

Outcomes/Epidemiology/Socioeconomics

TRENDS TOWARD LAPAROSCOPIC NEPHRECTOMY AT A COMMUNITY HOSPITAL

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ABSTRACT

Purpose: For proper indications at university hospitals laparoscopic nephrectomy is often considered the standard of care. At community hospitals past surveys have not demonstrated this change. We describe the changing practice patterns of performing laparoscopic nephrectomies in indicated patients at our community hospital. We reviewed our data on monitoring our training program.

Materials and Methods: A retrospective chart review was performed of 381 consecutive complete nephrectomies performed at our institution from February 2000 to December 2003, including 62 live donor nephrectomies. Patient age, pathological size, operative time, estimated blood loss, duration to solid food intake and duration of hospitalization were compared between open nephrectomy and laparoscopic nephrectomy groups using the Wilcoxon 2-sample test. Surgical practice and surgeon characteristics were also described.

Results: Patients who underwent laparoscopic nephrectomy demonstrated superior postoperative recovery with earlier return to solid diet and shorter hospitalization. The 2 groups were similar in regard to major complication rates. The number of laparoscopic nephrectomies increased annually, while the number of open nephrectomies decreased. The number of laparoscopic urologists increased annually. More importantly laparoscopic urologists performed an increasing number of nephrectomies, while nonlaparoscopic urologists faced a decrease in the number of nephrectomies performed. There appeared to be little evidence of hand assisted laparoscopic nephrectomy as a bridge to learning standard laparoscopic nephrectomy.

Conclusions: Our training paradigm has safely and effectively trained community urologists to perform laparoscopic nephrectomies. Laparoscopic nephrectomy is now considered a standard treatment option along with conventional open surgery and it should be offered to the patient in the medical setting. Although fellowship trained urologists can certainly add expertise to any program, community based hospitals do not have to depend on them.

KEY WORDS: kidney; nephrectomy; laparoscopy; hospitals, community; education, medical

Surgical extirpation of the kidneys has undergone significant changes in the last decade. Since the introduction of laparoscopic nephrectomy (LNx),¹ groups in university settings now consider this approach to be the standard of care in indicated patients.^{2,3} In addition, laparoscopic techniques have been expanded to donor and partial nephrectomies, pyeloplasty, nephropexy and pyelolithotomy.^{4–9} These operations are mostly performed by fellowship trained, laparoscopic experts. Although the significant advantages of laparoscopy have been demonstrated for renal surgery,^{10–12} many community urologists have been less than enthusiastic when offering and practicing these operations, despite having taken the appropriate training courses.^{13–16} Shay et al reported that this is especially true for urologists who did not perform laparoscopy during residency training.¹⁷ We describe progress at our teaching community hospital, in which urologists have incorporated laparoscopic surgical skills into general urological practice. We reviewed our data to monitor our training program. In addition, we describe the trends observed at our institution since the first laparoscopic nephrectomy was performed there.

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Study received human investigation committee approval.

METHODS

The charts of 381 consecutive complete nephrectomies from February 2000 to December 2003 were retrospectively reviewed after receiving institutional review board approval from the Human Investigation Committee. Hospital records, including anesthetic, operative and pathological records, were reviewed to obtain data regarding operative time, estimated blood loss, days to solid food intake, duration of hospitalization and pathological specimen size when suspicious renal masses were indications for nephrectomy. Only major complications during the 30-day perioperative period were reviewed. To monitor our laparoscopic teaching program we compared outcomes data on the LNx group to those on the open nephrectomy (ONx) group by the Wilcoxon 2-sample test using SAS System for Windows, version 8.2 (SAS Institute, Cary, North Carolina), and Minitab Statistical Software, version 13.32 (Minitab, State College, Pennsylvania) with $p < 0.05$ considered statistically significant.

RESULTS

Surgical procedures. From February 2000 to December 2003 we performed 381 complete nephrectomies at our institution, of which 135 (35.4%) were performed laparoscopically

and 246 (64.6%) were performed via the traditional open approach. Indications for complete nephrectomy were tumors or lesions suspicious for malignancy, recurrent chronic pyelonephritis or abscesses, polycystic renal disease or live kidney donation. Initial laparoscopic surgery by urologists was performed via a hand assistance device and then some proceeded to standard (transperitoneal or retroperitoneal) laparoscopic techniques. Laparoscopy was not offered to patients if they had a suspicious lesion with renal vein or vena caval involvement, or possible local invasion to surrounding tissue. Overall renal cell carcinoma (199 cases) represented the majority of lesions. The second most common indication for complete nephrectomy was live kidney donation (62 cases). Other pathological results were oncocytoma, angio-myolipoma, complex benign cysts, atrophic pyelonephritis and transitional cell carcinoma.

Of the 135 laparoscopic nephrectomies in our series 91 were hand assisted, while 44 were performed in standard fashion. We observed an increasing number of laparoscopic nephrectomies performed on an annual basis from 8 in 2000 to 52 by 2003 (fig. 1). Conversely, the number of open nephrectomies decreased from 74 in 2000 to 60 in 2003. As a percent of all complete nephrectomies performed, laparoscopic nephrectomies represented almost 50% by 2003 (fig. 1).

Table 1 lists the data collected on each group. Median age in the LNx group was 58.0 years. Similarly, median age in the ONx group was 59.0 years. The median size of solid renal masses was smaller in the LNx than in the ONx group (4.0 vs 5.5 cm). As expected, median estimated blood loss was less in the LNx group compared to the ONx group (125.0 vs 200.0 ml) and median hospitalization was also significantly shorter in the LNx group (3.0 vs 5.0 days). No patient was discharged home unless pain was adequately controlled with oral medication only. Median operative time in the LNx group was longer than in the ONx group (270.0 vs 165.0 minutes) but it included our initial laparoscopic surgeries, which took longer to perform. As each surgeon became comfortable, operative time decreased. All of these differences were statistically significant except median age in the 2 groups.

Table 2 lists the major complications in each group. Six laparoscopic cases required conversion to open nephrectomy, which equated to a 4.4% conversion rate in this series. Importantly no deaths were observed in the LNx group and only

TABLE 1. Outcomes of different nephrectomy approaches

	Median (25th–75th percentiles)		p Value
	Open	Laparoscopic	
No. pts	246	135	
Age	59.0 (46–71)	58.0 (40.5–71)	0.57
Tumor size (cm)	5.5 (3.5–8.0)	4.0 (3–5.3)	0.02
Operative time (mins)	165.0 (135–233)	270.0 (215–345)	<0.01
Estimated blood loss (ml)	200.0 (150–400)	125.0 (50–200)	<0.01
Length of stay (days)	5.0 (4–6)	3.0 (2–5)	<0.01
Solid food intake (days)	4.0 (3–5)	2.0 (1–3)	<0.01

TABLE 2. Major complications observed with different techniques

	No. Open (%)	No. Laparoscopic (%)
Overall	246	135
Pulmonary (hypoxia, pneumothorax, effusion)	5 (2.0)	3 (2.2)
Renal insufficiency requiring dialysis	5 (2.0)	3 (2.2)
Cardiac (myocardial infarction, arrhythmias requiring treatment)	7 (2.8)	2 (1.5)
Gastrointestinal (ileus, obstruction, exploratory laparotomy, pancreatitis)	10 (4.0)	8 (5.9)
Thromboembolic	4 (1.6)	0
Conversion to open surgery	4 (1.6)	6 (4.4)
Mortality	4 (1.6)	0
At least 1 major complication	32 (13.0)	19 (14.1)

4 (1.6%) were observed in the ONx group, of which all occurred in the perioperative period secondary to major comorbidities. Overall major complication rates (the number of patients who had a major complication) in the LNx and ONx groups were similar at 14.1% and 13.0%, respectively. Although it was not classified as a major complication in our review, 3 laparoscopic cases (2.2%) required blood transfusion, while 25 open nephrectomies (10.2%) required blood transfusion for acute blood loss anemia.

Surgeon training. In 2000 the 3 attending urologists who performed the initial laparoscopic nephrectomies were an endourologist and 2 oncological urologists. The total number increased to 6 urologists in 2001 with the addition of an endourologist, an oncological urologist and a general urologist. By 2002 another general urologist was performing lapa-

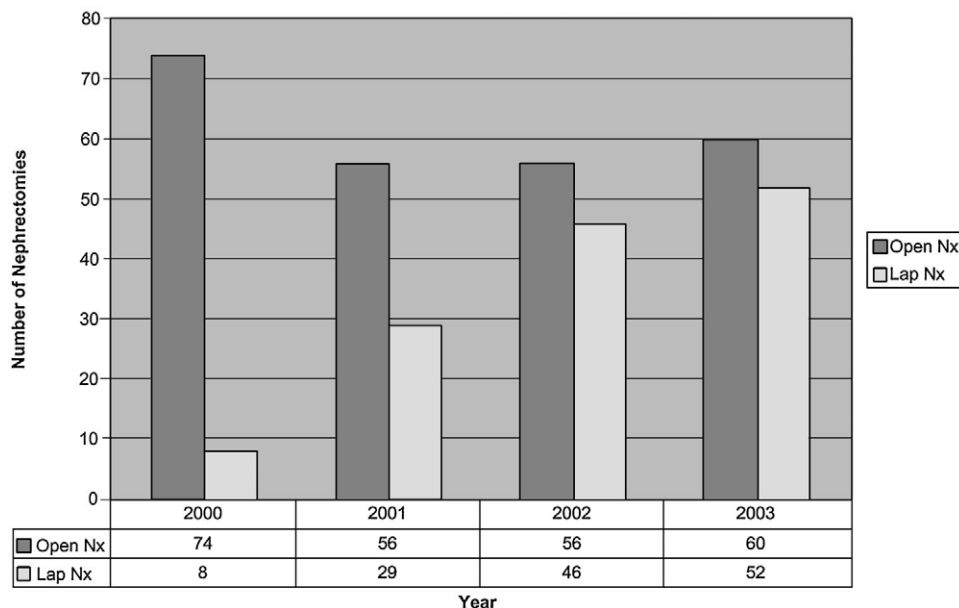


FIG. 1. Annual complete nephrectomies via open and laparoscopic (Lap) approaches

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