Orthopantomograph revealing a cloudy radiopacity of the right maxillary sinus

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fistula. Computed tomography scan report revealed a soft tissue lesion in the right maxilla with posterolateral bone destruction (Fig. 2). Carcinoma of maxillary sinus lining was suspected and excisional biopsy was done under general anesthesia. The specimen was sent to our department for the diagnosis.

Histopathology revealed a cellular proliferation of spindle shaped cells arranged in storiform or fascicular pattern with variable component of inflammatory cells. In some areas, these cells were polygonal in shape with vesicular nuclei. Inflammatory infiltrate consisted of predominantly lymphocytes, plasma cells, histiocytes and scattered neutrophils and eosinophils. Stroma was collagenous with areas of extravasated RBC's (Figs 3 and 4). Stratified squamous epithelium with reactive atypia and maxillary sinus lining of pseudostratified columnar ciliated epithelium were also observed.

Immunohistochemistry was performed for vimentin which was diffusely strong positive (Fig. 5) and smooth muscle actin was focally positive with the spindle cells and also around the blood vessels (Fig. 6).

Based on the histopathological and immunohistochemical findings, a final diagnosis of inflammatory myofibroblastic tumor was rendered.

DISCUSSION

Inflammatory myofibroblastic tumors represent a spectrum of myofibroblastic proliferation that includes reactive to benign to malignant lesions. Some lesions are

difficult to distinguish from the reactive process, whereas others appear sarcomatous. Lesions may show neoplastic features, such as persistent local growth, recurrence, and metastasis. Hence, few authors consider it as a low-grade sarcoma.⁵

The etiology of IMT is unknown. It has long been debated whether it was inflammatory reactive proliferation or a truly neoplastic lesion. It has been suggested by Hytiroglou P et al that IMT may occur as an immune response to an inflammatory stimulus and could represent a reaction to previous trauma or irritation.⁸ World Health Organization adopted the term IMT and included it into the category of soft tissue tumors in 1994. By definition, there is variable inflammatory cells in the tumor, hence the name is IMT, but the pathogenesis of which, whether inflammatory reaction induce neoplasm, or IMT causes inflammatory cells infiltrate, is not determined.³

These tumors are most commonly found in the lung, abdomen, extremities and less commonly in the head and neck region. However, few cases have been reported in the orbit, maxillary sinus, larynx, tonsil, parapharyngeal space, nasal cavity, thyroid gland, epiglottis, periodontal region, palatine tonsil, facial nerve and intracranial dura.^{6,13}

The most common clinical presentation of IMT is as an incidentally discovered mass. Intraorally, these tumors present as a painless swelling of relative short duration, which is firm and indurated on physical examination.⁶ In the nasal cavity and paranasal sinuses, the initial

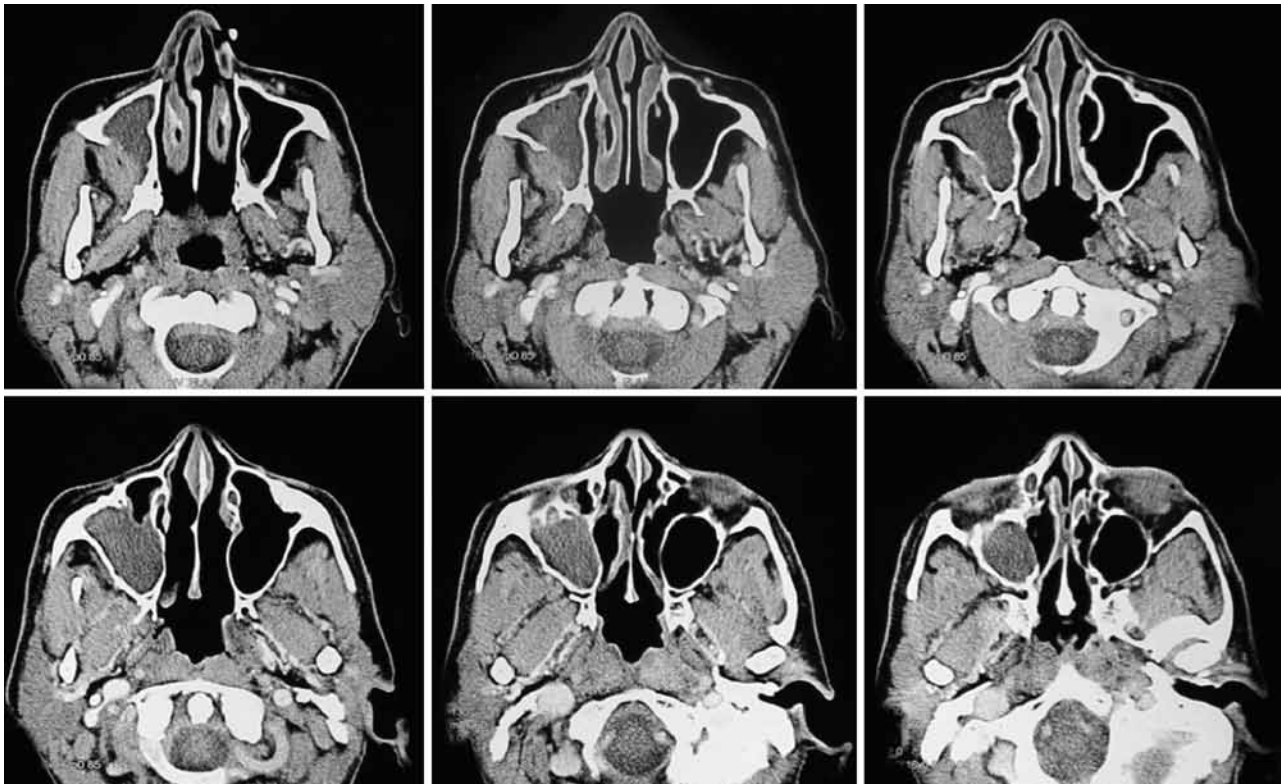


Fig. 2: Computed tomography scan report revealing a soft-tissue lesion in the right maxilla with posterolateral bone destruction

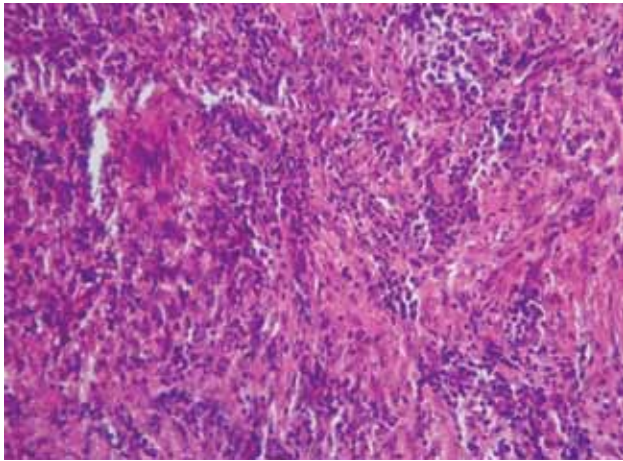


Fig. 3: Tumor cells arranged in fascicular pattern which are obscured by acute and chronic inflammatory cells (H&E section, 200x)

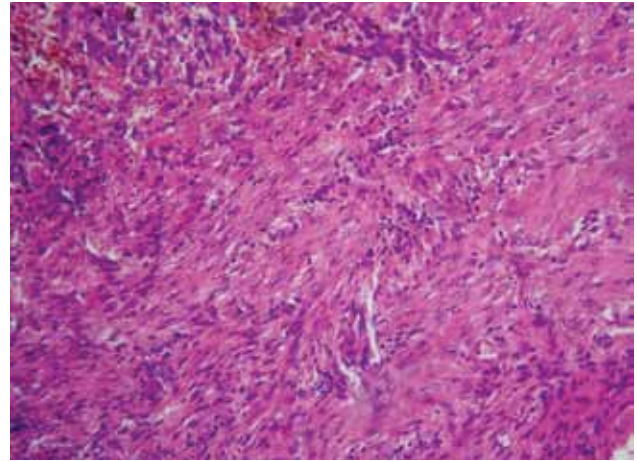


Fig. 4: Spindle shaped cells showing storiform pattern (H&E section, 200x)

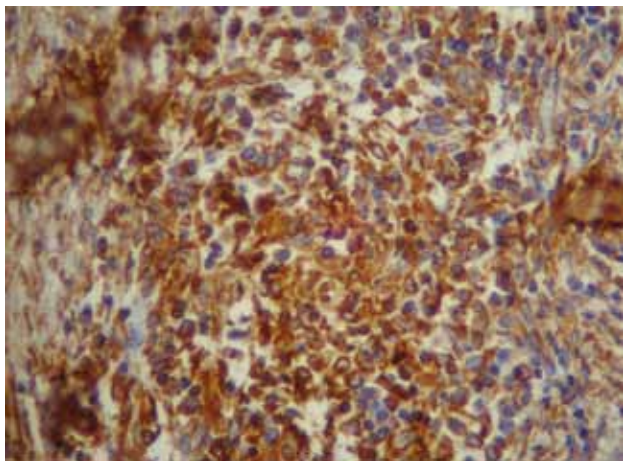


Fig. 5: Spindle cells showing diffuse strong positivity to vimentin (400x)

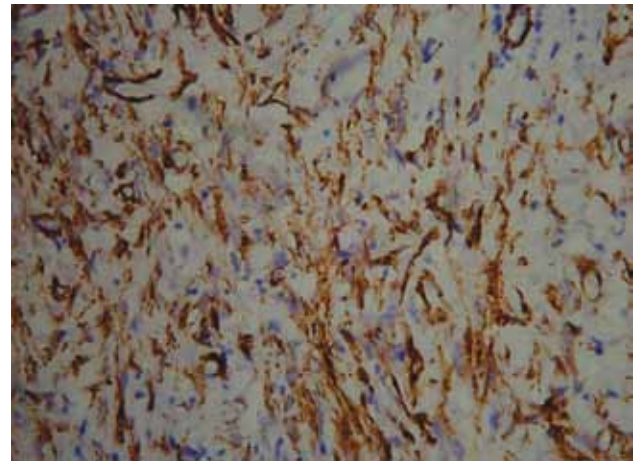


Fig. 6: Spindle cells showing positive expression to smooth muscle actin (400x)

presenting sign is usually a nonspecific sinonasal mass, which had been growing over a period of months or years. Inflammatory myofibroblastic tumors located in the paranasal sinuses are usually associated with at least one sinus wall-destruction.¹³ Similar finding was evident in the present case. Perineural spread along maxillary, mandibular, and hypoglossal nerves and a case complicated by internal carotid occlusion have been described in the literature by De Vuysere S et al.¹⁴

Histologically, IMT is composed of myofibroblastic spindle cells, admixed with a prominent infiltrate of lymphocytes, plasma cells, and acute inflammatory cells. Three basic histological patterns have been described as follows:

1. Myxoid/vascular pattern, resembling inflammatory granulation tissue;
2. Compact spindle cell pattern with fascicular and/or storiform areas and variation of cellular density; and
3. Hypocellular pattern, densely collagenised and reminiscent of a fibrous scar.^{1,18} The majority of spindle cells stains strongly for vimentin and smooth muscle actin and only a minority is positive for CD68.

They are negative for S-100, MAK-6, CD21, Ber-MAC-DRC, and Ki-M4.²⁰

Some benign and malignant tumors and tumor-like conditions pose significant challenges in differential diagnosis because of their morphologic similarities with inflammatory myofibroblastic tumor. The less cellular pattern may be mistaken for aggressive fibromatosis. The prominent inflammatory component is the critical distinguishing feature. The cellular form of inflammatory myofibroblastic tumor may be mistaken for fibrosarcoma or other spindle cell malignancies.⁷ The pathologist must also be careful to differentiate inflammatory myofibroblastic tumors from carcinomas, lymphomas, and chronic fungal disease.¹³

Inflammatory myofibroblastic tumor has shown clonal gene rearrangements of the short-arm of chromosome 2, some of which result in an ALK gene rearrangements; such rearrangements are uncommon in adults over 40 years of age with IMT.⁹ Lawrence et al subsequently identified two distinct balanced chromosomal translocations involving the ALK kinase gene. The overexpression of the ALK protein kinase often aids in the diagnosis of IMT.^{9,14}

Ultrastructural studies confirm the identity of the spindle-shaped cells as myofibroblasts, distinguished by their bundles of peripheral microfilaments, elongated and occasionally notched nuclei, abundant rough endoplasmic reticulum cisternae, and occasional fibronexus junctions.¹⁴

In the past, treatment for inflammatory myofibroblastic tumor had been wide local excision with radiation reserved for recurrences. Current treatment is conservative surgery.¹¹ Local excision with a rim of normal tissue should be performed to decrease the rate of recurrence.^{11,12} Therapy with corticosteroids, not antibiotics, is the first mode of treatment for suspected IMT.⁶ Coffin et al found a recurrence rate for incomplete resection to be 25% and that the overall aggressive behavior of the tumor is related to the anatomic site of the tumor, proximity to vital structures, and multinodularity of the lesion, all of which compromise definitive resection.¹⁹ A conservative approach may be considered as alternative to reconstructive surgery in particular cases in young subjects.¹⁶

The overall prognosis for an inflammatory myofibroblastic tumor is excellent. Most recurrences will occur within 1 year of initial surgery, with only a few reports of late recurrences.¹⁷ Strict follow-up is recommended. Patients must be reviewed 1 to 2 monthly for the first 2 years; 2 to 3 monthly for the following year and 6 monthly for the 4th and 5th year.¹⁵

CONCLUSION

Inflammatory myofibroblastic tumor represents a spectrum of myofibroblastic proliferation that includes reactive to benign to malignant lesions. Some lesions are difficult to distinguish from the reactive process, whereas others appear sarcomatous. Lesions may show neoplastic features, such as persistent local growth, recurrence, and metastasis, but the overall prognosis of the lesion is excellent.

REFERENCES

1. Gale N, Zidar N, Podboj J, Volavšek M, Luzar B. Inflammatory myofibroblastic tumour of paranasal sinuses with fatal outcome: reactive lesion or tumour. *J Clin Pathol* 2003;56(9): 715-717.
2. Yuan XP, Li CX, Cao Y, Singh S, Zhong R. Inflammatory myofibroblastic tumour of the maxillary sinus: CT and MRI findings. *Clinical Radiology* 2012;67(12):e53-57.
3. Songhua F, Danjun D, Mei J. Inflammatory myofibroblastic tumour of the maxillary sinus: CT appearance, clinical and pathological findings. *Eur J Radiol Extra* 2006;60(1):5-9.
4. de Oliveira Ribeiro AC, Joshi VM, Funkhouser WK, Mukherji SK. Inflammatory myofibroblastic tumor involving the pterygopalatine fossa. *Am J Neuroradiol* 2001 Mar;22(3): 518-520.

5. Lai V, Wong YC, Lam WY, Tsui WC, Luk SH. Inflammatory myofibroblastic tumor of the nasal cavity. *Am J Neuroradiol* 2007 Jan;28(1):135-137.
6. Naveen J, Sonalika WG, Prabhu S, Gopalakrishnan K. Inflammatory pseudotumor of maxillary sinus: mimicking as an aggressive malignancy. *J Oral Maxillofac Pathol* 2011 Sep-Dec;15(3):344-345.
7. Som PM, Brandwein MS, Maldjian C, Reino AJ, Lawson W. Inflammatory pseudotumor of the maxillary sinus: CT and MR findings in six cases. *Am J Neuroradiol* 1994;163(3): 689-692.
8. Cho S, Choi JY, Do NY, Kang CY. An inflammatory myofibroblastic tumor of the nasal dorsum. *J Pediatr Surg* 2008 Dec; 43(12):E35-E37.
9. Poh CF, Priddy RW, Dahlman DM. Intramandibular inflammatory myofibroblastic tumor—a true neoplasm or reactive lesion. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 2005;100(4):460-466.
10. Shek AWH, Wu PC, Samman N. Inflammatory pseudotumour of the mouth and maxilla. *J Clin Pathol* 1996;49(2): 164-167.
11. Gasparotti R, Zanetti D, Bolzoni A, Gamba P, Morassi ML, Ungari M. Inflammatory myofibroblastic tumor of the temporal bone. *Am J Neuroradiol* 2003 Nov-Dec;24(10): 2092-2096.
12. Binmadi NO, Packman H, Papadimitriou JC, Scheper M. Oral inflammatory myofibroblastic tumor: case report and review of literature. *Open Dentist J* 2011;5:66-70.
13. Brooks JK, Nikitakis NG, Frankel BF, Papadimitriou JC, Sauk JJ. Oral inflammatory myofibroblastic tumor demonstrating ALK, p53, MDM2, CDK4, pRb, and Ki-67 immunoreactivity in an elderly patient. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 2005;99(6):716-726.
14. De Vuysere S, Hermans R, Sciot R, Crevits I, Marchal G. Extraorbital inflammatory pseudotumor of the head and neck: CT and MR findings in three patients. *AJNR Am J Neuroradiol* 1999;20(6):1133-1139.
15. Ramachandra S, Hollowood K, Bisceglia M, Fletcher CDM. Inflammatory pseudotumor of the soft tissues: a clinicopathological and immunohistochemical analysis of 18 cases. *Histopathology* 1995;27(4):313-323.
16. Souid AK, Ziemba MC, Dubansky AS, et al. Inflammatory myofibroblastic tumor in children. *Cancer* 1993;72(6):2042-2048.
17. Donner LR, Trompler RA, White RR. Progression of inflammatory myofibroblastic tumor (inflammatory pseudotumor) or soft tissue into sarcoma after several recurrences. *Human Pathology* 1996 Oct;27(10):1095-1098.
18. Modarressi A, Pietramaggiori G, Bezzola T, Lacroix S, Richter M, Rilliet B, Pittet B. A facial inflammatory myofibroblastic tumour in a 6-year-old girl: plastic surgery lessons from a rare case. *J Craniomaxillofac Surg* 2011 Mar;39(2):141-144.
19. Browne M, Abramson LP, Chou PM, Acton R, Holinger LD, Reynolds M. Inflammatory myofibroblastic tumor (Inflammatory pseudotumor) of the neck infiltrating the Trachea. *J Pediatr Surg* 2004 Oct;39(10):e1-e4.
20. Ong HS, Ji T, Zhang CP, Li J, Wang LZ, Li RR, Sun J, Ma CY. Head and neck inflammatory myofibroblastic tumor: evaluation of clinicopathologic and prognostic features. *Oral Oncol* 2012;48(2):141-148.