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Original Research Article

Histomorphological spectrum of kidney lesions in nephrectomies and autopsies in a tertiary care center with an emphasis on primitive neuroectodermal tumor/ewings sarcoma

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ABSTRACT

Introduction: Nephrectomy is one of the commonest surgeries done in urology for kidney lesions. Routinely, kidney specimens from autopsy are being sent to look for morphological changes occurring in both natural and unnatural deaths. Primitive neuroectodermal tumor/Ewing's Sarcoma (PNET/ES), a member of Ewing's sarcoma family is an aggressive tumor rarely observed in kidney principally occurs in young patients and is very rare in older patients.
Hence this study was undertaken to contemplate the histomorphological pattern of kidney lesions in nephrectomy and autopsy specimens with an accentuation on Primitive Neuroectodermal tumor in Kidney which is a rare disease.
Materials and Methods: This study was carried out in the Dept of Pathology, MMCRI, Mysore, Karnataka. All the nephrectomy and autopsy specimens received over a period of one year (June 2018 to May 2019) were included. A total of 38 cases were studied during this period.
Result: Out of 38 cases, 29 were non-neoplastic and 9 were neoplastic lesions. Among non-neoplastic, 19 were chronic pyelonephritis and in neoplastic, renal cell carcinoma clear cell type (5 cases) was the commonest with a case of renal PNET (rPNET).
Conclusion: The present study provides a fair insight into the histological patterns of lesions in nephrectomy and autopsy specimen as they are liable for a great deal of morbidity and mortality. Histomorphological study of kidney lesions should be done thoroughly for early identification and prevention of progression of disease, and for prognosis and treatment.
Also features infrequent occurrence of PNET/ES of the kidney which is uncommon and is significantly rarer in older patients.

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1. Introduction

Nephrectomy is one of the commonest surgical procedure done in urology.[1] It can be either simple nephrectomy mainly done for non-neoplastic conditions or radical nephrectomy performed for renal neoplasm.[2] Simple nephrectomy is indicated in patients with irreversible kidney damage due to obstruction, chronic infections, calculus disease, renal dysplasia or severe traumatic injury. Partial nephrectomy is done in cases of bilateral renal cell carcinoma or renal cell carcinoma involving a solitary functioning kidney.[2]

Kidney specimen from autopsy are sent to look for morphological changes in unnatural death like drowning, poisoning, snake bite, road traffic accidents and natural deaths like cardiac failure.[1]

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Primitive neuroectodermal tumor/Ewing's sarcoma (PNET/ES), a member of Ewing's Sarcoma family is an aggressive type of sarcoma with an incidence of less than 1%.[3] They arise from the primitive neuroectoderm and most commonly seen in trunk, extremities, brain, spinal cord and sympathetic nervous system. Renal primitive neuroectodermal tumor (rPNET) is extremely rare.[3] It principally occurs in young patients (<50years) and is very rare in older patients (>50years). Only six cases of PNET of kidney have been reported in literature in older patients.[4]

Hence this study was undertaken to study the histomorphological pattern of kidney lesions in nephrectomy and autopsy specimens with an emphasis on Primitive Neuroectodermal tumor in kidney which is a rare disease.

2. Materials and Methods

This study was carried out in the Dept. of Pathology, Mysore Medical College and Research Institute, Mysore, Karnataka. All the nephrectomy specimens and autopsy specimens received over a period of one year from June 2018 to May 2019 were included. In each patient, the clinical findings such as age, sex and relevant investigations and pathological findings i.e. gross and microscopic features were recorded. Special stains and immunohistochemistry was also done where ever needed. All the diseases were classified as neoplastic and non-neoplastic and a specific diagnosis was given wherever possible. For neoplastic lesions, the tumor was identified and gross features i.e. size, color, location, capsular involvement, hemorrhagic and necrotic areas were identified and recorded. Histological typing was done according to WHO classification.

3. Results

In the current study, out of 38 cases, males constituted about 50% and females constituted about 50%, Male: Female = 1:1. Highest percentage of patient belonged to 41-50 yrs of age group. Majority of the lesions were chronic pyelonephritis accounting for about 52.6% (20 cases) followed by clear cell carcinoma showing 13.2% (5 cases) and acute tubular necrosis 10.5% (4 cases).

The histopathological evaluation of Primitive neuroectodermal tumor/Ewing's sarcoma (PNET/ES) revealed malignant small round cell tumor on H&E stain and showed strong expression of CD99 and were negative for myogenin, CK, CD45 and WT-1.

The patient declined treatment and succumbed to disease after 5 months of surgery.

4. Discussion

Nephrectomy is a standard treatment done for patients with benign as well as malignant lesions.

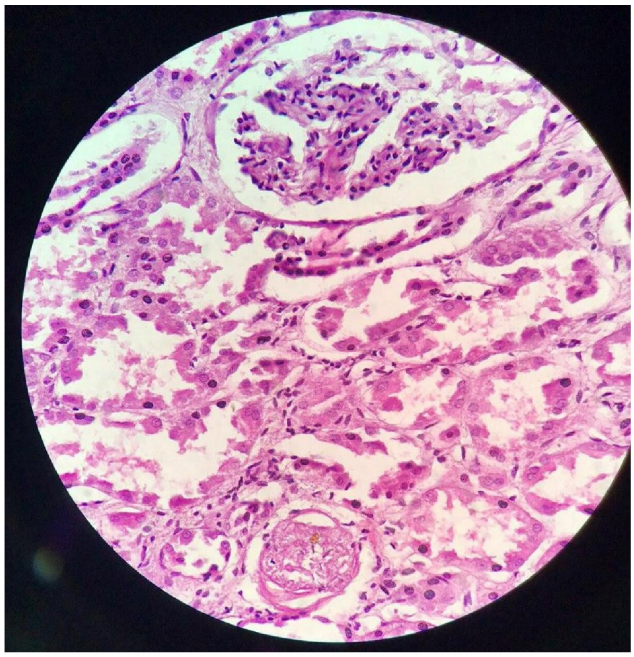

Fig. 1: Acute tubular necrosis (Stain H&E)

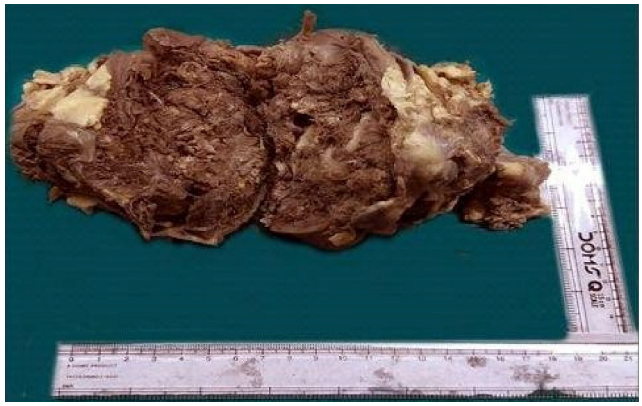

Fig. 2: Gross photograph of primitive neuroectodermal tumor/Ewing's sarcoma

Table 1: Distribution of nephrectomy specimens based on histomorphological study

Lesions	Number	Percentage
Non-neoplastic	29	76.3
Neoplastic	09	23.7
Total	38	100

Table 2: Gender – wise distribution of various lesions

Lesions	Male	Female	Total	Percentage
Acute tubular necrosis	3	1	4	10.52
Chronic pyelonephritis	7	13	20	52.63
Hydronephrosis	2	0	2	5.26
Xanthogranulomatous pyelonephritis	1	0	1	2.63
Atrophic kidney	1	0	1	2.63
Non-functioning kidney	0	1	1	2.63
Clear cell-RCC	3	2	5	13.18
Chromophobe RCC	1	1	2	5.26
Papillary RCC	0	1	1	2.63
PNET/ES	1	0	1	2.63

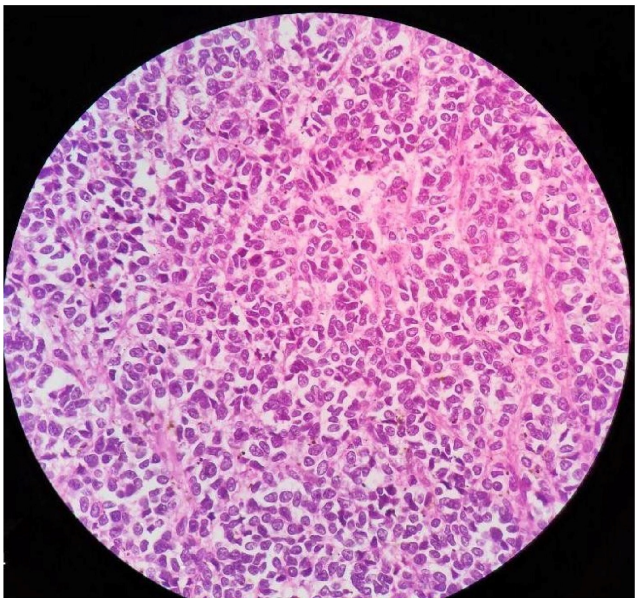

Fig. 3: Microscopic appearance of PNET/ES (Stain H&E)

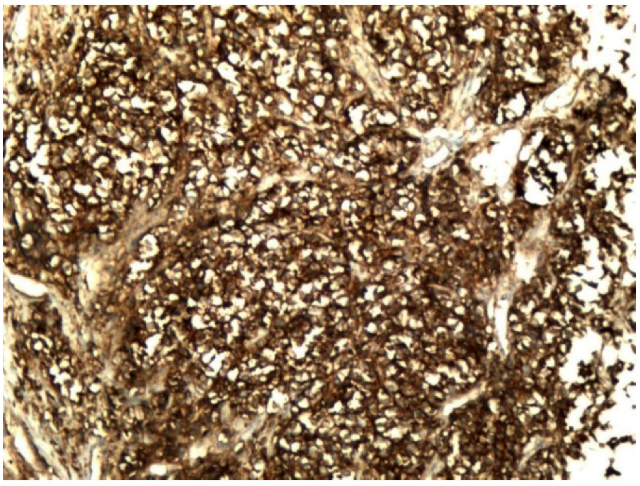

Fig. 4: Photomicrography of PNET/ES (Strong positive for IHC - CD99)

In the present study out of 38 nephrectomy specimens 76.3% were benign lesions and 23.7% were malignant. The M:F was 1:1 with an age group ranging from 11-85 yrs. Thus benign lesions comprised vast majority of cases in our study among which Chronic pyelonephritis was most common constituting 52.63% of all nephrectomy specimens followed by acute tubular necrosis constituting 10.5%. The most common indication for nephrectomy in our study was chronic pyelonephritis followed by renal cell carcinoma 21%.

Among malignant lesions, clear cell renal cell carcinoma was most common lesion constituting 13.2% followed by chromophobe RCC 5.26%, papillary RCC 2.63% and a rare case of PNET/ES.

The most common lesion encountered in autopsy was acute tubular necrosis 10.5% of all nephrectomy specimens, in instances of death due to poisoning.

PNET/ES is a small round cell tumor that predominantly occurs in bone and soft tissue. It is an aggressive tumor with high metastatic potential. PNET/ES of kidney (rPNET) as a primary tumor is a rare entity, first reported by Seemayer and colleagues in 1975.[4] Only 150 cases have been reported till date.[4,5] They usually occur in children and young adults and are rare in older patients as in our case.

5. Conclusion

The present study provides a fair insight into the histological patterns of lesions in nephrectomy and autopsy specimen as they are liable for a great deal of morbidity and mortality. Histomorphological study of kidney lesions should be done thoroughly for early identification and prevention of progression of disease, to know cause of death and also prognosis and treatment.

Also features infrequent occurrence of PNET/ES of the kidney which is uncommon and is significantly rarer in older patients.

6. Source of Funding

None.

7. Conflict of Interest

None.

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