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A Clinical Control Study on the Retroperitoneal Laparoscopy for Unilateral Simple Renal Cyst Decortication in Day Surgery Mode

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Research Article

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ABSTRACT

Background: To evaluate the safety, efficacy, adverse events, and feasibility of the Retroperitoneal Laparoscopy for Unilateral Simple Renal Cyst Decortication (RLFUSRCD) in day surgery mode and to compare the advantages and the disadvantages with conventional inpatient ward mode.

Methods: A total of 41 patients with unilateral simple renal cyst meeting surgical indications randomly assigned to undergo the retroperitoneal laparoscopy for cyst decortication in day surgery mode or in inpatient ward mode. The preoperative parameters, operative time, hospital stay, perioperative complications, and related data were recorded.

Results: With the help of the day surgery team, patients in the day ward group successfully completed admission, surgery, and discharge within 24 hours. The mean operation time (47.3 ± 6.1 *vs.* 50.8 ±7.8) minutes, the mean intraoperative blood loss (11.4 ± 4.5 *vs.* 13.0 ± 5.2) milliliter, the postoperative complications (1 (5%) *vs.* 2 (9%)), the patients' satisfaction rate (17 (89%) *vs.* 21 (95%)), the quality of life score (38.1 ± 5.5 *vs.* 38.3 ± 5.2) were no significantly different (P>0.05) and the mean total costs of hospitalization (5790 ± 99.8 *vs.* 7496 ± 120.6) (Chinese Yuan) and the mean time of hospitalization (22.7 ± 1.4 *vs.* 46.4 ± 11.3) (hours) were significantly different between the day ward group and the inpatient ward group (P<0.05).

Conclusions: With the help of the day surgery team, 24 hours discharge following RLFUSRCD was safe and feasible in well-selected patients. Complications were similar between the two groups.

Keywords: Day surgery; Simple renal cyst; Retroperitoneal laparoscopy; Medical resource; Medical cost

Abbreviations: ASA: American Society of Anesthesiologists; IAAS: International Association for Ambulatory Surgery; CT: Computed Tomography; RLFUSRCD: Retroperitoneal Laparoscopy for unilateral Simple Renal Cyst Decortication; QOL: Quality of Life; HIV: Human Immunodeficiency Virus; cm: centimeter; CNY: Chinese Yuan; COVID-19: Coronavirus Disease 2019

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INTRODUCTION

The concept of day surgery was first proposed by James Nicoll, a famous British pediatric surgeon in 1909. It was defined as selecting the appropriate patients to complete hospitalization, surgery, short-term observation, recovery and discharge within 1 working day. Day surgery is also known as same-day surgery, ambulatory surgery, and outpatient surgery, with terms varying from country to country. Many urological procedures are already routinely performed in the day surgery mode and bring lots of benefits to patients. However, there are few reports on the Retroperitoneal Laparoscopy for Unilateral Simple Renal Cyst Decortication (RLFUSRCD) in day surgery mode so far. Most surgeons of domestic hospitals in China still choose this treatment in inpatient ward mode. A review of the literature found that in most cases, the length of hospital stay was between 2 and 6 days. To evaluate the safety, efficacy, adverse events, and feasibility of the RLFUSRCD in day surgery mode, we conducted a single-center and case-control study for comparisons [1].

MATERIALS AND METHODS

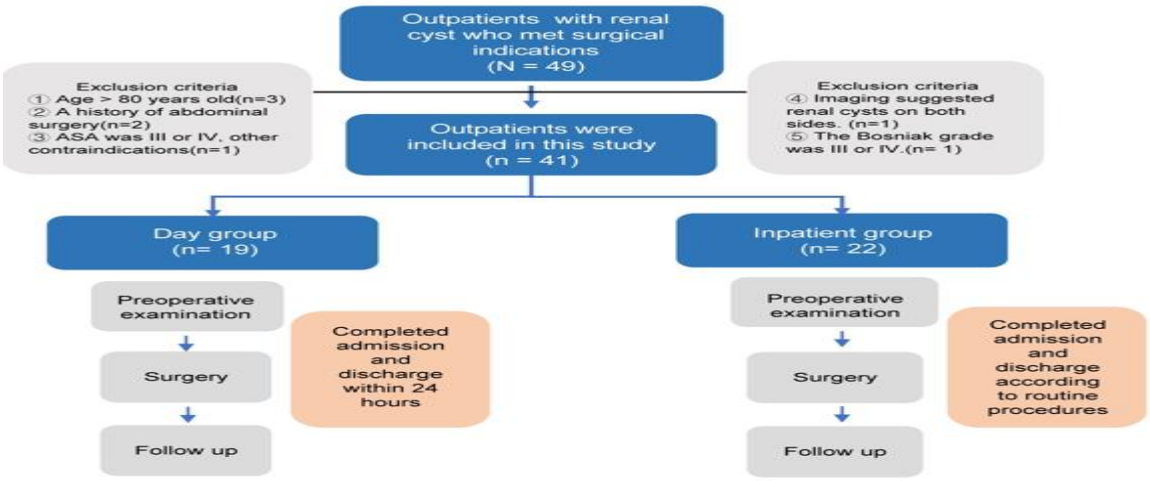
Study population

During the period from 15 January 2018 to 15 March 2019, 49 patients with renal cyst who met surgical indications were enrolled in the urology outpatient. The patients of day ward group completed all preoperative examinations in the outpatient department and completed admission, operation and discharge within 24 hours. The surgical indication was that the maximum diameter of simple renal cyst was more than 4 centimeter and there was obvious renal parenchyma compression and damage on imaging, or there were clinical symptoms such as waist swelling, hematuria and so on [2].

Exclusion criteria:

- Age>80 years.
- A history of previous abdominal surgery.
- Preoperative American Society of Anesthesiologists (ASA) grade was III or IV, or contraindications to surgery or anesthesia.
- Imaging suggested renal cysts on both sides.
- The Bosniak grade in imaging was III or IV. A total of 41 patients finally were included in this clinical control study and were randomized to the day ward group (19 patients) and the inpatient ward group (22 patients) (Figure 1) [3-5].

Figure 1. Flow chart of study design and participants.



Preoperative examination

All enrolled patients needed to complete preoperative examinations, such as: Laboratory examination, imaging examination of renal cyst, electrocardiogram, etc. In addition to the above, patients who were more than 60 years old also needed to complete the cardiopulmonary function and vascular ultrasound examination. Patients in the day ward group completed the above examinations in the outpatient department, and were evaluated with ASA by the outpatient anesthesiologist.

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Surgery and enhanced recovery after surgery

We set up a postoperative rehabilitation management team which consists of doctors, anesthesiologists, and nurses. The main components include assessing the patient's postoperative gastrointestinal function, evaluating postoperative pain, assisting the patient to get out of bed, and completing some of the postoperative patient's laboratory tests and imaging in a timely fashion [6,7].

Discharge criteria of RLFUSRCD in day surgery mode

In order to facilitate the clinical practice and ensure the postoperative safety of patients in the daytime mode, we made reference to previous articles on the operation in the daytime mode and formulated the discharge standard of RLFUSRCD in the daytime mode (Table 1). All patients in the day surgery mode must underwent the evaluation of discharge criteria [8].

Table 1. Discharge criteria of RLFUSRCD in day surgery mode.

	Vital signs were stable	**Gastrointestinal function (anal exhaust)**	**Get out of bed by themselves**	**Abdomen was plain and soft**	**The drainage tube has been removed**	**No significant decrease in hemoglobin**	**No obvious perirenal effusion (CT)**	**Accompanied by family members**
Yes								
No								
Not sure								
Notice: The patient needed to get 8 "Yes" before leaving the hospital.								
Signature:			Date:					

Collection of clinical data and follow-up data

The clinical data included basic characteristics, imaging data and surgical data and the follow-up data included imaging examination of renal cyst recurrence, Quality of Life score (QOL), and satisfaction and so on. The main comparisons between two groups were conducted including operation time (minute), duration of hospitalization (hour), intraoperative blood loss which was evaluated by the surgeon and anesthesiologis (milliliter), time of postoperative drainage tube removal (from insertion of drainage tube to removal of drainage tube) (hour), the incidence of postoperative complications (incision exudation, incision infection and urinary tract infection), the total costs of hospitalization (Chinese Yuan) (CNY), the postoperative patients' satisfaction rate (%), preoperative and postoperative patients' quality of life scores, renal cyst recurrence after surgery, etc.

Statistical analysis

Statistical software SPSS 19.0 was used for statistical analysis. Mean ± standard deviation (x ± s), n (%), n/N (%) were applied to represent the results of the data. The t-test was used for data of measurement, and the χ^2 test was used for data of count. When $p<0.05$, the difference was considered to be statistically significant [9].

Ethics approval and consent to participate

The principles of the Helsinki declaration were followed in this study. The First Affiliated Hospital of Wenzhou Medical University ethics review committees approved this study. All of the patients have informed consent form before undergoing the operation.

RESULTS

Results of clinical data

The data collected from 41 patients included clinical characteristics, imaging characteristics, surgery-related data. All cases were successfully operated under laparoscope without being converted to open surgery, and no peritoneal rupture occurred during the operation. Patients in the day ward group successfully completed admission, surgery, and discharge procedures within 24 hours. The mean operation time (47.3 ± 6.1 *vs.* 50.8 ± 7.8) minutes, the mean intraoperative blood loss (11.4 ±

4.5 *vs.* 13.0 ± 5.2) milliliter, the post-operative complications (2 (10%) *vs.* 2 (9%)), the patients' satisfaction rate (17 (89%) *vs.* 21 (95%)), the quality of life score (38.1 ± 5.5 *vs.* 38.3 ± 5.2) were no significantly different (P>0.05) and the mean total costs of hospitalization (5790 ± 99.8 *vs.* 7496 ± 120.6) (CNY) and the mean time of hospitalization (22.7 ± 1.4 *vs.* 46.4 ± 11.3) (hours) were significantly different between the day ward group and the inpatient ward group (P<0.05).

Results of surgical complications

Complications occurred in a total of 3 (7%) patients including obvious postoperative incision exudation in 2 (5%) patients, and postoperative urinary tract infection in 1 (2%) patient. For the standard of incision exudation, we included the patients with gauze use for exudation over 2 pieces and over 2 times incision dressing change after the procedure. The postoperative urinary tract infection was identified to be staphylococcus aureus in cultures with recovery by oral antibiotic treatment.

Results pathology of renal cyst

All patients' cystic fluid was clear except for one patient with cloudy cystic fluid. All removed cyst tissue specimens were confirmed benign renal cyst wall by histopathological examination.

Results of follow-up

CT or ultrasound examination was used to observe the hydronephrosis or recurrence of renal cyst after renal cyst decortication procedure. All the patients underwent CT or ultrasound examination, indicating the original renal cyst had been surgically decorticated with no recurrence of the cyst at the time of 10-12 months follow-up. Regarding satisfaction rate and Quality of Life (QOL) scores at 2 weeks after procedure, the inpatient ward group was slightly higher than the day ward group, but there was no significant difference. Ultrasound examination indicated that patients with mild hydronephrosis were relieved at two weeks after procedure. Six patients with preoperative swelling were relieved after 3 months of postoperative follow-up. Hematuria disappeared in 3 out of 4 patients with preoperative hematuria, who received exfoliative cytology but no suspicious malignant cells, remaining 1 patient with positive continuous hematuria refused further invasive examinations suggestion, such as cystoscopy, but still in long-term follow-up at our urology outpatient clinic.

DISCUSSION

Surgical indications of simple renal cyst

Due to the development of imaging technology and medical insurance on screening, more and more renal cysts are being found in humans. Renal cysts are usually one of the most common diseases. Most people are asymptomatic and a small number of patients have symptoms such as pain, hypertension, hematuria, recurrent urinary tract infection and even cyst rupture. In practice for patients with simple renal cyst (Bosniak I and II), if the maximum diameter of cyst is less than 4 cm with no clinical symptoms, the patient is usually advised to regularly follow up. There are many treatment options for renal cyst, such as percutaneous aspiration with or without sclerosing agent, laparoscopy of simple renal cysts, holmium laser incision for simple renal cysts by flexible ureteroscope and percutaneous unroofing for simple renal cysts.

Advantages and disadvantages of RLFUSRCD

Laparoscopic renal cyst decortication has the characteristics of less trauma, faster recovery, and better efficacy than open surgery. In terms of laparoscopic path selection, Levent Ozcan et al. showed that the retroperitoneal approach should be the first-choice for renal cysts because of its shorter operation time and particularly low level of postoperative pain. For those with large renal cysts, Dong-soo Ryu et al. showed that the retroperitoneal approach had the advantages of reduced operation time, time to oral intake and ambulation, as well as analgesic use. In the case of infected cysts, the retroperitoneal approach may reduce the incidence of peritoneal spread. However, the retroperitoneal space was small, and the peritoneal was easily damaged, which required high requirements of laparoscopic technology for the surgeon. Considering that no intraoperative peritoneal damage occurred in this study, we recommended that the RLFUSRCD in the day surgery mode by experienced clinicians may be safer. In addition, Shicong Lai et al. found that the peri-renal pedicle fat tissue wadding technique can decrease the cyst recurrence rate and represent an effective and safe treatment option in the management of renal cysts.

The team of day surgery

With the concepts of accelerated rehabilitation surgery and postoperative pain-free surgery developing in practice, the day surgery has become popular in hospital because of its simplified and standardized process of admission, diagnosis,

treatment, and discharge. In this study, we specifically developed a flow chart of RLFUSRCD in the day mode that includes the concept of rapid recovery, which was easy to apply and easily understood in clinical practice. Studies had shown that although surgery is performed in the daytime mode, there were still many patients with perioperative anxiety. High levels of anxiety had been shown to adversely affect the procedure and had become an important factor in the outcome of surgery. Therefore, our team adopted preoperative education, assessment of patients' pain and gastrointestinal function to reduce patients' anxiety. None of the patients in the day surgery mode in this study had a second admission. Although the discharge criteria was not official, our team had fully considered the safety of patients. It was convenient and comprehensive for the team to use this criteria to assess discharge within a short period of 24 hours.

Advantages of day surgery mode

It had been shown that the longer a patient has a catheter, the higher the risk of urinary tract infection. Reduction of the duration of catheterization and length of hospital stay of the patient had a positive impact in reduction of catheter-related urinary tract infections. The results of this study showed that patients could have their drains removed within 24 hours and had an acceptable rate of post-operative complications. There was no significant difference between two groups in comparison of the surgery related outcomes (operation time, intraoperative blood loss, renal cyst recurrence, post-operative quality of life score). This indicated that the study of RLFUSRCD in the day surgery mode is feasible and satisfactory. However, the time and cost of hospitalization were significantly shortened, which reduced the medical expenses and health resources need. In addition, for the prevention and control of the COVID-19 pandemic, day surgery mode could be one of the best options suitable for patients.

Summary of this study

Appropriate patient candidate selection and adequate preoperative assessment and preparation can be critical for prerequisites for the success of the day surgery. Antecedents to recovery, the time required to recover, support and encouragement, regular appropriate information, and setbacks during recovery were all thought to affect the recovery process in positive or negative directions. Therefore, we summarized the characteristics and requirements of RLFUSRCD in the day mode as follows:

- The surgeon with experience in laparoscopic operation. Through preoperative ultrasound or CT, the surgeon could carefully analyze the location, size, number of renal cyst and surrounding blood vessels.
- Preoperative ASA was I or II without other contraindications.
- The patient was younger than 80 years old.
- The standardized cooperation process protocols from the postoperative management team could timely assess postoperative pain, intestinal function, and drainage.
- The postoperative management team scheduled postoperative exam process timely, like CT and blood test.
- Every postoperative patient was evaluated by the team according to the discharge criteria.

Limitations

This study has several limitations. It was a prospective investigation, single-center and case-controlled study. All cases were limited to simple and unilateral renal cyst cases with several other limitations, we cannot conclude if it is still safe and effective in other situations, like bilateral renal cyst, other Bosniak grades, or even complicated renal cyst under day surgery mode. Therefore, further investigations and large-size study may be required to confirm if patients with surgically-indicated renal cysts have benefit from the day ward mode.

Prospects of RLFUSRCD in the day surgery mode

Day surgery is considered to be a high-quality, safe, and cost-effective surgical mode, which requires clinicians to continuously explore and accumulate evidences in practice. With the development of minimally invasive techniques, as well as the application of painless and rapid rehabilitation concept, we believe that the criteria will be broadened as the number of clinical cases increases.

CONCLUSION

With the help of the day surgery team, 24 hours discharge following RLFUSRCD was safe and feasible in well-selected patients. Complications were similar between the two groups.

CONSENT FOR PUBLICATION

Not applicable.

AVAILABILITY OF DATA AND MATERIALS

Data sharing is not applicable to this article as no datasets were generated or analyzed during the current study.

COMPETING INTERESTS

The authors declare that they have no competing interests.

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AUTHORS' CONTRIBUTIONS

H-HJ, X-LZ, CX and S-JW had roles in the study conception and design, patient recruitment, data collection, data analysis, data interpretation, literature search, and writing of the manuscript. J-TS, Mike, CX and X-LZ had roles in data collection, data analysis, and data interpretation. H-HJ contributed to critical revision of the manuscript. All other authors contributed to data acquisition, data analysis, data interpretation, and reviewed and approved the final version.

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