

## Case Report

### A Case of Congenital Embryonal Rhabdomyosarcoma, Presenting as Blueberry Muffin Baby

Mary Mathew<sup>1</sup>, Padmapriya Jaiprakash<sup>2</sup>, Lakshmi Rao<sup>1</sup>, Nalini Bhaskaranand<sup>2</sup>

1. Dept. of Pathology, Manipal University, Manipal, India

2. Dept. of Paediatrics, Manipal University, Manipal, India

#### ABSTRACT

Congenital or neonatal rhabdomyosarcoma is a rare entity, usually presenting as a mass in the head and neck region as well as genitourinary tract. The embryonal variant is the most common type occurring in infancy. This is a case of congenital rhabdomyosarcoma with a huge forearm mass, with metastatic discrete nodules in the soft tissues of the neck and scapular region, resembling a 'blueberry muffin baby'.

**Key Words:** Congenital, Embryonal Rhabdomyosarcoma, Case Report

#### Introduction

**R**habdomyosarcoma (RMS) is the most common malignancy in infancy and childhood. However, there are very few cases presenting as congenital or neonatal form. These are highly vascularised tumours and hence, can mimic haemangiomas, which are more common (1). The head and neck are the most common sites, followed by the genitourinary tract, deep soft tissues of the extremities and the pelvis and retroperitoneum. Histologically, embryonal RMS recapitulates the various stages in the embryogenesis of normal

skeletal muscle (2). The pattern may range from poorly differentiated tumours, which require immunohistochemistry for diagnosis, to well differentiated forms resembling foetal muscle. The incidence of neonatal RMS is about 7.2 per 100,000 live births and very few cases presenting as blue berry muffin babies have been reported (3).

We present a case of neonatal/ congenital RMS presenting with a huge forearm mass with multiple metastatic lesions in the neck and scapular region.

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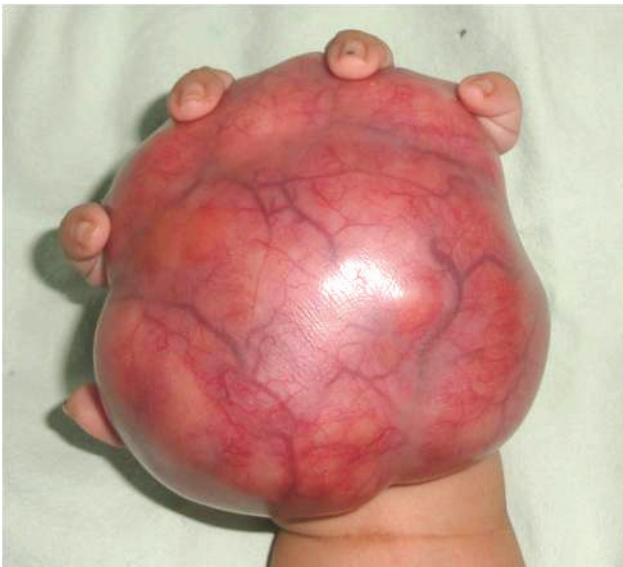
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Address Communications to: Dr. Padmapriya Jaiprakash, Department of Pathology, Basic Sciences Block, Kasturba Medical College, Madhav Nagar, Manipal University, Manipal – 576104, Karnataka, India.

Email: padmapriya.j@gmail.com

## Case Report

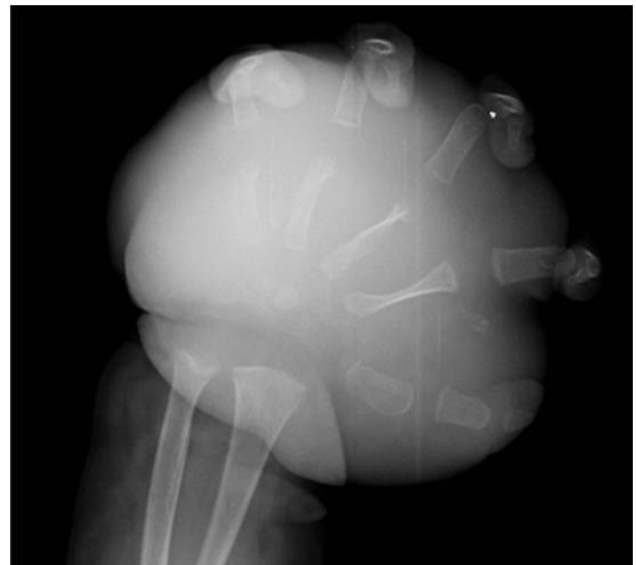
A 3 month old baby was brought to the Orthopedic Outpatient Department, Manipal University, Manipal, India with the complaints of swelling in the left hand since birth. The mother had an uneventful pregnancy and normal vaginal delivery. The mother noticed progressive swelling which gradually attained the present size of an 'orange'. Associated with this, there were numerous black nodular lesions in the neck and back, some of which disappeared and reappeared over time. On examination, the tumor was 10×12cm in size, involving the palm and dorsum with distortion of the fingers (Fig. 1). The surface was irregular



**Fig. 1:** Swelling of hand with involvement of palmar and dorsal aspect, showing a variegated appearance with surface dilated veins.

A biopsy (small incisional) was taken from the left forearm mass (large) and the mass in the scapular region (small lesion). The provisional diagnosis was haemangioma. Biopsy from the left forearm mass showed an infiltrating tumour composed of sheets & cords of malignant small round blue cells (Fig. 3). The cells had scant eosinophilic cytoplasm, hyperchromatic nuclei, numerous mitosis & apoptosis with geographic areas of necrosis. The biopsy from the scapular region also showed similar histology with

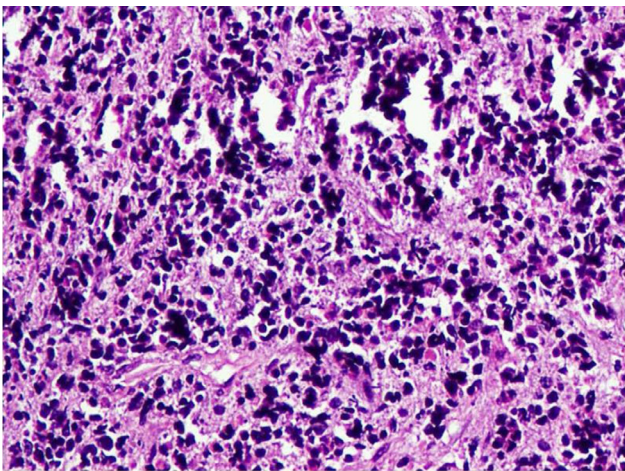
and had a variegated consistency (firm, hard and soft areas with fluctuation) with prominent dilated vessels. Multiple swellings were observed all over the body, which were firm in consistency, and measuring 2×1cm in the right inguinal region, 5×4cm on the right upper chest extending into axilla, 4×3cm on the right side of neck and multiple less than 1×1cm swellings over the back. The X-ray of the hand showed a soft tissue swelling without any evidence of calcification (Fig. 2). USG showed a hypoechoic mass with dilated vascular sinuses. MRI was suggestive of hemangioma/ lymphangiomas. CT angiogram also showed dilated radial and ulnar artery with increased vasculature in the mass.



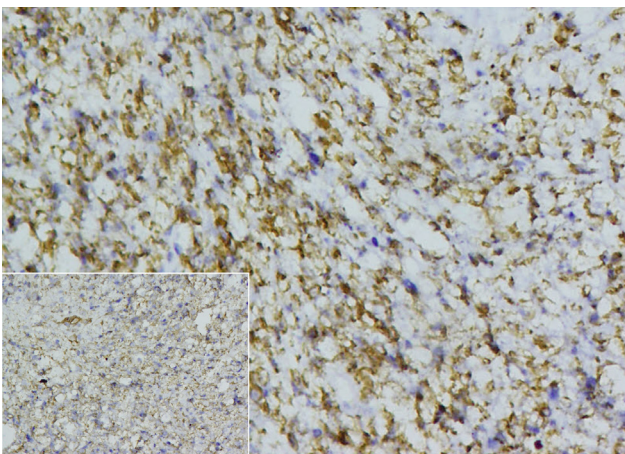
**Fig. 2:** X-ray showing soft tissue swelling with no evidence of calcification.

infiltration into the surrounding adipose tissue. Special stains including periodic acid Schiff were negative and stains for reticulin fibres showed a pattern-less diffuse meshwork of fibers around the tumor cells. The differentials entertained were extraskelatal Ewings sarcoma, rhabdomyosarcoma and lymphoblastic lymphoma and an immunohistochemistry panel was performed. The tumour cells were Negative for leucocyte common antigen (LCA), focally positive for CD99 (Fig. 4, inset), and strongly positive for desmin (Fig. 4),

thus confirming the diagnosis as rhabdomyosarcoma. The tumour showed no differentiation and was patternless, hence a final diagnosis of congenital/ neonatal embryonal rhabdomyosarcoma with metastasis was rendered, though molecular analysis was not done to confirm and rule out solid variant of alveolar rhabdomyosarcoma. Due to the disseminated nature of the lesion, the patient was administered chemotherapy. Following the first cycle of chemotherapy, the baby developed drug induced neutropenia and subsequently, pneumonia, which culminated in septic shock, resulting in death.



**Fig. 3:** Sheets of malignant small round blue cells with scant eosinophilic cytoplasm, hyperchromatic nuclei, numerous mitoses and necrosis. (Haematoxylin and Eosin,  $\times 200$ )



**Fig. 4:** Immunohistochemistry showing strong cytoplasmic positivity for desmin and weak positivity for CD99 (inset). (Immunoperoxidase,  $\times 200$ )

## Discussion

RMS is a malignant tumor of mesenchymal origin, categorized as a small blue round cell tumor of childhood. Few cases have been documented to be associated with certain syndromes such as Li Fraumeni and Neurofibromatosis, though majority is sporadic. RMS is classified into four subgroups based on prognosis: (a) Botryoid and spindle cell RMS (variants of the embryonal subtype), (b) Embryonal RMS, (c) Alveolar RMS and (d) Undifferentiated sarcoma. The embryonal subtype is the most common histologic subtype seen in all ages and is generally associated with an intermediate prognosis, just following the botryoid and spindle cell variants (4). The most common sites involved are the head, neck, extremities and genitourinary tract. Cutaneous involvement is rare. The dermal nodules are hypothesized to be the result of RMS arising within the dermis or secondarily invading the dermis of the underlying soft tissue (5). The regression of some of the dermal nodules can be ascribed to spontaneous regression of metastatic cutaneous nodules described in various tumors, with a proposed hypothesis being low tumor burden which can be overcome by patient's immune system.

The term 'blueberry muffin baby' was initially used in association with rubella infection. It describes a characteristic cutaneous manifestation that presents as non-blanching, blue-red macules or firm, dome-shaped papules and can be associated with extramedullary haematopoiesis, cutaneous vascular anomalies or neoplastic lesions of the skin (6). Metastasis is known to occur via lymphatics to the regional lymph nodes or hematogenously to the lungs, bone and bone marrow (5). In our case, the lesion had involved the dermis, probably via lymphatics, and spread to the skin of the trunk, producing a clinical picture of 'blue berry muffin syndrome'.

Congenital haemangioma was considered as the initial clinical diagnosis. However, these lesion

are usually fully formed at birth and thereafter rapidly involute or noninvolute. Other vascular tumours which may mimic RMS include tufted angioma and kaposiform hemangioendothelioma, but they are usually associated with profound consumption coagulopathy (1).

The other differential diagnoses include lymphangiomas, solitary myofibroma, lipoblastoma, teratoma, fibrosarcoma (1), neuroblastoma, extraskelatal Ewings sarcoma, melanotic neuroectodermal tumour of infancy and malignant lymphoma (3). Immunohistochemical studies and molecular cytogenetic analysis (in case of alveolar RMS) play a vital role in the definite diagnosis of these tumours (5). Cytogenetic abnormalities include loss of heterozygosity (LOH) for multiple closely linked loci at chromosome 11p15.5, resulting in activation of tumor suppressor genes and trisomy 8 (2). However, molecular analysis was not carried out as the parents could not afford it. These tumors are positive for vimentin indicating a mesenchymal origin and with differentiation, desmin; actin, myogenin and myoglobin are positive indicating a muscular differentiation (5). Positivity for CD99 has been described in both embryonal and alveolar rhabdomyosarcoma (2).

It has been demonstrated that alveolar variant is associated with the worst prognosis. However, infants tolerate chemotherapy poorly when compared to the older children. Functional immaturity of liver and the immune system is associated with greater toxicity of the drugs and increased morbidity (7). This may be reason for the unfavourable outcome in our case.

## Conclusion

Congenital rhabdomyosarcoma is a very rare tumour, which should be entertained as a differential in cases presenting as rapidly growing tumours with multiple cutaneous nodules.

## Acknowledgements

The authors declare that there is no conflict of interest.

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