Original Article

Histopathological study of kidney tumours in children

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Abstract

Background: Renal neoplasms in children present special challenges for pathologists as they are often undifferentiated. Wilms' tumour is the most common renal malignancy in children and the fourth most common childhood cancer. Wilms' tumour is a malignant embryonal neoplasm derived from nephrogenic blastemal cells that replicates the histology of developing kidneys and often shows divergent patterns of differentiation. **Objectives**: An audit of the various renal tumours in the paediatric age group received in the Department of Pathology **Material:** The cases of paediatric renal tumours were retrieved from the archives of the Department of Pathology. These cases were received from the Medical College Hospital and other private hospitals around the College. **Results:** The study results of 15 cases showed 11 cases of Wilms' tumour (WT) as the most common renal neoplasm. Other tumours which were recorded were 3 cases of Clear Cell Sarcoma of the Kidney (CCSK) and 1 case of Congenital Mesoblastic Nephroma. The peak age incidence of WT was in the age group 10 months to 8 years. Male to female ratio was 1.5:1. The incidence in the right kidney was found to be slightly higher compared to the left in the ratio of 2:1. Histologically, classical triphasic pattern was seen in 8 cases of WT and biphasic WT in 2 cases. **Conclusion:** Wilms' tumour was the most commonly encountered tumour. Other tumours are very rare, but need to be kept in mind when making a histopathological diagnosis. Tumour- specific treatment requires accurate diagnosis.

Keywords: Paediatric renal tumours, Wilms' tumour.

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INTRODUCTION

Paediatric renal tumours represent a relatively common group of childhood solid neoplasms, in which both diagnosis and treatment are highly dependent on the histopathological findings**.** Wilms' tumour (WT) or Nephroblastoma is the most common tumour (85%) [1]. It is seen primarily in infants, with 50% of the cases occurring below the age of 3 years[2]. Wilms' tumour (WT) is a malignant neoplasm derived from nephrogenic blastemal cells that replicates the histology of developing kidneys and often shows divergent patterns of differentiation[3]. Microscopically, three major components are identified: undifferentiated blastemal, mesenchymal (stromal) tissue, and epithelial tissue[4].

MATERIAL AND METHODS

The cases of paediatric renal tumours were retrieved from the archives of the Department of Pathology. These cases were received from the Medical College Hospital and other private hospitals around the College.

RESULTS

Table 1: The various histological features of the kidney tumours encountered in our study

Histologic type	Number of cases (Total = 15)
Wilms' tumour	11(73.3%)
Classical triphasic	9(81.8%)
Biphasic (blastemal + mesenchymal)	2(18.1%)
Clear Cell Sarcoma of Kidney(CSSK)	3(20%)
Congenital Mesoblastic Nephroma	1(6.6%)

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Wilms' tumour (figures 1 a, b, c): The study results of 15 cases showed 11 cases of Wilms' tumour (WT) as the most common renal neoplasm. The peak age incidence of Wilms' tumour was in the age group 10 months to 8 years. Male to female ratio was 1.5:1. The incidence in the right kidney was found to be slightly higher compared to the left in the ratio of 2:1. Histologically, classical triphasic pattern were seen in 9 cases of WT and biphasic WT in 2 cases. The most common pattern was triphasic WT with mixture of blastemal, epithelial and mesenchymal tissue. One of the nine cases of triphasic Wilms' tumour showed fibromuscular differentiation and two cases showed cartilage and fat with myxoid stroma. Two of the cases were biphasic with mesenchymal and blastemal component. One of the two cases of biphasic Wilms' tumour were primitive mesenchymal with myxoid stroma.

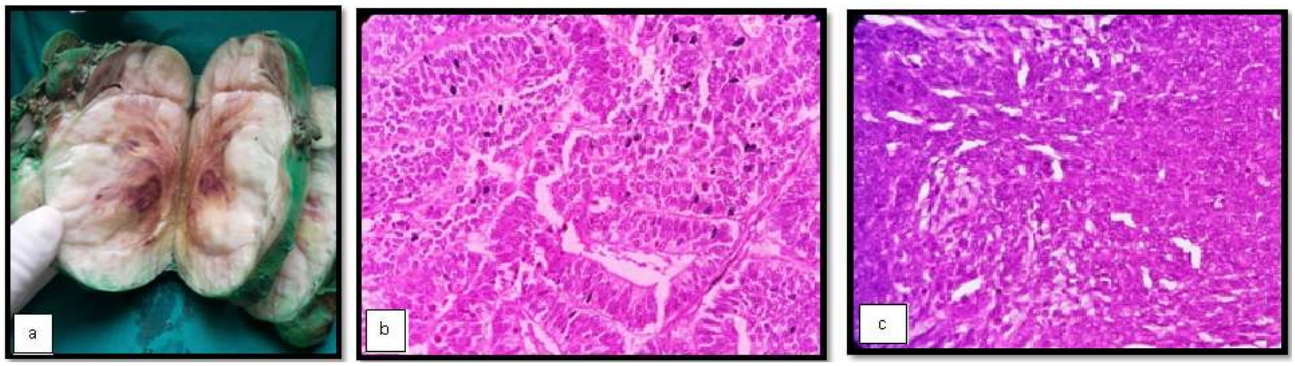

Figure 1: Case of WT. **1a** Cut surface is pale white and shows foci of yellowish areas. **1b** Microscopy showing abortive tubules (Epithelial component) (H and E X 40), **1c** Microscopy showing abundant blastemal component (H and E X 40)

Clear Cell Sarcoma of the Kidney (CCSK) (figures 2 a, b**):** All three cases were males seen in the 2 year age group. Grossly, circumscribed tumour with solid grey white appearance was seen. Microscopically, the tumour showed ovoid cells containing pale non-staining cytoplasm with indistinct cytoplasmic borders. The nuclei were pale with indistinct nucleoli. Evenly distributed network of vascular septae subdivided the tumor into conspicuous pattern of cords and nests.

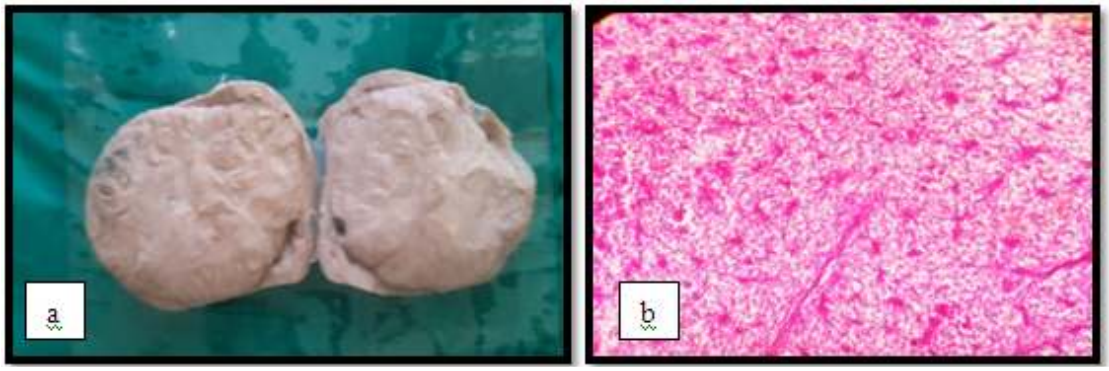

Figure 2: Case of CCSK. **2a:** Cut surface shows circumscribed tumour with the solid grey white appearance. **2b:** Microscopy showing clear cells separated by fibrovascular septae (H and E X 40)

Congenital Mesoblastic Nephroma (CMN) (figure 3 a, b): In our study we found one case of Congenital Mesoblastic Nephroma in 10 days old female baby. Grossly, the tumour was solid, grey white with a whorled configuration reminiscent of uterine leiomyoma. Histopathology showed a benign spindle cell tumor with cellular growth and dense collagenous stroma. Occasional mitoses were noted.

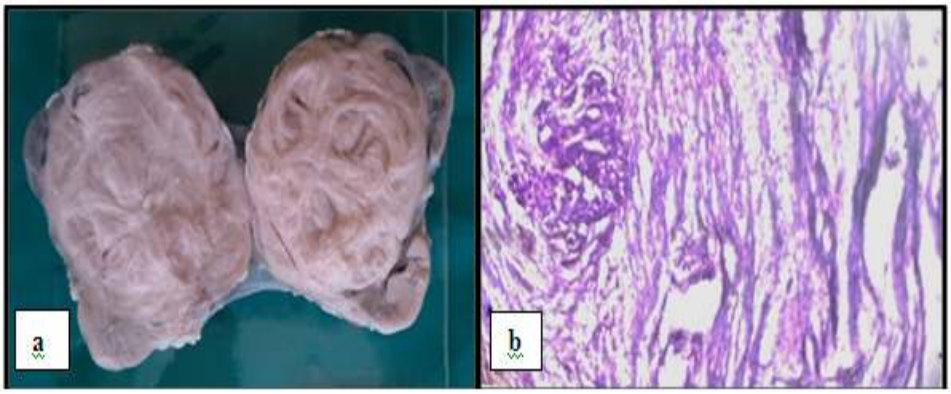

Figure 3: Case of CMN. **3a:** Cut surface shows solid grey white tumour with whorled configuration. **3b:** Microscopy shows kidney tissue with tumour composed of spindle shaped cells. Background shows abundant collagen (H and E X 40).

DISCUSSION

Wilms' tumour constitutes 82% of childhood renal tumours as seen in literatures but in our study it accounts for 73.3%. Gender distribution of WT differs from study to study. We found male preponderance which is similar to RN Das *et al*[5] study, whereas Guruprasad *et al*[6] have reported female preponderance. Peak incidence was seen in the age group 10 months to 8 years which is slightly higher compared to that recorded by Ram Narayan Das *et al*[5]. Triphasic pattern consisting of blastemal – epithelial lineage cells was noted in 81.8% of our cases, the figure being similar to study done by FT Dénes *et al*[7]. In our study Biphasic pattern was seen in 18.1% of our cases. All the ten cases of WT showed favourable histology and no anaplastic nuclear features whereas the study done by Ram Narayan Das *et al*[5] showed 2.5% of cases with anaplasia. Clear cell sarcoma of the kidney, also known as bone metastasizing renal tumour is a rare and distinctive neoplasm comprising about 4 - 5% of childhood renal tumours[8,9]. The incidence in our study was 20% (3 cases out of 15 cases) which is higher compared to RN Das *et al*[5], Guruprasad *et al*[6] study and T.H Jaing *et al*[12] study. All the three cases were seen in the second year of life. Histologically, the cases showed fibrovascular septae dividing the tumour into a conspicuous pattern of cords and nests of cells arranged in a chicken-wire like pattern with clear cytoplasm and bland nuclear features which cannot be mistaken for any other tumour. Two of three cases had metastasis to bone at the time of diagnosis. Congenital Mesoblastic Nephroma (CMN), also known as foetal mesenchymal or leiomyomatous hamartoma is a congenital renal neoplasm that is usually discovered before 6 months of age[10,11]. It was recorded in 6.6% of our cases which was slightly lower compared to TH Jaing *et al*[12] study. Age ranges from 0 to 3 years even though 90% were diagnosed in the first year of life[13]. The microscopic appearance in our study was classical fibromatosis. Prognosis is excellent needing only nephrectomy. Since there are a variety of renal tumours which occur in children, it is important to distinguish the ones with good prognosis from others, and hence avoid unnecessary radiotherapy and their consequent side effects.

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