

Comparison between Retroperitoneal and Transperitoneal Approaches in the Laparoscopic Treatment of Bosniak Type I Renal Cysts: A Retrospective Study

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Purpose: We retrospectively compared laparoscopic transperitoneal and retroperitoneal approaches for the decortication of simple renal cysts with respect to safety, postoperative pain, and clinical results.

Materials and Methods: The study included 40 patients (28 males and 12 females) with symptomatic simple renal cysts and who underwent laparoscopic cyst decortication, and they were evaluated retrospectively. Patients' age, gender, disease-specific history, comorbid disease and family history, in general and urological and physical examination findings were recorded. Patients prior to surgery were evaluated by urinalysis, serum creatinine level, blood count, urinary tract ultrasonography, and unenhanced and contrast-enhanced abdominal computed tomography. Patients were informed about laparoscopic surgery and their written informed consent was taken. For those who preferred the laparoscopic approach, the placement of the cyst, history of prior surgery and obesity were evaluated. All patients filled out the visual analog scale (VAS) to evaluate postoperative pain.

Results: The mean age of the patients were 54.65 ± 5.26 years in the retroperitoneal group and 56.0 ± 4.66 years in the transperitoneal group. For all patients the indication for surgery included right or left flank pain. The mean operative time for the transperitoneal approach was 51.5 min, and that for the retroperitoneal approach was 44.75 min. This difference was statistically significant between the two groups ($P < .05$). According to VAS scale, the retroperitoneal scoring method was found to be lower than the transperitoneal scoring method. All patients were discharged on the first postoperative day, and the drains were taken out. None of the patients had complications. At the end of six months, no clinical and radiological recurrence was detected in any patient.

Conclusion: We consider the retroperitoneal approach to be the first-choice because of its shorter operation time and particularly low level of postoperative pain.

Keywords: kidney diseases; cystic; laparoscopy; surgery; retrospective studies.

INTRODUCTION

Simple renal cyst is a relatively common disease of renal parenchyma, with a reported incidence of about 10% in the general population.^(1,2) The incidence increases with age and between 40-60 years of age is up to 30%.^(3,4) Although its etiology is unknown, no genetic factor has been found to be associated with the condition⁽⁵⁾ however, it is speculated that men tended to have a higher incidence than women.⁽¹⁾ 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.⁽⁶⁾

Prior to the introduction of the laparoscopic approach, ultrasound-guided percutaneous aspiration and sclerosing agents injection were the first option for treatment.^(7,8) Laparoscopic renal cyst decortication was first described by Hulbert and colleagues as a good alternative to open surgery.⁽⁹⁾ Laparoscopic surgery can be a transperitoneal or a retroperitoneal approach.⁽¹⁰⁾ The

transperitoneal approach is the most preferred one in the literature. It has advantages especially for anteriorly located exophytic and parapelvic cysts. Conversely, the retroperitoneal approach is beneficial for posteriorly located cysts.⁽¹⁰⁾ Organ injury is less, unlike in the transperitoneal approach, and there is no risk of peritonitis, as the intracystic fluid does not interact with the peritoneum.⁽¹¹⁾

We retrospectively compared laparoscopic transperitoneal and retroperitoneal approaches for the decortication of simple renal cysts with respect to safety, postoperative pain, and clinical results.

MATERIALS AND METHODS

Study Population

The study included 40 patients (28 males and 12 females) with symptomatic simple renal cysts who underwent laparoscopic cyst decortication, and they were evaluated retrospectively. Patients' age, gender, disease-specific history, comorbid disease and family history, in general and urological and physical examination findings were recorded. Patients prior to surgery were evaluated by urinalysis, creatinine level, blood count,

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Received November 2014 & Accepted June 2015

Table 1. Clinical and demographic characteristics of study patients.

Variables	Transperitoneal	Retroperitoneal	P Value
Number	20	20	-----
Age, (mean) y	56.0 ± 4.66	54.65 ± 5.26	.634
Size of cyst, cm	5.55 ± 1.32	5.25 ± 0.85	.605
Localization of cysts			
Upper pole	7	9	.747
Middle pole	5	3	.692
Lower pole	8	8	-----

urinary tract ultrasound (USG), and unenhanced and contrast-enhanced abdominal computed tomography (CT) scan. Patients were informed about laparoscopic surgery and their written informed consent was taken. For those who preferred the laparoscopic approach, the placement of the cyst, history of prior surgery and obesity were evaluated.

The transperitoneal approach using three ports was used for cyst decortication in all patients.

Surgical Techniques

The patients were initially positioned supine for intravenous access. After the induction of general anesthesia, endotracheal intubation, bladder catheterization, and nasogastric tube placement, the patients were positioned in a modified lateral decubitus position. Approximately 45 degrees of rotation of the chest and abdomen was conducted. The table was 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. As the surgical technique used, pneumoperitoneum of 15 mmHg was conducted used 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 the Veress needle placement. Then, two more 5-mm trocars were inserted under direct vision in the flank lateral to the rectus. After the lateral peritoneal line of Toldt was incised, the colon was reflected medially, and the overlying fat and tissue were cleared, the retroperitoneal space was exposed. After visual inspection, the dome of the cyst was opened using bipolar scissors, and the fluid was aspirated using the suction irrigation device. In the retroperitoneal approach, the retroperitoneal laparoscopic procedure was performed. In brief, a 1.0 cm transverse skin incision was made over the midaxillary line, 1.5 cm above the iliac crest. The underlying mus-

culature was spared by hemostat, and the retroperitoneal cavity was blunt dilated. A Hasson trocar was inserted, and another two 5 mm trocars were inserted in the anterior and posterior axillary lines below the costal under laparoscopic direction. The renal fascia was dissected until the cyst was recognized. After visual inspection, the dome of the cyst was opened using bipolar scissors, and the fluid was aspirated using the suction irrigation device. A drain tube was inserted through the trocar in the posterior axillary line incision. After the cyst wall was excised, it was sent for pathologic interpretation. A sample of the fluid obtained for cytological analysis. About 5 h postoperatively all patients were filled out the visual analog scale (VAS) to evaluate postoperative pain. All patients underwent radiological follow-up with a repeated CT and/or USG immediately and six months after surgery. Procedural success was defined as no recurrence of the cyst and pain relief declaration by the patients.

Statistical Analysis

The Mann-Whitney *U* test and Chi-square test was used for comparing the groups of patients. $P < 0.05$ was considered statistically significant. The Statistical Package for the Social Science (SPSS Inc, Chicago, Illinois, USA) version 12.0.1.

RESULTS

The mean age of the patients were 54.65 ± 5.26 years in the retroperitoneal group and 56.0 ± 4.66 years in the transperitoneal group. For all patients the indication for surgery included right or left flank pain. The transperitoneal approach was performed in 20 (20/40) patients and the retroperitoneal approach was performed in 20 (20/40) patients. According to localization, 16 cysts were located in the upper pole (16/40), 8 cysts in the medial pole (8/40) and 16 cysts in the lower pole (16/40).

Table 2. Comparison of time of operations and visual analog scale score between study groups.

Variables	Transperitoneal	Retroperitoneal	P Value
Time, min			
Upper pole	55 ± 4.08	45 ± 3.54	.001
Middle pole	52 ± 2.74	43.3 ± 2.88	.02
Lower pole	48.13 ± 4.58	45 ± 3.78	.148
Total	51.5 ± 4.89	44.75 ± 3.43	.001
VAS score	6 ± 0.86	1.8 ± 0.52	.001

Abbreviation: VAS, visual analog scale.

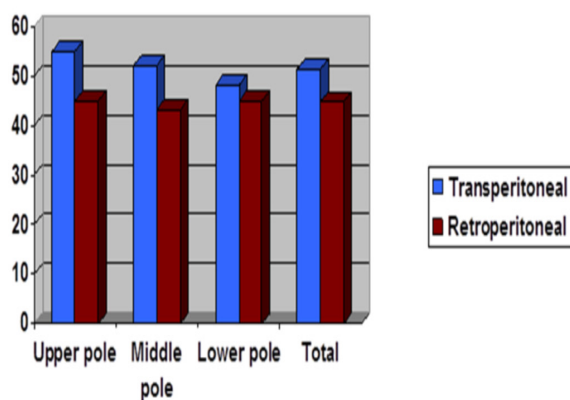


Figure 1. Comparison of operating time according to the types of surgical procedure.

The mean cyst size was 5.4 cm. The mean cyst size was for the transperitoneal and retroperitoneal approaches, was 5.5 cm and 5.25 cm, respectively. Among the cysts, 18 (18/40) were on the right side and 22 (22/40) were on the left side. The characteristics of the patients are summarized in **Table 1**.

The mean operative time from skin incision to the placement of last stitch for the transperitoneal approach was 51.5 min and that for the retroperitoneal approach was 44.75 min. This difference was statistically significant between the two groups ($P < .05$). When two methods were compared according to the location of the cysts that settled in the upper and middle poles, duration of operation is significantly shorter in the retroperitoneal approach than in the transperitoneal approach ($P = .001$ and $P = .02$, respectively), and it when it was determined in terms of time in the lower pole cysts, the difference between the two methods was not statistically significant ($P = .148$) (**Table 2**) (**Figure 1**).

VAS in the range of 0-10 was used in the scoring system of the patients (0 = absence of pain; 10 = worst possible pain). All patients filled out the VAS to eval-

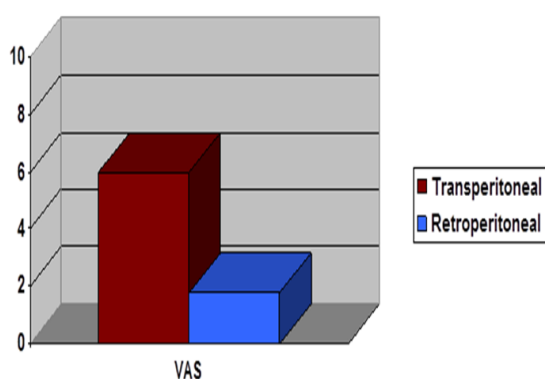


Figure 2. Comparison of VAS score according to the types of surgical procedure.

Abbreviation: VAS, visual analog scale.

uate postoperative pain. According to this scale, the retroperitoneal scoring method was found to be lower than the transperitoneal scoring method. This result was statistically significant ($P < .05$) (**Table 2**) (**Figure 2**). None of our patients had the need for a fourth port during the operation. All patients were discharged on the first postoperative day, and the drains were taken out. None of the patients had complications. At the end of six months, no clinical and radiological recurrence was detected in any patient. All patients had negative cytological and pathological findings for malignancy or any other abnormalities.

DISCUSSION

Benign cystic disease of the kidney is a common disease that is accidentally diagnosed by radiological examination. In recent years, with the increasing use of diagnostic tools such as US and CT scan, the number of renal cysts diagnosed has increased dramatically although most of them do not require treatment.⁽¹²⁾ Bosniak classification by CT scan is necessary after the diagnosis of cysts by ultrasonography.⁽¹³⁾ Simple cysts are type I and type II cysts according to Bosniak classification. In our study, Bosniak classification was applied to all patients after the diagnosis by US and CT scan. Only Bosniak type I cysts were included in the study.

The percutaneous cyst aspiration is non-invasive and does not require hospitalization; therefore, it is the first choice of treatment, but recurrence rates are reported to be up to 78%.⁽¹⁴⁾ The first percutaneous intervention for the treatment of simple renal cysts was performed by Dean in 1939.⁽⁴⁾ Many sclerosing agents such as ethanol, tetracycline, glucose phenol, povidone-iodine, bismuth-phosphate, cholohydrolyactate, polidocanol, pantopaque and ethanolamine oleate have been used to prevent the re-growth of cysts and the return of symptoms.⁽¹⁵⁾ The literature presents some successful reports about the usage of sclerosing agents, but the recurrence rates still range from 32% to 100%.^(16,17) Although rare, sclerosing agents have potential side effects such as migration to the collecting system, allergy, anaphylaxis, pneumothorax, hematoma and adjacent organ damage. Moreover the entry of a sclerosing substance into the collecting system could cause ureteropelvic junction obstruction in long term follow-up.⁽¹⁶⁻¹⁸⁾ A previous study by Okeke and colleagues compared the percutaneous treatment with the laparoscopic excision and found that laparoscopic treatment was the better option.⁽¹⁹⁾

In generally simple renal cyst is asymptomatic and intervention is not necessary unless it develops symptoms or complications. In our series, our indication was pain unresponsive to analgesics.

Today, laparoscopic cyst decortication has become the method of choice due to its lower rates of relapse, mortality, and morbidity compared with open surgery.⁽²⁰⁾ Although the transperitoneal approach has been used in the laparoscopic treatment of renal cysts for years, the retroperitoneal approach has recently become an alternative method.⁽²¹⁻²³⁾ The most important advantages of the retroperitoneal approach are that the risk of intraperitoneal organ damage is low and that the retroperitoneum is limiting in conditions such as bleeding and urinoma. Its most important disadvantage is its narrow operational area.⁽¹⁴⁾ Although many authors prefer the transperitoneal approach for renal cysts, the retroperito-

neal approach is accepted as the simpler method particularly for cysts located in the dorsal part of the kidney.⁽¹⁵⁾ The transperitoneal approach was demonstrated to be more effective and associated with minimal morbidity particularly for large renal and adrenal cysts, regardless of the location.^(15,24) Conversely, the retroperitoneal approach is more preferred to reduce the complications associated with the challenge in port entries caused by the adhesion in patients with previous abdominal surgery.⁽²⁰⁾ In their series, Huri and colleagues showed that previous abdominal surgery was not important in preferring the transperitoneal or the retroperitoneal approach.⁽²⁰⁾ In our case, we used the retroperitoneal method in two patients with previous abdominal surgery. In the literature, the symptomatic success rate ranges between 78% and 100%, and the radiological success rate is between 80% and 100% in patients who underwent laparoscopic surgery. In a survey on 19 consecutive patients, Tefekli and colleagues reported a radiological success rate of 88.2% and a symptomatic success rate of 89.5%, they used the retroperitoneal approach in all of their cases.⁽²⁵⁾ Geçit and colleagues reported radiological and symptomatic success rates of 100%.⁽²⁶⁾ In our series, the symptomatic and radiological success rates were 100% in both methods. Compared in terms of success, none of the methods was superior. When analyzed in terms of operation time, Rassweiler and colleagues reported a mean operation time of 65 min in their series consisting of 50 cases of laparoscopic retroperitoneal cyst decortication.⁽²⁷⁾ In a similar study to ours, Huri and colleagues reported that the mean operation time was 57.3 min for the transperitoneal approach and 47.2 min for the retroperitoneal approach in their series of 24 cases.⁽²⁰⁾ In recent years, surgeons have made some modifications, such as finger assisted laparoscopic cyst excision to decrease the operation time.⁽¹⁰⁾ In our series, the mean operation time was 51.5 min for the transperitoneal approach and 44.75 min for the retroperitoneal approach. In our study, the patients completed a VAS 5 h after the operation for postoperative pain assessment. According to this scale, the score of patients operated on using the retroperitoneal method was significantly lower than that of the patients who were operated using the transperitoneal method. We consider the low level of pain associated with the retroperitoneal method to be due to the absence of preperitoneal insufflation which may cause lower postoperative pain.

CONCLUSIONS

In conclusion, based on the present experience, laparoscopic cyst excision is a good alternative to open surgery as a safe, effective, and minimally invasive method. Although the transperitoneal and retroperitoneal approaches are not superior to each other, we consider the retroperitoneal approach to be the first-choice because of its shorter operation time and particularly low level of postoperative pain.

CONFLICT OF INTEREST

None declared.

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