



Laparoscopic Versus Open Simple Nephrectomy Our Initial Experiences

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Abstract

Background: Nephrectomy is indicated in patients with an irreversibly damaged kidney. The nephrectomy can be performed through open or laparoscopic procedure. Although there is evidence that laparoscopy is the preferred choice, additional evidence is indicated.

Objective: To compare the outcomes of nephrectomy through open and laparoscopic procedures.

Methods: This prospective observational study was conducted in the Department of Urology, National Institute of Kidney Diseases and Urology, Sher-e-Bangla Nagar, Dhaka from July 2017 to December 2019 over a period of two and half years. In this study, 13 patients had laparoscopic nephrectomy and 17 patients had open nephrectomy. Operative time, length of hospital stay, loss of bleeding, transfusion requirement, peri and post-operative complications were recorded and compared. SPSS 12 was used for analysis. Categorical data were compared with Chi-square test and numerical data were compared with unpaired t test.

Results: Maximum patients were more than 40 year old and mean age was 43.53 ± 5.55 years & 41.46 ± 6.31 years in open & laparoscopic nephrectomy group respectively. Male and female ratio was almost similar in both groups. Operative time for open nephrectomy was significantly lower than operative time for laparoscopic nephrectomy (147.9 ± 34.2 vs 184.6 ± 33.3 min; $p=0.004$). Mean length of post-operative hospital stay was significantly longer for patients receiving open surgery than for patients receiving laparoscopy (7.06 ± 3.67 days vs 3.92 ± 0.86 days; $p < 0.001$). There was no significant difference in mean postoperative time to oral intake for patients receiving open and laparoscopic nephrectomy (24.71 ± 2.91 hours and 24.00 ± 0.00 hours; $p = 0.391$). Per-operative complications occurred in 9 (52.9%) patients in the open nephrectomy group and in 3 (23.1%) patients in laparoscopic nephrectomy group. There was no significant group difference in complication rates ($P = 0.098$). Pain was reduced significantly in both groups. In each follow up, VAS was significantly lower in laparoscopic nephrectomy group than open nephrectomy group groups.

Conclusion: The overall outcomes of the two procedures were similar. Pain was significantly less in laparoscopic nephrectomy.

Keywords: Nephrectomy;
Laparoscopic nephrectomy;
Open nephrectomy; Radical
nephrectomy

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Introduction:

Nephrectomy is advised in patients with an irreversibly damaged kidney due to symptomatic chronic infection, calculus disease, or severe traumatic injury. It is also performed to treat malignant or benign tumors of the kidney, renovascular hypertension due to uncorrectable renal artery disease, or severe unilateral parenchymal damage from nephrosclerosis, pyelonephritis, reflux, or congenital dysplasia.

Nephrectomy can be carried out through open or laparoscopic procedure.¹ Most nephrectomies for benign and malignant renal disease were performed by an open approach during last decade.² In 1990 the first laparoscopic total nephrectomy for a renal tumor was accomplished.³ Since that time laparoscopic surgery for benign renal disease has become a widely accepted mode of management. However, the laparoscopic approach for renal cell carcinoma remains controversial.

Laparoscopic nephrectomy is performed through transperitoneal or retroperitoneal approach. When compared with an open procedure, many surgeons find that laparoscopic nephrectomy offers shorter length of hospital stay, shorter time to oral intake, less pain medication requirement, and faster return to normal activity. The procedures have similar complication and cancer-control rates. Numerous studies have documented longer operative time for laparoscopic approaches; however, with surgeon experience, operative times may even be shorter than with open techniques.⁴

The purpose of the present study was to compare the outcomes of nephrectomy through open and laparoscopic procedures.

Methods

This prospective observational study was conducted in the Department of Urology, National Institute of Kidney Diseases and Urology, Sher-e-Bangla Nagar, Dhaka from July 2017 to December 2019 over a period of two and half years.. Initially, 15 patients were scheduled for laparoscopic nephrectomy and 15 patients were scheduled for open nephrectomy. Two (02) patients underwent open nephrectomy who were receiving Laparoscopic nephrectomy due to complications.

All operations were done under general anesthesia. For patients receiving laparoscopy, a nasogastric tube and urethral catheter were placed before the operation. The procedure was done in a flank position with a Karl-Storz (Germany). The primary entrance site was the umbilicus, using a direct trocar insertion method. A pneumoperitoneum was made with CO₂ and the abdominal cavity was inspected with the laparoscopic

lens. Retroperitoneal incision was made. Colon was medialized. Spleen was medialized in case of left side. Duodenum was cookerised on right nephrectomy. Ureter and gonadal vein was identified and renal vein was identified as gonadal vein opened in renal vein. Renal artery was dissected and clipped and cut. Then renal vein was dissected clipped and cut. Upper pole was mobilized and kidney was freed from lateral side and ureter was cut after clipping. Kidney was extracted by using endobag through hypogastric incision. After proper hemostasis wound was closed by keeping a drain tube in situ.

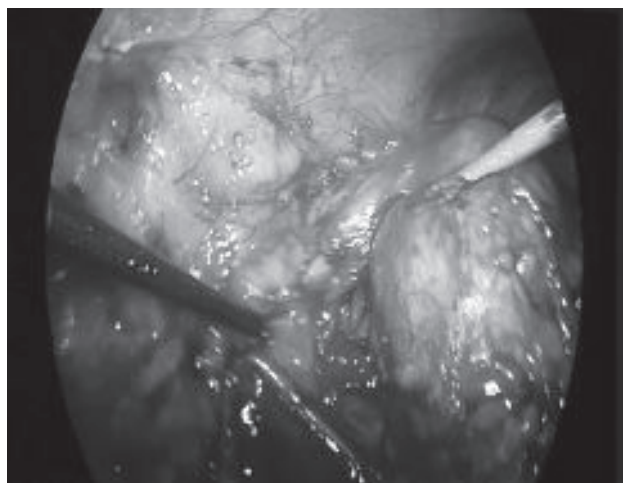


Fig-1: Laparoscopic dissection of hilum

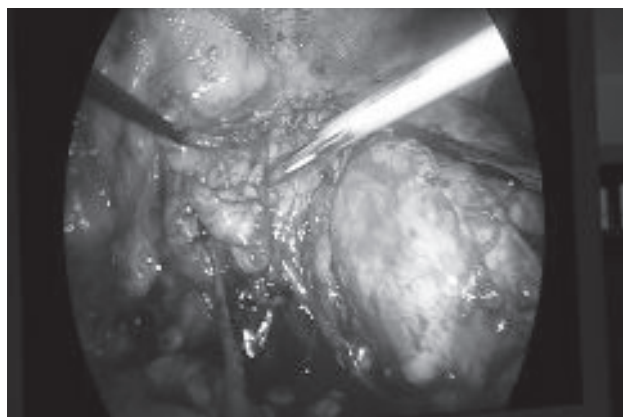


Fig-2: Mobilization of upper pole of kidney

During laparoscopy, the surgeons used a LigaSure® device (Valleylab, Boulder, CO, USA) for dissection and bleeding control, which was particularly useful in difficult cases.

Open simple nephrectomy was done mostly through retroperitoneal approach.

Operative time, length of hospital stay, loss of bleeding, transfusion requirement, peri and post operative complications were recorded and compared. SPSS 12

was used for analysis. Transfusion requirement, peri and post operative complications were compared with Chi-square test and operative time, length of hospital stay, loss of bleeding were compared with unpaired t test.

Results:

Table I: Demographic profile of the study subjects (N=30)

	Open	Laparoscopic	p-value
Age (years)			
≤40	4 (23.5)	6 (46.2)	
>40	13 (76.5)	8 (53.8)	
Mean± SD	43.53 ± 5.55	41.46 ± 6.31	0.348
Gender			
Male	8 (47.1)	7 (53.8)	0.713
Female	9 (52.9)	6 (46.2)	
BMI (kg/m ²)	26.24 ± 2.66	24.97 ± 1.99	0.160
Location			
Right	9(52.9)	9 (69.2)	0.367
Left	8(47.1)	4 (30.8)	
Hypertension	1(5.9)	4 (30.8)	0.138
Diabetes mellitus	3(17.6)	1 (7.7)	0.613

Maximum patients were more than 40 years old in both groups. Mean age was 43.53 ± 5.55 years & 41.46 ± 6.31 years in open & laparoscopic nephrectomy group respectively.

Table II: Per and post operative complications (N=30)

	Open	Laparoscopic	p-value
Per-operative	9 (52.9)	3 (23.1)	0.098
Bleeding	6 (35.3)	3 (23.1)	
Infection	1 (5.9)	0 (0.0)	
Injury	2 (11.8)	0 (0.0)	
Post operative	1 (5.9)	0 (0.0)	1.000

Per-operative complications occurred in 9 (52.9%) patients in the open nephrectomy group and in 3 (23.1%) patients in laparoscopic nephrectomy group. Most common complication was bleeding in both groups (35.3% vs 23.1% in open and laparoscopic nephrectomy group respectively)

Operative time for open nephrectomy was significantly lower than operative time for laparoscopic nephrectomy (147.9 ± 34.2 vs 184.6 ± 33.3 min; p=0.004). There was no significant difference in blood loss and transfusion between two groups. Mean length of post operative hospital stay was significantly longer for patients receiving open surgery than for patients receiving laparoscopy (7.06 ± 3.67 days vs 3.92 ± 0.86 days; p = <0.001). There was no significant difference in mean postoperative time to oral intake for patients received open and laparoscopic nephrectomy (24.71 ± 2.91 hours and 24.00 ± 0.00 hours; p = 0.391).

Table III: Peri and post operative features of the study subjects (N=30)

	Open	Laparoscopic	p-value
Operation time (minutes)	147.9 ± 34.2	184.6 ± 33.3	0.004
Blood loss (ml)	148.2 ± 105.4	111.5 ± 78.5	0.509
Transfusion (yes)	7 (41.2)	4 (30.8)	0.708
Post operative hospital stay (days)	7.06 ± 3.67	3.92 ± 0.86	<0.001
Time to oral intake (hours)	24.71 ± 2.91	24.00 ± 0.00	0.391

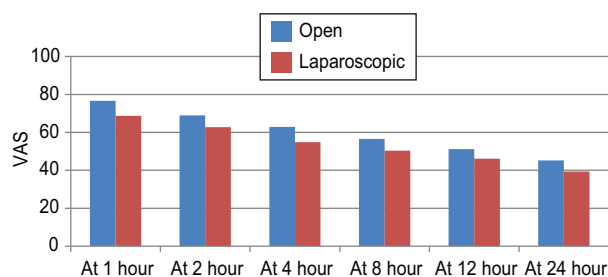


Fig-3: Post-operative pain scores (VAS)

Pain was reduced significantly in both groups. In each follow up, VAS was significantly lower in laparoscopic nephrectomy group than open nephrectomy group.

Discussion:

In this present study, operative time for open nephrectomy was significantly shorter than operative time for laparoscopic nephrectomy (147.9 ± 34.2 vs 184.6 ± 33.3 min; p=0.004). Falahatkar et al.⁵ reported

that mean operative time was shorter for open nephrectomy than laparoscopic nephrectomy (176.25 ± 36.17 versus 188.8 ± 91.83 minutes). Similar findings were also found in the studies of Dunn et al.⁶ Zhang et al.⁷ and El-Galley et al.⁸

Mean length of post operative hospital stay was significantly longer for patients receiving open surgery than for patients receiving laparoscopy (7.06 ± 3.67 days vs 3.92 ± 0.86 days; $p = <0.001$) in this study. El-Galley et al.⁸ reported that postoperative hospital stay was significantly shorter in laparoscopic nephrectomy than open nephrectomy (2 ± 2 days vs 3 ± 2 days; $p = 0.01$). Similarly, Falahatkar et al.^[5] found that the mean postoperative hospital stay following laparoscopy was significantly shorter than the stay following open surgery (3.45 ± 1.70 versus 4.9 ± 1.21 days; $p = 0.004$). Similar findings were also found in the studies of Dunn et al.^[6] and Zhang et al.⁷

Mean time to oral intake was shorter in laparoscopic nephrectomy than open nephrectomy but the difference was not statistically significant. Similar finding was observed in the studies of Dunn et al.⁶ and Ku et al.⁹

Blood loss was higher in open nephrectomy than laparoscopic nephrectomy but the difference was not statistically significant in our study. Goel et al.¹⁰ reported similar findings.

In this study, per-operative complication was found in 9 (52.9%) patients in open nephrectomy group and in 3 (23.1%) patients in laparoscopic nephrectomy group. Most common complication was bleeding in both groups (35.3% and 23.1% in open and laparoscopic nephrectomy group respectively). Goel et al. [10] reported that the complication was 11.0% in laparoscopic nephrectomy and 15.0% in open nephrectomy. Falahatkar et al.⁵ found that complication was 30.0% in open nephrectomy and 25.0% in laparoscopic nephrectomy, with no significant difference.

Laparoscopic nephrectomy has been found to be an attractive and viable alternative to open surgery. It results in more patient comfort, less narcotic intake, improved cosmetic results, shorter hospital stay, and rapid return to normal activity⁴.

Conclusion:

According to the study findings it can be concluded that laparoscopic nephrectomy is advantageous in terms of short-term hospitalization, pre and

postoperative complications and less pain but disadvantageous in terms of long operation period.

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