Transperitoneal laparoscopic radical and partial nephrectomy in patients with cirrhosis: report of three cases

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Introduction: *Surgical stress in patients with liver disease is associated with hepatorenal syndrome, coagulopathy, encephalopathy, sepsis, ARDS, and abnormalities of volume and electrolytes. These risks as well as the surgical difficulties associated with portal hypertension, varices, ascites, and thrombocytopenia limit the treatment options available to cirrhotic patients with renal masses. The decreased stress of laparoscopy may benefit patients with significant liver disease.*
Methods: *We performed a retrospective chart review of three patients with cirrhosis and renal masses who underwent laparoscopic renal surgery.*
Results: *The mean patient age was 56 years old. Two patients had Child-Pugh class B cirrhosis and one had Child-Pugh class A cirrhosis. Two hand-assisted laparoscopic radical nephrectomies and one laparoscopic partial nephrectomy were performed via a transperitoneal approach. Relevant data for the radical nephrectomies includes: mass size 4.5 cm and 4.0 cm, operative time 145 and 230 minutes, estimated blood loss 25 cc and 150 cc, and postoperative hospitalization of 4 and 3 days, respectively. Data for the partial nephrectomy includes: mass size 1.3 cm, operative time 130 minutes, estimated blood loss 50 cc, and postoperative hospitalization of 2 days. No case required open conversion nor suffered postoperative complications. Final pathology revealed clear cell renal cell carcinoma, stage pT1a, Fuhrman grade 2/4 in two patients and sarcomatoid renal cell carcinoma, stage pT1b, Fuhrman grade 4/4 in one patient. Intraoperative findings included thickened peritoneum with dense vascular adhesions due to chronic ascites. Platelets and fresh frozen plasma were administered intraoperatively during the partial nephrectomy to prevent bleeding. A peritoneal drain was placed during one of the radical nephrectomies for postoperative monitoring of ascites volume.*
Conclusions: *Patients with cirrhosis and a renal mass represent challenging cases. With careful patient selection and management in conjunction with their hepatologist, laparoscopic renal surgery can be performed safely by experienced laparoscopists.*

Key Words: laparoscopic renal surgery, cirrhosis, renal masses

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Introduction

Laparoscopic radical nephrectomy is now a widely accepted treatment option for localized renal cell carcinoma.[1,2] Laparoscopic partial nephrectomy, though not as well established, is also being utilized

more frequently. Laparoscopic surgery has been shown to shorten hospital stay and recovery time, decrease postoperative pain, and improve cosmetic outcomes when compared to open surgery.[3,4] The decreased physiologic stress of laparoscopy may also benefit patients with significant liver disease.[1]

Cirrhosis is a significant risk factor/predictor of postoperative complications and death. Despite this, basic and advanced laparoscopic procedures have been performed safely with mild to moderate cirrhosis in the general surgery and urology population,[1] and retroperitoneoscopic radical and partial nephrectomies have been reported in patients with cirrhosis.[2] We report our experience with transperitoneal radical and partial nephrectomy in three patients with liver cirrhosis and portal hypertension.

Case reports

Case 1

A 54-year-old man with a history of Child-Pugh class B cirrhosis from chronic hepatitis-C was found to have an enhancing exophytic 1.3 cm left midpole renal mass, Figure 1. The mass had demonstrated interval growth on serial computed tomography (CT) scans. The patient had a prior history of encephalopathy and GI bleeding secondary to esophageal varices. Pertinent preoperative laboratory values include a creatinine of 0.5, platelet count of 72, INR of 1.4, and mildly elevated liver function tests. His Model for End-Stage Liver Disease (MELD) score was 9. The MELD scale is a validated, reliable measure of mortality risk in patients with end stage liver disease.[3] The patient underwent an uncomplicated transperitoneal laparoscopic partial nephrectomy without hilar clamping. Hemostasis was obtained in the resection bed using the argon beam coagulator and Tisseel (Baxter, Deerfield, IL). He was given platelets and fresh frozen plasma intraoperatively to correct his coagulopathy and reduce his risk of bleeding. Operative time was 130 minutes and estimated blood loss was 50 cc. His postoperative course was uneventful and he was discharged home on postoperative day 3 with a serum creatinine of 0.6. Final pathology revealed a pT1a Nx Mx, Fuhrman nuclear grade 2 of 4, papillary renal cell carcinoma with negative margins. He remains free of disease at 2 years follow up.

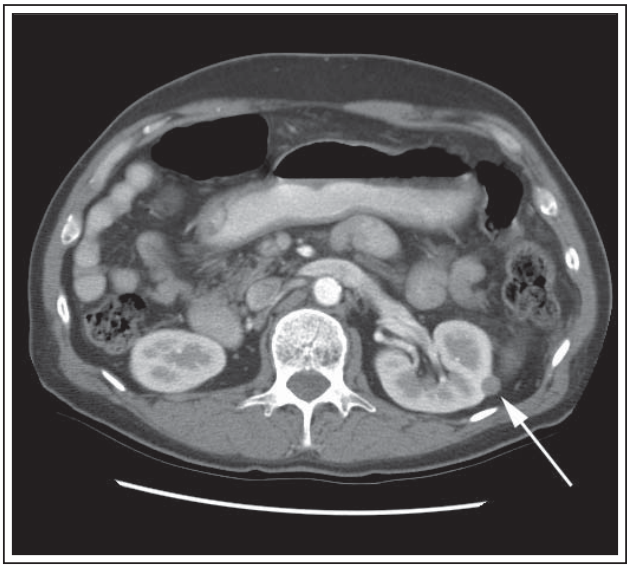

Figure 1. Contrast CT of abdomen and pelvis showing 1.3 cm left mid-pole renal mass.

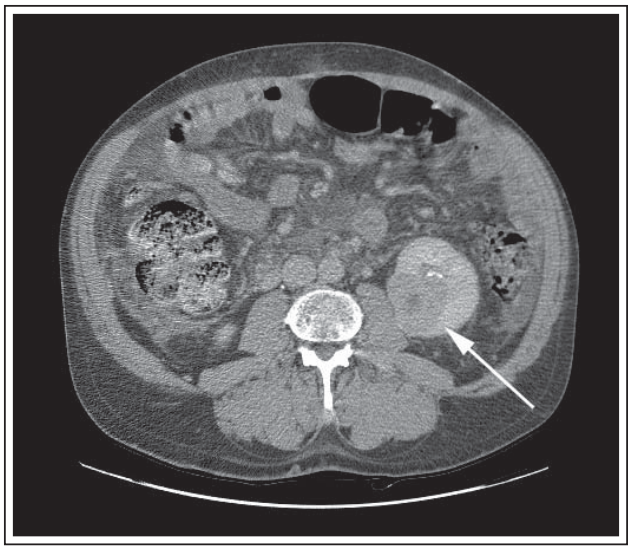

Figure 2. Contrast CT of abdomen and pelvis showing 4.0 cm left lower-pole renal mass.

Case 2

A 55-year-old man with a history of Child-Pugh class B cirrhosis secondary to alcohol abuse was found to have an enhancing 4.0 cm left lower pole renal mass on CT, Figure 2. In addition, the CT showed evidence of ascites and varices throughout the abdomen. He had a history of variceal bleeding treated with multiple esophageal procedures and bandings. Relevant preoperative laboratory values include a creatinine of 1.2, INR of 1.3, total bilirubin of 2.4, and albumin of 2.3. His MELD score was 14. He underwent a transperitoneal laparoscopic radical nephrectomy. Operative time was 230 minutes and estimated blood loss was 150 cc. Intraoperative findings included thickened peritoneum with dense vascular adhesions

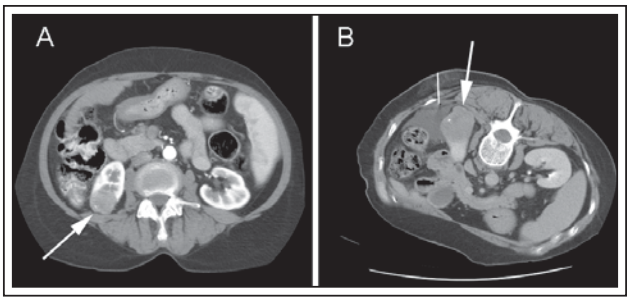

Figure 3. a) Contrast CT of abdomen and pelvis showing 2.8 cm x 3.0 cm right lower pole renal mass; b) Contrast CT of abdomen and pelvis performed 2 months later, demonstrating interval growth of the right renal mass to 3.8 cm x 4.5 cm.

due to chronic ascites. A pigtail paracentesis catheter was placed into the left lower quadrant and directed into the left pelvic gutter for postoperative drainage of ascites based on the recommendations of the hepatology service. His postoperative course was uneventful. The paracentesis catheter was removed on postoperative day 2 and he was discharged home on postoperative day 3 with a serum creatinine of 1.9. Final pathology revealed a pT1a Nx Mx, Fuhrman nuclear grade 2 of 4, clear cell renal cell carcinoma with negative margins. He remains free of disease at 2 years follow up with a stable serum creatinine.

Case 3

A 60-year-old female with a history of Child-Pugh class A cirrhosis secondary to hepatitis C was found to have an enhancing and rapidly enlarging right renal mass. The right lower pole mass was identified on CT imaging, and had grown from 2.8 cm x 3.0 cm to 3.8 cm x 4.5 cm over a period of 2 months, Figure 3. The patient's serum creatinine was 0.8, total serum bilirubin was 0.8 and INR was 1.2. Her MELD score was 5. She underwent a transperitoneal laparoscopic radical nephrectomy. Operative time was 145 minutes and estimated blood loss was 25 cc. Her postoperative course was uneventful, and she was discharged on postoperative day 3 with a serum creatinine of 1.1. Final pathology reveaved a pT1b Nx Mx, Fuhrman nuclear grade 4 of 4, sarcomatoid renal cell carcinoma asising from clear cell renal cell carcinoma. Margins were negative. She remains free of disease at 1 year follow up with a normal serum creatinine.

Discussion

Cirrhosis of the liver adds significant morbidity and mortality to patients undergoing surgical procedures. Excluding liver transplantation, cirrhotic patients undergoing general anesthesia for any type of surgery have an overall mortality within 30 days of surgery that is reported to be as high as 11.6%. In addition, more than 30% of this same patient population experienced at least one postoperative complication.[4] Mortality after open surgical operations for Child-Pugh classification A patients is 10%, as compared to 30% for class B and 82% for class C patients.[5,6] The MELD score is also used to predict 3 month mortality risk in patients with end stage liver disease. It uses serum creatinine, total serum bilirubin, and International Normalized Ratio (INR) for prothrombin time to predict mortaility risk, Figure 4. The scores range from 0 to ≥ 40, with scores ≥ 10 predictive of higher rates of 3 month mortality.[3]

Multiple series have shown that laparoscopic cholecystectomy can be performed safely in patients with cirrhosis, with comparable results when compared to open cholecystectomy.[1] The largest of these series contains 226 patients with Child-Pugh classification A and B who underwent laparoscopic cholecystectomy. They report a 4.4% open conversation rate, and an overall morbidity of 6.6% and mortality of 0.9%.[7] Laparoscopic splenectomy,[1] colectomy,[1] and liver resection for hepatocellular carcinoma[8] has also been performed safely in cirrhotic patients.

Laparoscopic radical and partial nephrectomy are alternative standards to open surgery for localized renal cell carcinoma.[3,4] Given the high morbidity of cirrhotic patients undergoing surgery, the decreased physiologic stress of laparoscopy may be of benefit. Recently, Johnston et al reported on their series of patients

Child-Pugh Score

Pugh et al[9]

Scoring

Measure	1 point	2 points	3 points	units
Bilirubin (total)	<34 (<2)	34-50 (2-3)	>50 (>3)	µmol/l (mg/dl)
Serum albumin	>35	28-35	<28	g/l
INR	<1.7	1.71-2.20	> 2.20	*no unit*
Ascites	None	Suppressed with medication	Refractory	*no unit*
Hepatic encepholopathy	None	Grade I-II (or suppressed with medication)	Grade III-IV (or refractory	*no unit*

Interpretation

Points	Class	One year survival	Two year survival
5-6	A	100%	85%
7-9	B	81%	57%
10-15	C	45%	35%

MELD Calculation

Kamath et al[3]

Formula

$3.8*\log_e(\text{bilirubin[mg/dL]}) + 11.2*\log_e(\text{INR}) + 9.6*\log_e(\text{creatinine [mg/dL]}) + 6.4*(\text{etiology: 0 if cholestatic or alcoholic, 1 otherwise})$

Figure 4. Reproduction of Child-Pugh classification tables and MELD risk assessment.

with cirrhosis who underwent retroperitoneoscopic radical and partial nephrectomy. Of their 10 patients, 7 underwent radical nephrectomy and 3 underwent partial nephrectomy. Two of the 10 patients had extensive bleeding from portosystemic collateral veins requiring transfusion and open conversion in one case. One patient had bleeding from a dilated anterior retroperitoneal collateral vein requiring endoscopic stapling and intraoperative transfusion. There were no mortalities in their series.[2]

We report on three patients with cirrhosis who underwent transperitoneal laparoscopic partial and radical nephrectomy. The patient who underwent partial nephrectomy was transfused platelets and fresh frozen plasma intraoperatively to correct his pre-existing coagulopathy and prevent bleeding complications. The two patients who underwent radical nephrectomy did not require intraoperative fresh frozen plasma or platelets. None of the patients required a transfusion of packed red blood cells. One of the patients who underwent radical nephrectomy had a pigtail paracentesis catheter placed intraoperatively to manage his chronic ascites postoperatively. This was done after consultation with the hepatology service. The paracentesis catheter was removed on postop day 2 without complications.

Patients with cirrhosis are at an increased risk of intraoperative and postoperative complications. In an attempt to minimize these risks, patients should be medically optimized preoperatively with the help of the hepatology service. Blood products, including fresh frozen plasma, platelets, and packed red blood cells should be readily available during and after the procedure. For patients with chronic ascites, a paracentesis drain may be helpful in monitoring for an increase in postoperative ascites volume, which can signal impending hepatic decompensation. The paracentesis drain can be removed when deemed appropriate by the hepatology service.

Conclusion

Perioperative management of patients with liver disease and renal masses is a challenge. Comorbid conditions responsible for perioperative morbidity and mortality, such as coagulopathy, renal function, intravascular volume, electrolytes, cardiovascular status, and nutrition should be identified and optimized preoperatively, as this may decrease morbidity and mortality after surgery.[8] Transabdominal laparoscopic procedures in patients with ascites and portal hypertension can be challenging due to their enlarged portal venous system and dilated portosystemic venous communication, although the transperitoneal approach may be advantageous at avoiding bleeding from retroperitoneal varices. Whatever the approach, these cases should only be attempted by experienced laparoscopists. Though patients with cirrhosis and renal masses are challenging, it appears that with careful patient selection, pre and postoperative consultation with hepatology, and meticulous operative planning laparoscopic renal surgery to be performed safely and effectively. □

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