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Original Research Article

A Study on Wilm's Tumor Staging in Correlation with Local Invasion

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Abstract

Wilms' tumor being the most common malignant renal tumor in children with long term survival rates, proper staging and assessment of invasion is important. Our study is a retrospective study of 60 children diagnosed to have wilms' tumor. out of 60 cases, 25 cases were stage II accounting for 41.7%, 36.7% were stage III, 11.7% were stage I and 10% were stage IV (NWTS staging). 45% of cases were found to have capsular / vascular invasion which is the most common route of spread of wilms' tumor; the next being parenchymal invasion with 23%, followed by hilar/renal sinus invasion – 20 %

Keywords: NWTS – National Wilms Tumor Staging.

INTRODUCTION

Wilms tumor is the most common malignant renal tumor in children with 80% in the age group of 1-5 yrs [1]. The diverse histological appearance along with staging plays an important role in treatment. NWTS staging (table 1.) based on clinicopathological appearance is further substaged based on 1. Presence of inflammatory pseudocapsule, 2. Renal sinus invasion 3. tumor capsule invasion and 4.tumor intrarenal vessels. Penetration through the renal capsule is the most common site of exrarenal spread. The propensity for extension into adjacent venous tributaries is a well known charactersistic of wilms' tumor [2,3]. Cystic partially differentiated nephroblastoma (CPDN) is a rare lesion occurring primarily in children <2 years of age [4]. Confirming or extending the stage of wilms' tumor is one of the most important objectives of pathologic study of nephrectomy specimens since therapy is based on the stage.

Table-1: NWTS staging

NWTS Stage	Definitions and staging criteria
1.	Tumor confined to the kidney and completely resected(capsule intact,not penetrated by tumor., no biopsy before nephrectomy other than FNA, no involvement of vessels of the renal sinus)
2.	Tumor extends beyond the kidney but is completely resected(penetration of renal capsule, invasion of renal sinus vessels or renal vein, localized tumor spillage confined to the flank, specimen margins uninvolved)
3.	Residual, nonhematogenous tumor spread confined to the abdomen(tumor at the resection margin or in abdominal lymph nodes, tumor spillage in the peritoneal cavity, peritoneal implants)
4.	Hematogenous metastasis or nodal metastasis outside the abdomen(liver or lung metastasis etc)
5.	Bilateral wilms' tumor. Whenever possible , the substage of the lesion on each side should also be determined, with the final destination indicating the highest substage lesion(eg, stage v, substage 2)

MATERIALS AND METHODS

The tumor board records and medical record of each patient treated for wilms' tumor received in department of pathology, ICH and HC in Chennai from 1999 to 2003 were retrospectively studied. Total of 60 cases were taken into study and histological features studied using hematoxylin and eosin staining under light microscope.

The NWTS staging system is used which is based on surgical and histopathological findings.

RESULTS AND OBSERVATIONS

In our study, stage II was found to be maximum accounting for 41.7 %, followed by stage III -36.7%, Stage I – 11.7%, stage IV – 10%. CPDN accounted for 5% of cases in our study.

Table-2: staging

stage	Number of cases
I	7
II	25
III	22
IV	6

Table-3: invasion

Invasion	No of cases
Capsular invasion	15
Vascular invasion	12
Capsule/vascular invasion	27
Parenchymal invasion	14
Hilus/ renal sinus invasion	12

Table-4: Wilms' tumor studies

Author	Percentage of cases
Ritchy et al.,	4.1%
Luck et al.,	22.2%
Martenez et al.,	5%
Claymen	70%
Our study	1.6%

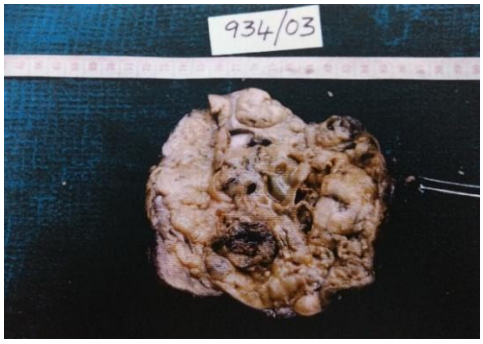

Fig-1: Cut section shows tan grey areas with haemorrhage and necrosis

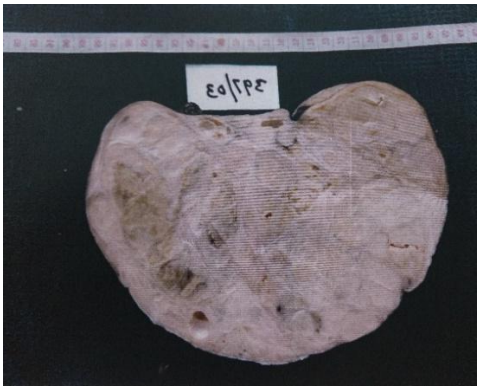

Fig-2: cut section shows tan grey solid area

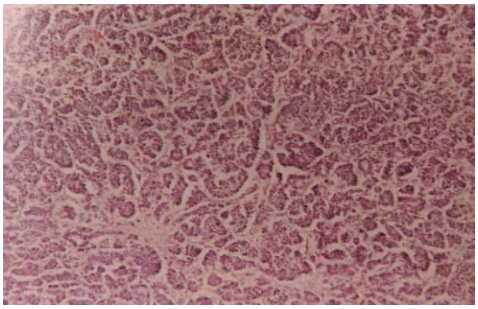

Fig-3: monophasic pattern 100x showing blastemal cells

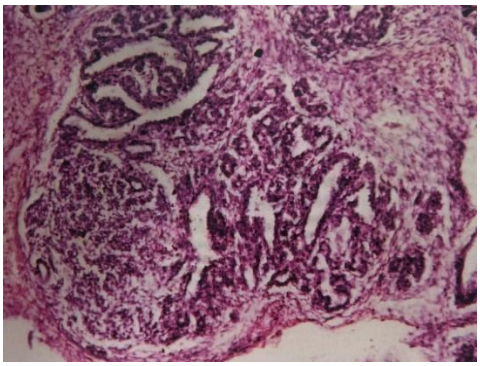

Fig-4: Triphasic pattern 200x – showing all three elements

In our study, 45% of cases had capsular invasion, 23% had parenchymal invasion and 20% had hilar/ renal sinus invasion.

DISCUSSION

Wilms' tumor is the fifth most common pediatric malignancy [8]. It is the most common malignant renal tumor that arises from persistent primitive embryonal tissue.

It was first formally described by Max Wilms in 1899. In 1814, Rance *et al*. was the first to report a wilms' tumor [9]. Since late 1970's most of the advances most of the advances in the chemical management of children with wilms' tumor have been based on clinical trials performed by NWT study group and the Nephroblastoma study group of the International society of pediatric oncology (SIOP).

Due to systematic pathological study and new therapeutic protocols, marked improvement in prognosis of wilms' tumor has occurred.

Left side was commonly involved [6]. Nath P. et al Sharma S *et al*. found out that incidence was more in males when compared to females, with the ratio of 4:1. Most tumors are unicentric and solitary with residual renal parenchyma compressed at one pole. Wilms'tumor has diverse histological features comprising blastemal, epithelial and stromal cells. Classical wilms' tumor has triphasic appearance. Anaplasia is rarely seen in tumors of patients younger than 2 years of age [7]. Wilms' tumor with focal anaplasia in any stage and stage 1 with diffuse anaplasia has favourable histology; stage II, III and IV with diffuse anaplasia have unfavourable histology. Evan Geller et al., found out that 90% of wilms' tumor are of favourable histology. Accurate staging of wilms' tumor allows treatment to be evaluated and enables universal comparison outcome.

Examination for extension through the capsule, residual disease, vascular involvement, lymph node involvement is essential to properly assess the extent of the tumor. According to Green et al., 1998 the proportion of cases in stage I is 41.8%, stage II is 27.5%, stage III is 21.5% and stage IV is 9.3% , compared to our study which showed highest proportion of cases in stage II (41.7%), with stage III being 36.7, stage I – 11.7% and stage IV being 10%.

Wilms' tumor can spread by different means. Local spread to adjacent organ can occur following capsule invasion [5]. According to Ritchy *et al*., 4.1% of nephroblastoma had caval thrombus (table 4). According to Luck *et al.*, most cases of wilms' tumor involves renal vein for intravascular extension. Adequate biopsy of lymph node in renal hilum and along the inferior vena cava or aorta is critical to adequate staging. Hematogenous metastasis to lung was commonly seen followed by liver. In our study capsular invasion was seen in 15 cases prone for adjacent organ involvement, vascular invasion is seen in 12 cases, parenchymal invasion in 14 cases and renal sinus invasion in 12 cases.

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