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Research Article

Wilms Tumor

Wilms Tumor Treatment Outcome in Bangladesh Shishu Hospital & Institute, Dhaka, Bangladesh

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Background: Wilms tumour is the most common renal malignancy in childhood. Survival in high-income countries is approximately 90%, whereas in low-income countries, it is less than 60%. This study assessed treatment outcomes of patients with Wilms tumor at Bangladesh Shishu Hospital & Institute.

Methods: We conducted a prospective study in all children diagnosed with Wilms tumour between July 2020 and July 2024. A total of 30 patients with Wilms tumor were enrolled in our study, Data were collected such as treatment outcomes and various socio-demographic and clinical characteristics and recorded in a sheet.

Results: Of the 30 patients with Wilms tumour, 73.33% had event-free survival, 20% had relapsed, and 6.67% died. Patients presented as follows I (20%), II (25%), III (35%), IV (15%), or V (5%). The most likely treatment outcome in patients with low-stage (I to II) disease was event-free survival (100%), whereas, in those with high-stage (III, IV and V) disease, it was 46.67%. No deaths or instances of progressive or relapsed disease were recorded among patients with low-stage disease. The stage of disease significantly affected treatment outcomes (p =0 .01) and event-free survival estimates (p<.001). Age at diagnosis, sex, and duration of symptoms did not statistically significantly influence treatment outcomes or event-free survival estimates.

Conclusion: Survival of patients with Wilms tumour in Bangladesh is lower compared with that in high-income countries. Treatment abandonment is the most common cause of treatment failure. The stage of disease at diagnosis statistically significantly affects treatment outcomes and survival.

Keywords: Wilms Tumor, Low-Income Countries, High-Income Countries, Prospective, Relapse

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Introduction

Wilms tumour is the most common primary renal malignancy in children. It accounts for 5% of childhood malignancies [1]. It is thought to arise from nephrogenic rests, which are foci of persistent metanephrenic cells [2]. Survival rates have improved from 20% in the 1960s to approximately 90% currently in high-income countries; middle-income countries have survival rates of approximately 80% [3]. This has been achieved through cooperative study groups as well as the use of multimodal approaches to therapy. Low-income countries, however, have survival rates between 20% and 50% [1][2][3].

Reasons for the low survival in low-income countries include limited access to proper medical care as a result of lack of facilities for treatment, shortage of personnel, long distances to treatment centres, poor infrastructure, and limited public transport facilities. These factors lead to late presentation, which also affects outcomes. Other contributors to the low survival include lack of health insurance, abandonment of treatment, and lack of a multidisciplinary approach to the management of patients. Treatment includes surgery and chemotherapy, as well as radiotherapy for metastatic disease [2][3][5]. Our study aimed to assess the treatment outcomes of children presenting with Wilms tumour at Bangladesh Shishu Hospital & Institute and to evaluate the influence of various sociodemographic and clinical characteristics (eg, age at diagnosis, sex, duration of symptoms, stage of disease) on treatment outcomes.

Patients and Methods

Study Design: It was a prospective study done at Bangladesh Shishu Hospital & Institute, between July 2020 and July 2024. Wilms tumour patients aged between 0 and 18 years at diagnosis were included. After admission detailed history and physical examination were done and the results were recorded in the questionnaire. Investigations like plain x-ray abdomen, USG/CT abdomen, CXR/Chest CT, bone scan and CNS imaging if needed were recorded in the questionnaire.

Data Analysis: Data analysis and management were performed using SPSS software (version 24; SPSS, Chicago, IL). Frequency distributions, means, and medians were calculated.

The relationship between treatment outcomes and sociodemographic or clinical characteristics was evaluated using χ^2 and Fisher's exact tests. The probability of event-free survival was estimated using the Kaplan-Meier method; estimates were compared using the log-rank test. Event-free survival was measured from the date of Wilms's tumour diagnosis to the first treatment failure or date of the last follow-up. Treatment failure included abandonment of treatment, death, and progressive or relapsed disease.

Results

A total of 30 patients with Wilms tumours presented to the hospital during the study period. Among the study population, 16 were boys and 14 were girls. The ratio of boys to girls was 1.14:1.

Table 1: Patient Sociodemographic and Clinical Characteristics (N = 30)

Parameters		Number	Percentage
Age at diagnosis	<2 years	6	20
	2 to 5 years	12	40
	5 to 10 years	10	33.33
	>10 years	2	6.67
Gender	Male	16	53.33
	Female	14	46.67
Abdomial pain present		9	30
Hypertension present		7	23.33%
Hematuria present		6	20
Duration of symptoms before 1st admission to the Hospital	<1 month	10	33.33
	1-3 months	17	56.67
	>3 months	3	10
Stage of disease at diagnosis	Stage I	6	20
	Stage II	9	30
	Stage III	10	33.33
	Stage IV	4	13.33
	Stage V	1	3.33

Table 2: Treatment Outcomes in Children With Wilms Tumor

Wilms tumor stage	Outcome (number of pt)			Percentage of cure
	Cure	Relapse	Death	
Stage I	06	0	0	100%
Stage II	09	0	0	100%
Stage III	06	04	0	60%
Stage IV	01	02	01	25%
Stage V	0	0	01	0
Lower stage(stage I and II) VS Higher stage(stage III, IV and V)P value for cure rate is <0.01				

Table 3: Histological Subtype Affecting the Treatment Outcomes in Children With Wilms Tumor

Histological subtype	Number of patients	3-year Event-free survival	P value
Favorable histology	21(70%)	87%	0.012
Anaplasia(Focal/Diffuse)	09(30%)	23%	

Of 30 patients with documented stages of disease, 50% had low-stage (I to II) and 50% had high-stage (III, IV and V) disease. The most likely treatment outcome in patients with low-stage disease was event-free survival (100%), whereas in patients with high-stage disease, it was 46.67%.

No deaths or instances of progressive or relapsed disease occurred among patients with low-stage disease. As summarized in Table 2, differences in treatment outcomes between children with low- and high-stage disease were significant (P = <0.01).

Discussion

In our study, 60% of patients were within 5 years of age and the result correlates with the previous study [6]. In this study we found a slight male predominance than females, our result is different from the previous study [7] [8], which found Wilms tumour more in females than males. Male predominance in our study is probably attendant seeking more medical advice for their male child than females in our country. In our study hypertension was present in 23.33% of patients, the result is similar to a previous study [9].

Hypertension may be due to renovascular compromise, rather than catecholamine. Our 30% of patients have abdominal pain, which may be due to ischemia, this result is similar to a previous study [9]. Our 20% of patients have microscopic hematuria, this result is similar to previous studies with Wilms tumor [9].

Duration of symptoms at admission was 1 to 3 months in the majority of patients(90%), but our result differed from previous study [10], it was more than 3 months. Among our study population, 50% had low-stage (I to II) and 50% had high-stage (III, IV and V) disease at diagnosis, our result is the same as previous results [11]. This study demonstrated a survival rate of 100% among patients diagnosed with Wilms tumor in stages I and II, our result is the same as previous study [12].

Histological subtype also affects the outcome of Wilms tumour. In our study 70% of patients have favourable histology with 87% event-free survival, our result is similar to the findings of a previous study [13][14]. This is a great improvement from the survival rate of 29% that was documented for those patients treated at the institution between the years 2000 and 2007 [15].

This improvement may be attributed to several factors. The hospital adopted the SIOP approach to the management of Wilms tumour during the timeframe of our study. In the previous study, some patients never received any preoperative chemotherapy, and mortality was high. In 2009, the hospital developed a protocol manual that was used to manage all patients with cancer. The use of protocols and the establishment of a multidisciplinary team have been demonstrated to lead to better outcomes.

We now have competent pediatric surgeons, psychological counsellors, social workers, and pharmacists involved in the care of patients with Wilms tumours. A team of dedicated pediatric oncology nurses cares for the children, unlike in the past, when nurses were moved from the department every few months. This has increased nurses' knowledge and experience, which has resulted in better patient care. Supportive care has also improved over time through the use of a protocol for the management of febrile neutropenia and the better availability of antibiotics.

Nutritional care has improved significantly. Previously, cultural beliefs and associations with death prevented both the medical team and the families from using nasogastric feeding. Now most children do undergo nasogastric tube feeding, which allows feeding even when children have decreased appetite or mucositis. High-income countries have reported high survival rates among children with Wilms tumours. In the United Kingdom, an overall survival rate of 88% was documented on a 10-year follow-up [14].

Middle-income countries also have good survival rates, with China reporting a survival rate of 81% [15]. However, the survival rates are still low in low-income countries, especially in Africa. A 2-year survival rate of 25% was reported from an eight-center Wilms tumor treatment collaborative effort in Africa [16]. In Malawi, the survival rate is 46% [17].

These low survival rates have been attributed to several factors, including high treatment abandonment and treatment-related mortality [18]. Fifty percent of patients in our study presented with late-stage disease. Those who had stage I & II disease had good outcomes, in contrast to those with later stages of disease. A multicenter study of Wilms tumours involving French-speaking countries in Africa reported that patients with stage III or IV disease comprised 41% of all patient cases [19]. In South Africa, those with stage III or IV disease comprised 49% of patient cases [20]. In both these studies, patients with stage V disease were excluded from the analysis. This indicates that late presentation is still a major issue in low-income settings. It could be explained by circumstances that lead to both patient and healthcare system delays. Healthcare system delays result from the unavailability of the qualified personnel or equipment required to make correct diagnoses [21] [22]. The disease stage has been documented as one of the most important prognostic factors. However, there are still huge differences when we compare outcomes in high- versus low-income countries. To improve outcomes, we should concentrate not only on improving the standards of care but also on diagnosing patients with early-stage disease. Increasing awareness of childhood cancer among healthcare workers is paramount. Having ultrasound machines as well as trained personnel in most primary care centres could lead to increased detection rates. This strategy could have the potential of increasing survival with less strain on the health care system.

Conclusion

Based on the findings of our study, the earlier stage of disease and/or favourable histology the more chance of cure. The late stage of disease or unfavorable histology the more chance of relapse or death.

What does the study add to existing Knowledge: Survival of patients with Wilms tumor in Bangladesh is lower compared with that in high-income countries.

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