Dorsal Lumbotomy Incision for Partial Nephrectomy in Patients With Small Posterior Renal Masses

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OBJECTIVE To describe our single-surgeon experience with dorsal lumbotomy, an uncommonly utilized muscle-sparing incision, for open partial nephrectomy.

MATERIALS AND METHODS We retrospectively identified patients who underwent partial nephrectomy through dorsal lumbotomy incision by a single surgeon from September 2012 through April 2014. Clinicopathologic characteristics were recorded along with early postoperative outcomes including hospital length of stay and narcotic requirement.

RESULTS Twenty-four patients were identified for analysis. Median operative time was 71 minutes (interquartile range [IQR]: 63-91 minutes), and median estimated blood loss was 250 mL (IQR: 100-438 mL). Median length of stay was 1.2 days (IQR: 0.94-2.0 days) and median narcotic requirement was 17 mg of oral morphine equivalents (IQR: 4.9-43 mg). Overall perioperative complication rate was 25% including 1 major (Clavien III-V) complication.

CONCLUSION Partial nephrectomy via dorsal lumbotomy incision is a safe and feasible option for small posterior renal masses when performed by an experienced surgeon. The drawbacks of this approach are limited access to the renal hilum and risk of injury to the iliohypogastric or subcostal nerves. Dorsal lumbotomy is associated with postoperative outcomes equivalent to or better than standard operative approaches and should be considered a viable surgical approach in selected cases. UROLOGY 87: 120–124, 2016. © 2015 Elsevier Inc.

The incidence of small renal masses is on the rise, due in large part to increasing detection on radiographic images performed for unrelated indications.[1] This upward trend is concerning, as over three quarters of clinical T1 renal masses are malignant in some series, and even those <2 cm are malignant in up to 70% of cases.[2] Because of concerns over the development of de novo renal dysfunction following radical nephrectomy as well as a 25%-30% rate of benign histology, nephron-sparing surgery achieved by partial nephrectomy (PN) has become the standard of care for the management of clinical T1 renal masses.[2-5]

PN can be performed safely in a laparoscopic (LPN), robot-assisted laparoscopic (RAPN), or open (OPN) fashion. The open approach typically employs a flank, thoracoabdominal, or subcostal incision, depending on the surgeon's preference and the specifics of the case.[6] Each approach has unique drawbacks; for example, laparoscopic and robotic approaches often require access to the peritoneal cavity, as do subcostal incisions, which also leave a large scar. Minimally invasive retroperitoneal approaches have been described but are not commonly utilized. A flank approach has the associated risk of a flank bulge and increased pain associated with removal of the tip of the 11th rib. An alternative surgical approach that has been seldom explored for PN is dorsal lumbotomy (DL). This approach is well described in the literature but has traditionally been used in children for pyeloplasty, pyelolithotomy, or simple nephrectomy for atrophic kidneys.[7,8] DL has been shown to be a practical, minimally invasive approach with short convalescence and low postoperative analgesic requirement when used for ureteropelvic junction repair.[8] To our knowledge, there are no reports in the literature of DL for PN; however, in select patients, this approach may be an equivalent or superior alternative to the current open and minimally invasive approaches for PN. Here we report outcomes of a single-surgeon experience with DL for PN.

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MATERIALS AND METHODS

Data Collection

Following institutional review board approval, we retrospectively identified patients who underwent PN through DL from September 2012 through April 2014. Preoperative evaluation in all patients included history and physical examination, and routine

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laboratory work including estimated glomerular filtration rate (eGFR), urinalysis, chest radiograph, and cross-sectional abdominal imaging. eGFR was calculated by the modification of diet in renal disease formula and recorded as greater or less than 60 mL/min/1.73 m^2, which is how the values are reported at our institution. All surgical candidates with clinical T1a masses are offered resection or active surveillance. It is not our practice to obtain renal biopsy except in rare cases and none were obtained in this cohort. Following hospital discharge, patients are seen in the office setting for at least 1 postoperative visit 2-3 weeks after discharge. The majority of patients chose to continue subsequent urologic care with their referring urologists outside of our institution.

Patient charts were individually reviewed to collect demographic and oncological data as well as operative times and estimated blood loss. Tumors were characterized according to the RENAL nephrometry scoring system.[9] All complications are reported according to the Clavien-Dindo classification, with major complications defined as Clavien grade III-V.[10] Early postoperative outcomes including hospital length of stay (LOS) and narcotic requirement (reported in oral morphine equivalents [OME]) were also extracted from electronic medical record.

For purposes of comparison, we queried our institution's small renal mass database and identified other posteriorly located tumors with a RENAL nephrometry score ranging from 4p to 6p that were treated with standard open or minimally invasive approaches from 2010 to 2014. Outcomes including LOS, postoperative narcotic requirement, and postoperative complications were compared between DL, laparoscopic or robotic, and open surgical approaches.

Surgical Technique

The patient is placed in a prone position on the operating room table. A vertical incision is made between the iliac crest and the 12th rib while making sure to spare both the rib and the neurovascular bundle. The subcutaneous tissues are divided down to the aponeurosis of the latissimus dorsi, which is carefully separated to expose the posterior layer of the lumbodorsal fascia. The lumbodorsal fascia is incised allowing the erector spinae to be retracted medially. Next, the fused anterior and the middle layers of the lumbodorsal fascia are vertically incised allowing medial retraction of the quadratus lumborum. Entry is then gained into the retroperitoneal space. Gerota's fascia is incised and the kidney is defatted to expose the known area of tumor. For more superiorly located tumors, reverse Trendelenburg positioning can be utilized to facilitate exposure. Once adequate tumor exposure is obtained, the capsule is circumscribed with electrocautery and the tumor is enucleated taking care to ensure clean margins. The renal hilum is never exposed. Hemostasis is obtained with a 5-0 polydioxanone suture and argon beam coagulation. It is our practice to place a piece of fat within the tumor crater and close the capsule over this defect with interrupted Teflon-pledgeted 3-0 Polysorb horizontal mattress sutures. Once adequate hemostasis is ensured and the wound is irrigated, the incision is closed by returning the muscles to their anatomic position and reapproximating the lumbodorsal fascia overlying the erector spinae with a running 0 looped Maxon suture. This fascial layer is then infiltrated with 0.25% ropivicaine for local analgesia. Next, the deep dermal layer is reapproximated and closed with a running 2-0 Polysorb. Lastly, the skin is closed with a subcuticular stitch utilizing a 4-0 Polysorb suture. Figure 1 shows a representative computed tomography image of a posterior renal mass amenable to this approach.

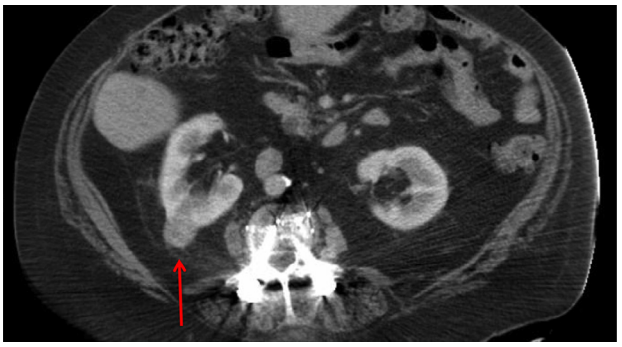

Figure 1. Representative axial computed tomography image demonstrating posteriorly located small renal mass. Note proximity to skin surface via the dorsal lumbotomy approach (arrow). (Color version available online.)

Data Analysis

Baseline characteristics are reported as means with standard deviation for normally distributed data and medians with interquartile ranges for nonparametric data. Kruskal-Wallis test was used to compare medians between 3 groups. The Fisher exact test was also used to compare categorical variables between the three surgical approaches. Postoperative eGFR was defined as the nadir during the postoperative hospitalization. Statistics were analyzed using SPSS Statistics 20 (IBM Corp., Armonk, NY). Statistical significance was defined as $P < .05$ using 2-tailed tests.

RESULTS

Twenty-four patients were identified for inclusion accounting for 12% of the partial nephrectomies performed by the primary surgeon over the study period. Clinicopathologic characteristics are summarized in Table 1. Median follow-up was 19 days (interquartile range: 15-22).

Median RENAL nephrometry score was 5 with 86% (21 of 24) of tumors classified as low-complexity lesions (Table 1). Seventy-nine percent of tumors originated from the lower pole (19 of 24) and none were anteriorly located.

Early postoperative outcomes are reported in Table 2. Median operative time was 71 minutes and median estimated blood loss was 250 mL. There were no intraoperative complications and 1 patient required perioperative transfusion of 2 units of packed red blood cells. Cell Saver was not used in any of the cases. There was no warm ischemia time as there was never any hilar clamping. Overall perioperative complication rate was 25% (6 of 24), including one major complication of a postoperative stroke. Minor complications included urinary retention requiring temporary catheterization in 2 patients, a surgical site infection requiring antibiotics, a cephalosporin-associated drug rash, and an iliohypogastric nerve injury managed with nonsteroidal anti-inflammatories and gabapentin. There were no readmissions during the study period. No perioperative deaths occurred. Median LOS was 1.2 days and median narcotic requirement while in the hospital was 17 mg OME. Preoperatively, 5 patients had an eGFR less than 60 mL/min/1.73 m^2. Postoperatively, 3 of the 5 patients'