**ORIGINAL ARTICLE**

# Frequency of Inflammatory Myofibroblastic Tumours at Children Hospital, Lahore

MAHVISH HUSSAIN, GHAZALA HANIF, ADEEL HAMID*, *ANUM SHAHID**, SAMINA ZAMAN, ZUNAIRA BASIT, SAJIDA PARVEEN, ZONAIRA RATHORE, SAADIA KHAN, AYESHA HAIDER*

## ABSTRACT

**Objectives:** To determine the frequency of IMT in children and to correlate the histological diagnosis with the clinical features and provisional diagnosis.

**Materials and methods:** This was a retrospective analysis of all cases of IMT received in the duration of approximately two years from Apr 2010 till date at the Histopathology Department of Children's Hospital & Institute of Child Health, Lahore. Data regarding age, size and tumor histology were collected from medical records. Routine H/E staining was performed.

**Results:** A total of fifteen cases of IMT were seen in this duration. The age range was between 3 to 13 years with slight preponderance in males and predominant involvement of GIT.

**Conclusion:** IMT is a rare benign tumor seen in children. Contrary to previous studies intra-abdominal IMT is common in pediatric age group.

**Key words:** Inflammatory myofibroblastic tumors, benign, rare, children

## INTRODUCTION

Inflammatory myofibroblastic tumors (IMT) are rare but heterogenous group of lesions[1,2] due to spindle cell proliferation of disputed nosology, with a distinctive fibro inflammatory and even pseudo-sarcomatous appearance. Due to infiltrative pattern and cytological features, they are sometimes difficult to discriminate from malignancy[1,3].

Vanik was first to define the entity histologically, termed "gastric granuloma with eosinophilic infiltration"[4]. It was previously referred to as plasma cell granuloma, inflammatory pseudo tumor (IPT), eosinophilic granuloma or inflammatory fibroid polyp[2].

It has long been debated regarding the origin of IMT whether it was truly neoplastic or a post inflammatory process. The proposed etiologies include Epstein Barr virus (EBV), Human Herpes virus (HHV8), and over expression of interleukin 6 (IL-6). Although some other diseases like Kaposi's sarcoma and Castleman's diseases also have similar etiologies, but molecular transcription form of open reading frame (ORF) -16, K13, 72 are only expressed in IMT[5]. Moreover the recent research suggest that IMT is probably a neoplasm because of cytogenetic clonality, recurrent involvement of chromosomal region 2p23, occasional aggressive local behavior and metastasis of the tumor[6,7].

*Department of Pathology, Children Hospital & Institute of Child Health, Lahore, *Jinnah Hospital, Lahore*
***King Edward Medical University, Lahore*
*Correspondence to Dr. Mahvish Hussain, 66-C, New Muslim Town, Lahore Email mahvish66@gmail.com Cell 0332 4752537*

The outlook of this disease has changed with time from a benign reactive process to a malignant neoplasm, based on the multiple case reports demonstrating recurrent and constant clonal genetic alterations[8,9,10]. Histologically, IMT consists of proliferation of spindle cells admixed with various amounts of lymphocyplasmacytic infiltrate[1]. The architectural appearances vary[11] with three main histological patterns: nodular fasciitis-like, fibrous histiocytoma-like, and desmoid or scar tissue-type[8].

IMT generally tend to lack severe cytologic atypia and less mitosis than sarcomas and also generally tend to be negative for p53 which is positive in sarcomas[11].

The differential diagnosis of IMT is a recently described lesion known as Calcifying fibrous pseudotumor (CFP), which histologically is characterized by varying degrees of calcifications in addition to fibroblastic proliferation along with inflammatory cell infiltrate. It has been postulated that CFP may represent a sclerosing end stage of IMT. The final diagnosis can be helped by immunomarkers as all IMTs are diffusely positive for actin, variable positive for CD34, and focal positive for Factor XIIIa whereas CFPs are diffusely positive for factor XIIIa and negative for smooth muscle actin, muscle-specific actin and CD34[12]. Typically the IMT is also characterized by the expression of vimentin and cytokeratins, corresponded to that of myofibroblasts along with other inflammatory markers[13]. ALK is only positive in 50% cases of IMT and specially in younger patients[12,14].

## MATERIALS AND METHODS

This was a retrospective analysis of all cases of IMT received in the duration of two years from April 2010 till date at the Histopathology Department of Children's Hospital & Institute of Child Health, Lahore. Data regarding age, size and tumor histology were collected from medical records. Routine H/E staining was performed.

## RESULTS

A total of fifteen cases of IMT were seen in approximately two years. The age range was between 3 to 13 years with preponderance in males (M, n=10, 67% F, n=5, 33%) (Fig 1).There were nine cases of IMT involving GIT (Fig 2 ), while in four patients IMT was seen in lung, and one each in chest wall and upper pole of testis (Fig 3). Size range was between 20–120 mm (Table 1). The patients with IMT in GIT presented with the clinical features of abdominal pain, constipation, malaise and weight loss (Fig 4). There were four patients in whom the lesion was in the lungs who gave the history of respiratory distress, productive cough and yellowish sputum, while the patient with the scrotal swelling presented with enlarged testis and discomfort (Fig 5). The provisional diagnosis was mostly of either granulomatous inflammation or a malignant neoplasm.

Table 1: Size of tumour

| Tumour Size(mm) | Tumour Size(mm) |
|---|---|
| 120 x 110x 70 | 85 x 70 x 30 |
| 115 x 100 x 80 | 80 x 40 x 30 |
| 110 x 90 x 30 | 70 x 60 x 50 |
| 110 x 60 x 40 | 60 x 50 x 30 |
| 100 x 60 x 30 | 60 x 40 x 30 |
| 100 x 60 x 20 | 55 x 30 x30 |
| 95 x 80 x 50 | 50 x 30 x 30 |
| 90 x 70 x 50 | |

Fig 1: Gender distribution of IMT

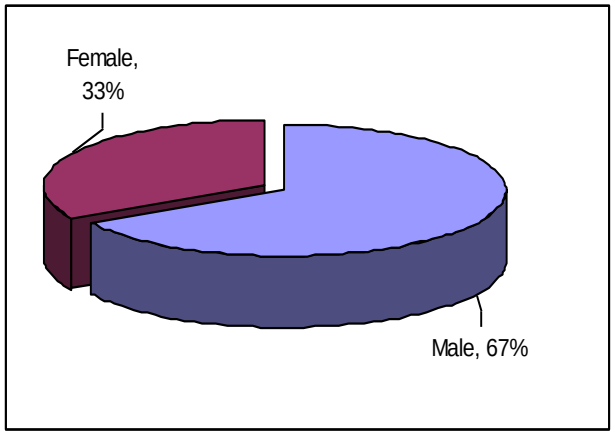



Fig 2: Gross appearance of IMT involving mesentery of Gut.

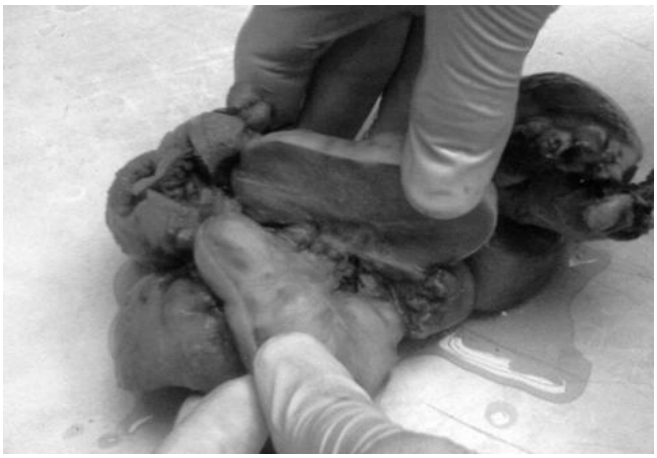


Fig 3: Distribution of IMT in Different Sites

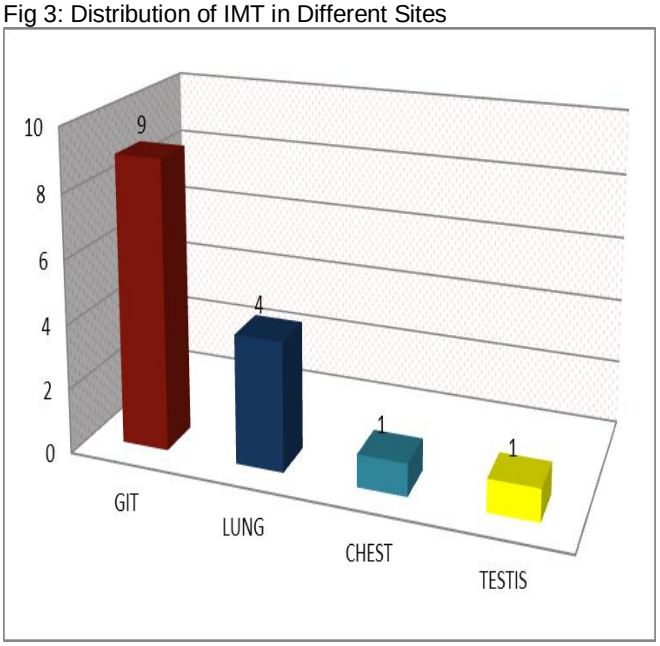



Fig 4: IMT of Gut showing spindle shaped cells arranged in fascicles with intervening inflammatory cells X 200

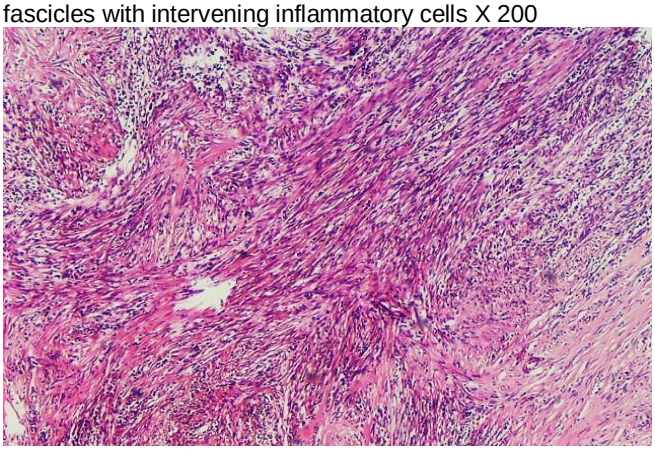
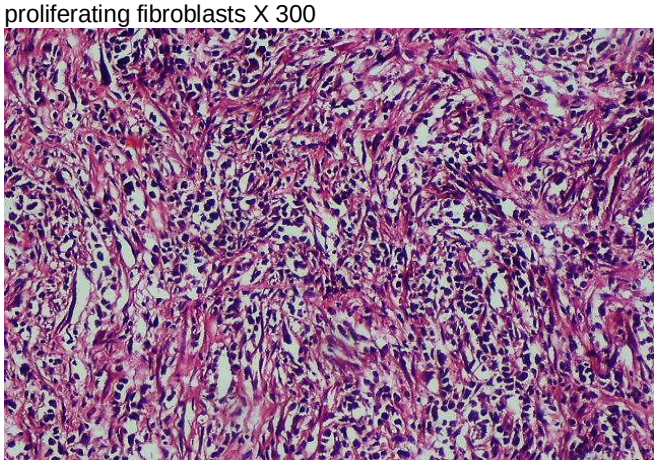


Fig 5: IMT of Testis showing dense inflammation with proliferating fibroblasts X 300



## DISCUSSION

IMT is a rare benign tumor that can be seen in various organs. Local recurrences and malignant transformation have been reported in a small subset of patients, but these generally tend to occur where complete resection has been impossible[1].

IMT is a challenging lesion with respect to classification, differential diagnosis, and biologic potential. It is usually seen in young people and of unknown etiology[15,16] affecting females more than males as it has also been observed by Coffin et al[3]. This is in contrast to the present study in which majority of patients were males (67%). IMT can be seen in any part of the body[1,2] most commonly involving lungs[3] and orbit[17]. Urinary bladder is the most common organ involved in the genitourinary tract while kidneys, renal pelvis and ureter are rarely involved[10]. IMT occurring at intra-abdominal sites in children have rarely been described. Similar findings were observed by Yimyaem et al and Imtiaz Wani who noticed IMT as very rare lesion in the gut[18,19]. However their findings are in contrast to the present study as we diagnosed nine cases (60%) of IMT in GIT alone. Coffin et al also observed that most of the IMT were present in GIT and pelvis followed by head and neck, trunk and extremities[3].

These tumors can also be present in the thoracic cavity although cardiac IMT are very rare as Burke et al observed 10 intracavitary polypoid myofibroblastic proliferations in children and young adults with the male to female ratio of 6:4 and a mean age of 10 years[20], whereas we observed four cases (26.7%) of IMT in the lung.

The tumors in the present study ranged in size from 20-120mm. Coffin et al also observed the lesions of IMT in the range of 10-170mm[3].

The clinical features of these patients depend upon the sites involved. However they often present with fever of unknown origin and other vague nonspecific symptoms. Usually it has a benign course and in most cases it is a slow growing, locally confined tumor with less metastatic potential. However, there are some predictors for aggressive behavior and metastatic potential of IMT which include presence of ganglion like cells, cellular atypia, aneuploidy, and p53 over expression[15,16].

According to a study conducted by Montazeri et al 108 myofibroblastic tumors were seen in a 25-year period. Based on clinicopathologic criteria, 82(76%) were regarded as benign, 14(13%) as borderline, and 12(11%) ias malignant with the recurrence rate of 16%. The average age at diagnosis for the entire series was 7 years with a male/female ratio of 1.8:1. The most frequent topographic site was the extremities 48(44%), followed by the trunk 31(29%) and the head and neck region 27(25%). Virtually 50% (51 tumors) of cases were diagnosed during the first year of life, and 73(71%) occurred in the first decade[21].

Biselli et al as well as Morotti et al also observed local recurrence or distant metastases in their studies[22,23]. The follow-up of the patients was beyond the scope in the present study; however the clinical diagnosis of the cases was of either granulomatous inflammation or suspicion of malignant neoplasms.

## CONCLUSION

IMT is a rare benign tumor commonly seen in children. Contrary to previous studies in paediatric age group intra-abdominal IMT is more common as well as preponderance in males.

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