

## Hepatic tumours in childhood: An experience at the Children Hospital and Institute of Child Health, Lahore

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### Abstract

**Objectives:** In this report, we share our experience about the common types of childhood hepatic tumours during 10 years (2001-2010) and compare them with other studies.

**Methods:** During 10 years (2001-2010), all the hepatic tumours of childhood received at Pathology Department of the Children Hospital and Institute of Child Health, Lahore Pakistan are recorded. This includes both resected specimens and biopsies. All the slides were reviewed and the pathologic diagnosis was confirmed.

**Results:** We diagnosed 48 liver tumour cases in children (below 18 years of age). Among these tumours, 39 (81.25%) were malignant. Male to female ratio was 2 : 1. Hepatoblastoma was the most common liver tumour in this age group accounting for 69.23% of all malignant tumours (27 cases). The second most common primary tumour was hepatocellular carcinoma diagnosed in six patients (15.38%). Other malignant tumours were undifferentiated embryonal sarcoma and biliary rhabdomyosarcoma. Benign tumours included mesenchymal hamartoma, infantile haemangioendothelioma, hemangioma and benign cyst. There were also three metastatic tumours during these 10 years. In one case there was tumour necrosis only and as such no definitive diagnosis was rendered.

**Conclusion:** The spectrum of hepatic tumours in children is different from that found in the older age group and most of them are malignant.

**Keywords:** Hepatoblastoma, Hepatic tumour, Hepatocellular carcinoma, Lahore, Pakistan, Rhabdomyosarcoma (JPMA 61: 1079; 2011).

### Introduction

Hepatic tumours are a varied group of benign and malignant neoplasm occurring in children. Primary neoplasms of the liver are rare in children comprising only 1-4% of all solid malignancies for children younger than 18 year of age.<sup>1</sup>

Two third of liver tumours in children are malignant with two third of them being Hepatoblastoma (HBL) Other childhood liver malignancies include hepatocellular carcinoma (HCC), sarcomas, germ cell tumour and rhabdoid tumour. Benign liver tumours include vascular tumours, hamartomas and adenomas.<sup>2</sup>

The histopathology of childhood hepatic tumours

guides the treatment and prognosis, and is the cornerstone for precise diagnosis. Until now, to our knowledge, there has been no documented study on paediatric liver tumour cases from anywhere in Pakistan; in this study, we share our experience about the common types of childhood hepatic tumours during ten years (2001-2010) and compare them with other studies.

### Materials and Methods

All the hepatic tumours of childhood (under 18 years age) reported during ten years (2001-2010) were retrieved from the Histopathology Department of the Children Hospital and the Institute of Child Health. Data regarding age and gender distribution was recorded. These include both resected specimens (n=14) and biopsies (n=34). All the slides were

reviewed and the pathologic diagnosis was confirmed. Routine Haematoxylin and eosin staining was done using special stains like PAS and Immunohistochemistry on selected cases.

## Results

During this ten year study period, forty eight children presented with hepatic tumours. Male to female ratio was 2 to 1. There were 9 (18.75%) cases of benign and 39 (81.25 %) cases of malignant hepatic tumours.

Of the benign tumours, the most frequently diagnosed tumour was mesenchymal hamartoma 4 (44.44%) cases with equal sex distribution. Age range observed was 8 months to 5 years. Infantile haemangioendothelioma was seen in 2(22.22%) cases. Both cases were seen in females at young age of 3 and 7 months. Two cases (22.22%) of haemangioma were also diagnosed during this period. Single case of benign hepatic cyst was found.

Among malignant hepatic tumours, HBL was the most common liver tumour in this age group accounting for 27 (69.23 %) patients (Figure-1), followed by 6 (15.38%) cases of HCC and 3 (7.6%) cases of metastatic tumours. Other malignant tumours were undifferentiated embryonal sarcoma (UES) (Figure-2) and biliary rhabdomyosarcoma. One case showed tumour necrosis only. Gender and age distribution is shown in (Table).

Regarding different histologic subtype of HBL, most of these were epithelial (16cases, 59.25%) with 10 (37.04%) cases of foetal, 6 (22.22%) cases of embryonal and one (3.7%) case of macrotrabecular HBL. No case of small cell undifferentiated HBL was observed in our study. Mixed Epithelial Mesenchymal type accounted for 11(40.74%) cases. Differentiated mesenchymal tissue was present in 8 cases, osteoid in 2 cases and cartilage in 1 case.

The second most common primary tumour was hepatocellular carcinoma (HCC), in 6 (15.38%) patients with all cases occurring after 1st decade of life. Only one case of

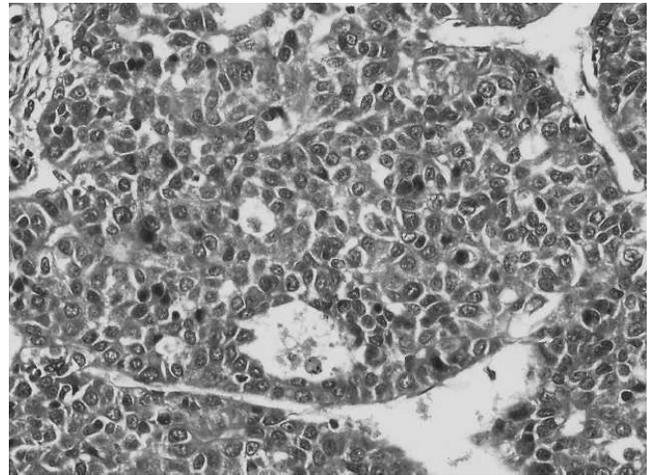


Figure-1: Foetal HBL showing small sized hepatocytes arranged in 2-3 cell thick trabeculae (X 400).

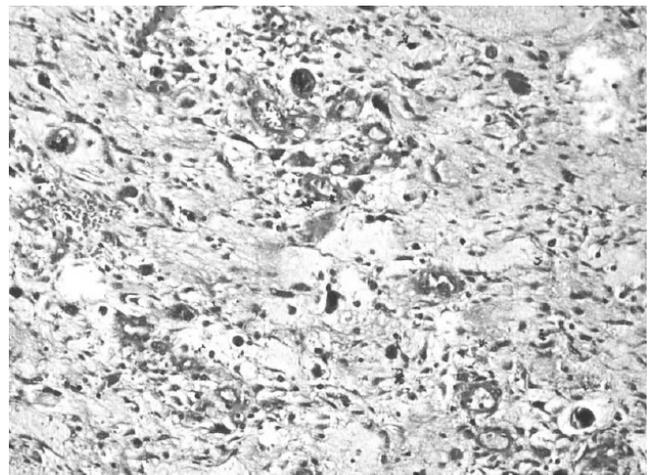


Figure-2: Undifferentiated Embryonal Sarcoma with bizarre tumour giant cells embedded in abundant myxoid stroma (X 300).

HCC was associated with hepatitis B. We had two patients of malignant mesenchymal tumours with one case each of UES and biliary rhabdomyosarcoma.

Table: Gender and Age Distribution of Pediatric Hepatic Tumours (n=48).

Tumour Types	Males n	Females n	Age Range	Mean Age
<b>Benign Tumours (n=09)</b>				
Mesenchymal Hamartoma	02	02	8m-3 years	1.6 years
Haemangioma	0	02	6m-1 year	9m
Infantile Haemangioendothelioma	0	02	3m-7m	5m
Benign cyst	01	0	5m	5m
<b>Malignant Tumours (n=39)</b>				
HBL (n=27)	18	09	17d-7 years	1.64 years
HCC (n=06)	05	01	11yrs-13 years	12 years
UES (n=01)	0	01	6 years	6 years
Rhabdomyosarcoma (n= 01)	0	01	2 years	2 years
Mets (n=03)	02	01	1 years-4.5 years	2.5 years
Tumour Necrosis (n=01)	01	0	8 years	-

Metastatic tumours were seen in 3 (7.6%) cases, first in 1 year old male having Neuroblastoma, second in 4 year old boy with undifferentiated malignant neoplasm in parapharyngeal area and third case was of metastatic Non-Hodgkins Lymphoma.

## Discussion

Primary hepatic malignancies make up 1-4% of all malignant neoplasm cases among children less than 18 years of age.<sup>1</sup> They are clinically relevant as 2/3rd of them are malignant.<sup>3</sup> Spectrum of hepatic tumours in children is different from adult hepatic tumour. With the exception of HCC, all other types of hepatic tumours occurring in children are unique and rarely encountered in adults.<sup>4</sup>

There is remarkable diversity of benign tumour masses in children.<sup>5</sup> Hepatic vascular tumours (HVT) are the commonest benign liver tumours in children and are frequently associated with high output cardiac failure. HVT are divided into haemangioma, infantile haemangiopericytoma and arteriovenous malformation.<sup>6</sup>

A study carried by François et al found that 42% of all hepatic tumours were benign with haemangioma and IHE being the most commonest followed by mesenchymal hamartoma. This is in contrast to our study in which we report only 18.75% cases of benign tumours with mesenchymal hamartoma being commonest amongst them.<sup>7</sup> However, Coronado and Angulo in Mexico also found MH to be the commonest benign tumour<sup>8</sup> whereas in Iran equal frequency of vascular tumours and MH was observed.<sup>4</sup> MH typically present with abdominal distension or mass in children under 2 years of age and is composed of both epithelial and mesenchymal components.<sup>9,10</sup> Extramedullary haematopoiesis is present in 85% of cases.<sup>11</sup> Mesenchymal hamartoma requires surgery for cure.<sup>12</sup>

The two most common malignant tumours of children are HBL and HCC. A strong male predominance for both HBL and HCC has been observed by us.

HBL accounts for 91% of primary hepatic carcinoma in children less than 5 year of age.<sup>1</sup> Similar finding was observed in the present study where HBL comprised of 96.29% of primary malignant liver neoplasms under 5 years age. The etiology of HBL remains unknown but association is seen with Beckwith-Weidman syndrome, FAP, and low birth weight. Different environmental factors implicated include exposure to metals in soldering, welding, petroleum and paints.<sup>2,13,14</sup> HBL is often unifocal, therefore, it is treated primarily by surgical resection but chemotherapy increases the number of resectable HBL.<sup>15</sup>

Most of these tumours are epithelial on histologic examination.<sup>4</sup> We also observed more epithelial HBLs (59.25%) than mixed epithelial and

mesenchymal HBLs (40.74%).

HCC occurs in older children (10-14 year) and more commonly affects boys just as in present study.<sup>15</sup> In many Asian countries, HCC in children is 10 times more common than North America. This is related to high incidence of perinatally acquired hepatitis B.<sup>16</sup> Bilobar and multifocal disease is more common<sup>17</sup> and survival is below 30%.<sup>18</sup> Around fifteen per cent of hepatic malignancies in our center were HCC. Only one was associated with hepatitis B. This is in contrast to a study by Moore et al carried out in South Africa where they observed a high incidence of HCC (35%) with two third of them being positive for HBsAg.<sup>19</sup> HCC in children are also seen in association with tyrosinemia, other metabolic disorders and in hepatitis B infections acquired perinatally.<sup>5</sup>

UELS is described as a separate entity by Stocker et al in 1978. It is a rare tumour occurring exclusively in older children aged 6-10 years.<sup>20</sup> It presents with abdominal pain and mass with no jaundice and normal serum AFP levels. Histologically, diffuse anaplasia, PAS positive-DR hyaline globules and variable myxoid change. Differential diagnosis includes biliary rhabdomyosarcoma which occurs in younger children (1-5 year), present with jaundice.<sup>21</sup> In the present study there was one case each of UELS and biliary rhabdomyosarcoma having above mentioned features.

Reports of metastatic liver tumours in children are scanty.<sup>4</sup> Neuroblastoma is the most frequent tumour which metastasizes to liver in children followed by leukaemia, lymphoma and Wilms tumour. Other malignancies which give liver metastases are yolk sac tumour, rhabdomyosarcoma, rhabdoid tumour.<sup>12,22</sup> We encountered only three cases. One of them was metastatic B-cell Non-Hodgkin lymphoma.

## Conclusions

The spectrum of hepatic tumours in children is different from that found in adults and majority of them are malignant.

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