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Laparoscopic decortication of symptomatic renal cysts: Experience from a referral center in Iran

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Objective: To present our experience with laparoscopic management of symptomatic simple renal cysts.
Methods: From April 2004 to November 2006, 21 patients (10 men; 11 women) underwent laparoscopic decortication for simple renal cysts at our department and were included in the analysis. All procedures were carried out by one surgeon using a transperitoneal approach. Patients underwent radiological follow-up with computerized tomography and/or ultrasonography. Procedural success was defined as no recurrence of the cyst and complete pain relief. Symptomatic success was defined as a significant pain decrease.
Results: All 21 procedures were completed laparoscopically, without major complications or conversion to open surgery. Estimated mean blood loss during surgery was about 50 mL. Patients were hospitalized for a mean of 1.9 ± 1.1 (range: 1–5) days. Age of the patients and size and location of the cysts, had no relationship with the duration of operation as well as the length of hospital stay ($P > 0.05$). Patients who experienced complete pain relief had significantly larger cyst sizes compared with patients with a partial pain decrease (7.3 ± 1.1 *vs* 9.1 ± 2.0, respectively; $P = 0.023$, $F = 0.606$). All patients had negative cytological and pathological findings for malignancy or any other abnormalities. At 16.6 months of mean follow up, none of the patients reported symptomatic and/or radiologic failure.
Conclusions: Laparoscopic transperitoneal decortication represents an effective and safe treatment option in the management of symptomatic renal cysts.

Key words: laparoscopy, management, renal cyst.

Introduction

Simple renal cyst is a relatively common disease of renal parenchyma, with the reported incidence of about 10% in the general population,[1,2] varying from 4.5% in ages younger than 29.0–36.1% in the eighth decade of life.[3] The etiology is unknown; no genetic factor has been found to be associated with the condition;[4] however, it is speculated that men tended to have a higher incidence than women.[1,3] Moreover, tubular obstruction and ischemia due to the obstruction may have an etiologic role.[4] Fortunately, in the majority of patients, simple renal cyst is asymptomatic and intervention is not necessary unless it develops symptoms or complications. The most common symptom requiring intervention is dull flank pain; other reported symptoms and complications are: hypertension, infection, upper urinary tract obstruction, hematuria, and even renal failure.[5,6]

Prior to the introduction of the laparoscopic approach, the first line treatment of symptomatic simple renal cyst was ultrasound guided aspiration of the cyst and application of sclerosing agents.[7,8] The procedure of laparoscopic renal cyst decortication was first described by Hulbert *et al*.[9] as a good alternative to open surgery.[9] As previously mentioned, simple aspiration or sclerotherapy of the cyst and endoscopic cyst ablation are some other treatment options for managing simple renal cysts;[5] however, laparoscopic surgery combines the advantages of a minimally invasive procedure with the effectiveness of cyst resection achieved by open surgery.

Recurrence rate, however, depends on the technique of the treatment, location of the cysts and surgeon expertise. The reported 2 years recurrence rate after a simple drainage of the cyst is 80–100%; a single sclerotherapy session using ethanol has a 2-year failure rate of 40–100%; but the reported success rate for laparoscopic decortication is 90–100%.[10–15] In the present study we report our experience with laparoscopic surgical treatment in 21 symptomatic patients with simple renal cyst in our hospital.

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Methods

Between April 2004 and November 2006, 21 patients (10 men and 11 women) were selected to enter the study and underwent laparoscopic decortication for simple renal cysts at our department. None of the patients had a history of previous percutaneous aspirations, sclerotherapy and/or any other surgical interventions for their cystic kidney disease. All procedures were carried out by one surgeon (M.H.N.). Patients were informed in detail about the laparoscopic surgery and its advantages as well as the potential disadvantages, like a risk for conversion to open surgery. Written consent was taken from each patient. Urine analysis, urine culture, serum electrolytes, ultra-sonography and computed tomography (CT) scan were carried out before each operation. Cysts of all patients enrolled in the study were classified as simple cysts (Bosniak class 1–2). A transperitoneal approach using three ports was used for cyst decortication in all. Patients were initially positioned supine for intravenous access. After the induction of general anesthesia, endotracheal intubation, bladder catheterization, and orogastric tube placement, the patients were positioned in a modified lateral decubitus position. Approximately 45 degrees of rotation of the chest and abdomen was used. The table could be flexed as needed and padding was used to support the buttocks and flank. The patients were taped in position with multiple strips of wide cloth tape.

Surgical technique pneumoperitonium of 15 mmHg was achieved via a veress needle (Karl Storz, Tuttlingen, Germany) introduced in the umbilical region. Once the port was placed, the abdomen was then inspected for any injury from veress needle placement. Then, two more 5-mm trochars were inserted under direct vision in the flank lateral to

Table 1 Characteristics of all subjects that underwent operation at our clinic

Cases	Age (years)	Gender	Operative time (min)	Kidney side	Cyst size (cm)	Operation indications	Hospitalization (days)	Symptomatic success (pain relief)
Case 1	57	Female	70	Right	7–8	Flunk pain and urinary frequency	3	Complete
Case 2	65	Male	60	Right	10–11	Flunk pain	2	Complete
Case 3	47	Male	90	Right	8.5–10	Flunk pain	4	Complete
Case 4	52	Female	90	Left	8	Flunk pain	6	Partial
Case 5	54	Female	45	Left	15	Flunk pain	4	Complete
Case 6	73	Female	45	Left	6–7	Flunk pain and repeated UTI	2	Partial
Case 7	36	Female	60	Left	7.5–8	Flunk pain	3	Complete
Case 8	63	Female	60	Left	9–10	Flunk pain	2	Complete
Case 9	72	Male	60	Right	8	Flunk pain	4	Complete
Case 10	16	Female	60	Left	9	Flunk pain	3	Partial
Case 11	50	Male	66	Right	6	Flunk pain	2	Complete
Case 12	52	male	70	Right	11–12	Flunk and abdominal pain	2	Complete
Case 13	54	Female	60	Left	6.5	Flunk pain	2	Partial
Case 14	54	Male	35	Right	7–8	Flunk pain	2	Complete
Case 15	80	Male	60	Left	10	Flunk pain	4	Complete
Case 16	51	Male	60	Left	8	Flunk pain	2	Complete
Case 17	74	Male	50	Left	8–9	Flunk pain	4	Complete
Case 18	55	Female	40	Left	6–7	Flunk pain	3	Partial
Case 19	49	Male	35	Left	8–9	Flunk pain	2	Complete
Case 20	53	Female	40	Left	10	Flunk pain	3	Complete
Case 21	43	Female	60	Left	9	Flunk pain	2	Complete

the rectus. After the lateral peritoneal line of Toldt was incised and the colon was reflected medially and the overlying fat and tissue were cleared, the retroperitoneal space was exposed. After visual inspection, the blue dome of the cysts was opened using bipolar PK scissors (Karl Storz, Tuttlingen, Germany), and the fluid was aspirated using the suction irrigation device. At this point, the cyst wall was excised at its junction with the parenchyma and sent for pathologic interpretation as well as a sample of the fluid obtained for cytological analysis. A drain was not required.

All patients underwent radiological follow up with a repeated CT and/or ultrasonography immediately and 6–12 months after surgery. Procedural success was defined as no recurrence of the cyst and pain relief declaration by the patients. A re-growth cyst, even if it was smaller by more than half at any time, was also categorized as a failure. Symptomatic success was also defined as a considerable decrease in the pain, which effectively satisfies the patients; the severity of pain was not evaluated for a lack of using a validated questionnaire. χ^2 test and independent sample *t*-test were used for evaluations where appropriate. Two tailed *P*-value < 0.05 was considered significant.

Results

Table 1 shows the characteristics and measured parameters for each of the studied patients. The mean age of patients enrolled in the study was 54.7 ± 14.1 years (16–80). There were 11 (52.4%) female and 10 (47.6%) male patients. The indication for surgery included right or left quadrant or abdominal pain (in 21 patients; 100%); in addition, one of the patients had recurrent urinary tract infections (4.7%; case 6), and one another (4.7%; case 1) complained of urinary frequency. Perioperative CT revealed one single cyst in 18 (86%) and two cysts in the remaining three (14%; cases 2, 7, 18) patients. The mean cyst size was 8.7 ± 2.0 (range: 6–15) cm; mean operative time, from skin incision to placement of last stitch, was 58 ± 15 min (range: 35–90).

All 21 procedures were completed laparoscopically, without major complications or conversion to open surgery. Estimated mean blood loss during the operation for the patients studied was about 50 mL. Patients were hospitalized for a mean of 1.9 ± 1.1 (range: 1–5) days. Age of the patients and size and location of the cysts, had no relationship with the duration of operation as well as the length of hospital stay ($P > 0.05$). Patients who experienced complete pain relief had significantly larger cyst sizes compared with patients with a partial pain decrease (7.3 ± 1.1 *vs* 9.1 ± 2.0, respectively; $P = 0.023$, $F = 0.606$). All patients had negative cytological and pathological findings for malignancy or any other abnormalities.

Sixteen (76%) subjects, experienced complete pain relief whereas, five said their pain has been improved considerably. At the time of preparing the manuscript, we contacted all patients by telephone in April 2007 and asked them whether they had any problems. Mean duration between the operation and last follow was 16.6 ± 9.0 (range: 4.5–35.9) months. Except one patient (case 4), who displayed deterioration of flank pain 1 year after operation and returned to the clinic, all other 20 patients reported that they were satisfied with the operation outcome. Case 4, who re-presented recurrence of flank pain, underwent a repeated CT scan and the imaging revealed the existence of multiple cysts around the kidney. The patient underwent open surgery and with a diagnosis of hydatid cysts, radical nephrectomy was carried out. A re-evaluation of her initial cytological specimen confirmed the previous diagnosis of a simple cyst.

Discussion

Simple renal cysts are fairly common in adult individuals and its incidence increases with age; however, because of a lack of clinical consequence in most of them, there has been rarely a need for therapeutic intervention. Thus, the existence of simple renal cysts does not induce concern until development of symptoms (e.g. hematuria, hypertension, pelvicalceal obstruction, cyst rupture, recurrent urinary tract infections, abdominal mass, and pain; the latter is the most common).[16]

Treatment of simple renal cysts is generally focused on control of symptoms and preventing further complications. Compared with other management modalities, it is widely accepted that open decortication of renal cysts has the highest short- and long-term success rates, however, it also has greater morbidity. Other alternative options include needle aspiration, sclerotherapy and laparoscopic decortication.

Decompression of renal cysts by percutaneous needle aspiration, and although simple and minimally morbid, over half of the patients had a re-accumulation of cyst fluid and recurrence of symptoms.[10] As a result, sclerosing agents (e.g. ethanol,[11] glucose, phenol, chlorohydrolactate, pantopaque,[17] 50% acetic acid,[18] povidone iodine,[19] tetracycline solution,[20,21] bismuth phosphate,[22] morrhuate sodium[23] and ethanolamine oleate.[24]) have been used for preventing re-growth of cysts and return of symptoms. However, sclerotherapy also represented a high recurrence rate as well as a risk for accidental spillage of the sclerosing agent, which can pose a risk of fibrosis when peripelvic cysts are treated in this manner.

Laparoscopic interventions have become increasingly popular in urological practice due to the progressive improvement in the quality of laparoscopic instrumentation and the pioneering studies of some groups that have established the feasibility of rather complex procedures (e.g. nephrectomy, renal cell carcinoma [RCC], radical prostatectomy, retroperitoneal lymph node dissection, colposuspension, dismembered pyeloplasty, and adrenalectomy), carried out via the laparoscopic approach. Nowadays, through a process of evolution – not revolution – laparoscopy is finally establishing its place in the Iranian urologists' armamentarium as their counterparts' throughout the world.

Laparoscopic decortication of simple renal cysts is a highly effective, safe and minimally invasive alternative to other treatment modalities mentioned above. Almost all previous studies on laparoscopic management of renal cysts have reported a high satisfaction degree in terms of high success rate, low recurrence rate and minimal morbidity. Reported mean success rates of laparoscopic simple renal cysts decortication is about 90%; however, success rates may be related to several factors such as cyst location, technique of operation and surgeon's skillfulness. In the present study, aside from the case which finally developed hydatid cysts, we achieved a radiological and symptomatic success rate of 100%. Tefekli *et al*. in a survey on 19 consecutive patients reported a radiological success rate of 88.2% and a symptomatic success rate of 89.5%; in contrast to our study, they had used a retroperitoneal approach in all of their cases. Shiraishi *et al*.[14] reported a series of 37 patients that had undergone laparoscopic decortication between 1993 and 2004; according to their report, there were five (13.5%) patients whose cyst sizes were above 50% of their preoperative volume, at the first follow up evaluation during the first year after operation. However, although like us, they basically used a transperitoneal approach, if the cysts were dorsal to the kidney (as in seven cases), they used a retroperitoneal approach. Moreover, six of their cases had peripelvic renal cysts. Iannelli *et al*. reported a symptomatic success rate of 80–90% after a mean follow up of 60 months after laparoscopy. Surveying on seven patients, Okeke *et al*. also reported a symptomatic success rate of 100% during 17.7 months of follow up.

As previously mentioned, simple renal cyst can be accessed either transperitoneally and retroperitoneally; although the transperitoneal approach is generally considered as the preferred method, it is speculated that compared with the retroperitoneal approach, it may prolong operative time and hospital stay. In the present study, using a transperitoneal approach, although our mean hospital stay was longer than in the report of Tefekli *et al*.[25] (2.9 *vs* 2.3 days) our operating time was shorter (58 *vs* 83 min). Moreover, Gupta *et al*.[26] and Lutter *et al*.[27] reported almost equivalent mean hospital stays (2.9 and 3.0 days, respectively) but longer operative durations (95 and 70 min, respectively) for the retroperitoneal approach. On the other hand, Atug *et al*. and Okeke *et al*. also spent a mean of 89 and 106 min on renal cyst decortication and a hospital stay of 1.1 and 3.4 days, respectively, using the transperitoneal approach.[11,12] These results suggest that operative time as well as hospital stay duration is not essentially associated with the method of laparoscopic operation and there may be several other factors interfering in them.

Our results demonstrate that laparoscopic operation via the transperitoneal approach, in simple renal cysts management – particularly larger cysts – is feasible, efficient and minimally morbid. Nevertheless, although compared with other known methods, laparoscopic cyst ablation has a lot of advantages (e.g. minimal postoperative pain, decreased blood loss, short hospital stay, shortened convalescence period, and cosmetic benefits), we should not disregard its potential disadvantages including the use of expensive equipment, significant technical experiences in carrying out surgery, and the risk of organ injury and hemorrhages during operation.

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