Surgical outcomes of retroperitoneal laparoscopic renal cyst decortication at Nghe An Friendship General Hospital

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ABSTRACT

Objective: To describe the clinical and paraclinical characteristics and evaluate the surgical outcomes of retroperitoneal laparoscopic renal cyst decortication. ***Subjects and Methods***: A prospective cross-sectional descriptive study was conducted on patients with a confirmed diagnosis who underwent retroperitoneoscopic renal cyst excision at Nghe An Friendship General Hospital from January 2025 to December 2025. ***Results***: A total of 64 patients were included, with a mean age of 57.3 ± 14.7 years (range: 19–76), with a female-to-male ratio of 1.1:1. A total of 43/64 patients (67.1%) had a history of chronic medical conditions, and 4/64 patients (6.7%) had previously undergone urological surgery. Flank pain was the most common presenting symptom, reported in 84.4% of the patients. Imaging findings showed that the mean cyst diameter measured by computed tomography (CT) and ultrasonography was 78.6 ± 25.9 mm (58–121 mm) and 80.4 ± 26.1 mm (60–126 mm), respectively. The proportion of cysts measuring 50–100 mm was 76.6% on CT and 79.7% on ultrasound, while thin-walled cysts accounted for 90.6% and 93.7% on CT and ultrasound, respectively. The mean operative time was 54.5 ± 10.8 min (range: 25–73 min), and no intraoperative complications were recorded. Postoperative complications included bleeding through the drainage tube in two patients (3.1%). The mean length of hospital stay was 3.08 ± 0.74 days (range, 2–5 days). At the 1-month postoperative follow-up, 7.8% of the patients still experienced flank pain, and 3.1% had residual renal cysts detected on ultrasonography. ***Conclusion:*** Retroperitoneal laparoscopic renal cyst decortication is a safe and effective surgical method for treating renal cysts.

Keywords: *Renal cyst; renal cyst decortication; retroperitoneal laparoscopic surgery.*

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INTRODUCTION

Renal cysts are a relatively common disorder of the urinary system that arise from the renal parenchyma and typically do not communicate with the renal collecting system. In many cases, renal cysts progress insidiously and are incidentally detected on imaging studies when patients are evaluated for other medical conditions [1]. Most renal cysts are asymptomatic. However, when the cyst enlarges, it may compress adjacent structures, leading to clinical manifestations such as flank pain, hypertension, and urinary tract infection, or complications such as intracystic hemorrhage, cyst rupture, or dilatation of the renal calyceal–pelvic system.

Currently, imaging modalities play an essential role in the detection and evaluation of renal cysts. Among them, computed tomography (CT) of the urinary tract is considered a highly valuable method for establishing a definitive diagnosis. On CT

imaging, renal cysts are commonly classified according to the Bosniak classification system, which is used to assess the risk of malignancy and guide clinical management [3]. For simple renal cysts (Bosniak I–II), treatment is generally indicated only when the cyst becomes large, causes clinical symptoms, or leads to complications. In contrast, cystic lesions with higher Bosniak categories require careful surveillance and management because they may represent cystic renal tumors [3], [4].

Several treatment modalities have been applied in the management of renal cysts, including simple cyst aspiration, aspiration combined with sclerosing agent injection, open surgery, and laparoscopic surgery [4]. Among these, retroperitoneal laparoscopic renal cyst decortication has been increasingly adopted because of its minimally invasive nature, shorter recovery time, and favorable therapeutic outcomes. At Nghe An Friendship General Hospital, this technique has been routinely implemented for many years and has yielded encouraging results in the treatment of renal cysts.

Based on clinical practice, we conducted this study with the objective to: "Describe the clinical and paraclinical characteristics and evaluate the outcomes of retroperitoneal laparoscopic renal cyst decortication in patients treated at Nghe An Friendship General Hospital from January 2025 to December 2025."

PATIENTS AND METHODS

Patients

Patients diagnosed with solitary renal cysts who underwent retroperitoneal laparoscopic renal cyst decortication at the Department of Urology, Nghe An Friendship General Hospital, between January 2025 and December 2025 were included in the study.

Inclusion criteria: Patients diagnosed with renal cysts and indicated for treatment by retroperitoneal laparoscopic renal cyst decortication were included in the study. Eligible patients had cysts with a diameter greater than 50 mm, or cysts smaller than 50 mm but associated with clinical symptoms or compression of the renal calyceal–pelvic system. In addition, the cysts were required to be classified as Bosniak category I or II on imaging studies and located peripherally in the kidney.

Exclusion criteria: Patients with renal cysts smaller than 50 mm in diameter without clinical symptoms were excluded from the study. In addition, patients with contraindications to endotracheal general anesthesia or contraindications to retroperitoneal laparoscopic surgery were also excluded.

Methods

This study was designed as a prospective descriptive cross-sectional study. All patients who met the inclusion criteria during the study period were enrolled using a total sampling method. From January 2025 to December 2025, a total of 64 patients undergoing retroperitoneal laparoscopic renal cyst decortication were included in the study.

The variables collected in the study included demographic characteristics such as age, sex, and medical history. Clinical manifestations recorded were flank pain, hypertension, dysuria and urinary frequency, hematuria, incidental detection, and associated comorbidities. Paraclinical parameters included cyst size and cyst wall thickness, assessed using computed tomography (CT) and ultrasonography (US). Surgical outcomes were evaluated based on

operative time, intraoperative complications, and postoperative complications.

The collected data were processed and analyzed using SPSS software (version 21.0). Continuous variables were expressed as mean ± standard deviation, while categorical variables were presented as frequencies and percentages.

This study was conducted for scientific research purposes, and all patient information was kept strictly confidential.

RESULTS

General Characteristics of the patients

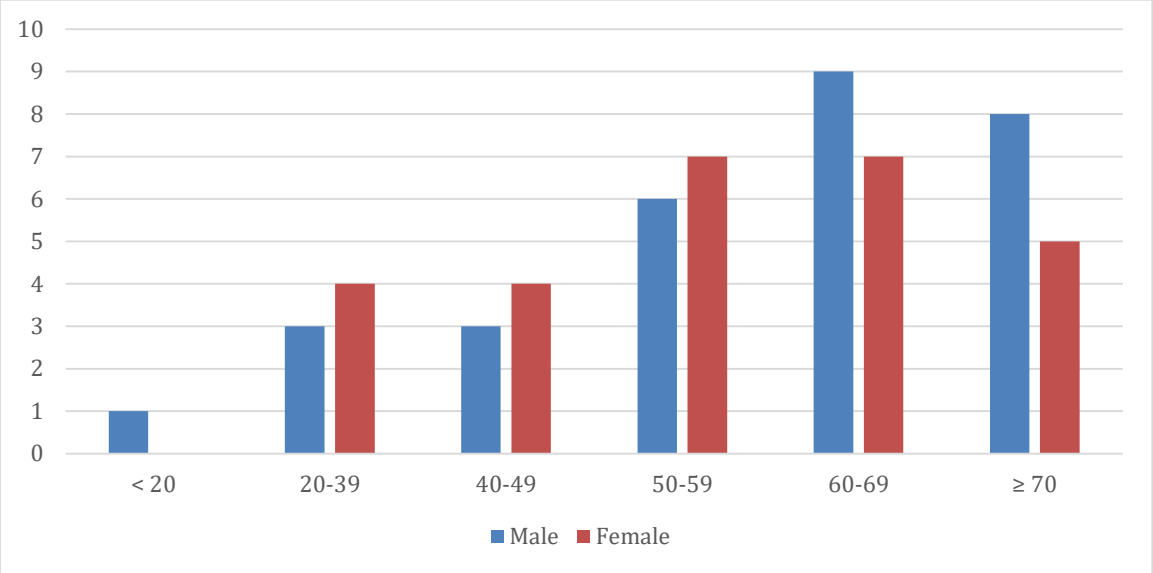

Figure 1. *Distribution of patients by age group and sex (n = 64)*

Comment: The mean age was 57.3 ± 14.7 years, with the oldest patient being 76 years old and the youngest being 19 years old. The majority of patients were over 50 years of age, accounting for 67.1%. The male-to-female ratio was 1.1:1.

Clinical and paraclinical characteristics of the patients

Table 1. *Reasons for hospitalization (n = 64)*

Symptom	Number (n)	Percentage (%)
Flank pain	54	84,4
Dysuria and urinary frequency	3	4,7
Hypertension	2	3,1
Incidentally detected	5	7,8
Total	**64**	**100**

Comment: Most patients were admitted with flank pain (84.4%). Five patients (7.8%) were incidentally detected during routine health check-ups.

Table 2. *Characteristics of renal cysts on imaging (n = 64)*

Characteristic	Number (Percentage %)

		CT	Ultrasonography
Diameter (mm)	50 – 100mm	49 (76,6%)	51 (79,7%)
	>100mmm	15 (23,4%)	13 (20,3%)
	Mean	78,6 ± 25,9	80,4 ± 26,1
Cyst wall thickness	Thin	58 (90,6%)	60 (93,7%)
	Thick	6 (9,4%)	4 (6,3%)
Bosniak classification	I	54	84,4
	II	10	15,6

Comment: The cyst diameter was mainly within the range of 50–100 mm on both CT and ultrasonography, with relatively similar mean sizes between the two imaging modalities. Most cysts had thin walls, whereas thick-walled cysts accounted for a small proportion. On CT imaging, the majority of cysts were classified as Bosniak I, accounting for 84.4%, while Bosniak II accounted for 15.6%. No cases of Bosniak III or IV were observed.

Surgical outcomes in the treatment of renal cysts

Table 3. *Operative time (n = 64)*

Operative time	Number (n)	Percentage (%)
< 30	3	4,7
30 – 60	41	64,1
>60	20	31,2
Mean	54,5 ± 10,8 min (25–73)	

Comment: The mean operative time was 55 min, ranging from 25 to 73 min. No intraoperative complications were recorded during surgery, and no cases required conversion to open surgery. Regarding postoperative complications, our study recorded two cases of bleeding through the drainage tube, accounting for 3.1%.

Table 4. *Postoperative pain (n = 64)*

Postoperative pain status		Number (n)	Percentage (%)
Postoperative pain intensity according to VAS	Mild pain	61	4,7
	Moderate pain	3	95,3
Number of days of analgesic use	1	60	93,8
	2	4	6,2
	mean	1,1 ± 0,24 days	

Comment: After surgery, most patients experienced mild postoperative pain (95.3% of patients). Most patients required analgesics for only 1 d (93.8%). The mean duration of analgesic use was 1.1 ± 0.24 days.

Table 5. *Length of hospital stay (n = 64)*

Length of hospital stay	Number (n)	Percentage (%)

2 - 3 days	61	4,7
≥ 4 days	3	95,3
Mean	3,08 ± 0,74 days (2–5)	

Comment: The mean length of hospital stay was 3.08 ± 0.74 days, ranging from 2 to 5 days. Most patients had a postoperative hospital stay of 2–3 days, with only 4.7% staying for > 3 days.

Table 6. *Follow-up outcomes at 1 month after surgery (n = 64)*

1-month follow-up	Number (n)	Percentage (%)
Flank pain	5	7,8
Residual cyst on ultrasonography	2	3,1

Comment: At the 1-month follow-up, a small number of patients still experienced flank pain, while the rate of residual cysts on ultrasonography was very low.

DISCUSSION

General characteristics of the patients.

Regarding age distribution, the highest proportion of patients belonged to the group over 50 years old, accounting for 67.1%. The mean age of patients in this study was 57.3 ± 14.7 years; the oldest patient was 76 years old and the youngest was 19 years old (Table 3.1). These results indicate that the disease can occur across various age groups; however, it is more common in individuals aged > 50 years. This age group is also frequently associated with chronic comorbidities, which may increase the risk of surgery. Therefore, selecting a minimally invasive surgical approach and shortening the operative time are essential. Laparoscopic surgery for the treatment of this condition meets these criteria, thereby contributing to the reduction of intraoperative and postoperative complications in patients with obesity.

The proportion of male and female patients in this study was nearly equal. This finding is consistent with the study by Lorn Sopheak (2021), which reported a male-to-female ratio of 1:1 [5], as well as the study by Tran Quoc Hoa (2023), in which males accounted for 57.6% and females for 42.4% [6]. Therefore, we found no evidence suggesting that sex is associated with the risk of developing this disease.

Clinical and paraclinical characteristics of the patients

In our study, 54 of 64 patients presented with intermittent flank pain or a sensation of heaviness in the lumbar region, accounting for 84.4%. Among these patients, four had flank pain associated with hypertension, and two had flank pain with a positive renal ballottement sign. In addition, five patients (7.8%) were incidentally diagnosed during routine health checkups.

This rate is comparable to the findings of Ho Thanh Ut (2020), in which the proportion of patients presenting with flank pain was 100% [7], and the study by Lorn Sopheak (2021), which reported that 40 out of 46 patients experienced flank pain, accounting for 86.96% [5]. Flank pain is a nonspecific but the most common symptom, often causing discomfort and prompting patients to seek medical attention. This symptom significantly affects the daily activities and work of patients. Therefore, pain severity is

an important factor when considering surgical indications to improve the patient's quality of life.

Ultrasonography and computed tomography: No significant difference was observed in cyst diameter or cyst wall thickness between ultrasonography and computed tomography (Table 3.3). The mean renal cyst diameter on ultrasonography was 80.4 ± 26.1 mm (60–126 mm), whereas it was 78.6 ± 25.9 mm (58–121 mm) on computed tomography. These results are comparable to those a of study by Nguyen Ngoc Anh (2016) [8], in which the mean renal cyst diameter was 77.25 ± 16.8 mm. The evaluation of renal cysts using computed tomography and ultrasonography not only assists in establishing the diagnosis but also helps surgeons better plan the surgical approach and determine the optimal dissection pathway to locate the renal cyst during surgery.

In this study, Bosniak category I cysts accounted for 84.4%, while category II cysts accounted for 15.6%. These results are similar to those reported by Tran Hieu Hoc (2017), in which Bosniak category I cysts accounted for 87.5% and category II for 14.3% [4], as well as the study by Tran Quoc Hoa (2023), with corresponding proportions of 75.8% and 24.2% [6]. Currently, the Bosniak classification is widely used to evaluate the severity of renal cysts, guide the selection of surgical methods, and assist in patient follow-up and prognosis. In this study, we performed retroperitoneal laparoscopic surgery in patients with renal cysts classified as Bosniak I or II based on computed tomography findings.

Surgical outcomes in the treatment of renal cysts

In our study, the mean operative time was 56 min, calculated from the initial skin incision for trocar placement to the completion of closure of the trocar sites. The operative time ranged from 36 to 86 min. These results are comparable to those reported in several previous studies. Specifically, Ho Thanh Ut (2020) reported a mean operative time of 69 min, while Lorn Sopheak (2021) reported an average operative time of 54.74 min [5], [7]. Minor differences between studies may be related to several factors, such as the size and location of the renal cyst, the surgeon's experience, and the availability of laparoscopic surgical equipment at each institution.

During surgery, no intraoperative complications were recorded, and no cases required conversion to open surgery. Intraoperative blood loss was generally minimal, usually limited to soaking a single laparoscopic gauze, with the maximum estimated blood loss of approximately 20 ml. Regarding postoperative complications, our study recorded two cases of bleeding through the drainage tube, with blood loss of less than 100 ml. This may be related to oozing from the resected cyst wall surface; however, the clinical course remained stable, with no signs of progressive bleeding. Both cases were managed conservatively and subsequently discharged after 4 and 5 days of treatment, respectively. In addition, we did not observe any other complications, such as urinary leakage, fluid collection, or surgical site infection. In comparison, Tran Hieu Hoc (2017) reported one case of urinary leakage (1.8%), one case of fluid collection (1.8%), and one case of trocar site infection (1.8%) [4]. Although the complication rate in our study was lower, this difference may be attributed to factors such as sample size, patient selection criteria, or surgical experience.

Regarding postoperative pain control, most patients in our study required intravenous analgesics only during the first postoperative day, accounting for 96.9%. Only two patients (3.1%) required intravenous analgesics for two days after surgery, after which the pain symptoms markedly improved and the patients were discharged. The duration of analgesic use in our study was shorter than that reported by Lorn Sopheak (2021), in which the mean duration was 2.72 days [5]. This finding suggests that the surgical procedure is relatively minimally invasive, allowing patients to recover quickly and reducing the need for prolonged analgesia.

Regarding postoperative hospital stay, the results showed that the mean length of hospitalization was 3.3 ± 1.02 days, ranging from 2–6 days. Most patients (89.1%) were discharged within 2–4 days after surgery. These findings are relatively consistent with those a of study by Tran Quoc Hoa (2023), in which 90.9% of patients were discharged 2 days after surgery [6]. The short hospital stay reflects the effectiveness of the retroperitoneal laparoscopic approach in reducing surgical trauma and promoting postoperative recovery. In our study, apart from the two cases of minor bleeding through the drainage tube, no additional postoperative complications were recorded; therefore, shortening the length of hospital stay may be considered in patients with an uneventful postoperative course.

At the 1-month postoperative follow-up, five patients (7.8%) still experienced flank pain; however, the pain intensity was markedly reduced compared with the preoperative condition and responded well to analgesic therapy. Follow-up ultrasonography showed that 62 of the 64 patients (96.9%) had no residual renal cysts, whereas 2 patients (3.1%) still had cysts. However, the remaining cysts measured only approximately 15–20 mm in diameter, representing a reduction of more than 50% compared with the initial size, and the patients had no clinical symptoms at the time of reassessment. These findings indicate that retroperitoneal laparoscopic renal cyst decortication is highly effective in the treatment of simple renal cysts and significantly improves patients' clinical symptoms.

CONCLUSION

Based on the analysis of 64 cases in this study, surgical intervention was primarily indicated in patients who presented with clinical symptoms. The study results demonstrate that retroperitoneal laparoscopic renal cyst decortication is a minimally invasive and safe procedure with favorable therapeutic outcomes. In addition, this technique offers advantages in terms of cosmetic results, low postoperative pain, and rapid recovery. With these advantages, this method can be routinely implemented in medical centers equipped with laparoscopic surgical systems and adequately trained surgical teams.

REFERENCES

1. Radiology. Steven Sussman, et al. (1984). "Hyperdense renal masses: A CT manifestation of hemorrhagic renal cysts." Radiology, 150, pp. 207–211.
2. Tran Cho Thanh (2002). "Indications and outcomes of laparoscopic renal cyst decortication for simple renal cysts." Residency thesis, Hanoi Medical University.
3. Nguyen Hoang Duc, et al. (2005). "Retroperitoneal and transperitoneal laparoscopic renal cyst decortication." Ho Chi Minh City

Journal of Medicine, Supplement No. 1, Vol. 9.
4. Tran Hieu Hoc and Tran Que Son (2017). “Laparoscopic decortication of simple renal cysts at Bach Mai Hospital.” Vietnamese Journal of Laparoscopic Surgery, Vol. 7, No. 1, pp. 24–30.
5. Lorn Sopheak, et al. (2021). “Outcomes of retroperitoneal laparoscopic renal cyst decortication at Bach Mai Hospital.” Vietnam Medical Journal, 506(2).
6. Tran Quoc Hoa and Trinh Nam Son (2024). “Outcomes of retroperitoneal laparoscopic renal cyst decortication at Hanoi Medical University Hospital.” Vietnam Medical Journal, 533(1B), pp. 66–70.
7. Ho Thanh Ut and Dam Van Cuong (2023). “Treatment outcomes of symptomatic renal cysts using retroperitoneal laparoscopic cyst decortication.” Can Tho Journal of Medicine and Pharmacy, 29, pp. 21–27.
8. Nguyen Ngoc Anh (2016). “Study of clinical and paraclinical characteristics and treatment outcomes of renal cysts using laparoscopic surgery at Can Tho Central General Hospital and Can Tho City General Hospital.” Medical Doctor thesis, Can Tho University of Medicine and Pharmacy.