

Laparoscopic Nephrectomy: Initial Experience with 120 cases

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Abstract

Laparoscopic nephrectomy for both benign and malignant diseases of kidney is increasingly being performed. We report our experience with the first 120 consecutive laparoscopic nephrectomy performed in our hospital. It is the retrospective analysis of a prospectively maintained database of 4 years period. The parameters examined included age, gender, indications, operative time, blood loss, intraoperative and post operative complications. Mean age of surgery was 59 years (rang 19-84years). The indications for surgery included solid renal masses (71 patients), non-functioning kidneys (43), and collecting system tumours (6). The mean operating time was 132 minutes (range 75-270), average blood loss was 209ml (range 0-1090) and average hospital stay was 4.7days (range 2-20). Bleeding, bowel injury and poor progression of laparoscopic procedure were the reasons in 7 (5.8%) cases converted to open surgery. There was 1 (0.8%) perioperative mortality. Eight (6.6%) patients developed post operative complications. Laparoscopic nephrectomy has inherent benefits and may be considered an alternate therapeutic option for kidney diseases with acceptable morbidity

Introduction

Laparoscopic nephrectomy (LN) has become an accepted and widely practiced procedure for both benign and malignant lesions of kidney. The proven benefits of laparoscopic surgery compared with open surgery are now recognized in the treatment of renal disease and include decreased requirements for post operative pain medication, shorter hospital stay, improved cosmetic results and a more rapid return to full activity. In our institution we started laparoscopic urological surgery in April 2005 and since then have performed 120 laparoscopic nephrectomy for both benign and malignant diseases of kidney. We present our experience with 120 cases of laparoscopic nephrectomy performed by two surgeons during last 4 years. To our knowledge this is the largest series of laparoscopic nephrectomy in Ireland.

Methods

We performed a retrospective review of a prospectively maintained database of 120 consecutive laparoscopic nephrectomies carried out between April 2005 to April 2009. Data was recorded in real time and entered into a database; this included age, gender, and indication for surgery, operative time, blood loss, intraoperative complications, conversion rates, post operative complications and histological results For the transperitoneal approach patients were positioned in a modified lateral decubitus position and pneumoperitoneum was created using the Hassan technique. The peritoneum lateral to colon was incised and the colon was reflected medially. The ureter was identified and dissected to renal hilum. The hilar vessels were dissected carefully and the renal artery was clipped first followed by the renal vein using Hem-o-lok clips. After division of the vessels the kidney was dissected laterally, superiorly and posteriorly before removing the bagged specimen through the extended lower port site. For the retroperitoneal approach patients were positioned in a lateral position. A potential space is developed without entering the peritoneal cavity. Three ports were used midway between costal margin and ileal crest. The lower pole of kidney was mobilized and lifted up to allow dissection of the renal hilum. After clipping and dividing the vessels the kidney was dissected free and removed through a small incision at a port site. Drains were not left in any of the patients. Oral feeding started on the same day and patients were mobilized the next day.

Results

During the study period 120 laparoscopic nephrectomies were performed. The indications for surgery included renal tumours in 71 cases, non-functioning kidneys in 43 and collecting system tumours in 6 cases. The procedures carried out were radical nephrectomy, simple nephrectomy and nephroureterectomy respectively. The transperitoneal approach was used in 100 patients. Twenty patients were operated through a retroperitoneal approach. The mean age at surgery was 59 years (rang 19-84 years). Seven (5.8%) cases required conversion to open surgery, two of them due to bowel injury, three due to uncontrolled bleeding and two due to poor progression. Mean operating time was 132 minutes (range 75-270 minutes) and average blood loss was 209ml (range 0-1090ml). There was one perioperative mortality due to massive pulmonary embolism. There were two major postoperative complications, including pneumothorax in one patient which was treated conservatively and one retroperitoneal bleed, which was initially managed conservatively but subsequently requiring drainage radiologically as the collection became infected.

Average post operative hospital stay was 4.7 days (range 2-20 days). Minor complications were encountered in 6 patients. One patient developed urinary retention, two suffered wound infections, one developed a port site hernia, one developed a wound site hernia and one patient developed post operative psychosis, prolonging their hospital stay. Histological examination revealed renal cell carcinoma (pT1-pT3a) in 66 patients, Oncocytoma (n=3), Transitional cell carcinoma (n=6), Angiomyolipoma (n=1), Cystic nephroma (n=1) and end stage kidney in the remaining (n=43) cases. Negative surgical margins were demonstrated in all those cases operated for tumour.

Discussion

The first Laparoscopic nephrectomy (LN) in a human was performed by Clayman in 1990¹ and raised tremendous interest in this approach to renal surgery². In the past few years the laparoscopic approach to nephrectomy has gained widespread acceptance in the urologic community. The indications have been extended from simple nephrectomy for benign disease to radical nephrectomy and radical nephroureterectomy for malignancy. The main benefits of the laparoscopic approach to renal surgery compared to open procedures are reduced pain level, reduced blood loss, faster return to normal activity and excellent cosmetic results^{2,3}. Laparoscopic simple nephrectomy for benign lesions has proved to be a safe procedure with considerable advantages over the open approach. A reduced pain level, faster convalescence and excellent cosmetic results have turned the laparoscopic approach into the new standard of care for simple nephrectomy⁴. These benefits have been reproduced for radical laparoscopic nephrectomy performed for renal cancer, and in selected centres the laparoscopic approach is consequently gradually replacing open surgery⁵. In accordance, Gill et al. reported that laparoscopic radical nephrectomy decreases morbidity and expedites recovery without compromising the oncologic efficacy⁶. In their series, a comparison of the laparoscopic and open approach showed that patients treated by laparoscopy had fewer complications, less blood loss, lower analgesic requirements, shorter hospitalization and a faster convalescence. The quality of life after surgery, defined as a combination of several variables (postoperative pain, hospitalization convalescence period, time to full recovery) was shown to be significantly improved after laparoscopic nephrectomy compared to open nephrectomy.

Similarly, Portis and Clayman reported, following their comparative study that patients undergoing laparoscopic radical nephrectomy benefited from decreased pain, reduced hospitalization, less blood loss and more rapid convalescence⁷. Additionally, at 5 years follow-up, their data show that cancer control was identical to that obtained by the open procedure. Several authors reported that mean analgesic requirements were less than half in laparoscopic cases compared to open nephrectomy. In the present study, we evaluated the outcome of 120 cases of laparoscopic nephrectomy. This is largest series of its kind reported from an Irish centre and extends over a period of four years. It reflects the experience of two laparoscopic surgeons experienced in laparoscopic renal surgery through two different approaches. The indications for the LN are essentially the same as for open nephrectomy, except in some cases where tumour size is greater than 10cm, there is suspicion of renal vein involvement or severe peri-renal inflammatory process such as encountered in xanthogranulomatous pyelonephritis. In our study there were 7 (5.8%) conversions to open surgery. The main reasons were uncontrolled bleeding and failure to progression. It is noteworthy that 5 of the conversions were in first 50 cases and 2 in last 70 cases.

Although a higher conversion rate has been reported in laparoscopic nephrectomy for non-functioning kidneys⁸, this was not the case in our series. One elderly patient died on the third post operative day after a massive pulmonary embolism although being on anticoagulation therapy. There were two bowel injuries during port insertion requiring open repair. In one patient transverse colon was injured during port insertion as the bowel was adherent to abdominal wall as a result of adhesions secondary to a previous laparotomy, and in second case duodenum was injured during dissection in a patient with xanthogranulomatous pyelonephritis. Post operatively there were two major complications, one of them was pneumothorax which was treated conservatively, and other was a retroperitoneal bleed requiring percutaneous aspiration after being infected. Six other minor complications were recorded as shown in Table 2. Several authors have reported complication rates similar to that in our series. Simon and associates⁹ recently reviewed the complications of laparoscopic nephrectomy in their series of 285 laparoscopic renal procedures performed at the Mayo Clinic. Their analysis reveals that 5.6% had major complications (bleeding, splenic injury, pneumothorax and pulmonary embolus) and 7.6% had minor complications. Sequeira and colleagues¹⁰ reported a 7.3% rate of major complications and a conversion rate of 6.1% in a series of 213 Laparoscopic nephrectomies. The authors conclude that their series provides additional evidence to support the evolution of laparoscopic nephrectomy into standard of care. Gill et al¹¹ reported a single surgeon experience with 100 cases of Laparoscopic radical nephrectomy. Their complication rate was 14% with 3% major and 11% minor complication, and a very low conversion rate (2%). In their opinion, this procedure is safe, routine and should be considered as a standard of care for low-stage kidney cancer.

Considering the existing data in the literature and our personal experience, we believe that Laparoscopic nephrectomy can be considered as an alternative to open nephrectomy with acceptable morbidity. Acknowledging the inherent advantages of Laparoscopic surgery, this approach has become the standard approach for nephrectomy in our institution.

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