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Flexible ureteroscopic management of symptomatic renal cystic diseases

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ABSTRACT

Background: Parapelvic renal cysts are more likely to be symptomatic compared with that of simple peripheral renal cysts, and their treatment remains challenging. This study aimed to assess the feasibility and safety of flexible ureteroscopy in managing symptomatic endogenous renal cystic diseases.

Materials and methods: Thirty-five patients with symptomatic endogenous renal cystic diseases were treated by ureteroscopic unroofing and drainage into the collecting system. Surgical procedure, patient's outcome, and postoperative complications were retrospectively evaluated.

Results: Ureteroscopic unroofing and drainage were successful in 35 patients without conversion to open surgery. For patients with successful surgery, the mean operation and hospitalization times were 25.38 ± 3.71 min and 3.01 ± 0.57 d, respectively, with a curative standard rate of 74.3% (26/35). Three patients experienced Clavien grade I and II complications but no serious perioperative complications occurred. During the follow-up period averaging 36 mo, no cysts were detected in 74.3% of patients (26/35); noticeable relief was observed in four patients showing a simple renal cyst (diameter <2 cm). In five patients who presented with polycystic kidneys, the renal volume was decreased by 93.76 ± 7.38 mL per side, on average, compared with pretreatment values. Pain was relieved in all 30 patients with renal cysts. Hydronephrosis disappeared in all 15 patients diagnosed with this condition at presentation. No secondary cyst lesions (such as infection, hematoma formation, and solid cystic changes) occurred.

Conclusions: The transurethral flexible ureteroscopic incision and drainage for symptomatic endogenous renal cystic diseases has multiple advantages such as minimal trauma, rapid recovery, and a definite curative effect.

1. Introduction

The kidney is arguably the most common site of cyst in the human body; renal cyst prevalence is about 5% in the general population, and its incidence increases with age [1]. Fortunately, most renal cysts are asymptomatic and do not require any intervention. However, parapelvic renal cysts are more likely to be symptomatic because of obstruction or

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hemorrhage of the collecting system; their treatment remains a bigger challenge compared with peripheral simple renal cysts because of the cyst proximity to the renal hilar structures and pelvis [2,3]. Laparoscopic unroofing of parapelvic cysts is not feasible and safe unless operators have advanced surgical skills. Moreover, reoperation after treating polycystic kidney disease with this approach is quite difficult owing to hemorrhage and adhesion. Percutaneous aspiration with or without sclerosis and percutaneous marsupialization result in high recurrence rates, limiting their use for disease treatment [4,5]. Therefore, the treatment of endogenous renal cystic diseases remains challenging.

Natural orifice transluminal endoscopic surgery, heralded as the next frontier in minimally invasive surgery, holds incredible potential as innovative treatment approaches for urological diseases [6]. This novel surgical approach does not require skin incisions and potentially improves morbidity, convalescence, and cosmesis [6]. Compared with percutaneous nephroscopy and laparoscopy, ureteroscopic marsupialization, a complete natural orifice transluminal endoscopic surgery, is much less invasive. Recently, the development of flexible ureteroscopy has facilitated the treatment of symptomatic endogenous renal cystic diseases; however, the outcome of this method remains unclear. In this study, we retrospectively investigated the safety and feasibility of flexible ureteroscopic incision and drainage in treating symptomatic endogenous renal cystic diseases. Based on Bosniak classification, Bosniak III–V cysts are usually managed with complete resection [7]. Therefore, the present study included symptomatic and Bosniak I and II cysts for ureteroscopic management.

2. Material and methods

2.1. Patients

From January 2010–January 2014, 35 patients with symptomatic endogenous renal cystic diseases were selected and treated by transurethral flexible ureteroscopic incision and drainage. Inclusion criteria were as follows: 1) renal cysts >4 cm; 2) symptoms such as lumbago, hematuria, history of repeated infection, kidney stones, obvious obstruction in the renal parenchyma or pelvis, renal calyces or ureter hypertension, renal insufficiency, and polycystic kidney, which is characterized by recently rapidly increased renal dimensions due to enlarging cysts, renal insufficiency ± concurrent hypertension; and 3) endogenous cysts mainly convex to the renal hilus as determined by imaging. Patients with hemorrhage, infection, and solid or malignant transformations were excluded. Two cases were excluded from the analysis as these patients underwent cyst unroofing decompression surgeries via laparoscopic approach, due to thicker endogenous renal cyst walls.

This study was approved by the ethics committee of the First Affiliated Hospital, Medical School of Zhejiang University, Hangzhou 310003, China. Patient records and/or information were anonymized and deidentified before analysis.

2.2. Operation methods

All 35 patients underwent double-J ureteral stenting for 5–7 d before ureteroscopy, to facilitate passage of the ureteroscope intraoperatively without mucosal trauma. Patients were first placed in the lateral position, and percutaneous renal cyst puncture was performed using ultrasound for localization. Clear cystic fluid (3–5 mL) was extracted for routine and biochemical tests, and the same volume of contrast solution was injected to prepare for intraoperative exploratory positioning. Afterward, patients were placed in the lithotomy position. An 8/9.8F rigid ureteroscopy (Wolf, Knittlingen, Germany) was inserted in the bladder and after ureteral patency was verified, removal of the double-J ureteral stent with foreign body forceps was performed. On stent removal, a 12.5F flexible ureteroscope access sheath (Cook Medical, Bloomington, IN) was inserted with a superlubricity- or Zebra urological guide wire and the inner core pulled out. An Fr8.5/9.9 electronic flexible ureteroscope (Olympus, Tokyo, Japan) was then inserted to enter the collection system and determine the anatomic location of the pelivicalyceal system and cyst. The cyst wall typically was bulging into the collecting system, appearing thin and semitransparent. The thin cyst wall bulging to the collecting system was incised and drained (approximately 1–3 cm in diameter) using a 200-μm holmium laser optical fiber (1.0–3.0 J/10–15 Hz), which allowed cysts to connect with the collecting system (Figs. 1 and 2). Holmium laser lithotripsy (200 μm) was performed simultaneously, and stone fragments were extracted using a spiral stone basket. Patients with bilateral parapelvic cysts underwent 1-stage bilateral procedure, whereas those with polycystic kidneys underwent 2-stage procedures. A double-J stent was routinely placed with the proximal end in cystic cavity for drainage and removed 1–3 mo later. Operation duration and hospitalization time were recorded.

2.3. Follow-up and observational measurements

All patients underwent postoperative follow-up for 24–48 mo and outpatient appointment review. The maximum diameter (cm) of the residual cystic cavity was measured using ultrasonography and computed tomography scanning at 3 mo, 6 mo, 2 y, and 4 y, postoperatively. Patients were considered cured with elimination of symptoms and cysts not detected on imaging 6 mo after the operation. Curative effects were evaluated, and adverse events and complications assessed throughout the operation and follow-up period. In our center, we use a pain visual analog scale score. Pain scores were measured before and after treatment and compared. Pain was considered cured if the patients did not complain about it and if it did not limit their daily activities. Significant blood loss was defined as 24-h bleeding >400–500 mL or a decrease in hemoglobin >10 g/L.

2.4. Statistical analysis

Continuous data are presented as means ± standard deviations or as range (minimum and maximum values), as appropriate, and were analyzed using paired samples t-test. Categorical data are presented as frequency and