

Nephrectomy – A study of recent trends in a high-volume tertiary care center, exploring the need for screening and preventive strategies



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ABSTRACT

Background: Nephrectomy being one of the most commonly performed procedures, a retrospective study and analysis was done to evaluate, the scope for screening and timely preventive measures that could help to reduce the need for nephrectomy. **Aims and Objectives:** The aim of the study was to study indications, demographic-details, clinical-presentations, time delay, comorbidities, operative procedures, and complications of patients undergoing nephrectomies. The study was to identify the high risk groups, assess for feasibility for screening measures, and formulate strategies for nephrectomy prevention for benign etiologies. **Materials and Methods:** A retrospective study was done on medical records of 220 consecutive nephrectomies from June 2018 to June 2020. **Results:** Out of 220 nephrectomies, 68% were performed for benign conditions, 17% for malignant etiology, and 15% were donor nephrectomies. In the benign group, the most common etiology was renal stones (44.54%), followed by pelvic ureteric junction obstruction (12.72%), and renal tuberculosis (6.81%). The most common clinical presentations were flank pain (80%), followed by lower urinary tract symptoms (22%), dysuria (25%), hematuria (15%), and fever (7%). In the malignant group, the most common etiology was renal cell carcinoma (14.09%). The most common clinical presentations were flank pain (90%) followed by hematuria (67%). Overall, 24% of the patients presented with acute kidney injury. A pre-operative intervention such as DJ stenting and percutaneous nephrostomy insertion was performed in 13% and 9% of patients, respectively. A laparoscopic approach was used in 76% of the patients out of which 10% were converted to open procedures. Partial nephrectomy was performed in 3% of patients. **Conclusion:** There is a difference in nephrectomy indications between Western countries and India, where 68% of nephrectomies are performed for benign conditions especially calculus disease. Nephrectomy for calculus disease is potentially preventable and public education in the form of posters, media and the involvement of the community medicine department could be helpful.

Key words: Benign; Calculus disease; Nephrectomy; Preventive strategies; Screening

INTRODUCTION

Nephrectomy is one of the most commonly performed surgeries in the field of urology. However, its incidence, indications, presentations, and complications vary considerably among different geographical areas. There is a paucity of likewise data from the Indian subcontinent region. Here, we present an observational study of all

nephrectomy surgeries performed at a high-volume tertiary care institute in a metropolitan city in the past 2 years. Our objective was to gain information about the demographic profile, complications, and common denominator in the series for self-learning. We also evaluated whether a certain group of the patients could be treated better, the scope for screening, and the need for any awareness campaigns. Emphasis was placed on what can be done to prevent

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these nephrectomies with a special focus on patients with calculus disease.

Aims and objectives

To study indications, demographic-details, clinical-presentations, time delay, co-morbidities, operative procedures, and complications of patients undergoing nephrectomies. To identify high risk groups, assess for feasibility for screening measures and formulate strategies for nephrectomy prevention for benign etiologies.

MATERIALS AND METHODS

This retrospective study was done on records of 220 consecutive nephrectomies performed at a high-volume tertiary care urology center in a metropolitan city from June 2018 to June 2020. The series was analyzed according to the indications for nephrectomy, age group, clinical presentations, intraoperative and post-operative complications, and comorbidities. Ethical approval was obtained from the Institutional Ethics Committee. Waiver of consent was sought and no identifier information was used during data analysis. Data were entered in Microsoft Excel 2016 and analyzed using SPSS version 23.0.

RESULTS

This study conducted on records of 220 consecutive nephrectomies from June 2018 to June 2020 yielded the following results:

Baseline characteristics

Out of 220 nephrectomies, 149 (68%) were performed for benign conditions, 37 (17%) for malignant etiology, and 32 (15%) cases were donor nephrectomy. In the benign group, the most common etiology was renal stones (98 patients, 44.54%), followed by pelvic ureteric junction obstruction (PUJO) (28 patients, 12.72%), renal tuberculosis (15 patients, 6.81%), pyonephrosis (12 patients, 5.45%), xanthogranulomatous pyelonephritis (11 patients, 5%), and emphysematous pyelonephritis (four patients, 1.81%). The most common age group affected by benign conditions was 30–45 years (mean 37 years). Male and females were equally affected. The most common clinical presentations for benign conditions were flank pain (80%), followed by lower urinary tract symptoms (LUTS) (22%), dysuria (25%), hematuria (15%), and fever (7%). Asymptomatic presentation with incidentally detected non-functioning kidney due to calculus disease and PUJO were 3% and 2.5%, respectively. Among 98 patients of calculus disease, 18 patients (19%) suffered from hypertension

alone, 12 patients (13%) suffered from diabetes alone, 19 patients (20%) had both diabetes with hypertension, and 17 patients (18%) had chronic kidney disease (CKD); while 11 patients (12%) had a history of tuberculosis. In the malignant group, the most common etiology was renal cell carcinoma (RCC) confined to the kidney (18 patients, 8.18%), followed by RCC with inferior vena cava thrombosis (eight patients, 3.63%), metastatic RCC (five patients, 2.27%), angiomyolipoma (two patients, 0.9%), and paraganglioma (one patient, 0.45%). The most common age group for malignant conditions was 45–60 years (mean 52 years). Male (52%) and female (48%) were equally affected. The most common clinical presentations for malignant conditions were flank pain (90%) followed by hematuria (67%), LUTS (10%), rarely fever (4%), and vomiting (5%). Among patients with malignancy, 27% were hypertensive, 25% were diabetic, 13% suffered from both diabetes mellitus (DM) and hypertension (HTN), 18% suffered from CKD, and 5% cases had a history of tuberculosis. Overall, 53 (24%) patients presented with acute kidney injury (AKI). About 36% of the patients presented within 6 months of the onset of symptoms; whereas around 32% of patients had symptoms for more than 1 year before presentation. Other baseline characteristics are given in Table 1.

Operative details

A pre-operative intervention such as DJ stenting and percutaneous nephrostomy insertion was performed in 27 (13%) and 19 (9%) patients, respectively. A laparoscopic (lap) approach was used in 168 (76%) of the patients out of which 24 (10%) were converted to open procedures. The main reason for conversion to open procedures was hemorrhage (62%), followed by dense adhesions leading to difficulty in dissections (28%). Partial nephrectomy was performed in 8 (3%) patients. Intra- and post-operative complications are given in Table 2.

DISCUSSION

In literature, there are very few audits about surgical nephrectomies. Kerbl et al., in 1994, analyzed laparoscopic nephrectomies; however, it is live-related donor nephrectomies alone.¹ Beisland et al., 2000,² Scott and Seizman in 1966,³ and Schiff and Glazier,⁴ 1977 are the few series available for reference. Naturally, indications for nephrectomy would vary from region to region, and a comparison would be futile. However, the number of nephrectomies performed for benign conditions in our study is much higher than that reported in the Western series. In our study, 68% of nephrectomies were done for benign etiology, 17% for malignant, and 15% were donor nephrectomy. This suggests that the people neglect

Table 1: Baseline characteristics of patients who underwent nephrectomy (n=220)

Baseline characteristics	Number	Percentage
Age group (in years)		
11–20	13	5.90
21–30	26	11.82
31–40	40	18.18
41–50	48	21.82
51–60	47	21.36
61–70	31	14.09
>70	15	6.82
Etiology		
Benign	149	67.73
Malignant	37	16.82
Donor nephrectomy	32	14.54
Symptoms at presentation		
Flank pain	156	70.90
Hematuria	28	12.73
LUTS	38	17.27
Dysuria	46	20.90
Fever	18	8.18
Nausea/vomiting	18	8.18
Asymptomatic	6	2.73
Duration of symptom onset to doctor consultation		
<6 months	79	35.90
6 months–1 year	69	31.36
1 year–2 years	51	23.18
>2 years	21	9.54
Comorbidities		
DM	28	12.72
HTN	42	19.09
Tuberculosis	26	11.81
CKD	39	17.72
DM+HTN	44	20
None	40	18.18

LUTS: Lower urinary tract symptoms, DM: Diabetes mellitus, HTN: Hypertension

symptoms, take alternate therapies, and present late with non-functioning kidneys. The mean age of the patients with benign indications was 37 years and with malignant indications was 52 years. No sex predilection was seen in benign and malignant conditions. Similarly, in a study by Rafique in Pakistan, 76% nephrectomies were done for benign etiology and 23% for malignant etiology. The mean age of the patients with benign indications was 32 years and with malignant indications was 53 years. The benign conditions were more in females and malignant conditions were more in males.⁵ However, in the Western series, a study conducted by Beisland et al., 67% nephrectomies were done for malignant indications and 23% for benign conditions. The mean age of the patients with benign indications was 51 years and with malignant indications was 65 years.² In our study, 45% of the total nephrectomies were done for calculus disease and its complications. Therefore, it is necessary to see whether this can be prevented in the future. Emphasis should be placed on public awareness with the help of the community medicine department.

Table 2: Operative details and complications in patients (n=220)

Operative details	Number	Percentage
Surgical approach		
Lap simple nephrectomy	129	58.64
Open simple nephrectomy	38	17.27
Lap converted to open simple nephrectomy	19	8.64
Lap converted to open radical nephrectomy	5	2.27
Open radical nephrectomy	12	5.45
Lap radical nephrectomy	9	4.09
Lap partial nephrectomy	8	3.64
Intra-operative complications		
Hemorrhage > 300 ml	28	12.73
Major vessel injury	12	5.45
Pleural injury	8	3.64
Duodenal injury	1	0.45
Ascending colon tear	1	0.45
Post-operative complications		
SSI	14	6.36
Pulmonary complications	8	3.64
Fever	8	3.64
Urinoma	5	2.27
PCS leak	1	0.45
Abscess	1	0.45
Intra-abdominal collection	1	0.45

SSI: Surgical site infections, PCS: Pelvi-collecting system

About 62% of our patients underwent laparoscopic nephrectomy and 16% underwent open nephrectomy. Conversion to open nephrectomy was done in 12%. The rate of complication was 12.7%. Studies done in the past show majority of the nephrectomies were open. With the advancement of technology, laparoscopic nephrectomy is possible now with fewer complications, lesser reoperation rates, and fewer mortalities.^{2,5}

About 24% of the patients who underwent nephrectomy presented with AKI, which has a high mortality rate. Others had symptoms related to stones whereas only 3% were asymptomatic with incidental detection.

Almost 35% of the patients presented within 6 months of the onset of symptoms. Thus, it strongly suggests a need for a screening method for the high-risk cases, (i.e., patients with comorbidities such as DM, HTN, history of tuberculosis, and CKD) preferably during their visit to endocrine or nephrology OPDs, facilitating early recognition of calculus disease and prompt intervention. Another 32% of patients presented after 1 year from symptom onset. The primary reason for late referral was a lack of awareness and seriousness about calculus disease and its implications, self-medication fueled by misinformation that it will cause stone dissolution, and visits to alternate medicine practitioners leading to inappropriate treatment. Thus, awareness campaigns involving local electronic and print media are the need of the hour so that appropriate

knowledge is acquired and precious time is not wasted in seeking expert opinion.

Limitations of the study

1) Complete Follow up data weren't available due to ongoing covid pandemic situation. 2) It was single center study. (On the basis of encouraging results of this study, A pan-India multi-centre study is needed to better extrapolate the findings.

CONCLUSION

There is a drastic difference in nephrectomy indications between Western countries and India. In our study, about 68% of nephrectomies were performed for calculus disease and its complications. Nephrectomy for calculus disease is potentially preventable. Screening procedures particularly for the high-risk group of patients, creating public awareness and educating them through involvement of local electronic and print media as well as social media campaigns are the need of the hour. Involvement of the Department of Community Medicine for the same and encouraging screening of the high-risk cases in endocrinology and nephrology OPDs will prove to be highly beneficial.

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AV- Concept and design of the study, prepared first draft of manuscript; **KS, TR**- Interpreted the results; reviewed the literature and manuscript preparation; **SB, BP, SP**- Concept, coordination, statistical analysis and interpretation, and revision of the manuscript

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