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Original Research Article

Current nephrectomy scenario with pathological correlation in a tertiary care centre - A three year study

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Abstract

Introduction: Kidneys are vital organ for multiple function in the body. Thereby kidney can be involved in various pathological processes. Nephrectomy is the treatment of choice in extreme and untreatable conditions including malignancies.

Aims and Objectives: In this study we aim to analyse the nephrectomy specimen received in terms of the various epidemiological factors and their clinico-histopathological correlation. The study also aims to give an account of currect trend of nephrectomy in the study population.

Materials and Methods: This is three year prospective and retrospective analysis of the consecutive nephrectomy specimen received in department of pathology with emphasis on epidemiological and clinic-pathological correlation.

Results: A total of 48 nephrectomy specimen received during the study period, 28(58%) were male and 20(42%) were females. We found that 40% of the cases constituted that of chronic pyelonephritis with or without end stage renal disease while renal cell carcinoma of clear cell type constituted 17% of the cases.

Conclusion: This study concludes that non neoplastic indications for nephrectomy constitute the major burden in our study population. These conditions if diagnosed in advance can be treated and nephrectomy can be avoided.

Introduction

Kidneys are vital organ for multiple function in the body. From Apart from excretory function their function ranges from maintaing the acid base balance in the body to as important as maintain the required blood pressure. As can be expected from the functions involved, kidney can be associated with various pathological processes. The patients often present with various symptoms including loin pain, hematuria, mass per abdomen and various radiological investigations signifying reduced renal functioning. Although most of the pathologies can be treated on medical basis alone, nephrectomy is done in extreme and untreatable conditions. Nephrectomy is the treatment of choice in renal cell carcinomas. In this study we aim to analyse the nephrectomy specimen received in terms of various epidemiological factors and their clinico-histopathological correlation. The study also aims to give an account of current trend of nephrectomy in the study population.

Materials and Methods

This is three year prospective and retrospective analysis of the all the consecutive nephrectomy specimen received in department of pathology during the specified duration from 2015-2018 of our institute. Ours is multispeciality tertiary care teaching institute located in Pune, Maharashtra, India. A total of 48 nephrectomy specimens were received during this period. The study included cases of one year in retrospective collection of data from the departmental records and two years of prospective collection of information as and when the nephrectomy specimen were received in the department of pathology. The specimens were sent to histopathology section in 10% formalin. Patient particulars were recorded in detail on prepared proformas, which included age, sex, and clinical findings, investigations such as X-ray, USG, DTPA and other relevant investigations were also noted. The diagnosis and impression given after the gross and histopathological examination were recorded for each case in both prospective and retrospective data collection. The details of each case were matched with the corresponding histopathology results. The data was then studied in detail with emphasis on epidemiological and clinic-pathological correlation. Analysis for the age wise, sex wise distribution of cases for each lesion with mean age for each lesion was recorded. The study aims to present the current trend of nephrectomy with pathological correlation in the study population.

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Results

A total of 48 nephrectomy specimen were received during the study period. Of them 28(58%) were male and 20(42%) were females. Table 1 gives the age and sex wise distribution of cases. 29 specimen were of right sided nephrectomy where as 19 were left sided. Table 2 gives the gender wise and side wise distribution of the cases. We found that right sided nephrectomy was more common in both male and female cases.

The various indications for nephrectomy included conditions like calculus (in kidney, pelvi ureteric junction and ureter), hydronephrosis, and various miscellaneous conditions which included aplastic kidney, poor renal functioning, reflux disease etc. As far as non neoplastic nephrectomise are considered, we found that hydro nephrosis was by far the commonest indication in males whereas calculi leading to poor renal functioning was seen to be the commonest indication in females. Table 3 gives the detailed gender wise distribution of the cases according to the indication for nephrectomy. All the patients had undergone a radiological investigation with either one or more of the following: X-ray, ultrasound, DTPA, reflux study. Table 4 gives the details of the radiological investigations.

The cases were then categorised according to the histopathological diagnosis as shown in Table 5. We found that 40% of the cases constituted that of chronic pyelonephritis with or without end stage renal disease while renal cell carcinoma of clear cell type constituted 17% of the cases. Other cases included those of acute pyelonephritis, interstitial nephritis, hydronephrosis and tuberculous nephritis.

Table 1: Age and sex distribution of cases

Age group	Male	Female	Percentage of total cases
0-10 yrs	1	0	2
11-20	1	2	6.25
21-30	5	4	18.75
31-40	4	5	18.75
41-50	6	3	18.75
51-60	4	1	10.41
61-70	5	4	18.75
71-80	2	0	4.16
81-90	1	0	2

Table 2: Side of nephrectomy

Gender	Right sided nephrectomy(percentage)	Left sided nephrectomy(percentage)	Percentage of total cases
Male	17(35.41)	11(22.9)	58.33
female	12(25)	08(16.6)	41.66

Table 3: Indications for nephrectomy

Indication for nephrectomy	Males	Females	Total cases
Non – neoplastic	23	16	39
neoplastic	07	02	09
Total cases	30	18	48

Table 4: Radiological investigations done and their contributions

Investigation	Number of cases	Percentage of total
X-Ray	31	64.58
Vesicoureteric reflux	01	2
Ultrasound	48	100
DTPA	21	43.75

Table 5: Spectrum of diagnosis in nephrectomy specimen with gender wise distribution

Diagnosis	Male	Female	Mean age	Percentage of total cases
Acute on Chronic pyelonephritis	1		65	2
Chronic pyelonephritis with or without end stage kidney disease	10	9	43.5	40
Hydronephrosis with end stage kidney disease	3	1	34.75	8
End stage kidney disease	6	1	45.7	15
Chronic interstitial nephritis	1	3	32.5	8
End stage kidney disease with glomerulonephritis	0	1	14	2
Pyelonephritis with hydronephrosis	1	0	6	2
Granulomatous inflammation	0	1	40	2
Renal cell carcinoma- clear cell type	7	1	51.7	17
Renal cell carcinoma- chromophobe type	0	1	64	2
Miscellaneous	1	0	22	2

Discussion

The purpose of this study was to analyse the demographic distribution of the nephrectomy cases and to understand their clinic-pathological correlation with emphasis on radiological investigations done. The sex wise distribution of the cases showed that 58% of the cases were males and 42% were females. Similar findings were found by Mahesh Kumar U et al with 63.6% males and 36.4% females.[1] The age wise distribution of the cases showed that majority of the cases were aged between 20-50 years (54%) with almost equal males to female ratio in each age group (Table 1). We found that there was almost equal distribution of cases in each age group (18%). Mahesh Kumar U et al found the majority of case distribution between 51-60 years of age (27%).[1] Shaila et al found majority of cases (27%) to be between 41-50 years while Aiffa et al found it to be between 21-30 years.[2,3] With reference to the side of nephrectomy, we found that about 60% of the cases were right sided nephrectomise. Shaila et al found that maximum number of cases in their study were of left sided nephrectomy (54%).[2]

On studying the indication for nephrectomy we found that 39 out of 48 cases were for non neoplastic etiology and the remaining were for neoplastic aetiology (Table 3). Mahesh et al and Aiffa et al found the non neoplastic indication for nephrectomy to be 45% and 77% respectively.[1, 3]

Apart from the laboratory investigations, the radiological investigations play a vital role in determing the renal function and localising the size of the renal lesions.[4-6] We also recorded the various radiological investigations done prior to nephrectomy in each case. We found that all the cases had undergone ultrasound examination. The other investigations done included X-ray (64%), Diethylenetriamine Pentaacetic Acid (DTPA) scan (44%) and imaging studies for vesico-ureteric reflux (2%). The investigations were done to study the renal function and location of renal mass. Although ultrasound was done in all the cases, DTPA was considered detrimental in assessing the renal function in our cases as was also found by Liu et al and many others.[7]

The spectrum of diagnosis of the nephrectomy specimens showed a wide variety of cases ranging from acute pyelonephritis to renal cell carcinoma (Table 5). As has been seen from many years, inflammatory conditions of kidney constitute major burden on health care system in most of the countries in terms of money spent in their treatment.[8] The major category included the inflammatory and benign lesions contributing to 81% of the total nephrectomise. Following chronic pyelonephritis (40%), the next common lesion was renal cell carcinoma of clear cell type which constituted 17% of all lesions. Chronic pyelonephritis with or without end stage renal disease comprised 40% of the cases. This finding was in agreement with Shaila et al and Aiffa et al. The mean age for the inflammatory lesions ranged from 40-50 years. Aiffa et al found the incidence of chronic pyelonephritis to be around 40% and the age group of highest incidence was 21-40 years.[3] On radiological correlation we found that majority of the benign lesions were supported with radiological evidence of poor renal function in the form of DTPA. The DTPA reports suggested the renal function to be reduced in most cases operated for end stage renal failure. Our institutal study shows that DTPA was detrimental in selecting the cases for nephrectomy in non neoplastic conditions. Glomerulonephritis cases of presumably infection related, cases of interstitial nephritis (thought to be due to potential environmental exposures to nephrotoxins), and stones have been reported to be the most frequent causes of nephrectomy in our set up. This findings are in agreement with many studies.[9-11] Chronic interstitial nephritis and hydronephrosis with end stage renal disease constituted substantial percentage (8%) of cases apart from chronic pyelonephritis. One of the case was confirmed as tuberculosis of the kidney with presence of caseating granuloma with positivity for acid fast bacilli on Zeil Neilson stain. Another specimen received in multiple pieces turned out to be suspicious of seminal vesicle remnants. This case was described on ultrasound as dysplastic/aplastic kidney. Shaila et al also found the incidence of hypoplastic kidney to be about 2% of nephrectomy which was similar to that in our study. Though our study found no cases of Xanthogranulomatous pyelonephritis during our study period, we feel that this condition has little relevance in our population. In support to this statement we found that Shaila et al reported the incidence of xanthogranulomatous pyelonephritis to be 1%.[1] While studying the associated conditions, we found that two of the cases were diagnosed with hypertension and one of the cases was on treatment for diabetes mellitus for the past 6 years approximately. One of the cases was HbsAg positive.

Kidney is affected by both benign and malignant tumors. Malignant tumors constitute about 99% of the renal tumors.[12] Renal cell carcinoma constitutes for approximately 2 percent of adult malignancies and 80-85 percent of malignant renal tumors.[13] Renal cell carcinoma is two times more common in men than in women. It is primarily a disease of elderly patients, seen most commonly in the fifth to seventh decades of life.[14] A total of 19 cases of renal cell carcinoma were amongst the studied cases. Renal cell carcinoma (RCC) of the clear cell type was the most common comprising of 89% of malignant lesions. The mean age for the malignant lesions was also on the higher range with 64 years for clear cell type of RCC. One of the cases presented with radiological evidence of inferior venacave invasion in the form of thrombi. Along with nephrectomy specimen, a segment of inferior vena cava was also sent for histopathological investigation. We found the sample to be consistent with malignant thrombi in inferior venacava on microscopy. Shaila et al found 60% of the malignant lesions to be RCC whereas Mahesh et al found it to be 45%. Aiffa et al found the incidence of malignant tumors to be 53%. In both these studies benign tumors of the kidney such as oncocytoma, nephroma were amongst the cases where as in our study we found only malignant lesions apart from inflammatory condition. This may be attributed to geographic distribution. Relevant supporting evidence for

this incidence rate could not be found in our research. Although our study findings slightly differ in terms distribution of neoplastic renal lesions, we present these findings to bring forward the current insight into the incidence of renal lesions in our study population.

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