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Case Report

Maculopapular Cutaneous Mastocytosis Presentation with Elevated Serum Tryptase Levels (>20 μg/L): A Case Report

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Abstract

Cutaneous mastocytosis is a rare group of diseases characterised by the abnormal accumulation and proliferation of mast cells in the skin. There are three recognized forms: Diffuse cutaneous mastocytosis, cutaneous mastocytoma and, the most common form, maculopapular cutaneous mastocytosis. Pediatric patients are relatively rare to suffer from cutaneous mastocytosis. The presented case of 9-month-old male infant with respiratory distress and coughing for 2 days, along with dark raised and flat lesions all over his body for 4 months. Skin biopsy showed uniformly spindle-shaped cohesive aggregates of mast cells filling the papillary and mid dermis. A modest increase in perivascular mast cells was identified. Toluidine blue wet stains of the tissue showed a striking cluster of mast cells in the dermis observed in purple to red color. Even though serum tryptase >20 μg/L, there is no evidence of marrow involvement. A retrospective review of literature on pediatric cutaneous mastocytosis in Indian scenarios demonstrated that serum tryptase levels are significantly higher.

Key words: Bone marrow, Cutaneous mastocytosis, Tryptase

INTRODUCTION

Mastocytosis is a disorder of mast cells characterized by multifocal compact clusters or cohesive aggregates. The disorder is heterogeneous with skin or multi-organ involvement (cutaneous/systemic involvement). In cutaneous mastocytosis, atypical/normal mast cells accumulate in the dermis due to increased proliferation and decreased apoptosis. A recent WHO classification recognizes them as diffuse cutaneous mastocytosis, cutaneous mastocytoma, and maculopapular cutaneous mastocytosis, the most common form.

CASE REPORT

A 9-month-old male infant is brought with a complaint of respiratory distress, fever, and cough for 2 days. Complain of dark to red colored raised and flat lesions associated with itching all over the body for 4 months. Lesions started initially over the face and neck and slowly progressed to involve the trunk over 2 months. Lesions are erythematous and later hyperpigmented and associated with itching. Past history of chicken pox, no relevant other histories (vomiting/food allergy/abdominal pain/diarrhoea/family history). On physical examination Figure1 illustrates, multiple erythematous to hyperpigmented macules and plaques are present on the face, trunk, scalp, and neck. No involvement of hair, nails, oral, and genital mucosa. Darier's sign is positive.

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Laboratory workup showed elevated serum tryptase level (27.9 μg/L, Method: floroenzyme immunoassay), and peripheral blood smear reveals mild eosinophilia (1.22 × 10^3 micro/L) with thrombocytosis. Ultrasonography works up to finding negative for organomegaly. Subsequently, a skin biopsy was performed.

Histopathological studies as illustrated in Figure 2 showed epidermal spongiosis with basal layer hyperpigmentation. Uniformly spindle-shaped cohesive aggregates of mast cells fill the papillary and mid dermis. A modest increase in perivascular atypical mast cells was identified. Toluidine

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Table 1: Comparisons of MPCM studies with elevated tryptase level

Study	Carter *et al.*[16] (>20 μg/L)	Schwartz *et al.*[11] (>20 μg/L)	Sathishkumar *et al.*[17] (>24 μg/L)
MPCM cases count	12.5%	23%	30.7%

blue wet stains of the tissue showed a striking cluster of mast cells at the dermis in purple to red in color. In view of raised tryptase levels (>20 μg/L) to rule out systemic mastocytosis, bone marrow studies were performed. Diluted aspirates show an increase in eosinophilic precursors and mast cells. Mastocytosis can present with hypogranular mast cells (atypical) which are appreciated by CD117, but aspirated smears are negative for mast cell clusters. Based on the above evidence, cutaneous mastocytosis is rendered and the toddler was kept under follow-up.

DISCUSSION

Cutaneous mastocytosis is identified by the clinical presentation of skin lesion associated with Darier's sign in addition to the absence of systemic mastocytosis. Histological presence of increased mast cells (in clusters) in the dermis by 4–8-fold in the lesion compared to the skin of healthy subjects or increase of mast cells by 2–3-fold compared with those in the skin of patients with inflammatory cutaneous disease.[1-7]

Maculopapular cutaneous mastocytosis (urticaria pigmentosa) is the most common manifestation of mastocytosis among children. MCPM is classified into monomorphic and polymorphous lesions clinically. Often, children with polymorphous MPCM exhibit brown or red lesions of different sizes with sharp or indistinct margins, as well as flat or elevated lesions. Over time, lesions commonly spread to the upper trunk, distal extremities, and lateral neck, starting on the thigh, axilla, or lower trunk. The skin on the face is usually spared.[8,9] There is a wide range of lesions among patients, ranging from fewer than 10 lesions to almost universal coverage, and the number may correlate with systemic involvement, as well as with serum tryptase.[10]

Most of the cutaneous mastocytosis had (B12) tryptase levels <20 μg/L, while systemic disease patients had levels above 20 μg/L.[11] The presence of MPCM with serum tryptase levels above 20 μg/L raises suspicions of systemic mastocytosis, subsequently leading to bone marrow testing, which is more likely to yield negative results. Routine Peripheral blood smears in mastocytosis are often normal with minority of cases show evidence of abnormal proliferation of cells of one or more myeloid lineage (neutrophils, eosinophils, basophils, monocytes, or thrombocytosis).[12,13] cutaneous mastocytosis in pediatric population has hypocellular smear with increased

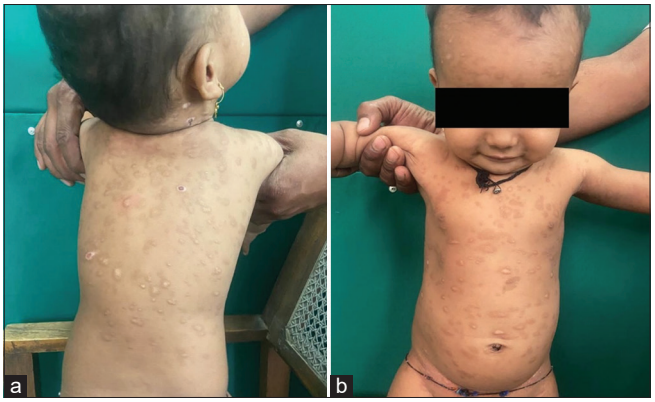

Figure 1: Clinical presentation of maculopapular cutaneous mastocytosis on inspection. (a) Inspection of the child on ventral and dorsal (b) Aspect shows hyperpigmented macules and plaques Involving face, trunk, scalp and neck

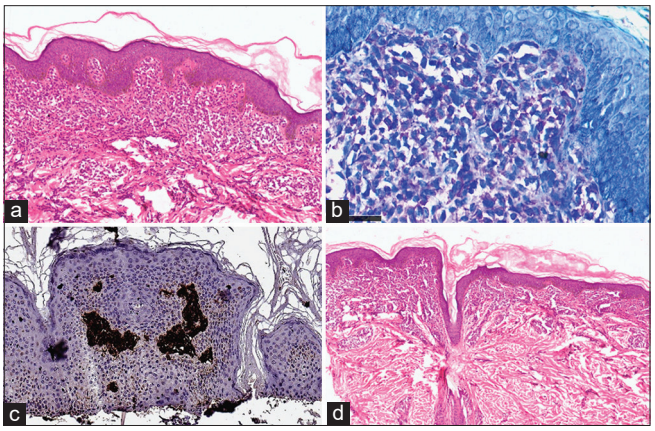

Figure 2: Microscopy of Maculopapular cutaneous mastocytosis. (a and d) (scale 200 μm) showing uniformly spindle-shaped cohesive aggregate of mast cells filled the papillary area and the mid dermis. (b) (scale 200 μm) Tolidine blue staining of skin highlights mast cells in purple colour. (c) (scale 50 μm) section from skin showing CD117 IHC highlighting mast cells in epidermis in a exhausted skin block of cutaneous

hematogones in bone marrow aspirate smears.[14] There may be mild erythroid and megakaryocytic dysplasia. Bone marrow biopsy shows focal perivascular and peritrabecular location of mast cells, eosinophils, and early myeloid cells.[15] Comparing with various studies as showed in the Table1 above, Southern Indian population are tend to have higher serum tryptase levels.

MPCM is less likely associated with bone marrow involvement or organomegaly, but if present, they are usually associated more with hepatomegaly. In follow-

up bone marrow studies in MPCM, its observed that biopsies are normocellular to hypocellular with 27% of cases showing increased mast cells (typical) in addition 9% of cases demonstrated mast cell aggregates (<15 cell). All the cases were resolved or partially resolved with no transformation into systemic mastocytosis in follow-up biopsy after 20-years.[18]

CONCLUSION

It has been observed that few pediatric MPCM cases with relatively higher or marginally elevated serum tryptase levels (>20 μg/L) at initial presentation are less likely to have underline systemic disease (especially in the South Indian population). The threshold point of suspecting underlining systemic disease by serum tryptase level is relatively higher in the South Indian population. Perhaps it's better to keep such cases under annual follow-up check-ups and teleconsultations once every 6 months rather than recommended for bone marrow studies to rule out systemic mastocytosis, especially at the initial encounter.

More analytical studies should be done to judge the threshold point on serum tryptase levels to know when should we suspect underlining systemic mastocytosis in the Southern Indian pediatric population.

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