

Nephron Sparing Surgery in a Tertiary Care Center in Nepal- An Initial Experience

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ABSTRACT

Background: Malignant renal mass accounts for 2 to 3% of all malignant diseases in adults. Radical surgery used to be the treatment of choice with high propensity to develop chronic kidney disease in the compromised contralateral kidney. Currently, nephron sparing surgery is considered to be the standard of care with equivalent oncological outcome.

Methods: This was a retrospective chart review of patients with renal mass less than seven cm in size who had open nephron sparing surgery from July 2012 to Sep 2013 at Tribhuvan university teaching hospital, Nepal. Latest follow up either from record or over telephone was documented.

Results: Eight patients (mean age 45 years, male: female ratio 1:1.6) underwent nephron sparing surgery over the specified period. Mean size of tumor was 4.75 cm. Mean ischemia time was 16.37 min. Histopathological diagnosis was benign in two and renal cell carcinoma in six patients.

Conclusions: Nephron sparing surgery is safe in low stage renal tumors. It also prevents unnecessary nephrectomy in benign lesions and prevents negative sequelae of long term chronic renal impairment in remaining contralateral kidney.

Keywords: Nephron sparing surgery; renal cell carcinoma; renal mass

INTRODUCTION

Renal cell carcinoma (RCC) accounts for 2% to 3% of all malignant diseases in adults.¹ Large portion (20-25%) of all renal masses finally proves to be benign.^{2,3}

Small renal mass (SRM) is now a common clinical diagnosis.⁴ This is because of the improvement in the detection modalities. As a result 75% of newly diagnosed renal masses are asymptomatic, incidentally detected and ≤ 4 cm in size.⁵ Preservation of every possible nephron is always desirable in the form of nephron sparing surgery (NSS).^{7,6} Patient morbidity, preservation of renal function, and cancer control are the goals. NSS for T1 tumors has supplanted radical nephrectomy, given its superior functional and equivalent oncological outcomes.⁸⁻¹⁰ Moreover, there is decreased risk of chronic kidney disease (CKD) after NSS.

Data on occurrence of RCC is sparse from Nepal.¹¹ This study was conducted to evaluate the safety and efficacy of NSS in patients with renal masses less than seven cm.

METHODS

This was a retrospective study done at the Urology unit, Department of Surgery, Tribhuvan University Teaching Hospital, Kathmandu, Nepal from July 2012 to Sep 2013. The medical records of eight consecutive patients undergoing NSS for various indications were reviewed. Patient demographics, lesion characteristics, indications for NSS, and outcome including recent follow up were analyzed. Tumor Node Metastasis (TNM) staging was done applying the seventh edition of the American Joint Committee on Cancer TNM staging system.¹²

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RESULTS

A total of eight patients underwent nephron sparing surgery over the specified time. The mean age of the patients was 45 years. Male to female ratio was 1:1.6. Pain was the most frequent symptom seen in 50%, while three were detected incidentally. Three patients had absolute indication for NSS (Table 1).

Table 1. Demographics of eight patients who underwent NSS for renal mass.

Variable	Result (n=8)
Smoking	2
Symptoms	
Pain	4
Pain and Hematuria	1
Incidental	3
Incidentally detected	3
Renal dysfunction of contralateral kidney	1
Solitary kidney/ Non-functional contralateral kidney	3
Normal functioning contralateral kidney	4
Hypertension	3
Diabetes mellitus	1

NSS: Nephron sparing surgery

Tumor was evenly distributed over different poles of the kidney. Right-sided tumor was more common. Mean size of renal mass was 4.75 cm (Table 2). Peroperatively, mean ischemia time was 16 minutes with one patient undergoing zero ischemia resection. No one required blood transfusion.

Table 2. Clinical characteristics of the tumor in patients who underwent NSS for renal mass.

Variable	Result (n=8)
Position	
Upper pole	3
Middle pole	2
Lower pole	3
Laterality	
Right	5
Left	3
Size (cm)	
< 4	3
4- 7	5
Mean Ischemia time (min)	16.37 ± 7.8
Mean Blood loss (ml)	156
Median Hospital stay (days)	5

One patient had acute myocardial infarction and expired on seventh postoperative day. One patient had superficial surgical site infection on sixth post-operative day, which was managed with dressing and wound care.

Histopathological examination revealed clear cell RCC in 80% and benign in 20%. Margin was positive in one case (Table 3).

Table 3. Post-operative histopathological characteristics of the renal masses in eight patients who underwent NSS.

Variable	Result
Type	
Clear cell RCC	4
Chromophobe RCC	2
Xanthogranulomatous pyelonephritis	1
Angiomyolipoma	1
Furhman grade	
II	4
III	2
TNM	
T1a	2
T1b	4

DISCUSSION

The mean age of patients in this series was fourth decade which is in contrast to sixth and seventh decade in other studies.^{11,13,14} This may be because current study incorporated renal mass of less than 7 cm, which had an early detection at an early age. There was female gender predilection probably reflecting the result of a small series. Pain with hematuria was the main presenting feature. We had three (33%) cases of incidentiloma, lower as compared to other reports.^{10,11} One of the series from Nepal has shown the rate of incidentiloma to be 40%.¹¹ One of the main surgical points during NSS is consideration for ischemia time.¹⁵ It should be less than 30 min with newer recommendations of lesser than 20 min.¹⁶ In our series warm ischemia time in average was 16 minutes. Clear cell RCC account for most of the tumor ranging from 80-90%.^{13,17,18} In current study 80% were RCC and 20% benign.^{17,18} One patient had positive surgical margin in our series. There are confusions and controversies for management of such patients. Although complete resection is always desirable, focal positive surgical margin need not lead to urgent conversion to radical nephrectomy.^{19,20} The patient has been kept on active surveillance.

The number of patients in the series is small with short follow up to draw further recommendation. However, recent literature strongly recommends the use of modality of NSS for saving every single nephron.⁷

CONCLUSIONS

NSS is an effective and reliable treatment in low stage small renal tumors. It prevents unnecessary nephrectomy in benign lesions which are difficult to be diagnosed preoperatively and prevents negative sequelae of long term chronic renal impairment. NSS is mandatory in solitary functioning kidney with renal masses.

REFERENCES

1. Siegel R, Naishadham D, Jemal A. Cancer statistics, 2012. *CA Cancer J Clin.* 2012 Jan-Feb;62(1):10-29.
2. Ljungberg B. Nephron-sparing surgery--strategies for partial nephrectomy in renal cell carcinoma. *Scand J Surg.* 2004;93(2):126-31.
3. Montie JE, Novick AC. Partial nephrectomy for renal cell carcinoma. *J Urol.* 1988 Jul;140(1):129-30.
4. Sun M, Thuret R, Abdollah F, Lughezzani G, Schmitges J, Tian Z, et al. Age-adjusted incidence, mortality, and survival rates of stage-specific renal cell carcinoma in North America: a trend analysis. *Eur Urol.* 2011 Jan;59(1):135-41.
5. Hollingsworth JM, Miller DC, Daignault S, Hollenbeck BK. Rising incidence of small renal masses: a need to reassess treatment effect. *J Natl Cancer Inst.* 2006 Sep 20;98(18):1331-4.
6. Campbell SC, Novick AC, Belldegrun A, Blute ML, Chow GK, Derweesh IH, et al. Guideline for management of the clinical T1 renal mass. *The Journal of urology.* 2009 Oct;182(4):1271-9.
7. Licht MR, Novick AC. Nephron sparing surgery for renal cell carcinoma. *J Urol.* 1993 Jan;149(1):1-7.
8. Leibovich BC, Blute M, 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 Mar;171(3):1066-70.
9. Lau WK, Blute ML, Weaver AL, Torres VE, Zincke H. Matched comparison of radical nephrectomy vs nephron-sparing surgery in patients with unilateral renal cell carcinoma and a normal contralateral kidney. *Mayo Clinic proceedings Mayo Clinic.* 2000 Dec;75(12):1236-42.
10. Lee CT, Katz J, Shi W, Thaler HT, Reuter VE, Russo P. Surgical management of renal tumors 4 cm. or less in a contemporary cohort. *J Urol.* 2000 Mar;163(3):730-6.
11. Sidharth, Luitel BR, Gupta DK, Maskey P, Chalise PR, Sharma UK, et al. Pattern of renal cell carcinoma - a single center experience in Nepal. *KUMJ.* 2011 Jul-Sep;9(35):185-8.
12. Edge SB, Byrd DR, Compton CC, et al. editors. *AJCC cancer staging manual (7th ed).* New York, NY: Springer; 2010.
13. Belldegrun A, Tsui KH, deKernion JB, Smith RB. Efficacy of nephron-sparing surgery for renal cell carcinoma: analysis based on the new 1997 tumor-node-metastasis staging system. *J Clin Oncol.* 1999 Sep;17(9):2868-75.
14. Poulakis V, Witzsch U, de Vries R, Moeckel M, Becht E. Quality of life after surgery for localized renal cell carcinoma: comparison between radical nephrectomy and nephron-sparing surgery. *Urology.* 2003 Nov;62(5):814-20.
15. Thompson RH, Lane BR, Lohse CM, Leibovich BC, Fergany A, Frank I, et al. Every minute counts when the renal hilum is clamped during partial nephrectomy. *Eur Urol.* 2010 Sep;58(3):340-5.
16. Becker F, Van Poppel H, Hakenberg OW, Stief C, Gill I, Guazzoni G, et al. Assessing the impact of ischaemia time during partial nephrectomy. *Eur Urol.* 2009 Oct;56(4):625-34.
17. Gill IS, Matin SF, Desai MM, Kaouk JH, Steinberg A, Mascha E, et al. Comparative analysis of laparoscopic versus open partial nephrectomy for renal tumors in 200 patients. *J Urol.* 2003 Jul;170(1):64-8.
18. Link RE, Bhayani SB, Allaf ME, Varkarakis I, Inagaki T, Rogers C, et al. Exploring the learning curve, pathological outcomes and perioperative morbidity of laparoscopic partial nephrectomy performed for renal mass. *J Urol.* 2005 May;173(5):1690-4.
19. Yossepowitch O, Thompson RH, Leibovich BC, Eggner SE, Pettus JA, Kwon ED, et al. Positive surgical margins at partial nephrectomy: predictors and oncological outcomes. *J Urol.* 2008 Jun;179(6):2158-63.
20. Rassweiler JJ, Gozen AS. Small renal masses: A positive surgical margin does not affect survival. *Nat Rev Urol.* 2013 May;10(5):256-7.