

Laparoscopic Management of Renal Hydatid Cyst

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ABSTRACT

Introduction: Renal involvement by hydatid disease is uncommon. The patients may be asymptomatic or present with flank pain, hematuria, and hypertension. Surgery is the mainstay of treatment, and options include cyst deroofing, partial nephrectomy, and total nephrectomy. We share our experience of laparoscopic management of 3 patients with large hydatid cysts of the kidney and review the literature.

Case Description: Three patients with hydatid cysts of the kidney were treated at our institution between 2008 and 2010. In all 3 patients, hydatid disease involved the left kidney. One of the three cases also had concomitant liver involvement. Abdominal pain was the predominant symptom. A flank mass was palpable in 2 patients. The diagnosis was confirmed on abdominal ultrasonography and computed tomography in all 3 patients. Laparoscopic management was successfully completed in 2 patients. A large intrahepatic cyst in 1 patient prompted conversion to an open procedure. A special hydatid trocar-cannula system helps in eliminating the possibility of spillage from the cyst while puncturing and aspirating the cyst.

Discussion: There are few reports on laparoscopic management of this uncommon disease of the kidney. In our series the laparoscopic management was attempted in all 3 cases. The procedures included laparoscopic aspiration of the cyst contents along with subtotal excision of the ectocyst in 2 patients and nephrectomy in 1 patient. The latter case had to be converted to an open procedure because of inaccessibility of the intrahepatic liver hydatid cyst. Laparoscopic management of renal hydatid cysts is feasible and safe.

Key Words: Renal, Hydatid cyst, Laparoscopy.

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INTRODUCTION

Echinococcal infection, a zoonosis, is caused most commonly by *Echinococcus granulosus*.¹ It is a common cause of hepatic cysts worldwide, particularly in the Middle East, Australia, North Africa, India, and some parts of South America.^{1,2} It is seen more commonly in children than in adults.³ Hydatid cysts are slow-growing space-occupying lesions, seen in virtually every organ of the body.⁴ Cysts of the liver and lungs constitute 90% of cases, and only 10% occur in the rest of the organs in the body.⁵ Other sites are the brain,⁶ bones,⁷ kidneys,^{1,8} and pancreas.^{9,10} Renal hydatid cysts are rare and comprise 2% to 3% of all cases of hydatid disease.^{11,12}

The cysts located in the liver and lungs can occasionally be treated medically with albendazole and mebendazole.^{13,14} However, there are no data available on medical treatment of hydatid disease of the kidney. Surgical treatment modalities include scolicalid agent injection, marsupialization, percutaneous drainage, simple cystectomy, and total nephrectomy. It is generally agreed that excision of the cyst with conservation of the renal parenchyma is the most appropriate treatment, but this is not always possible.^{10,15} In this study we report our experience of management of 3 cases of hydatid disease of the kidney.

DESCRIPTION OF CASES

Case 1

A 40-year-old woman presented with complaints of abdominal discomfort and pain. Abdominal examination of the patient showed normal findings, and no mass was palpable. Results of liver function tests, renal function tests, and urinary microscopy were normal. Abdominal ultrasonography (USG) showed a 7.4 × 6.4-cm cyst in the lower pole of the left kidney with floating membranes inside. A contrast-enhanced computed tomography (CT) scan of the abdomen showed an 8.6 × 7.5 × 7.0-cm cyst with an enhancing wall and membranes in relation to the mid and lower poles of the left kidney. The pelvicalyceal system was normal. Hydatid serology yielded positive findings. Diethylenetriamine pentaacetic acid scan showed non-visualization of the lower half of the left kidney, bilateral



Figure 1. Laparoscopic view showing a large cyst occupying the lower pole of the left kidney with povidone-iodine-soaked gauze pieces placed around the cyst.

nonobstructive clearance, and differential function of 65% and 35% in the right and left kidneys, respectively. The patient was treated with laparoscopic management of the cyst by a transperitoneal approach. The cyst was exposed by careful dissection. Gauze pieces soaked in 10% povidone-iodine were placed all around the cyst as is done in open surgery (**Figure 1**). The cyst was aspirated completely after puncturing it with a special hydatid trocar-cannula—the Palanivelu hydatid system—to avoid spillage. The details of this system have been described in a case series on laparoscopic management of hepatic hydatid disease by Palanivelu et al.¹⁶ Essentially, this system has a 29-cm-long hollow trocar with a 16-cm-long, 12-mm cannula (**Figure 2**). The cannula has a dual channel: one for the gas insufflation and the other for the suction. Once this cannula abuts the cyst wall, applying suction to one of the inlets allows the cyst wall to become tightly approximated to the cannula. This prevents any spillage of cyst contents around the site of insertion of the cannula. A 5-mm-long trocar, with suction attached to it (from a second suction machine), is then pushed through the cannula and punctures the cyst and enters it. All the cyst contents are aspirated with a 10-mm suction instrument. The complete evacuation of the cyst is confirmed by placing the telescope inside the cyst through the same cannula.

Subsequently, a subtotal excision of the ectocyst was performed by use of ultrasonic shears. Only a small part of the cyst wall, which was adherent to the kidney parenchyma, was left behind. A soft tube drain was placed

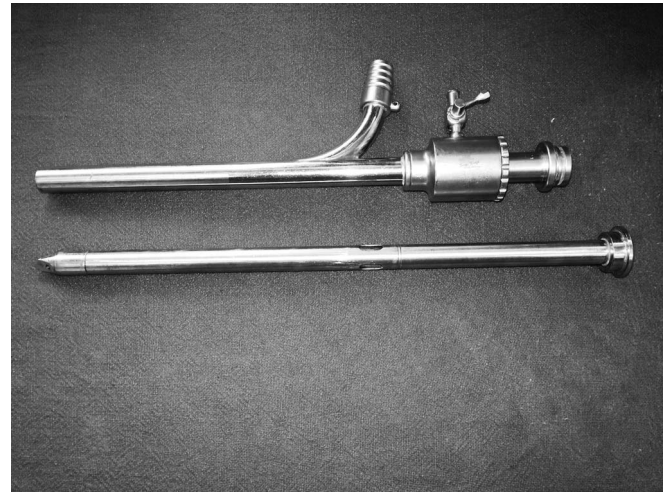


Figure 2. Palanivelu hydatid system showing the long trocar and cannula with dual inlets.

outside the cavity. Perioperative albendazole prophylaxis was used.

The patient recovered well and was discharged on the seventh postoperative day. Follow-up USG of the abdomen performed 12 months later showed no recurrence of the hydatid disease.

Case 2

A 40-year-old man presented with complaints of an abdominal lump and pain in the right upper quadrant of 2 months' duration. Abdominal examination showed a palpable liver, 7 cm below the subcostal margin. USG showed 2 masses: a large intrahepatic cyst and left renal cystic mass. A CT scan of the abdomen showed a 13 × 12-cm hypoechoic mass in the right lobe of the liver with multiple intralocular daughter cysts and a large 10.5 × 9-cm cyst in the left kidney causing compression of the collecting system. Hydatid serology yielded positive findings. Diethylenetriamine pentaacetic acid scan showed 95% function by the right kidney and the remaining 5% by the left kidney. The liver and renal function test results were normal. Laparoscopic management was planned. The colon was reflected medially, and a left nephrectomy was performed after aspirating the cyst contents. After the completion of laparoscopic nephrectomy, management of the liver cyst was attempted. However, the procedure was converted to an open procedure because of inaccessibility of the liver cyst. Cyst deroofing, evacuation of cyst contents, and excision of the ectocyst were performed for the liver cyst, taking all the standard precautions for preventing spillage. A perihepatic drain was placed, which was

removed on the fourth postoperative day. The patient recovered well and was discharged on the fifth postoperative day.

Case 3

A 60-year-old woman presented with a complaint of a progressively increasing abdominal lump since 4 months, with associated weight loss and anorexia. Abdominal examination showed a 15 × 8-cm firm, nontender lump in the left upper quadrant. USG of the abdomen showed a large cystic lesion in the left hypochondrium. A contrast-enhanced CT scan of the abdomen showed a large 15 × 10-cm cystic lesion with a thick wall, probably arising from the retroperitoneum, pushing the left kidney upward, up to the anterior abdominal wall. Intraoperatively, a large cyst arising from the lower pole of the left kidney was seen. The patient underwent laparoscopic aspiration with the Palanivelu hydatid system, deroofing of the cyst wall, and subtotal removal of the endocyst. The patient was discharged on postoperative day 6 and was free of any symptoms at the last follow-up performed 24 months after surgery.

DISCUSSION

The parasite *Echinococcus granulosus* inhabits the small intestines of infected dogs.¹⁷ The feces of infected dogs contain a large number of parasite eggs. These eggs are swallowed by lamb, cattle, goats, or sometimes humans.¹ Humans are dead-end hosts and become infected by direct contact with infected dogs (during handling or fondling), by ingesting contaminated raw or undercooked vegetables, or by swallowing contaminated water. After ingestion of the eggs, the capsule of the eggs opens in the small intestine of the host. The larvae penetrate the jejunum and enter the venous system, as well as the lymphatic system. Through these systems, they settle in various organs and develop into hydatid cysts.¹ Sometimes, iatrogenic rupture of hydatid cysts during surgery may involve adjacent organs.¹⁸

Hydatid disease of the kidney is extremely rare.¹⁹ Most patients are aged between 30 and 50 years.²⁰ The cyst is usually single and lies in the cortex of the kidney.²¹ Symptoms may vary according to the size and extent of the cyst. These cysts may reach an enormous size before causing symptoms.²¹ Patients may be asymptomatic if the cyst is closed and not communicating with the pelvis. Symptomatic patients most commonly present with flank pain, hematuria, and hypertension. A palpable mass is the only clinical sign^{22,23} and was present in two of our cases. All 3

patients in our series had abdominal pain, but none presented with hematuria. Anuria and acute urinary retention have also been reported.^{1,24,25} Hydatiduria, seen in about 5% to 28% of the patients, is pathognomonic of the disease. It is characterized by an episode of renal colic followed by passage of grapelike material in the urine.^{13,25–30}

Chemical tests for the diagnosis of hydatid cyst include the Casoni test, which can detect up to 90% of the cases, and Ghedine-Weinberg test, which can detect up to 80% of cases. However, these tests are not specific.^{31,32} Radiologic tests are important tools for the diagnosis of renal hydatid disease. These include the plain film, which may show a soft-tissue mass in the renal area with or without calcification. If calcification is present, it is generally peripheral curvilinear and eggshell like.³³ Intravenous urogram shows a calcified renal cyst. In case a daughter cyst is communicating with the collecting system, it can be outlined. The mainstay of diagnosis is USG, which shows a cystic mass along with daughter cysts consistent with hydatid disease. CT features of renal hydatid cysts are characteristic. Hydatid cysts are seen as unilocular or multilocular cysts with defined walls, which are frequently calcified. Increased tissue density of the hydatid membrane is seen with contrast enhancement. Large daughter cysts can be delineated.^{34–36} In all 3 of our cases, the imaging was diagnostic.

The various modalities for the treatment of renal hydatid cyst include medical treatment, percutaneous intervention, open surgery, and minimally invasive surgery. Mebendazole and albendazole have been the recommended drugs for lung and liver hydatid disease. These drugs reduce the size and volume of the cyst. However, the disadvantages of this modality are that these drugs do not have high rates of efficacy and can have serious side effects, including hepatotoxicity, allergic reactions, leukopenia, and alopecia.³⁷ Hence the utility of medical treatment is limited.^{38,39} Although they have been used in the treatment of liver and lung hydatid disease, no data are available on the efficacy of medical treatment in patients with renal hydatid cysts. Medical treatment should be used prophylactically against spillage before and after surgery. We have used oral albendazole at a dosage of 400 mg twice daily for 4 weeks before surgery and for 2 weeks after surgery.

Percutaneous management has been reported to be a safe option.⁴⁰ PAIR (puncture, aspiration, injection of scolical agent, re-aspiration) under USG guidance can be an alternative treatment for renal hydatid cysts that are not related

to the collecting system. It is also useful in cases in which the renal parenchyma needs to be preserved. The disadvantages of this method include dissemination of daughter cysts and fatal anaphylaxis.^{31,41}

Surgery is the treatment of choice for renal hydatid cysts. Superficial renal hydatid cysts that do not involve the renal parenchyma can be treated by cystectomy or pericystectomy.¹⁰ However, in cases in which the cyst extends deep into the renal parenchyma, partial nephrectomy can be performed. However, an attempt must be made to preserve as much of the parenchyma as possible.¹⁰ These nephron-sparing surgeries are possible in 75% of the cases, and total nephrectomy should be reserved only for cases in which the entire kidney is occupied by the cyst.⁴² Pedicled omentoplasty has been used to reconstruct large soft-tissue defects in the kidney after cystectomy.⁴³ In our series one patient required a total nephrectomy because minimal function was seen on renal isotope scanning. The procedure was started laparoscopically but converted to an open procedure because of inaccessibility of the accompanying liver cyst.

With the advances and increasing experience in laparoscopic surgery, transperitoneal and retroperitoneal laparoscopic management has been reported.^{44,45} The former approach is considered superior because it provides a better working space outside the Gerota fascia and prevents subsequent cyst rupture.⁴⁵ Laparoscopic transperitoneal nephrectomy can be performed for cases in which the kidney is totally replaced by the hydatid cyst. Shah et al⁴⁵ reported a case of an isolated renal hydatid cyst, which was managed by uneventful laparoscopic transperitoneal nephrectomy. In cases in which the cyst is

located at one pole of the kidney, laparoscopic partial nephrectomy is the preferred approach because it preserves the normal renal parenchyma.^{46,47} Laparoscopic cystopericystectomy is another option that has been described in the literature, and two cases have been reported so far.^{47,48} Laparoscopic transperitoneal aspiration of the cyst, followed by deroofing of the cyst wall and endocyst removal, has been reported by Prabhudessai et al.⁴⁹ We used this procedure in two cases (cases 1 and 3). A laparoscopic retroperitoneoscopic approach can be used for treating renal hydatid cysts.^{44,50–52} By use of this approach, closed cyst pericystectomy has been described in a single case⁴⁴ and deroofing of the cyst wall followed by cyst wall excision has been described in two cases.^{50,51} **Table 1** summarizes a few of the reported series on surgical management of renal hydatid cysts.

Special attention must be given to prevent cyst rupture during manipulation of the hydatid cyst. The Palanivelu hydatid system is mandatory and is useful in eliminating this possibility. In the unfortunate event of spillage, the brood capsules can spread throughout the body, and daughter cysts can grow wherever their contents come to rest. Moreover, epinephrine should be available at the time of surgery.¹⁹ The cyst should be packed on all sides with gauze soaked in one of the scolical solutions including 20% normal saline solution, 1% iodine, 10% cetrimide, 10% povidone-iodine, or 0.5% silver nitrate.¹⁹

CONCLUSION

Laparoscopic treatment of renal hydatid cysts is feasible and can be used for all the surgical options for manage-

Table 1.
Surgical Modalities Used in the Laparoscopic Management of Renal Hydatid Cyst

Authors	No. of Patients	Approach	Procedure
Shah et al ⁴⁵	1	Laparoscopic	Transperitoneal nephrectomy
Bilen et al ⁴⁸	1	Laparoscopic	Transperitoneal pericystectomy
Basiri et al ⁴⁶	1	Laparoscopic	Transperitoneal partial nephrectomy
Prabhudessai et al ⁴⁹	1	Laparoscopic	Transperitoneal deroofing of cyst and endocyst removal
Ozden et al ⁴⁴	1	Laparoscopic	Retroperitoneal closed cyst pericystectomy
Rabii et al ⁵²	1	Laparoscopic	Retroperitoneal deroofing of cyst and endocyst removal
Divarci et al ⁵⁰	1	Laparoscopic	Retroperitoneal deroofing of cyst and endocyst removal
Current series	3	Laparoscopic (failed in 1)	Transperitoneal deroofing, evacuation of endocyst, and subtotal excision of cyst wall in 2 cases Laparoscopy to open transperitoneal nephrectomy and deroofing of liver hydatid

ment of renal hydatid disease. Because renal hydatid disease is a benign disorder, an attempt should be made to save as much of the renal parenchyma as possible. Laparoscopic aspiration of the cyst followed by deroofting of the cyst wall with conservation of the renal parenchyma seems to be the most reasonable treatment option.

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