January 2000

Clinicopathological profile of Wilms tumor

L Paul

D Thaver

S Muzaffar

IN Soomro

Zafar Nazir
Aga Khan University, zafar.nazir@aku.edu

See next page for additional authors

Authors
L Paul, D Thaver, S Muzaffar, IN Soomro, Zafar Nazir, and Sheema Hasan

Clinical Brief

Clinicopathological Profile of Wilms' Tumor

Louisa Paul, Durrane Thaver, Suhail Muzaffar, Irshad Nabi Soomro, Zafar Nazir and Sheema H. Hasan

Department of Pathology and Surgery, The Aga Khan University Hospital, Karachi

Abstract. The profile of renal tumors in children less than 15 years of age during the period 1991-1997 is presented. Among the 37 children with kidney tumors, 29 (78.4%) had Wilms' tumor. There was also a 20-year-old female with Wilms' tumor. The median age at presentation was 2.6 years (range 2.5 months to 20 years). 66.7% of the cases diagnosed were ≤ 3 years and 90% were ≤ 6 years. Five cases were under one year of age. The male to female ratio was 2:1. Twenty-two cases (73.3%) were triphasic and 7 (23.3%) were biphasic. Only one case was monophasic with blastemal component. Five cases (16.7%) showed nephrogenic rests in the uninvolved renal parenchyma and one case had nephroblastomatosis. The tumor was favorable in 26 cases (86.7%) and unfavorable in 4. Fourteen cases were in-patients while 16 were outside referrals. The pathological (10 cases whose specimens were sent from other centers) and clinicopathological (13 hospitalized patients) staging showed 10 cases (43.5%) with stage 1, 4 cases (17.4%) with stage 2, and 7 cases (30.4%) with stage 3. In two cases (8.7%), there was stage 4 disease. The length of the follow-up period in the 13 hospitalized patients ranged from 7 days to 5 years 5 months (median 14 months). There was one recurrence and one death after 2 years of diagnosis.
[Indian J Pediatr 2000; 67 (10) : 765-767]

Key Words : *Pediatric renal neoplasms; Wilms' tumor*

Wilms' tumor or nephroblastoma is the most common primary malignant neoplasm of the kidney in children[1-4]. Classic Wilms' tumor is unusual in the first year of life. More than half of the tumors are found in children under the age of 3 years and 90% occur before the age of 6 years[3,4]. The majority of Wilms' tumors are sporadically occurring neoplasms and they represent about 5-6% of all childhood malignancies[5]. In this study, the profile of Wilms' tumor and other renal neoplasms in children less than 15 years of age, presented to the Aga Khan University Hospital (AKUH) between 1991 and 1997 is studied.

MATERIALS AND METHODS

Computer records from January 1991 to December 1997 of patients with kidney pathologies were reviewed and kidney tumors occurring in children under 15 years were analyzed. However, later during analysis of the data, a 20-year-old female with Wilms' tumor was also included. Data concerning age, sex, gross and microscopic features of the tumor, site of the tumor, and clinicopathologic staging were analyzed using Epi-Info. The medical records of 14 hospitalized patients with Wilms' tumor were reviewed and follow-up status was recorded.

Reprint requests : Suhail Muzaffar, Asst. Professor, Department of Pathology, The Aga Khan University Hospital, Stadium Road, P.O. Box 3500, Karachi-74800, Pakistan.

RESULTS

Out of the 37 children under 15 years diagnosed with kidney tumors, twenty-nine cases had Wilms' tumor, 2 had clear cell sarcoma, 3 had renal cell carcinoma (papillary, well differentiated and poorly differentiated in one case each), and one case each had primitive neuroectodermal tumor (PNET), embryonal rhabdomyosarcoma and rhabdoid tumor. Of the 11 girls, 9 had Wilms' tumor and 1 each had rhabdoid tumor and embryonal rhabdomyosarcoma. There were 26 boys of whom 20 had Wilms' tumor, 3 had renal cell carcinoma, 2 had clear cell sarcoma and 1 had PNET.

Of the 29 children under 15 years with Wilms' tumor, the median age was 2.6 years (range 2.5 months - 18 years). The male to female ratio was 2.2 : 1. Since the present study was predominantly concerned with Wilms' tumor, we also looked into the records to see if any adults (>15 years old) had Wilms' tumor. Surprisingly, we found a 20-year-old female who had Wilms' tumor.

There were 5 (16.6%) cases of Wilms' tumor which were diagnosed during the first year of life. The peak incidence was noted during 1-3 years (15 cases; 50%).

By the age of 3 years, 20 cases (66.7%) and by the age of 6 years, 27 cases (90%) of Wilms' tumor were diagnosed. The tumor was diagnosed as favorable histology in 26 cases (86.7%) and unfavorable histology in 4 cases (13.3%) showing anaplasia. All the 4 cases who were under 6 months of age showed no anaplastic features. Ten patients (33.3%) had Wilms' tumor in the left kidney and 11 (36.7%) in the right, whereas the rest were not specified in the records. There was no patient with bilateral tumor. All 30 cases had blastema, 25 (83%) had mesenchyme and 26 (86.7%) had epithelial components separately. Twenty-two cases (73.3%) were triphasic. Five patients (16.7%) showed nephrogenic rests in the uninvolved renal parenchyma.

Pathologic staging was performed in 22 cases of nephrectomy specimens out of which 12 cases (54.5%) were stage 1, four (18.2%) were stage 2, five (22.7%) were stage 3, and one had stage 4 disease.

Of the 14 cases that were hospitalized at the AKUH, 13 clinical case records were available. Of these, 7 cases were diagnosed with a clinical stage 3 disease, three patients had stage 1 and two had stage 4 disease and in one the stage could not be determined. The clinical stage of these 13 cases matched with the pathological stage except in 4 cases. One was undetermined in the pathologic stage but had a clinical stage 3; the other not determined in the clinical stage but had a pathological stage of 2. The pathologic stages in the other two cases were 1 in both but the clinical stages were 4 and 3 respectively.

The length of the follow-up of the 14 patients initially seen at this hospital (median 14 months) ranged from 7 days to 5 years and 5 months. Seven patients were lost to follow-up within 4 months after the initial diagnosis and surgery. Four patients were in close follow-up and had completed 5 years 5 months, 3 years 8 months, 2 years 3 months, and 1 year 2 months following surgery and chemotherapy respectively. Of these, one boy developed tumor recurrence and is presently undergoing his second course of chemotherapy. One patient with stage 3 disease, died after completion of 2 years follow-up.

DISCUSSION

The most common primary malignant neoplasm of the kidney in children is the classic Wilms' tumor showing a favorable histology[3,4]. The mesoblastic nephroma and rhabdoid tumors are the two distinct tumors of infancy and are rarely seen after 2 or 3 years of age.

We reported 37 cases of pediatric renal neoplasms during the period of 7 years, out of which 29 cases (78.3%) had Wilms' tumor. This finding was comparable with the frequency rate of 80% reported in Western literature. 66.7% and 90% of our cases were diagnosed at or before the age of 3 years and 6 years respectively and these figures are also comparable with the studies in Western literature.

Five patients were diagnosed to have Wilms' tumor during the first year of life. This finding was significant as Wilms' tumor is rare during the first year of life[7].

The male to female ratio of 2 : 1 signify an important gender distribution in this study which was not noticed in other studies.

The most important prognostic determinator of Wilms' tumor is the clinicopathologic stage as proposed by NWTS group[8]. The pathologic evaluation of nephrectomy specimens in 10 outside referral cases revealed seven cases with stage 1 and three cases with stage 2 disease. In contrast, clinico-pathological evaluation of 13 in-patients nephrectomy specimens revealed, three cases with stage 1, one with stage 2, seven with stage 3 and two with stage 4 disease. The more advanced stage disease seen in our in-patient cases was most probably because of the availability of data regarding full clinical and pathological work-up in these patients.

The presence of anaplasia is a marker of unfavorable histology in Wilms' tumor. Anaplasia occurs in about 5% of the Wilms' tumor specimens. It is rarely seen in infants and rare in the first 10 months of life. Anaplasia is associated with increased resistance to chemotherapy, however it is not a marker of increased aggressiveness[6]. Anaplasia was appreciated in 13.3% in this series which is somewhat higher as compared to the other studies in which it was 5% overall and 10-15% after the age of 5 years[5]. Surprisingly features of anaplasia were also seen in a 7-month old girl. Three of the patients with anaplasia fell into higher stage disease (two cases with stage 3 and one case with stage 2). One patient who had anaplastic histology and stage 3 disease is without recurrence to date (60 months follow-up). An adequate follow-up data of more than 2 years was available only in 6 cases. One child died, one had recurrence of disease. Four cases (66.6%) did not show recurrence on follow-up.

Over the years, early diagnosis and therapy has significantly improved survival rates in children with Wilms' tumor. An overall cure rate for unilateral Wilms' tumor is 80-90%. Early recognition of abdominal masses and prompt referral of these patients to well-equipped institutions is of great importance.

REFERENCES

1. Beckwith JB. Tumors of infancy and childhood. In: Murphy WM, Beckwith JB, Farrow GM, eds. *Tumors of the kidney, bladder and related urinary structures.* Atlas of

Tumor Pathology, Armed Forces Institute of Pathology, Third Series. 1994; Fascicle 11 : 12-52.
2. Caty MG, Shambeiger RC. Abdominal tumors in infancy and childhood. *Pediatr Clin N Am* 1993; 40 : 1253-1271.
3. Webber BL, Parham DM, Drake LG, Williams JA. Renal tumors in childhood. *Pathol Annu* 1992; 27 (Pt 1) : 191-232.
4. Kissane JM, Dehner LP. Renal tumors and tumor-like lesions in pediatric patients. *Pediatr Nephrol* 1992; 6 : 365-382.
5. Bonadio JF, Stoner B, Norkool P, Farewell VT, Beckwith JP, D'Angio GJ. Anaplastic Wilms' tumor–Clinical and pathologic studies. *J Clin Oncol* 1985; 3 : 513-520.
6. Zuppan CW, Beckwith JB, Luckey DW. Anaplasia in unilateral Wilms' Tumor. A report from the National Wilms' tumor Study Pathology Center. *Hum Pathol* 1988; 19 : 1191-1209.
7. Kullendorff CM, Wiebe T. Wilms' tumor in infancy. *Acta Paediatr* 1998; 87 : 747-750.
8. Beckwith JB. National Wilms' tumor Study : An update for pathologists. *Pediatric Develop Pathol* 1998; 1 : 79-84.