

With 144 Retained Stones alongside Ureteropelvic Junction Obstruction: Is Stone-Free Status Possible? A Case Presentation

Ann. Ital. Chir., 2024 95, 5: 778–782
<https://doi.org/10.62713/aic.3289>

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Ureteropelvic junction (UPJ) obstruction, in addition to causing progressive renal function loss, can lead to the formation of retained stones. Management planning for concomitant stones and UPJ obstruction is a topic of debate in the literature. We performed laparoscopic pyeloplasty and extracted all 144 stones from the renal pelvis and calyces of a 37-year-old male with UPJ stricture, using wireless flexible cystoscopic guidance. No complications occurred during the perioperative and postoperative periods. In challenging cases of UPJ obstruction with stones in multiple calyceal locations, simultaneous flexible cystoscopy offers clinicians a significant advantage.

Keywords: ureteropelvic stricture; renal stones; stone-free; flexible cystoscopy; laparoscopy

Introduction

Ureteropelvic junction obstruction is a clinical condition that can lead to impaired kidney function due to increased intrarenal pressure, recurrent renal colic, pyelonephritis, and the formation of calculous retained stones [1]. Renal stones accompany approximately 20–30% of cases, and their management should be considered during pyeloplasty for postoperative care [2].

Pyeloplasty for ureteropelvic junction (UPJ) obstruction has gained prominence in modern times with the popularization of endourology, particularly through laparoscopic and robotic approaches [3]. Renal stones that are accessible can be easily retrieved with laparoscopic graspers, but the lower and upper polar anterior and posterior calyces, especially in challenging localizations, present difficulties. Several methods have been reported in clinical management, including simultaneous percutaneous nephrolithotomy, flexible ureteroscopy, laparoscopic nephrolithotomy, and the use of rigid nephroscopes [4, 5]. However, approaches such as planning interventions for renal stones in separate sessions have also been implemented.

This case presentation aims to demonstrate the safety and feasibility of single-session pyeloplasty with wireless flexible cystoscopy for removing all 144 renal stones.

Case Presentation

A 37-year-old male patient presented to the urology outpatient clinic due to recurrent right renal colic. His medical history did not reveal any prior renal surgeries or accompanying chronic diseases. Urine biochemistry evaluation showed microscopic hematuria. Complete blood count and kidney function tests were within normal limits. Kidney-ureter-bladder (KUB) radiography (shown in Fig. 1a) and urinary ultrasound revealed multiple-sized and numerous renal stones along with grade 3 hydronephrosis, leading to the performance of a non-contrast computed tomography (NCCT). The NCCT revealed multiple stones with the largest measuring 15 mm in the renal pelvis, lower, and upper poles (shown in Fig. 1b). Investigation for possible accompanying UPJ obstruction was conducted due to grade 3 hydronephrosis and retained stones. UPJ obstruction was observed in intravenous urography (shown in Fig. 1c). Dimercaptosuccinic acid (DMSA) and diethylenetriaminepentaacetic acid (DTPA) scintigraphies were performed to evaluate kidney functions. The DMSA scan showed a right kidney function of 41%, and the DTPA scan revealed diuretic non-responsive obstruction with 34.2 mL/min glomerular filtration. Laparoscopic pyeloplasty and pyelolithotomy were planned for the patient.

After the laparoscopic entry, the ureteropelvic junction was isolated (shown in Fig. 1d), and a 3 cm incision was made in the renal pelvis. Multiple stones in the renal pelvis were then removed using laparoscopic graspers (shown in Fig. 2a). The inaccessible lower and upper calyces were reached with a 15.6 french wireless flexible cystoscope sent through a 10 mm port. Residual stones were cleared (shown in Fig. 2b). After inspecting all calyces, the flexible cystoscope was removed. Subsequently, dismembered pyeloplasty was performed (shown in Fig. 2c), and a 4.8 F 28 cm Double J (DJ) stent was placed. The operation duration was 155 min-

Submitted: 3 March 2024 Revised: 23 July 2024 Accepted: 16 August 2024 Published: 20 October 2024

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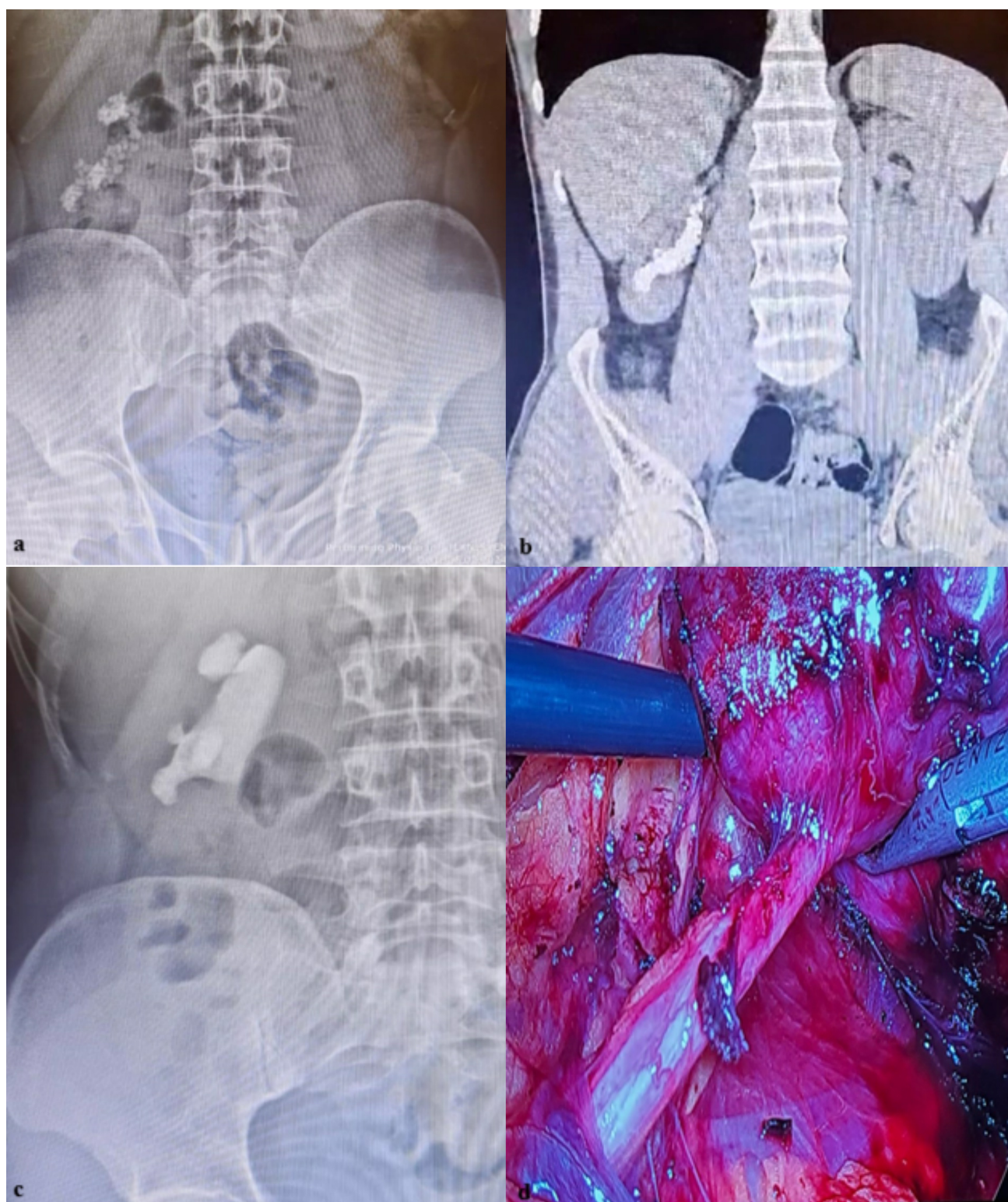


Fig. 1. Radiological findings and intraoperatively isolated ureteropelvic junction (UPJ). (a) Kidney-ureter-bladder (KUB) radiography of the right kidney. (b) Non-contrast computed tomography (NCCT) of the right kidney with multiple stones. (c) Intravenous urography to show UPJ obstruction. (d) Isolated UPJ during laparoscopy.

utes without complication. On the third postoperative day, the transurethral catheter was removed, and the drain was removed on the fifth day. No residual stones were observed in KUB radiography (shown in Fig. 2d).

The DJ stent was removed at the 1-month postoperative visit. A stone analysis was performed during follow-up, revealing calcium-oxalate stones. Following the stone analysis, a 24-hour urine test was conducted to measure cal-

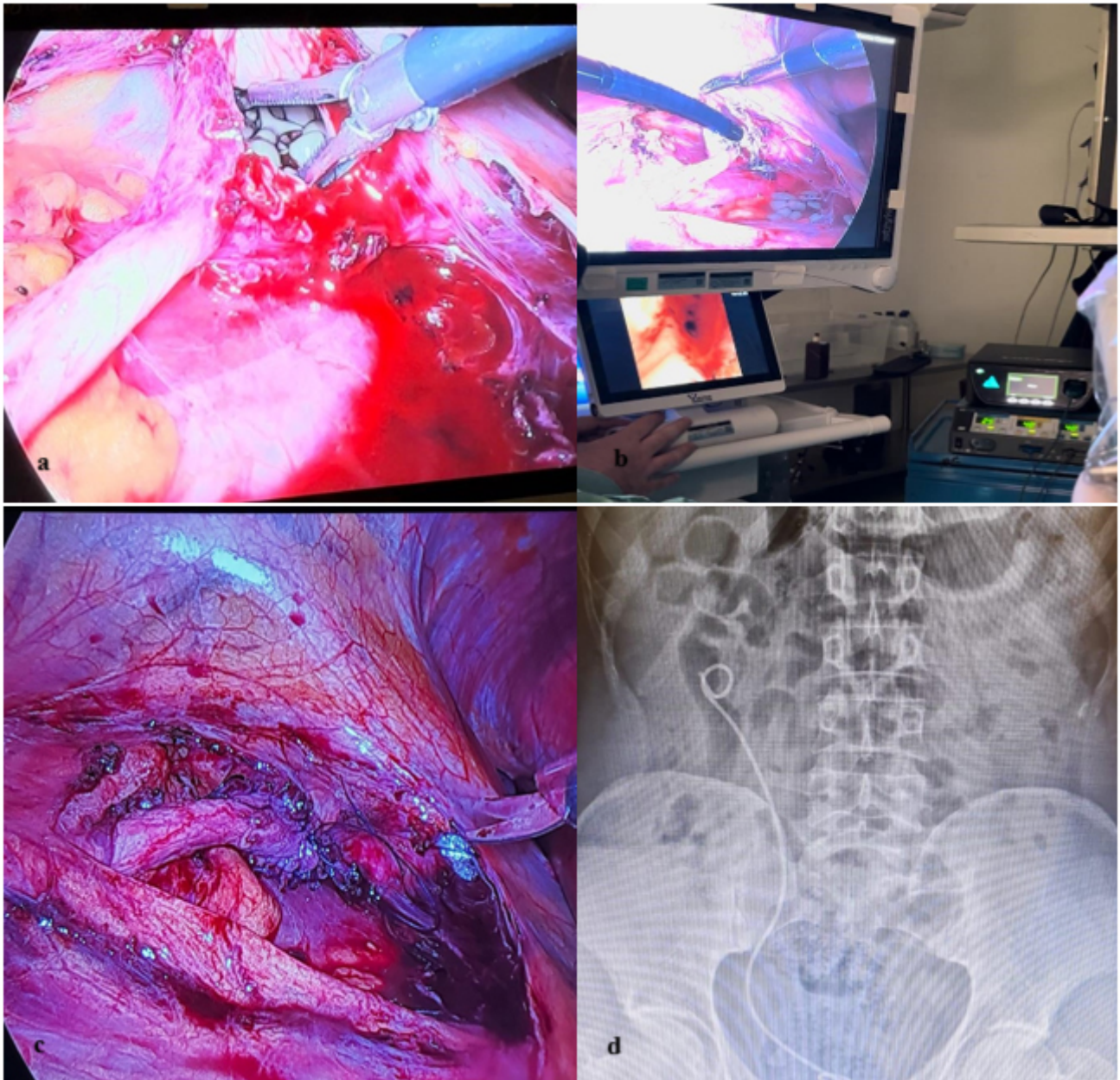


Fig. 2. Surgical procedure steps and postoperative KUB radiography. (a) Opening the renal pelvis and removing the stones with forceps. (b) Access with flexible cystoscopy for residual stones. (c) Anastomosis after dismembered pyeloplasty. (d) Control KUB radiography.

cium, citrate, oxalate, and uric acid levels. Additionally, serum levels of calcium, vitamin D, and parathyroid hormone clinical parameters potentially associated with calcium oxalate stones were analyzed. All test results were found to be within normal ranges. A high-fiber diet with a daily fluid intake of 2.5–3 liters was recommended to prevent stone recurrence.

An ultrasonography (USG) at one month postoperatively showed a reduction in grade 2 hydronephrosis compared to the preoperative state. At the six-month follow-up, DTPA scintigraphy showed no signs of obstruction. The follow-up protocol focuses on monitoring renal stone recurrence

and ipsilateral kidney function. DTPA scintigraphy at six months showed non-obstructive dilatation findings at right kidney. Follow-ups continue without complications.

Discussion

UPJ obstruction is observed at an approximate rate of 0.1% as a congenital disease [6]. The management of renal stones detected in conjunction with UPJ obstruction poses a challenge for surgeons. Difficult-to-reach calyces localizations may necessitate a review of simultaneous treatment alternatives. In the retrospective study by Chertin *et al.* [7], it was reported that simultaneous renal stone

surgery in pediatric patients undergoing robot-assisted laparoscopic pyeloplasty was performed safely without complications. Agarwal and colleagues [5] reported that despite lengthy surgeries, laparoscopic pyeloplasty combined with percutaneous nephrolithotomy effectively achieves stone-free status. Similarly, Nishio *et al.* [8], performed a single-session robot-assisted laparoscopic pyeloplasty and renal stone management using a robotic port access in a patient with a duplex system, without any complications in the short- and long-term follow-ups. In another study conducted by Zheng J and colleagues [4], it was reported that rigid ureteroscopy applied through the assistant port achieved high success rates in the intervention of accompanying renal stones. The debate among urologists about whether to address UPJ obstruction or associated renal stones first or to treat both simultaneously remains unresolved. However, the literature suggests that simultaneous management of renal stones during the same session as UPJ stenosis treatment does not pose additional risks. This approach can protect patients from the risks and costs associated with additional surgeries.

Surgical complications following laparoscopic pyeloplasty can be categorized into early and long-term complications. Early complications include fever, urinary infection, and prolonged urine drainage, while long-term complications can involve recurrent UPJ obstruction and loss of renal unit function. In patients with UPJ obstruction and concurrent renal stones, simultaneous stone treatment has demonstrated better outcomes in reducing the risk of urinary system infection and achieving stone-free status, as shown in the study by Yang C *et al.* [9]. These findings, supported by our case and literature, emphasize the necessity of pre-operative evaluation for simultaneous stone management in patients with UPJ obstruction and renal stones.

Long-term complications for both laparoscopic and open pyeloplasty include renal insufficiency and recurrence of the obstruction. Follow-up typically involves monitoring the degree of hydronephrosis, dynamic renal filtration studies, and renal parenchymal thickness. Long-term follow-up data are crucial for preserving ipsilateral kidney function and managing necessary interventions [10]. Based on the reported principles, our follow-up assessments have not encountered complications such as stone recurrence, UPJ stenosis recurrence, or urinary tract infections. This supports the contribution to stone-free status reported in the literature and indicates no differences in complication rates. The wider availability and capability of flexible cystoscopes to reach smaller sizes have increased the use of laparoscopic surgeries. The use of a flexible cystoscope during pyeloplasty to manage renal stones in the same session can eliminate the need for retrograde intrarenal surgery and reduce the necessity for additional surgical interventions. The use of flexible cystoscopy can eliminate the need for major surgeries such as percutaneous nephrolithotomy in some UPJ obstruction patients. Additionally, the ability to

use thicker basket catheters compared to ureteroscopy and the capacity to provide rotation to the renal calyces are positive aspects. The capability of multiple entries into each renal calyx with a flexible cystoscope has facilitated access to a high number of stones, such as the 144 stones in this case. According to our literature review, one of the studies reporting the number of stones is by Hüttenbrink and colleagues [3], who extracted 1 to 15 stones. Chertin *et al.* [7] reported extracting 1 to 8 stones. We believe that the number of stones extracted in the case presented here is one of the highest among the cases reported in the literature.

Conclusions

In the presented case with hydronephrosis accompanying renal stones, it was observed that patients should be investigated for UPJ obstruction. Flexible cystoscopy during laparoscopic pyeloplasty can help achieve stone-free status in various calyx locations, offering clinicians a pathway to positive outcomes without complications.

Availability of Data and Materials

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Author Contributions

TA performed data validation and evidence synthesis, wrote the original paper, and revised and edited the manuscript. FC and AU acquired the data and designed the study. IK analyzed, interpreted the data and partied in the conceptualization of the study. AEC and TA performed the operation. All authors revised the manuscript critically for important intellectual content. All authors read and approved the final manuscript. All authors have participated sufficiently in the work and agreed to be accountable for all aspects of the work.

Ethics Approval and Consent to Participate

The patient provided written informed consent for the publication of this case report and any related images. This study was approved by University of Health Sciences, Erzurum Medical Faculty Scientific Research Ethics Committee (Approval number: BAEK/07-125) and was conducted in accordance with the Declaration of Helsinki.

Acknowledgment

Not applicable.

Funding

This research received no external funding.

Conflict of Interest

The authors declare no conflict of interest.

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