

Are we performing a lot of simple nephrectomies?

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Abstract

Objective: To assess the frequency of simple nephrectomies for benign diseases and compare it with the frequency of nephrectomies for malignant diseases\.

Methods: The observational study was conducted at the Armed Forces Institute of Urology, Rawalpindi, Pakistan, from October 2008 to September 2011, and comprised patients undergoing simple nephrectomy for benign disease who were followed up for one year. This was compared to all the other urological procedures performed during the study period, including nephrectomies for malignant diseases. Indications and the post-operative sequel of simple nephrectomies were documented. SPSS 16 was used for data analysis.

Results: Of the total 7518 procedures, 1995(26.5%) were open cases. A total of 295 nephrectomies were performed during this period, out of which 203 (68.8%) were simple nephrectomies for benign disease and 92 (31.1%) were radical nephrectomies for malignant causes. Simple nephrectomy (203 cases) represented 2.7% of the total and 26.5% of the open procedures. In contrast, the radical nephrectomies for malignant disease (92 cases) represented 1.2% and 4.6% respectively.

Among the 203 cases of simple nephrectomy, the male-to-female ratio was 2.27:1 with 141(69.5%) males and 62(30.5%) females. The mean age was 40.21 + 17.243 years (range: 4-84 years) The most common indication of simple nephrectomy was non-functional kidney due to renal calculus disease 101(49.7%). This was followed by pelvi-ureteric junction obstruction causing renal damage 31(15.2%), chronic pyelonephritis 24(11.2%) and pyonephrosis 15(7.38%). Two (0.98%) patients had a fatal outcome..

Conclusion: The percentage of nephrectomies for benign diseases was more than the malignant diseases. Simple nephrectomies are being performed in a large percentage, indicating the advanced stage of benign diseases at the time of presentation.

Keywords: Nephrectomy, Non-functional kidney, Pelvi-ureteric junction obstruction, Disseminated intravascular coagulation. (JPMA 67: 438; 2017)

Introduction

The term "simple nephrectomy" describes the technique of removing the kidney from within the Gerota's fascia and is not a technically easy operation. This procedure is usually performed in the setting of a non-neoplastic disease state, but is the last option after other therapies, including surgery, have failed, making this operation technically challenging.

The current study was planned to evaluate the percentage of simple nephrectomies being performed compared to all the open or endoscopic urological procedures contemplated, with the intention to rationalise the procedure.

Patients and Methods

The prospective, non-randomised observational study was conducted at the Department of Urology, Armed Forces Institute of Urology (AFIU), Rawalpindi, Pakistan, from October 2008 to September 2011. Patients of either gender irrespective of age undergoing simple nephrectomy during the initial two

years were enrolled, assessed and were followed up for another year. Patients undergoing donor nephrectomy were excluded. Simple nephrectomy was performed through the lumbar approach using the supracostal incision (12th rib) under general anaesthesia. The number of patients subjected to simple nephrectomy was compared to all other urological procedures, both endoscopic and open, performed during the study period. Also, the number of nephrectomies for malignant causes were recorded during the period of first two years, but the follow-up record was only kept for simple nephrectomy cases. Their indications and post-operative outcome were documented.

Data of each patient was recorded on a proforma. The results were analysed using SPSS 16. Continuous variables like age were expressed as mean $\pm$ standard deviation (SD), and discrete variables as frequencies and percentages.

Results

Of the total 7518 procedures, 1995(26.5%) were open cases. A total of 295 nephrectomies performed during this period, 203 (68.8%) were simple nephrectomies due to benign disease as compared to 92 (31.1%) radical nephrectomies

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Table-1: Lesions in patients undergoing simple nephrectomy.

S No	Indications of Nephrectomy	n 203	%age
1	NFK due to renal calculus disease	101	49.70%
2	NFK due to PUJO	31	15.20%
3	Chronic pyelonephritis	24	11.20%
	a. Tuberculosis	5	2.46%
	b. Xanthogranulomatous pyelonephritis	2	0.98%
4	Pyonephrosis	15	7.38%
	a. Emphysematous pyelonephritis	1	0.98%
5	Transplant kidney	2	0.98%
6	Atrophic/ dysplastic kidney	3	1.47%
7	VUR	7	3.74%
8	Obstructive uropathy due to ureteric calculus	9	4.43%
9	Obstructive uropathy due to ureteric stricture	5	2.46%
10	Polycystic kidney disease	2	0.98%
11	Iatrogenic	3	1.47%
	a. Post PCNL haemorrhage	1	0.49%
	b. Post nephrolithotomy haemorrhage	1	0.49%
	c. Post renal biopsy haemorrhage	1	0.49%
12	Renovascular hypertension	1	0.49%

NFK: Non-functioning kidney

PUJO: Pelvi-ureteric junction obstruction

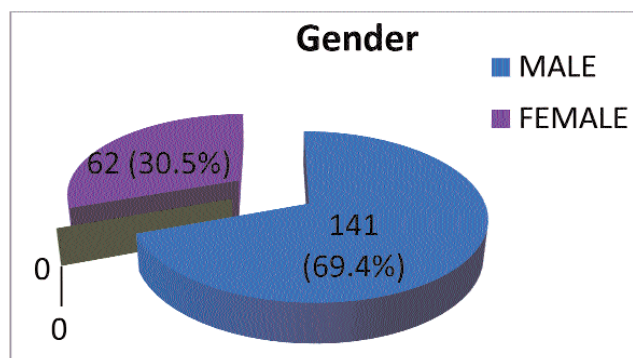
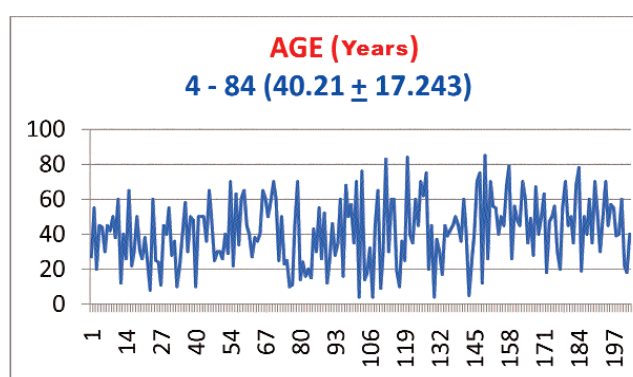
PCNL: Percutaneous nephrolithotomy.

Table-2: Statistical comparison with other studies.

S/No	Other studies	Commonest indication for simple nephrectomy	%age of simple nephrectomies as compared to radical nephrectomies
1	Our Study	Calculus disease	68.8%
2	Rafique M ⁵	Calculus disease	76.6%
3	Datta B et al ⁶	Neglected PUJ obstruction	62.5%
4	Ghalayini IK ⁷	-	70%
5	Malik EF et al ⁸	-	70%
6	Beisland C et al ⁹	-	32%
7	Philips et al ¹⁰	-	23.7%
8	Badamus TA ¹¹	-	1980-1987 - 86.2% 2000-2005 - 42.8%
9	Andualem D ¹²	Obstructive uropathy	63%

due to malignant causes. Simple nephrectomies (203 cases) represented 2.7% of the total and 26.5% of the open procedures while the radical nephrectomies (92 cases) represented 1.2% and 4.6% respectively.

Among the 203 cases of simple nephrectomy, the male-to-female ratio was 2.27:1 with 141(69.5%) males and 62(30.5%) females (Figure-1). The mean age was age was 40.21 ± 17.243 years (range: 4-84 years), with 12(5.91%) patients below 12 years of age (Figure-2). The cause leading to simple nephrectomy was non-functional kidney (NFK) due to renal calculus disease in 101(49.7%) cases (Figure-3),

**Figure-1:** Gender distribution.**Figure-2:** Age distribution.

followed by pelvi-ureteric junction obstruction(PUJO) causing renal damage in 31(15.2%) (Figure-4), chronic pyelonephritis 24(11.2%) and pyonephrosis 15(7.38%). There was 1(0.49%) case of of post-renal biopsy haemorrhage as well (Table 1). No case of external renal trauma requiring nephrectomy was noted.

Apart from the analgesic cover, which was required in all the cases, the peri-operative period was uneventful in 200(98.5%) cases. Of the remaining 3(1.47%) cases, 2(0.98%) patients with pyonephrosis developed septicaemia / multi-organ dysfunction syndrome (MODS) and had fatal outcome on the 3rd and 4th post-operative day respectively. One (0.49%) of them had emphysematous pyelonephritis. The other patient also had pyonephrosis and developed persistent blood stained discharge through the drain with deranged coagulation profile. This case of disseminated intravascular coagulation was managed with fresh frozen plasma, whole blood and antibiotics. One (0.98%) patient, who underwent nephrectomy due to torrential post-nephrolithotomy haemorrhage (Figure-5), was in fact a case of bilateral renal calculus disease. He went into end-stage renal disease (ESRD) as the other kidney was shrunken and poorly functioning. He was 55 years of age and became a

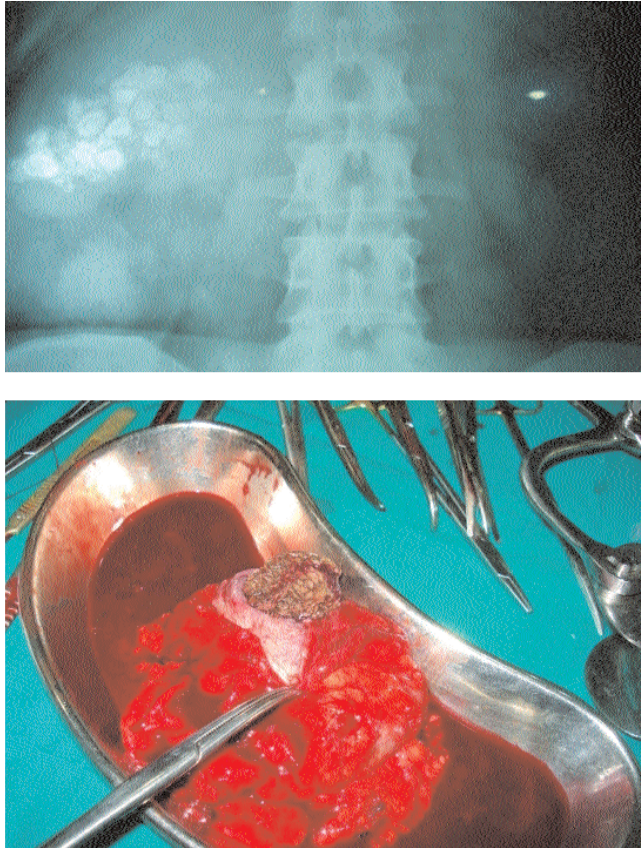


Figure-3: Non-functional kidney with renal calculus disease.

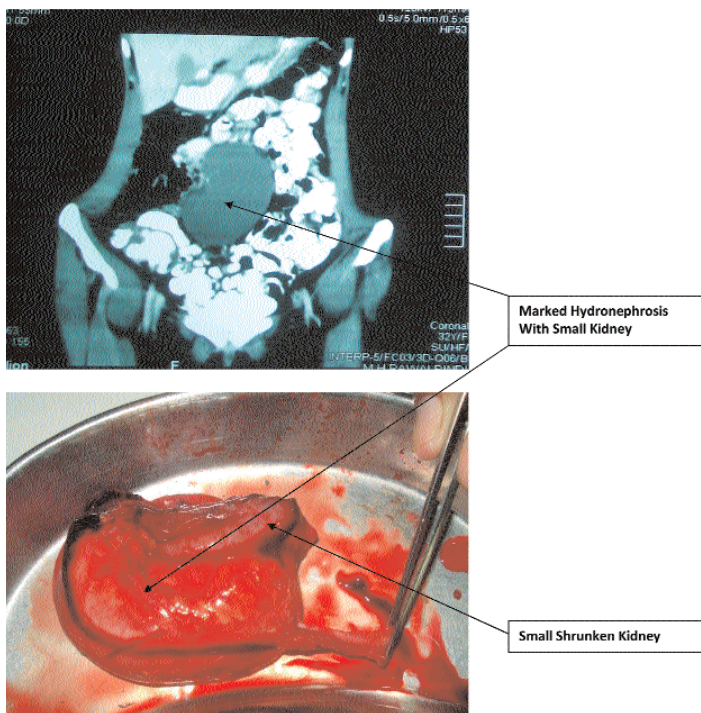


Figure-4: Pelvic kidney with pelvi-ureteric junction obstruction (PUJO).

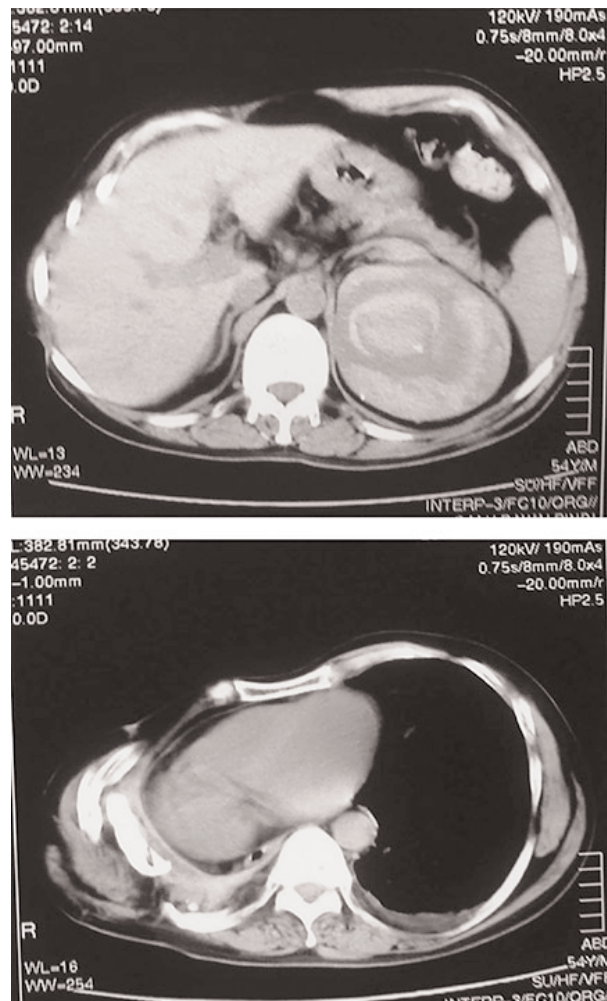


Figure-5: Post-nephrolithotomy haemorrhage with comorbidity (right pneumonectomy in past) requiring nephrectomy and ended up in end-stage renal disease (ESRD).

candidate for renal transplant. Overall, 10(4.92%) patients had a superficial wound infection which responded to local wound treatment and antibiotics.

All the 201(99%) patients who survived were advised regular follow-up in the outpatient department (OPD), but 171(84.2%) followed up after 2 weeks, 64(31.5%) after 3 months and only 1(0.49%) followed up after one year.

Discussion

The first planned simple nephrectomy was performed by Gustav Simon in 1869 as a treatment of uretero-vaginal fistula. Thereafter, many changes have occurred in the procedure of nephrectomy from anterior transperitoneal nephrectomy through a midline incision performed by Kocher in 1878 to Clayman¹ who performed the first laparoscopic nephrectomy at Washington University in 1990. Simple nephrectomy is indicated in non-functional

/ irreversibly damaged kidneys. The usual indications are calculus disease, chronic infections, obstruction, trauma, dysplastic / atrophic kidney or renovascular hypertension due to the renal artery stenosis or severe unilateral parenchymal damage from nephrocalcinosis, pyelonephritis, reflux or congenital dysplasia.² Nowadays laparoscopic nephrectomy has replaced the open procedures, especially in the developed world.^{3,4} But in a developing country like ours, in many centres, most of the nephrectomies are still being performed by open surgical techniques.

Rafique M⁵ evaluated 154 consecutive nephrectomies. More than half of the nephrectomies were reported due to calculus disease. Similarly in our study we found 49.7% with renal calculi and 4.43% with ureteric calculus disease. But Datta B et al⁶ from India documented neglected PUJO as the commonest indication for simple nephrectomy, followed by renal calculus disease. Rafique M⁵ also found that 76.6% nephrectomies were performed for benign conditions compared to 23% for malignant aetiology. We noted 68.8% simple nephrectomies and 31.1% radical nephrectomies for malignant diseases. Supporting this data, Datta B et al⁶ also reported 62.5% nephrectomies done for benign diseases and 37.5% for malignant causes. Similarly Ghalayini IK⁷ from Jordan reported 70% of nephrectomies for benign diseases, like Malik EF et al⁸ from Saudi Arabia. However, review of literature revealed that this data was quite different from the Western world where more nephrectomies were documented for malignant causes. Beisland C et al.⁹ recorded 646 consecutive nephrectomies over a period of 20 years in Norway. He noted 75% nephrectomies due to benign disease in 1978 which later fell to 32% in 1997. Philips et al.,¹⁰ similarly, reported 76.3% cases of laparoscopic nephrectomy for malignant diseases and 24.7% for benign causes. There was also a change in the indications for nephrectomy in a centre of Korea¹¹ where 13.75% cases of nephrectomy were done for renal tumour in the period from 1980 to 1987 whereas 57.12% cases of nephrectomy were done for renal tumour in the period from 2000 to 2005. Andualet D.¹² reported obstructive uropathy as the commonest cause of simple nephrectomies and found that 63% were of benign aetiology compared to the malignant ones (Table-2).

The mortality rate in our cases of simple nephrectomy was 0.98% which was quite comparable to less than 1% reported by Kercher KW et al.¹³ The mortality has usually been reported to be higher in cases like emphysematous pyelonephritis or pyonephrosis. The two patients who died in our study were both of pyonephrosis. Were we a little more aggressive in managing these patients? Could simple drainage with a percutaneous nephrostomy followed by a formal nephrectomy after control of sepsis had saved these patients?

It is difficult to make a formal recommendation on the basis of only two cases. However, the principle of controlling infection before any procedure cannot be overestimated.

Conclusion

A large percentage of simple nephrectomies indicated the advanced stage of benign diseases at the time of presentation which mandated the removal of kidney. The number of nephrectomies for benign disease outnumbered the malignant indications. The commonest indication was the renal calculus disease. It is high time that such a painful surgery was replaced by relatively lesser morbid laparoscopic techniques across the country.

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Conflict of Interest: None.

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