

# COMPLICATIONS OF TRANSPERITONEAL RADICAL NEPHRECTOMY, A SINGLE CENTRE EXPERIENCE

Hafiz Shahzad Ashraf,<sup>1</sup> Rana Ata-ur-Rehman,<sup>2</sup> Syed Waqar Hussain,<sup>3</sup> M. Nasir Ibrahim<sup>4</sup>  
Muhammad Muzammil Tahir<sup>5</sup>

## Abstract

**Objective:** To share our experience regarding complications of transperitoneal radical nephrectomy.

**Material and Methods:** After approval from ethical committee a retrospective study was conducted extending from January 2012 to January 2014 to identify clinical characteristics of renal cell carcinomas, staging of RCC, per operative and early post operative complications of transperitoneal radical nephrectomy. The study included all renal cancer patients presented to Sheikh Zayed Hospital Lahore with in this specified

period. Detailed history and physical examination was performed. Haematological and radiological investigations including abdominopelvic ultrasonography, CT scan abdomen and pelvis were performed to stage the renal tumour. High resolution CT chest was performed where indicated. Radical nephrectomy performed through transabdominal approach and outcomes measured in terms of pre and post operative complications.

**Results:** There were total of 50 cases. The male to female ratio was 3:2. Mean age of patients was 52.38 (18 – 93) years. Most common clinical presentation was gross haematuria(66%).The mean tumour size was 8.34 (3 – 24) cm. Operative findings in 40 patients (80%) were tumor limited to Gerota's fascia and in 6 (12%) there was tumour involvement of renal vein or IVC. In 2 patients (4%) Lymphadenectomy was performed. Total operative time ranged between 120 to 180 minutes. Intra-operative splenic injury was seen in 2 (4%), while aortic injury was observed in one (2%) patient. Post operatively one (2%) developed pulmonary embolism, 2 (4%) chest infection while 2(4%) developed wound infection and 3 patients (6%) required blood transfusion. Tumour histology was clear cell in (84%), papillary transitional cell carcinoma (12%) and oncocytoma contributed 4%.

**Conclusion:** Transperitoneal approach for radical nephrectomy is safe with minimal peroperative and early post-operative complications. It is also safe where tumour thrombus extends into IVC, as it provides good exposure of vessels.

---

Ashraf H.S.<sup>1</sup>  
Professor of Kidney Transplant Unit  
Shaikh Zayed Hospital, Lahore

Rehman R.A.<sup>2</sup>  
Resident Department of Urology  
Shaikh Zayed Hospital, Lahore

Hussain S.W.<sup>3</sup>  
Assistant Professor Department of Urology  
Shaikh Zayed Hospital, Lahore

Ibrahim M.N.<sup>4</sup>  
Senior Registrar Department of Kidney Transplant Unit  
Shaikh Zayed Hospital, Lahore

Tahir M.M.<sup>5</sup>  
Professor of Urology, Shaikh Zayed Hospital, Lahore

**Key Words:** Renal cell carcinoma, Radical nephrectomy, Complications.

## Introduction

Primary renal tumour in adults is renal cell carcinoma, which is responsible for 80 – 85% of tumours, followed by transitional cell carcinoma (TCC). Renal cell carcinoma is comparatively rare in children where it is replaced by Wilm's tumour.<sup>1</sup>

It is estimated that 4% to 10% RCCs have a tumor thrombus which may present in renal vein or inferior vena cava and in 1% of cases it has extension into the right atrium. Surgical resection remains standard treatment for RCC with tumor thrombus, despite advances in radiation, chemotherapy and immunotherapy. Several studies have demonstrated 5 – years survival rates of up to 60% in patients who have venous tumor thrombus at the time of diagnosis and treated with radical nephrectomy and tumor thrombectomy in the absence of metastatic disease.<sup>2</sup>

Principles of radical nephrectomy were presented by Robson in the 1960s. There are four principal routes of open renal surgery: extraperitoneal flank approach, dorsal lumbotomy, abdominal incision, or thoracoabdominal approach. The best technique of open radical nephrectomy includes early control of hilar renal vessels, removal of kidney with perirenal fat and Gerota's fascia. Ipsilateral adrenal gland removal is not necessary if location of the tumour is in the lower pole of the kidney or its size is smaller than 5cm in diameter.<sup>3</sup>

In the past, several studies were done to compare the complications of open transperitoneal and retroperitoneal radical nephrectomy. Now – a – days laparoscopic radical nephrectomy is being performed. But in developing countries like Pakistan open radical nephrectomy is common being done either by transperitoneal or reteroperitoneal approach.

The study was conducted to share the experience of radical nephrectomy through transperitoneal approach in patients of renal cell carcinoma presented in Sheikh Zayed Hospital Lahore in a period extending from Jan 2012 to Jan 2014 and compared the operative and early post operative complications with international and available local studies.

## Material and Methods

After approval from ethical committee a reterospective

analytical study was conducted between January 2012 and January 2014. A total of 50 patients were admitted in Urology Department of Sheikh Zayed Hospital Lahore. Data was collected from the available record about detailed history, physical examination, tumour size, intraoperative and early post operative complications and Fuhrman grades, classification and histological subtype.

Patients were diagnosed and staged preoperatively. Diagnostic criteria included CT scans of the abdomen and pelvis, x-ray chest, serum electrolytes and liver function test. HRCT chest was performed in specific cases. Only 6 patients underwent MRI to assess the venous extension (renal vein and inferior vena caval involvement).

Radical nephrectomy was performed transperitoneally through Cheveron incision. In our study we assessed total operative time, intraoperative and early postoperative complications and managed accordingly. After discharge from hospital, patients were followed up two weeks after the surgery and then three months after first visit.

## Results

Data analysis of fifty patients was done, out of fifty patients 30(60%) were male while 20(40%) females, male to female ratio was 3:2. Majority of our patients were aged more than 50 years (66%). Mean age of patients was 52.38 (18 – 93) years  $\pm$  SD 12.58. About 75% of patients have duration of more than one month when presented to us first time. Most of the patients presented with gross haematuria 33 (66%), detail of clinical presentation is given in table 1.

The median size of the tumour was 8.34 cms (2 –

**Table 1:** Clinical Presentation of Renal Tumor.

Sr. No.	Clinical Presentation	Percentage
1.	Haematuria	66
2.	Loin Pain	48
3.	Asymptomatic ( Incidental )	16
4.	Loin Mass	12
5.	Systemic Symptoms(anorexia, weight loss, fever, malaise)	10
6.	Classical Triad(haematuria, flank pain and flank mass)	8

24 cm) ± SD 4.48. Operative findings in 40 patients were (80%) tumor limited to Gerota’s fascia and in 6 (12%) there was tumour involvement of renal vein or IVC. Of these 6 patients, 3 patients had level I thrombus, two (4%) with level II thrombus while One patient had level III thrombus. Lymphadenectomy was performed in 2 patients (4%).

Total operative time ranged between 120 to 180 minutes. Intra-operative splenic injury was observed in 2 (4%) while aortic injury in one (2%) patient and one patient had colonic injury (2%). Post-operatively one

(2%) developed pulmonary embolism, 2 (4%) chest infection, 2 (4%) wound infection and three patients (6%) required blood transfusion. Mean hospital stay was seven days.

Details of post operative complications are given in graph:

Most common histopathology was clear cell carcinoma, detail of histopathology is given below in table 2.

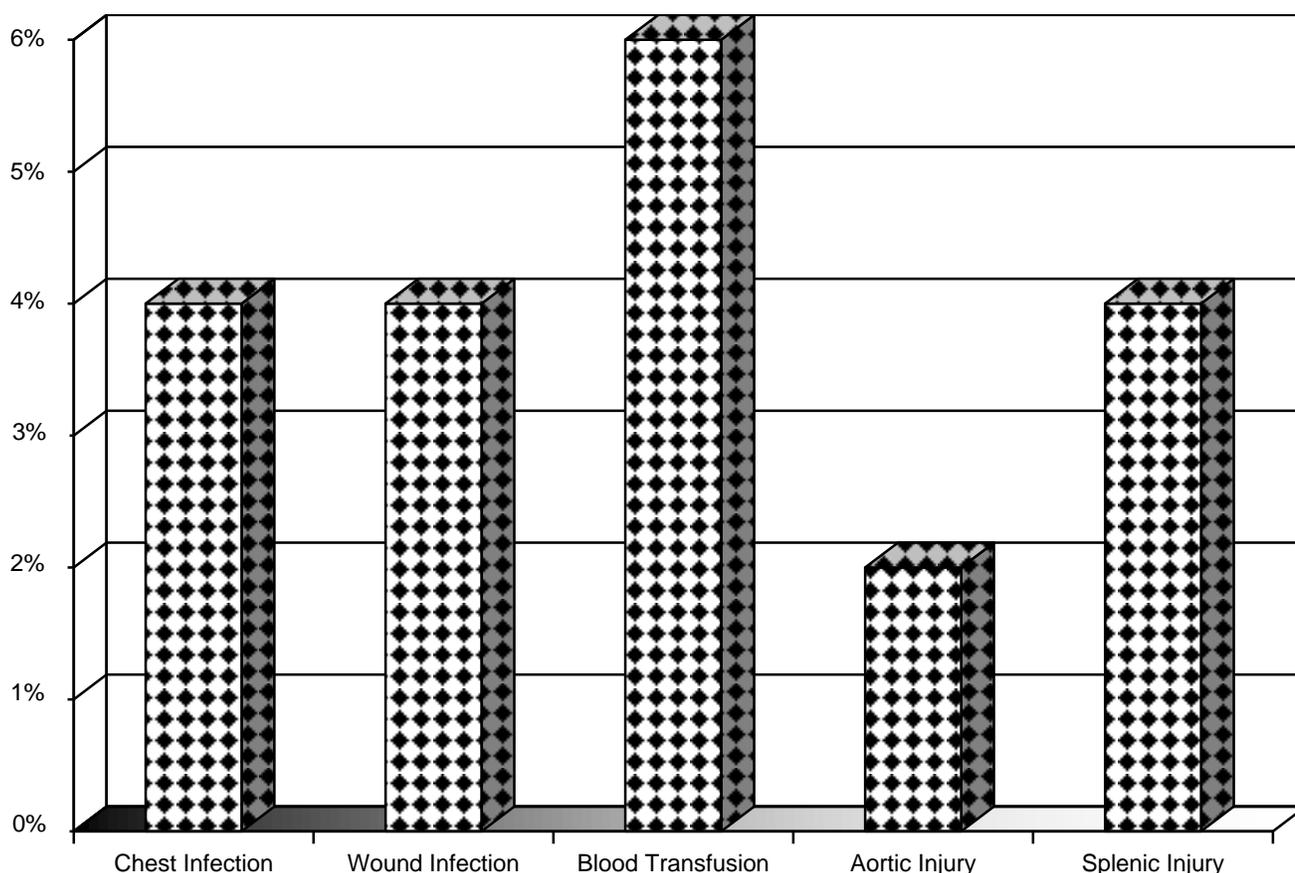


Fig. 1: Graphical representation of complications.

Table 2: Histopathological Type.

Sr. No	Type	No	Percentage
1.	Clear Cell	42	84
2.	Papillary cell	6	12
3.	Oncytoma	2	4

### Discussion

This study is retrospective, descriptive and hospital based. Very few local studies are available in pattern, presentation of renal tumors and complications of transperitoneal radical nephrectomy. Western countries have more incidence of renal cancer as compared

to Asian countries. The age adjusted incidence per 100,000 ranges from 9.3 to 11.6 in the Western population compared to 1.1 to 6.0 among the Asian population.<sup>4</sup> The male to female ratio showed male predominance with 3:2 which is comparable with available studies.

In our study common presenting symptoms were haematuria (66%) loin pain (48%) and loin mass (12%). Presentation was relatively different in Lagos study where hematuria (40.6%), loin pain (86%) and palpable loin mass was observed in (90.6%). The classical triad appeared in four patients 8%, it is similar to international reports which is 7 – 10%. The mean size of tumours in our study population was 8.34 cm (3 – 24 cm) which is generally larger than reported mean sizes which range from 4.7 – 6.3 cm.<sup>5</sup> In our study some patients (10%) presented with systemic symptoms such as; pyrexia, anemia and weight loss, which were matching with international studies.<sup>6</sup>

In our study operative findings were, in 40 patients (80%) tumor limited to Gerota's fascia and in 6 (12%) there was tumour involvement of renal vein or IVC. These findings are comparable to a study conducted by Marshall F and his colleagues.<sup>2</sup> Lymphadenectomy was performed in patients who were having enlarged hilar lymph nodes.

Total operative time ranged between 120 to 180 minutes with a mean of 130 minutes, which is same as has been reported by Arnaud Mejean.<sup>8</sup> While a study conducted by Chen XF and colleagues,<sup>12</sup> the median duration of operation was 155 min (range, 60 – 360 min). Total operative time for laparoscopic approach is more (mean operative time is 198 and 296 minutes).<sup>13,14</sup>

Intra-operative splenic injury was seen in 2 patients (4%), aortic injury was seen in one (2%) patient and colonic injury occurred in one (2%) patient. These results were comparable with study conducted by Arnaud Mejean where rate of intestinal complications was 1.8% and a splenic injury occurred in 8% of left nephrectomy. In a local study no intra operative intestinal or splenic injuries were seen.<sup>11</sup> Post operatively one patient (2%) developed pulmonary embolism and 2 (4%) developed chest infection. We could not compare it because no data is available for such complications in open radical nephrectomy but pulmonary embolism developed in one patient (3.03%) through laparoscopic approach.<sup>15</sup> 2 patients (4%) developed wound infection. Wound infection was found in 6.4% patients in the study by Harranz MO.<sup>9</sup> However, no patient had wound infection in the study by Amanullah

and associates.<sup>10</sup> 3 patients (6%) required blood transfusion. While study conducted by Chen XF, blood transfusion was required in 10.3% of cases. Rate of blood transfusion was less when compared with laparoscopic approach.<sup>18</sup> Mean post operative hospital stay was 7 days in our study which was 15 days in the case series of Chen XF.<sup>12</sup> Post operative hospitalization time was less when compared with laparoscopic approach.<sup>16,17</sup>

The histology types in our study shows similar patterns compared to reported Western and Asian population, in which clear cell was the dominant histology types (84%).<sup>7</sup>

## Conclusion

Transperitoneal approach for radical nephrectomy is safe with minimal perioperative and early post-operative complications. It is also safe in those patients, where tumour extends into IVC.

## References

1. Chow WH, Dong LM, Devesa SS. Epidemiology and risk factors for kidney cancer. *Nat Rev Urol.* 2010; 7: 245.
2. Marshall F, Dietrick D, Baumgartner W, et al. Surgical management of renal cell carcinoma with intracaval neoplastic extension above the hepatic veins. *J Urol.* 1988; 139 (6): 1166–72.
3. Tsui KH, Shvarts O, Barbaric Z, Figlin R, deKernion JB, Beldegrun A: Is adrenalectomy a necessary component of radical nephrectomy? UCLA experience with 511 radical nephrectomies. *J Urol.* 2000; 163: 437–441.
4. Singapore Cancer Registry 2004. Trends in cancer incidence in Singapore, 1968-2002.
5. Ganesh VR, Houston TR, Bradley CL, et al. Preoperative nomogram predicting 12 – year probability of metastatic renal cancer. *J Urol.* 2008; 179: 2146-51.
6. T.A. Badmus, A. B., Salako, F.A. Arogundade, et al. "Malignant Renal Tumors in Adults: AT en Year Review in Nigerian Hospital." *Saudi Journal of Kidney Diseases and Transplant.* 2008; 19 (1): 120-126.
7. Patrick ET, Houston TR, Satish KT, et al. Prognostic impact of histological subtype on surgically treated localized renal cell carcinoma. *J Urol,* 2009; 182: 2132-6.
8. Mejean A, Vogt B, Quazza JE, Chretien Y, Dufour B. Mortality and morbidity after nephrectomy for renal cell carcinoma using transperitoneal anterior subcostal incision. *Eur Urol.* 1999; 36 (4): 298-302.
9. Herranz Amo F, Verdú Tartajo F, Díez Cordero JM,

- Rodríguez Fernández E, Lledó García E, Moncada Iribarren I. et al. Complications of radical nephrectomy in the treatment of kidney adenocarcinoma. *Actas Urol Esp.* 1997; 21 (1): 15.
10. Amanullah, Saleem MA, Khan JH, Khan FA. Clinical presentation of renal cell carcinoma. *Biomedica.* 1999; 15: 9.
  11. Faisal Ghaffar, M. Ali Sajid, K. Anwar. Transperitoneal Approach For Radical Nephrectomy: Five Years Experience At Pakistan Institute Of Medical Sciences, Islamabad, Pakistan. *J Ayub Med Coll Abbottabad,* 2007; 19 (3).
  12. Chen XF1, Zhou FJ, Han H. Transabdominal radical nephrectomy for renal cell carcinoma: an experience on 155 patients. *Ai Zheng.* 2007 May; 26 (5): 528-32.
  13. Morita T, Fujisaki A, Kubo T, Kurokawa S. Approach via a small retroperitoneal anterior subcostal incision in the supine position for gasless laparoendoscopic single-port radical nephrectomy: initial experience of 42 patients. *BMC Urol.* 2014 Apr 4; 14: 29.
  14. Tsujihata M, Nonomura N, Momohara C. Clinical experience with laparoscopic radical nephrectomy for renal cell carcinoma. *Urol Int.* 2008; 81 (3): 301-5.
  15. Bayrak O, Seckiner I, Erturhan S2, Cil G. Comparison of the Complications and the Cost of Open and Laparoscopic Radical Nephrectomy in Renal Tumors Larger than 7 centimeters. *Urol J.* 2014 Mar 3; 11 (1): 1222-7.
  16. Shuford MD, McDougall EM, Chang SS. Complications of contemporary radical nephrectomy: comparison of open vs. laparoscopic approach. *Urol Oncol.* 2004 Mar – Apr; 22 (2): 121-6.
  17. Springer C, Inferrera A, Kawan F, Schumann A. Laparoendoscopic single – site versus conventional laparoscopic radical nephrectomy for renal cell cancer in patients with increased co-morbidities and previous abdominal surgery: preliminary results of a single – centre retrospective study. *World J Urol.* 2013 Feb; 31 (1): 213-8.
  18. Kercher KW, Heniford BT, Matthews BD. Laparoscopic versus open nephrectomy in 210 consecutive patients: outcomes, cost, and changes in practice patterns. *Surg Endosc.* 2003 Dec; 17 (12): 1889-95.