## Original Article

# Nephrectomy: Indications, complications and mortality in 154 consecutive patients

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## Abstract

**Objective:** To gain information about the indications for and complications of conventional nephrectomy as practiced in a teaching hospital of Pakistan.

**Methods:** Medical records of patients who underwent nephrectomy during five years period from January 2001 to December 2005 were studied with regards to clinical presentation, indication for nephrectomy, histopathological report, post-operative complications and mortality. The indications for nephrectomy were divided into benign and malignant conditions.

**Results:** Out of 154 nephrectomies, 118 (76.6%) were performed for benign condition and 36 (23%) for malignant etiology. In the benign group, majority (i.e. 53.3%) of the patients had kidneys removed due to renal stone. Other conditions in this group included chronic pyelonephritis (20%), neglected ureteropelvic junction obstruction (16%), renal tuberculosis (7.6%) and iatrogenic (2.5%). Thirty-six (23%) patients had nephrectomy for malignant conditions i.e. renal cell carcinoma. Malignant tumors were more common in males while benign conditions necessitating nephrectomy were predominant in female patients. Patients with benign conditions were much younger (mean age 32 years) than patients in malignant group (mean age 52.8 years).

Nephrectomy for malignant disease had a higher rate of complications (13.8%) than for benign conditions (7.6%). The re-operation rate was 1.29% for all patients who underwent nephrectomy. Two patients, one in each group, died post-operatively and the overall 30-day mortality was 1.29%

**Conclusion:** The mean age of the patients undergoing nephrectomy for benign and malignant conditions was lower than reported from western countries. In our series there was a much higher rate of nephrectomy performed for benign conditions. Renal stone related etiology was the major indication for nephrectomy. Malignant renal tumours affected patients at a remarkably younger age and clear cell renal carcinoma was the predominant histological variety. Nephrectomy for malignant conditions had a higher rate of complications than for benign conditions while there was no difference in the overall mortality (JPMA 57:308;2007).

## Introduction

Like any other human body organ, kidney can be involved in various pathological processes, some of which may require its surgical removal.

Simple nephrectomy is indicated in patients with an irreversibly damaged kidney owing to symptomatic chronic infection, obstruction, calculus disease or severe traumatic injury. Nephrectomy may also be indicated to treat renovascular hypertension owing to uncorrectable renal artery disease or severe unilateral parenchymal damage from nephrocalcinosis, pyelonephritis, reflux or congenital dysplasia.[1] Although radical nephrectomy is standard treatment with localized renal carcinoma with a normal contralateral kidney, there is growing interest in the use of nephron sparing surgery for selected patients.[2,3] In recent years interest in nephrectomy by minimally invasive techniques has increased and many authors have shown that nephrectomy by these techniques is associated with fewer complications and shorter hospital stay.[4,5]

In addition, there is geographical variation in the indications for nephrectomy as certain urological diseases are more prevalent in some countries.

The purpose for this study was to gain information about the indications and complications of conventional nephrectomy as practiced in a teaching hospital of south Punjab, Pakistan.

## Patients and Methods

Medical records of patients who underwent nephrectomy during five years period from January 2001 to December 2005 were studied. Data extracted included sex, age, affected side, clinical presentation, indication for nephrectomy, histopathological report and post-operative complications. The indications for nephrectomy were divided in to benign and malignant conditions.

## Results

During the 5 year study period (January 2001 to December 2005), 4786 urological operations on children and adults were performed. Total number of nephrectomies performed during this period was 154, so nephrectomy constituted 3.21% of total urological procedures. Seventy-

**Table 1. The indications for nephrectomy.**

| | |
|---|---|
| **(A) Benign Conditions (N=118)** | |
| (1) Renal stones related etiology | 63 (53.3%) |
| Renal stones only | 25 |
| Renal stones + Chronic Pyelonephritis | 19 |
| Renal stones + pyonephrosis | 17 |
| Renal stones + xanthogranulomatous Pyelonephritis | 02 |
| (2) Chronic Pyelonephritis | 24 (20%) |
| (3) Neglected Ureteropelvic junction obstruction | 19 (16%) |
| (4) Renal Tuberculosis | 9 (7.6%) |
| (5) Iatrogenic | 3 (2.5%) |
| **(B) Malignant Conditions (N=36)** | |
| (1) Clear Cell Renal Carcinoma | 35(97.3%) |
| (2) Chromophobe carcinoma | 01(2.7%) |

**Table 2.**

| **(A) Clinical presentation of patients undergoing nephrectomy for benign conditions** | **No.** | **(%)** |
|---|---|---|
| Unilateral flank pain | 85 | (72) |
| Flank pain and mass | 03 | (2.5) |
| Flank pain and pyrexia | 06 | (5) |
| Flank pain and hematuria | 01 | (0.8) |
| Lower urinary tract symptoms (LUTS) | 04 | (3.3) |
| Flank pain and LUTS | 03 | (2.5) |
| LUTS and Hematuria | 01 | (0.8) |
| Urinary tract infection (UTI) | 04 | (3.3) |
| Suprapubic pain | 01 | (0.8) |
| **During investigations for some other problem** | | |
| Pyrexia | 03 | (2.5) |
| Hypertension | 02 | (1.6) |
| Retarded growth | 01 | (0.8) |
| General weakness | 01 | (0.8) |
| Pain epigastrium | 01 | (0.8) |
| Backache | 01 | (0.8) |
| Abdominal pains | 01 | (0.8) |

**Table 3. Post-operative complications.**

| **Clinical presentation of patients undergoing nephrectomy for malignant conditions** | **No.** | **(%)** |
|---|---|---|
| Flank pain | 14 | (38) |
| Flank pain and hematuria | 06 | (16) |
| Hematuria only | 08 | (22) |
| Flank pain, mass and hematuria | 02 | (5.5) |
| Flank mass and hematuria | 01 | (2.7) |
| Bone pains (Metastatic) | 01 | (2.7) |
| Generalized weakness, weight loss | 01 | (2.7) |
| Incidental | 03 | (8) |

**Table 4. Post-operative complications.**

| | |
|---|---|
| **(A) Nephrectomy for benign conditions** | |
| Superficial wound infection | 03 |
| Deep wound infection | 02 |
| Iatrogenic colonic injury and colostomy | 01 |
| Worsening of renal parameters and delayed recovery | 01 |
| Bleeding and re-exploration | 01 |
| Septicemia | 01 |
| **(B) Nephrectomy for malignant conditions** | |
| Pneumonia | 03 |
| Paralytic ileus | 01 |
| Bleeding and re-exploration | 01 |

five (48.7%) patients were male and 79 (51.3%) were female (Male: Female ratio 1:1.05). Age of the patients ranged from 9 to 75 years (Mean age 37 years).

Out of 154 nephrectomies, 118 (76.6%) were performed for benign conditions while in 36 (23%) patients malignant etiology was the indication. {Table 1}. Patients with benign and malignant conditions presented with varied symptomatology {Table 2}

In patients with benign conditions, 63 (53.3%) had non or poor functioning kidney due to stone related etiology. Chronic pyelonephritis, pyonephrosis and xanthogranulomatous pyelonephritis was associated with renal stones in 19, 17 and 2 patients respectively. In addition there was preponderance of female patients (37 female vs 26 male) in renal stone-related nephrectomy.

Other benign conditions necessitating nephrectomy included chronic pyelonephritis (24 patients), neglected uretero-pelvic junction obstruction (19 patients) and non-functioning kidneys secondary to renal tract tuberculosis (9 patients).

Three patients had nephrectomy carried out due to iatrogenic causes. Two such patients had life threatening haemorrhage following renal stone surgery performed in peripheral hospitals and emergency nephrectomy was performed as a life saving procedure. Third patient had a non-functioning kidney with paper thin cortex with complete obstruction at uretero-pelvic junction and history of pyelolithotomy on the same side 5 years ago.

In the malignant group, 35 patients had clear cell renal carcinoma and chromophobe renal carcinoma in one patient. Majority of patients had Robson stage I (16 patients) and stage II (6 patients) disease. Other patients had higher stage renal carcinoma. In three patients tumor was detected incidentally and all had stage I disease while the others were diagnosed during investigations for various clinical symptoms. Malignant tumors were more common

in males (22 males vs 14 females).). There was no side predilection in malignant group, however, benign lesions occurred mostly on the right side (55%). The mean age of patients with nephrectomy for benign conditions was 32 years (range 9-75 years) while that for malignant disease was 52.8years (range 27-75 years).

Majority of malignant tumors were removed using a trans-abdominal approach. Retroperitoneal access was used for simple nephrectomy in all benign conditions.

Post-operative complications occurred in 14 (9%) patients {Table 3}. Complications were significantly higher in malignant group (13.8% vs 7.6%). Chest infections were more frequent in malignant group. One patient in this group needed re-exploration for reactionary haemorrhage. At exploration, he was found to have bleeding adrenal vein that was ligated. Wound infections were more common in patients with benign lesions. Three patients had superficial while two had deep wound infections. One patient had significant bleeding from drain site after difficult nephrectomy for xanthogranulomatous non-functioning kidney and needed re-exploration and packing.

Two patients (one in each group) died in the post-operative period (<30 days) with overall mortality of 1.29%. One of these patients died due to septicemia and the other due to advanced malignancy with superadded chest infection.

## Discussion

From the review of literature it appears that there is geographical variation in indications for nephrectomy. The reported rate of nephrectomy for malignant conditions from Norway[6] and Nigeria[7] was 68% and 67% respectively. Beisland et al[6] and Kubba et al[8] from Norway and UK respectively have reported that there has been a change in the indications for nephrectomy in their countries during the last few decades with more nephrectomies now being performed for malignant conditions. In a report 423 consecutive nephrectomies from Jordan,[9] 70% were performed for benign conditions.

In the present series 76.6% nephrectomies were performed for benign conditions. More than half of these had a stone related etiology. Other benign conditions included chronic pyelonephritis, neglected pelviureteric junction obstruction and tuberculosis in 20%, 16% and 7.6% patients respectively. Comparing our results within the country, in a review of 47 neprectomies from Karachi, 52% were for stone-related etiology and 26% were for tumours.[10] Pakistan is located in the stone belt area and renal stone disease remains a major problem. Here, renal stones are three times more common in men[11], however, the present series showed preponderance of female patients in stone-related nephrectomy (37 female vs 24 male). Delayed presentation of female patients due to social and cultural reasons is probably responsible for the higher number of nephrectomies in stone-related etiology.

Beisland et al[6] found that five (2.4%) tuberculous kidneys were removed out of 209 nephrectomies carried out for benign conditions during 20 years at two Norwegian hospitals. Another report from Jordan[9] showed that tuberculosis accounted for nine (3 %) nephrectomies performed for benign conditions. In the present series tuberculosis accounted for 9 (7.6%) nephrectomies performed for benign conditions. Whereas patients with renal tuberculosis are uncommon in developed countries, as many as 15 to 20% of tuberculous patients in the developing countries are diagnosed with M tuberculosis in their urine.[12] Tuberculosis still remains a major health problem in Pakistan and the present study reveals that there is much higher incidence of renal tuberculosis compared with other countries.

Renal cell carcinoma is primarily a disease of the elderly patients, typically presenting in the sixth and seventh decades of life.[13] With a slight male preponderance (male female ratio of 3:2).[14] Conventional renal cell carcinoma accounts for 70-80% of renal carcinoma while other subtypes are less frequent.[15]

In our series, mean age of the patients with renal carcinoma was 52.8 years and male female ratio was 1.5: 1. Clear cell variety accounted for 97% of renal carcinoma. In only 3 (8%) patients tumour was incidentally discovered, while all other patients presented with various symptoms. The present study showed that in our study malignant tumours occur at much younger ages compared with the west and are usually an advanced stage at the time of presentation.

We also noticed a significantly higher rate (13.8%) of complications for malignant conditions compared with benign (7.6%). Various authors have reported about 3% re-operation rate after nephrectomy[6,9], however, in the present study it was much less i.e. 1.29%. Reported mortality rate (<30 days) for nephrectomy ranged between 0.9% to 11.8%.[6,7,9] In the present series the mortality rate was 1.29%.

## Conclusion

There is a much higher rate of nephrectomy performed for benign conditions in our region. Malignant renal tumors tend to affect patients at a remarkably younger age and clear cell renal carcinoma is the predominant histological variety of renal carcinoma. Screening and education programmes are needed to decrease the rate of nephrectomy for preventable

conditions, like renal stone disease.

## References


1. Novick AC. Surgery of the kidney . In Campbell's Urology. 8th Ed. Walsh PC, Retik AB, Vaughan ED, Wein AJ. Eds. Saunders. Philadelphia. USA. 2002; pp 3570-3643.
2. Leibovich BC, Blute ML, Cheville JC, Lohse CM, Weaver AL, Zincke H. Nephron sparing surgery for appropriately selected renal cell carcinoma between 4 and 7 Cm results in outcome similar to radical nephrectomy. J Urol 2004;171:1066-70.
3. Becker F, Siemer S, Hacks M, Humke U, Ziegler M, Stockle M. Excellent long-term cancer control with elective nephron sparing surgery foe selected renal cell carcinoma measuring more than 4 Cm. Eur Urol 2006;49:1058-63.
4. Kercher KW, Heniford BT, Mathews BD, Smith TI, Lincourt AE, Hayes DH, Eskind LB, Irby PB, Teigland CM. Laparoscopic versus open nephrectomy in 210 consecutive patients: outcomes, cost, and changes in practice pattern. Surg Endosc 2003;17:1889-95.
5. Sim HG, Yip SK, Ng CY, Teo YS, Tan YM, Siow WY, Cheng WS. Laparoscopic nephrectomy: new standard of care? Asian J Surg 2005;28:277-81.
6. Beisland C, Medby PC, Sander S, Beisland HO. Nephrectomy-indications, complications and post-operative mortality in 646 consectutive patients. Eur Urol 2000;37:58-64.
7. Eke N, Echem RC. Nephrectomy at the University of Port Harcourt Teaching Hospital: a ten year experience. Afr J Med Sci 2003;32:173-77.
8. Kubba AK, Hollins GW, Deane RF. Nephrectomy: changing indications, 1960-1990. Br J Urol;1994; 74:274-8.
9. Ghalayini IF. Pathological spectrum of nephrectomies in a general hospital. Asian J Surg 2002;25:163-9.
10. Talati J. Management of renal stones by operation. In "The Management of Lithiasis: The rationale development of technology". Talati J, Sutton RAL, Moazam F, Ahmad M (Eds). 1997. Kluwer academic publishers, printed in Great Britain. p115-17.
11. Rafique M, Bhutta RA, Rauf A, Chaudhry IA. Chemical composition of upper renal tract calculi in Multan. J Pak Med Assoc 2000;5:145-148.
12. Freedman LR. In Earley LE, Gottschalk CW (ed). Strauss and Welt's Diseases of the kidney, 3rd ed. Boston .Little, Brown, 1979.p 859
13. Novick AC, Campbell SC. Renal tumors. In Campbell Urology. 8th Ed. Walsh PC, Retik AB, Vaughan ED, Wein AJ. Eds. Saunders. Philadelphia. USA. 2002; 2672-2731.
14. Landis SH, Murray T, Bolden S, Wingo PA. Cancer statistics: 1999, CA Cancer J Clin 1999; 49:8-31.
15. Storkel S,Eble JN, Adlakha K, Amin M, Blute ML,Botswick DG, Darson M, Delahunt B, Iczowski K. Classification of renal cell carcinoma: Workgroup No 1. Union Internationale contre le Cancer (UICC) and the American Joint Commttee on Cancer (AJCC). i 1997;80:987-909.