

Original Article

A 15-year Clinicopathologic Evaluation Of Wilms' Tumor In Referrals Of Children Hospital

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ABSTRACT

Background and Objective: Wilms' tumor has been recognized as the most common primary malignancy of kidney at childhood, comprises 5-6% of tumors in this period, and manifests itself with various clinical symptoms. Since there have been no sufficient studies in this field in Iran, therefore, this study was conducted to investigate its histopathology and clinical symptoms.

Materials and Methods: This study was carried out on existing data from 66 children with a diagnosis of Wilms' tumor at children hospital during the years 1984-1999. In this regard, personal and disease-related characteristics of patients including age, gender, tumor stage, histopathology, and involved kidney were evaluated and SPSS software and Chi-square, t-test, ANOVA, and Mann-Whitney U test were used for data analysis.

Results: The most common age of disease incidence was 2-4 years. In this regard, girl/boy ratio was 1.5. Meanwhile, the prevalence of an abdominal mass as the most common symptom was 83.3%. Left kidney was involved in 47% of cases and 55 of patients had a favorable histology. In addition, there was a significant correlation between site of kidney involvement and tumor histology ($p < 0.005$).

Conclusion: Considering the achieved advances in the diagnosis and treatment of Wilms' tumor, prompt identification with regard to clinical symptoms can have a valuable role in its effective management.

Key words: Wilms' tumor, Histopathology

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Introduction

Wilms' tumor has been recognized as the most common primary malignancy of kidney at childhood (1) which comprises 5-6% of tumors in this period (2). Its annual incidence rate is 7.8/1000000 with the highest prevalence at the second and third years of living. This tumor is bilateral in 5-10% of cases with an incidence at a lower age (3). The mean age of its unilateral type is 41.5 and 46.9 months in boys and girls (4). One of the main features of Wilms' tumor is its accompaniment with some instances of congenital abnormalities and syndromes including WAGR (Wilms' tumor, aniridia, urinary system dysfunction, and mental retardation) and Drash Denys syndrome (pseudohermaphroditism, degenerative disorder of the kidney, and Wilms' tumor itself)(5).

The most common clinical symptom in patients with Wilms' tumor is the presence of an abdominal mass and other symptoms include abdominal pain, hematuria, fever, and hypertension (1). Although the role of genetic factors in the pathogenesis of Wilms' tumor has been confirmed, but there is little information regarding environmental risk factors like exposure to hydrocarbons and lead at work places, maternal hypertension, and fluid retention (6).

According to National Wilms' tumor study group for its staging, tumor is classified into 5 stages. Stage I comprise those cases with solitary involvement of the kidney and can totally be removed by surgeon and at the other extreme, stage V with bilateral involvement. Meanwhile, its prognosis is affected by such factors like age, tumor stage and size, and microscopic findings. Among these factors, microscopic findings and the presence or absence of anaplasia are more important and on this basis, tumor can be histologically classified into two main classes, i.e. favorable and unfavorable (2).

There have been immense advancements in the treatment and prognosis of patients with Wilms' tumor with regard to great achievements in surgical techniques, post-operative care, and sensitivity of tumor itself to radiotherapy and chemotherapy (7). Since Wilms' tumor is the most common primary malignancy of kidney at childhood and

few researches have been performed in Iran, therefore, this study was carried out to determine its histopathology and clinical symptoms in referrals of children hospital during the years 1984-1999.

Materials and Methods

This study was carried out on existing data from 66 children with a diagnosis of Wilms' tumor at children hospital during the years 1984-1999. In this regard, related parameters including age, gender, family history, clinical symptoms, tumor stage and grade, histopathology, and site of involvement were evaluated and SPSS software and Chi-square, t-test, ANOVA, and Mann-Whitney U test were used for data analysis. In this regard, a statistical p value less than 0.05 was considered significant.

Results

The minimum and maximum age of children with Wilms' tumor was 4 months and 9 years respectively and 30 (54.5%) out of them had an age less than 3 years. Meanwhile, at the time of diagnosis, they had 33 and 39.5 months for boys and girls respectively. In addition, 26 (39.4%) and 40 cases (60.6%) out of the total were male and female respectively. Considering the clinical symptoms, 83.3% of them had referred with signs of abdominal mass that had been detected accidentally by their parents and/or physicians and the remaining cases had signs of abdominal pain, hematuria, fever, and vomiting in order of prevalence. Data obtained from laboratory analysis showed that 35 cases (46.8%) had normal WBC and 17 (25.8%) patients suffered from leukocytosis and others had leucopenia. In addition, 48 (72.7%), 16 (24.2%), and 2 (3%) cases had anemia, normal hemoglobin, and hemoglobin level higher than 14 mg/dl respectively. Urine analysis showed that 14 (21.2%) of cases had hematuria and 52 (78.8%) of them were normal in this respect. Meanwhile, 95.5% of cases had abnormal findings on sonography with calices abnormality (83.3%) as the most common deformity.

Pathological evaluation of patients showed that 55 cases (83.3%) had favorable histology and unfavorable histology was found out in 11 patients (16.7%). Table 1 shows different compositing parts of Wilms' tumor.

Table 1. Frequency distribution of different composing parts of Wilms' tumor with favorable histology

	Number of cases	% Frequency
Prodominantly epithelial	16	28.8
Prodominantly Blastmal	28	50.4
Prodominantly Stromal	8	14.4
Mixed epithelial and blastmal	2	3.6
Mixed epithelial and blastmal and stromal	1	1.8
Total	55	100

Regarding tumor metastasis and its spread to other systems, renal capsule involvement (60.6%, 40 cases) comprised the most common abnormality (Table 2).

Table 2. Frequency distribution of tumor metastasis in patients

Metastasis location	Number of cases	Frequency
Renal capsule	40	60.6
Renal vascular system	18	27.3
Peri-aortic lymph glands	10	15.2
Peritoneum	8	12.1
Lungs	4	6

With respect to tumor staging, most of the patients were at stage II (36.4%) (Table 3).

Table 3. Frequency distribution for tumor stage

Stage	Number of cases	% Frequency
I	23	34.8
II	24	36.4
III	7	10.6
IV	3	4.5
V	9	13.6
Total	66	100

In this study, 4 patients (6%) had accompanying congenital malformation including horse-shoe shaped kidney in addition to nephritic syndrome in an 18-month girl, pseudohermaphroditism in a 30-month boy, and lobulation and anomaly of the contralateral kidney in a 24-month girl, and umbilical hernia and hemihypertrophy of the right kidney in a 15-month boy. With regard to treatment strategies for patients, 64 cases (97%) underwent total and/or subtotal nephrectomy, 60 patients (90.9%) had post-operative chemotherapy, and 19 out of them (28.8%) had both post-operative chemotherapy and radiotherapy.

The parameters age, gender, tumor stage, and kidney involvement and their relationship with its histopathology were statistically analyzed. In this respect, a significant relationship was only obtained for kidney involvement and tumor histopathology ($p < 0.005$) and patients with bilateral involvement of kidneys had unfavorable histology.

Discussion

As mentioned before, 66 cases were enrolled in this study. Age of tumor diagnosis was 33 and 39.5 months for boys and girls respectively, which is nearly consistent with reported data in references and textbooks (1). In this regard, Tang et al (Taiwan, 2004) in their study on 98 patients with Wilms' tumor found 44.4 months as the mean age of tumor diagnosis (8). In another study by Painezza et al (Canada, 1990-2001) on 40 patients with Wilms' tumor, it was found out that the mean age is 28.5 months (9). Meanwhile, this age was reported as 44.5 months by Arzanian et al (Tehran, 2004)(4). In our study, boy/girl ratio was 1.5 and this ratio was reported as 1.04 by Tang et al (8). In this regard, in Ontario study, there were 18 boys and 22 girls (9). Meanwhile Arzanian study was conducted on 28 boys and 26 girls (4). In addition, Davari et al (Isfahan) in their study on 88 cases of Wilms' tumor had 54.5% boys and 45.5% girls.

In our study, abdominal mass was the most common clinical finding (83.3%). In this regard, Painezza et al and some references reported this as 85% (1, 9). Meanwhile, Arzanian et al (4) and Davari et al (10) found this as 88.9 and 88.2% respectively.

Considering the involved kidneys, left kidney was involved in the majority of patients (47%) in

our study. Arzanian et al reported left and right kidney involvement as 55.6% (30 cases) and 44.4% (24 cases) respectively and there was no bilateral involvement (4). In another study conducted by an oncology department in France, 4.6% of cases had bilateral tumor (11). In addition, left kidney in 58.5% of cases was involved in Arzanian study (10). In our study and that done by Davari et al, incidence rate for bilateral involvement was 13.6% and 3% respectively.

According to obtained results, the majority of patients were at stage II (36.4%) in our study, while this was 51.2 and 40% in Arzanian (4) and Ontario (9) studies respectively. Meanwhile, in Taiwan study, 43, 19.3, 23.9, and 6.8% of cases were at stages I, II, III, IV and V.

Regarding tumor histopathology, 83.2% of cases had favorable histology in our study, while this was 82.5, 55, and 91.1% in Ontario (9), Arzanian, and Davari studies respectively. In this study, only a significant relationship was found out between location of kidney involvement and tumor histopathology, while Arzanian study found such a relationship for tumor histopathology and its stage also and for tumor stage and age and gender (4). Furthermore, 6% of cases had accompanying anomaly, while this was 8.8% and included testis cryptorchidism and horse-shoe shaped kidney (10). These anomalies have been reported up to 17% which may be related to not being diagnosed and/or reported.

Conclusion

The obtained results in this study are rather consistent with other studies and referral system and sample size should also be considered in interpretation of the results. Therefore, further studies with a larger sample size and designing a multi-center research are strongly recommended.

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