

Urinary Stone Disease and Preventable Nephrectomies

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ABSTRACT

Background: Urinary stone disease has high prevalence in our belt. The end stage complication of this disease turns out to be a non-functioning kidney, which in fact could be prevented by means of appropriate treatment and follow up.

Methods: This is retrospective study of the nephrectomy cases of last 8 years retrieved from the hospital database. Variables like age, sex, indications for nephrectomy, modalities of nephrectomy and morbidities among the primary and recurrent disease were taken into consideration. Analysis were done using Microsoft Excel 2016.

Results: Five hundred and twenty-nine nephrectomies were performed in last 8 years at our hospital. Female were more prone for nephrectomies. Age at third and fourth decade were most to be affected. Ninety percentage of nephrectomies were done for benign causes, 65% for the stone disease. The recurrent renal stone disease without any past surgical interventions were more prone to undergo nephrectomies. The conventional open technique of nephrectomy has largely been replaced by laparoscopic means in recent years.

Conclusions: The main contributor for nephrectomy in our context is urinary stone disease, which is considered to be the preventable factor

Keywords: Nephrectomy; renal stone; urinary stone disease.

INTRODUCTION

Nephrectomy is defined as an acquired absence of kidney.¹ In developing countries, benign cause with predominance of stone disease is the main indication for nephrectomy.² In India, 12% of the population has been found to be suffering from renal stones and 50 % of them may end with renal damage.³ It has been found that the stone formers are at greater risk of developing chronic kidney disease and end stage renal failure by 60 % and 40 % respectively.³ About 84% of the nonfunctioning kidneys are secondary to obstruction by urinary stones in a study at BPKIHS.⁴ As these urinary stones are preventable,⁵ a decrease in its prevalence will ultimately leads to decrease in the number of nephrectomies.

The aim of this study was to analyze the clinical profile and causes of due to urinary stone disease at our institute.

METHODS

This retrospective study has been conducted in the department of Urology Bir Hospital after ethical approval

from the institutional review board. Demographic variables (age, sex, address and occupation) and clinical variables (clinical presentation, co-morbidities, previous treatment history, causes and duration of non-functioning kidneys, date of surgery, type and modality of nephrectomy, laterality, stone analysis and metabolic evaluation) of all the patients who underwent nephrectomy since April 14, 2011 to April 14, 2019, were collected from the hospital database. Children and donor nephrectomy were excluded. Data analysis of frequency distribution was done using Microsoft excel 2016.

RESULTS

During the last 8 years, among 529 nephrectomies, 346 (65.4%) were performed for urinary stone disease. The age wise distribution shows, 390 (73.72%) were among 20-60 years with equal distribution in 3rd to 6th decade (Table 1). Male patients were 297 (56.1%) (Figure 1).

Table 1. Age related incidence of nephrectomy (n=529).

Age range	(n)	(%)
<20	46	8.69

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21-30	103	19.47
31-40	99	18.71
41-50	92	17.39
51-60	96	18.14
61-70	62	11.72
>70	31	5.86

■ Male ■ Female

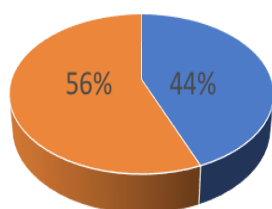


Figure 1. Sex related incidence of nephrectomy (n=529).

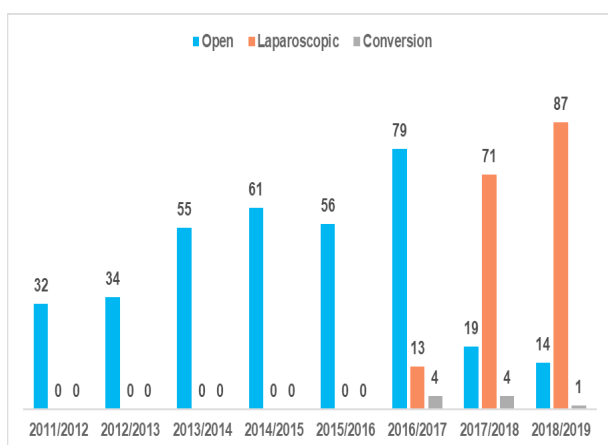


Figure 2. Trend in modalities of nephrectomy (n=529), open vs laparoscopic, during 8-years.

By laparoscopic means, only 5 cases have been performed as radical nephrectomy while the rest are simple nephrectomies. Open nephrectomies include 277 simple nephrectomies (79.36%), 33 radical nephrectomies (9.45%), 18 subcapsular nephrectomies (5.15%), 12 partial nephrectomies, 8 hemi-nephrectomies, and 1 cytoreductive nephrectomy.

Benign cause of nephrectomies was 478 (90%) and 346 (65.4%) were nonfunctioning kidney due to urinary stone disease (Figure 3).

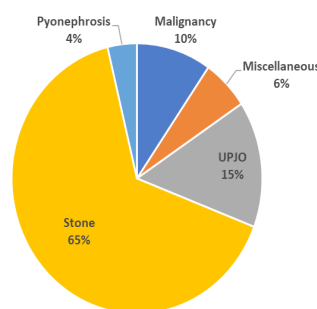


Figure 3. Indications for nephrectomy (n=529).

Table 2. Morbidity of urinary stone disease in nephrectomy patients.

Mode of presentation	Number (n)	(%)
Primary	142	41.04
Recurrent		
• With past surgical interventions	204	58.95
• Without past surgical interventions	77	37.74
	127	62.25

DISCUSSION

The present study reports the maximum number of nephrectomy series. Sixty-five percentage of urinary stone disease landing into nephrectomy reflects the health care status of our country. About 40% nephrectomies were performed in the patients at their 3rd and 4th decade of life, which is also considered as the most productive period of life in our scenario. Among those urinary stone disease group, only 41% had landed directly into nonfunctioning kidney without obvious clinical manifestations. The rest majority, about 59%, had a history of recurrent disease. About 62% of the recurrent urinary stone holder had some sort of medical treatment in the past, while the remaining had at least one surgical intervention for the urinary stone disease.

In a retrospective study of nephrectomy by Shah⁴ from BPKIHS Nepal during a period of 4 years, among 63 cases, 84.1 % (53) were related to benign cause.

Nephrectomies in our part of the world, are mainly indicated for stone disease. In a retrospective study from hospital database by Milind P et al.⁶ from India, 219 cases of nephrectomies have been performed between July 2001 to February 2015. Among them 84.47 % (185) cases were related to stone disease. Dehydration by global warming, diet habits, local geology with hydro mineralogy and sanitation by affecting geo mineralogy are the main culprit of stone disease in this region.³

Retrospective study by Zaki⁷ from Pakistan collected data of 189 nephrectomies between January 1996 and December 2010 and reported that 52.4 % (99) were indicated for stone disease. He clearly mentioned that socioeconomic status is the key of urinary stone occurrence. Delayed response of the patient and health care providing agencies may lead to opt the cheap options of non-steroidal anti-inflammatory drugs, steroids and other traditional non-medical agents, masking the symptoms and leading to late presentation. Similarly another publication from Pakistan, Rafique² studied indications, complications and mortality in 154 nephrectomy patients during the period of five years from January 2001 to December 2005 and found out 53.3 % cases were related to renal stone.

Advancements in early diagnosis, minimal invasive mode of treatment and adequate prophylactic measures in urinary stone disease has led to decrease in the incidence of nephrectomies.⁷ Although less common in developed countries, this burden still holds significant numbers in developing and underdeveloped countries. In a historical series of 1470 cases of nephrectomies between 1960-1990 from UK, Kubba et al⁸ concluded that although the total number of nephrectomies remained constant, the indications for benign disease decreased during that period. Similarly in a country like Norway, within a period of 20 years from 1978-1997, 646 nephrectomies have been performed highlighting a significant decline in the nephrectomies for benign diseases.⁹ From the British Association of Urological Surgeons (BAUS) nephrectomy database, Zelhof et al¹⁰ collected 1093 nephrectomies for benign disease from 112 centers of UK within a period of 1 year (2012) and calculated only 12.99 % (142) cases were attributed to stone disease.

Our study describes 90 % of nephrectomies for benign cause and 65 % were related to stone disease. This huge number of nephrectomies by stone disease are preventable if easy access of basic health services would have been possible to the population. Our challenges in this aspect are influenced by three broad factors: illiteracy, geographical variation and health facility access and awareness. With a total literacy rate of 66 % (2011), flank pain is believed to be cured by over the counter drugs in local health shops or by non-medical treatment. In a study done in our own center by Basnet RB et al.¹¹ males were found to seek treatment for renal stone diseases in a ratio of 1.5:1. But female (56 %) are much to suffer in landing into nephrectomy in our study as they might be neglected for majority of pain. This might throw a question to our society - are our females being obscured from getting timely treatment? Still

in majority of population, health is in second priority after food and sanitation. Hours of walk to access local health posts will only be arranged in case of emergency situation.

The burden of urolithiasis is in increasing trend in every region of the world.¹² So the preventive measures should be opted timely to reduce the prevalence of preventable nephrectomies. These measures would vary according to the health care system of the country. We want to highlight some of the strategies suitable for our country. Awareness is the center of prevention and should be carried out in every level - national level, basic health provider level, medical specialists' level. In the national level, policies should be made to address renal stone disease with similar gravity to other non-communicable diseases. Mass education of zero tolerance to loin pain and consequences of stone disease should be offered to the population. In the current scenario, most of the health posts and primary health centers have been equipped with ultrasound under maternal and child health program. So, short course ultrasound training to those community health workers to pick up renal stone and hydronephrosis, would lead to early detection of renal stones. All the renal stone disease should be referred promptly and treated (preferably by the urologists). Standard treatment with minimal invasive surgeries for urinary stone disease is to be followed by the urologists. The concept of renal stone disease has been shifted as a symptom of underlying disease rather than a disease itself. This indicates the recurrent nature of renal stones, even when removed completely. The huge number of recurrent stone disease (59 % in our study), reflects the need of metabolic evaluation for renal stone disease.¹³ The 5-year recurrence rate of renal stone disease (30-50 %)¹⁴ is similar to that of non-muscle invasive bladder cancer (54 %).¹⁵ So, close follow up of every renal stone disease patient is very crucial.

CONCLUSIONS

Despite of the advancements in diagnosis and treatment, we still hold huge number of preventable nephrectomies due to stone disease (65%).

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