

Research Article

Pathological study of elective nephrectomies for a two year period

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ABSTRACT

Background: Nephrectomies whether partial, total or radical are common surgical procedures these days with trauma being the most common cause of an emergency nephrectomy. The indications of elective nephrectomies vary with different age groups- malignancies being common in the elderly age group and non-neoplastic indications of nephrectomy may present in any age group. The present study was undertaken in view of the increasing elective nephrectomies in our area thus analyzing the common causes requiring nephrectomy as a treatment. The present study also aimed at determining the age and sex distribution of various renal lesions requiring a nephrectomy.

Methods: It was a prospective study for a period of 2 years - January 2013 to December 2014. A total of 45 nephrectomies were included in the study. Detailed clinical, biochemical and imaging findings were taken into consideration before analyzing each case.

Results: There was a male predominance(64.4%) and 26.6% of the cases were in the age group of 40-50 years. 95.5% of the nephrectomies were performed for a non-neoplastic indication. Involvement of the right and left kidney was almost equal in the study. Chronic pyelonephritis was the most common histopathological diagnosis(68.8%).

Conclusion: Inflammatory causes more commonly required a nephrectomy in the study population. Chronic calculous pyelonephritis was the most common underlying pathophysiology leading to a nonfunctioning kidney thus highlighting the early treatment of renal calculi.

Keywords: Nephrectomy, Radical, Pyelonephritis, Histopathology

INTRODUCTION

Nephrectomy can be either partial, total or radical depending upon the indication and other patient parameters. While Trauma is the most common cause of emergency nephrectomy, Elective nephrectomy has many indications. In children, the most common etiology is chronic pyelonephritis as a consequence of vesico-ureteric reflux¹. In children, the most common neoplastic etiology necessitating a nephrectomy - mostly radical is Wilms tumour. Xanthogranulomatous pyelonephritis is also becoming common these days. Chronic pyelonephritis leading to a non functioning kidney is again the most common cause in adults.² The most common neoplastic indication in adults is Renal cell carcinoma mostly requiring a radical nephrectomy². The

aim of the present study was to analyse the nephrectomy specimens and the underlying histopathological features and study the age and sex distribution of the patients in and around Hyderabad. The study helped to elucidate the common underlying disorders leading to a nonfunctioning kidney and thus requiring a nephrectomy.

METHODS

This is a prospective study for a period of 2 years – January 2013 to December 2014 at the Department of Pathology, Bhaskar Medical College, Telangana State and Satya Kidney centre, Hyderabad. A total of 45 cases were included in the study. A detailed clinical, laboratory and imaging reports of all cases were initially obtained along with the receipt of the nephrectomy specimen. All

the cases were treated by an open nephrectomy and all of them were elective procedures. The 2 cases of malignancies diagnosed before surgery underwent radical nephrectomy whereas all the other cases were total nephrectomies. Nephrectomy specimens received in the department were thoroughly grossed as per standard protocol for grossing of individual renal specimens and processed. Paraffin embedded, H & E stained sections were initially observed under light microscopy. Special stains were applied wherever necessary. A final diagnosis was given in each case, correlating the clinical, imaging and histopathological features. The age and sex distribution of individual lesions were analysed and the frequency of various conditions leading to nephrectomy were listed.

RESULTS

A total of 45 cases were included and 2 cases diagnosed preoperatively as malignancy underwent radical nephrectomy while all other cases requiring nephrectomy for a non-neoplastic etiology were treated with a total nephrectomy. The youngest patient undergoing nephrectomy was a 3 year male child while the eldest patient undergoing the procedure was a 70 year old male patient. Most of the patients were in the age group of 41-50 years(26.6%)(Table 1). 20% of the patients were under the age of 20 years. There was a male predominance in our study with male patients constituting 64.4% of the total cases (Figure 1). The youngest and the oldest patient were both males. Loin pain with or without flank tenderness is the most common presenting symptom(49%) followed by fever(18%)(Figure 2). Hematuria was observed as a presenting symptom in only 13% of the cases (Figure 2).



Figure 1a: Gross photograph of Hydronephrosis showing entire renal parenchyma converted into a cyst.



Figure 1b: Gross photograph of Xanthogranulomatous pyelonephritis showing yellowish and dark brown areas.

Table 1: Age distribution of the patients undergoing elective nephrectomy(n = 45).

Age group (years)	Number of cases	Percentage of cases
0-10	6	13.33%
11-20	3	6.66%
21-30	5	11.11%
31-40	6	13.33%
41-50	12	26.66%
51-60	9	20%
61-70	4	8.88%
Total = 45		

Most of the patients are in the age group of 41 to 50 years.

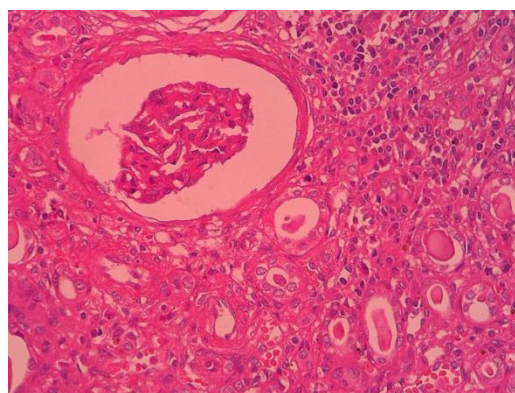


Figure 2a: Photomicrograph of chronic pyelonephritis showing interstitial infiltrate of lymphocytes, periglomerular fibrosis and thyroidisation of tubules.(H & E – 400X).

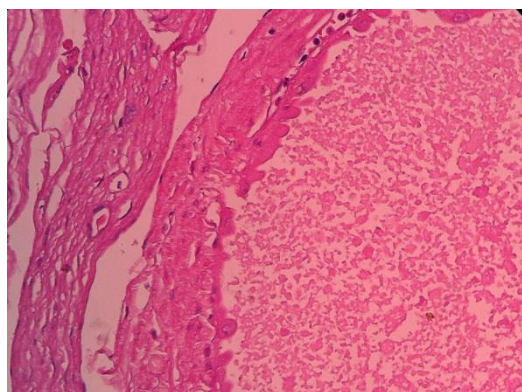


Figure 2b: Photomicrograph of adult polycystic kidney disease showing cyst lining(arrow) and cyst filled with hemorrhagic material and foamy macrophages.(H & E – 400X).

Out of 45 cases, only 2 cases underwent nephrectomy for a malignancy (4.44%) (Figure 3). The rest of the cases underwent nephrectomy for inflammatory conditions (95.56%). The most predominant gross appearance was that of a shrunken kidney (34 cases), Enlarged kidney was observed in 6 cases, 4 cases had a predominant cystic appearance grossly (Table 2). Only one case had a normal looking kidney grossly (Table 2). Chronic pyelonephritis was the most common histopathologic diagnosis (32 cases) (Table 3). There was a male predominance in all the disorders except for Xanthogranulomatous pyelonephritis where there was a female predominance (Table 3). Both the malignancies occurred in males and the lone case of chronic glomerulonephritis was a female child. Hydronephrosis and polycystic kidney disease had an equal sex distribution. Calculous pyelonephritis was the most common type (Figure 7). Noncalculous pyelonephritis made up only 24.2% of the total pyelonephritis cases. Most of these cases were due to prolonged vesicoureteric reflux phenomena and others were due to interstitial damage. There was only a single case of TB Pyelonephritis.

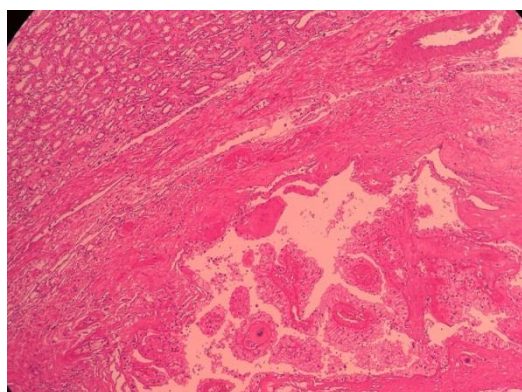


Figure 3a: Photomicrograph of Papillary adenocarcinoma kidney showing tumour composed of papillary formations. Tubules in the uninvolved kidney are also noted (arrow)(H & E – 100X).

Table 2: Gross findings of 45 elective nephrectomies (n = 45)

Gross findings	Number of cases
Enlarged	6
Shrunken	34
Cystic	4
Grossly normal	1

Shrunken kidney was the most common gross abnormality noted.

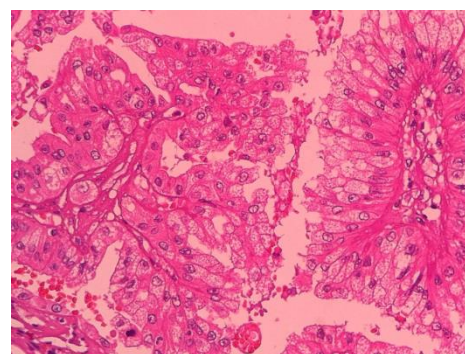


Figure 3b: Photomicrograph showing papillary processes lined by tumour cells(H & E – 400X).

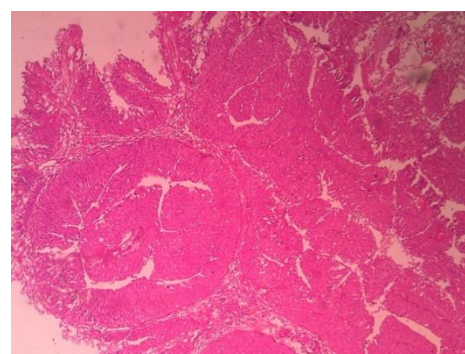


Figure 3c: Photomicrograph of Transitional cell carcinoma of renal pelvis showing tumour tissue composed of transitional epithelium(H & E – 100X).

Table 3: Histopathologic diagnosis of 45 elective nephrectomies.

Histopathologic diagnosis	Male	Female	Total
Chronic pyelonephritis	23	9	32
Xanthogranulomatous pyelonephritis	1	3	4
Polycystic kidney disease	1	1	2
Hydronephrosis	1	1	2
Interstitial nephritis	1	0	1
TB Pyelonephritis	1	0	1
Chronic glomerulonephritis	0	1	1
Papillary adenocarcinoma kidney	1	0	1
Well differentiated transitional cell carcinoma – pelves.	1	0	1

Chronic pyelonephritis was the most common histopathologic finding in both the genders. Xanthogranulomatous pyelonephritis was more common in females.

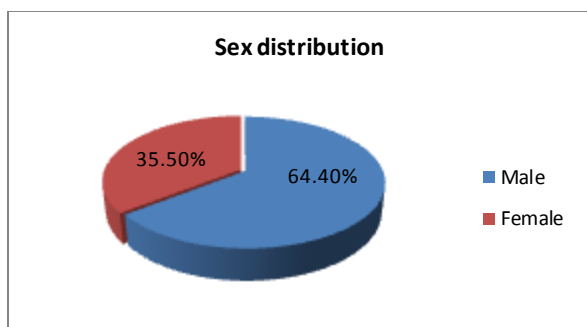


Figure 4: Gender distribution (n = 45).

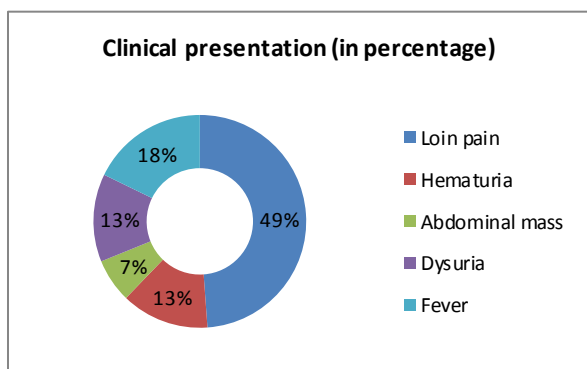


Figure 5: Distribution of clinical presentation in 45 cases.

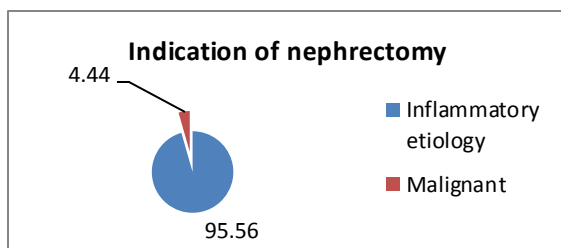


Figure 6: Indication for nephrectomy (n = 45) in percentage.

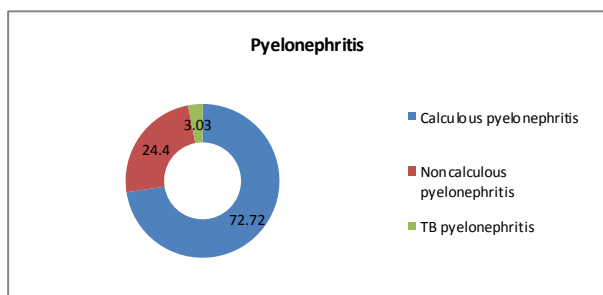


Figure 7: Etiology of chronic pyelonephritis (33 cases).

DISCUSSION

Gustav Simon performed the first planned nephrectomy for the treatment of urinary fistula in 1869 and one year later in 1870 Simon performed partial nephrectomy for hydronephrosis.³ The most common procedure done for a nonfunctioning kidney or a poorly functioning kidney is a

Nephrectomy – be it partial or total or radical.⁴ Malignancies are treated with a radical nephrectomy. The purpose of the present study was to analyse the nephrectomy specimens received in the Department of Pathology, Bhaskar Medical College, Telangana State and Satya Kidney centre, Hyderabad and to study the age and sex distribution of the various renal lesions.

A total of 45 cases were included in the study which was carried out for a period of two years at Bhaskar Medical College, Telangana. The age group of the patients ranged from 3 years to 70 years. In the study by Venkatesh et al, a total of 84 cases were studied and the age group ranged from 1 month to 70 years. In the study by Dutta⁵ et al, a total of 88 nephrectomies were analysed and the age of the patient ranged from 7 months to 68 years. In the present study, most of the patients (27%) were in the age group of 41 to 50 years. In the study by Venkatesh et al,⁶ 20% of the patients belonged to the age group of 21 to 30 years. In the study by Yelikar et al,⁷ 27% of the patients were in the age group of 61 to 70 years.

In the present study, there was a male predominance 64.4% of the patients being males. In the study by Venkatesh et al, 57% of the cases were male patients and in the study by Yelikar et al, 63% of the cases were males. Loin pain was the most common presenting symptom in the present study(49%) followed by fever (17.7%). In the study by Venkatesh et al, 70% of the patients presented with loin pain. In the present study, 4.4% of the patients underwent nephrectomy for a malignant indication whereas 95.6% of the cases underwent nephrectomy for an inflammatory condition. There were no benign tumours reported in the present study. In the study by Yelikar et al, malignant tumours accounted for 45.4% of the cases, benign tumours 9% and inflammatory lesions another 45.4% of the total cases. In the study by Dutta et al, 62.5% of the cases underwent nephrectomy for benign/inflammatory condition where as 37.5% of the cases underwent nephrectomy for a malignant indication.

In the present study, shrunken kidney was the most common gross appearance noted (75.5%), followed by an enlarged gross appearance in 13.3% of the cases. Only one case of Interstitial nephritis had a normal looking kidney grossly. In the study by Venkatesh et al, dilatation of the pelvicalyceal system was the most common gross abnormality noted (80%) followed by a shrunken kidney (13.2%). In the present study, Chronic pyelonephritis was the most common histopathological diagnosis constituting 71% of the cases followed by Xanthogranulomatous pyelonephritis (8.9%). In the study by Venkatesh et al, 84% of the cases had a final diagnosis of chronic pyelonephritis and 13% of the cases had a final diagnosis of granulomatous pyelonephritis. In the study by Yelikar et al,⁷ Renal cell carcinoma was the most common malignant indication for a nephrectomy accounting for 7 out of 10 cases of malignancies. In the study by Dutta et al, among the benign conditions,

neglected pelviureteric junction obstruction was the most common indication accounting for 21 cases (46%). In the present study, calculus was the most common underlying etiology leading to chronic pyelonephritis (72.72%). Tuberculous pyelonephritis was seen in only one case in the present study.

To summarize, there is a wide age range distribution of renal diseases from 3 years to 70 years in the present study. Inflammatory conditions constituted the most common indication for nephrectomy. Chronic calculous pyelonephritis was the most common histopathologic condition leading to a nonfunctioning kidney and thus necessitating a nephrectomy in the present study. The study highlighted the importance of prevention of calculus formation in the kidneys and prompt treatment of renal calculi to halt the progression of the kidney to a nonfunctioning stage.

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Ethical approval: Not required

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