

## Endourology

## Open nephrectomy: The extreme measure for sepsis after flexible-ureteroscopy (f-URS) procedure

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## ABSTRACT

URS is considered a safe method of stone treatment. Complications most often do not exceed grade II of the Clavien Dindo classification. Although it is considered safe, in some cases major complications may occur from grade III onwards. A 50-year-old man underwent f-URS for a 2.7 × 1.2 cm left medium caliceal stone; after surgery patient developed an intraparenchymal renal abscess and concomitant pulmonary and hepatic septic emboli. Despite attempts to treat it conservatively, nephrectomy was the only effective treatment. The f-URS is minimally invasive and effective procedure, although it is not free from complications.

## Introduction

Stone disease has been on the rise in Western countries over the last 20 years, with incidence increasing by more than 37%. Treatment of kidney stones depends on their size: < 2 cm minimally invasive with flexible ureteroscopy (f-URS), >2 cm with different percutaneous nephrolithotomy (PNL) procedures. The literature, taking into account the Clavien-Dindo classification, most of the reported complications are grade I and II. Rare are the cases of complications from grade III onwards, as Cindolo et al. reported.<sup>1</sup> We present the case of a patient who developed grade IV Clavien-Dindo after f-URS and needed nephrectomy for a pyelonephritis complicated with severe sepsis.

## Case presentation

In October 2020, a 50-year-old man with a positive history of urinary lithiasis came to our attention for left colic pain and mild hyperpyrexia (37.5 °C). Past history: in 1990 left renal shockwave lithotripsy (SWL), 1998 right pyelotomy for phosphatic/oxalate stones, 2000 parathyroidectomy. Patient underwent urinalysis which revealed mixed low burden microbial germs and a non-contrast medium CT scan (NCCT) that found bilateral lithiasis: 1.2 × 2.7 cm on left side (1400 HU) and 1.5 × 1.4 cm on right lower pole (1350 HU) (Fig. 1). Patient was treated in

emergency with left ureteral stenting and antibiotic therapy (Meropenem and Gentamicin) and then he was referred for elective left endoscopic combined intrarenal surgery (ECIRS). Pre-operative urinalysis was repeated and found to be negative, so Amoxicillin + clavulanic acid was administered in according to local prophylaxis protocol. In Valdivia Galdakao position, the patient underwent to 3-unsuccessful renal puncture attempted for noncompliant urinary system so it was decided to convert the procedure with f-URS laser lithotripsy (100WATT Holmium Quanta System; ureteral access sheath 10/12FR). After 1 hour operative time, we decided to stop the procedure and deferred to a second look due the stone burden and the potential risk of UTIs. On the first day patient developed fever (>38 °C), blood cultures were performed and empirical antibiotic therapy with Tazobactam and Teicoplanin was administered after counseling of infectivologist; a CT scan showed signs of pyelonephritis with no abscesses or perirenal haematoma (Fig. 2A). The antibiotic therapy was subsequently modified, on the basis of positive blood cultures for *Pseudomonas Aeruginosa*, with Meropenem and Linezolid.

The patient was subsequently admitted to the Intensive Care Unit due to the onset of a haemodynamically unstable situation (tachycardia and hypotension). At 4 days after surgery, due to the lack of clinical improvement a thoracic/abdomen CT scan was performed showing pulmonary septic emboli and bilateral pleural effusion with left renal

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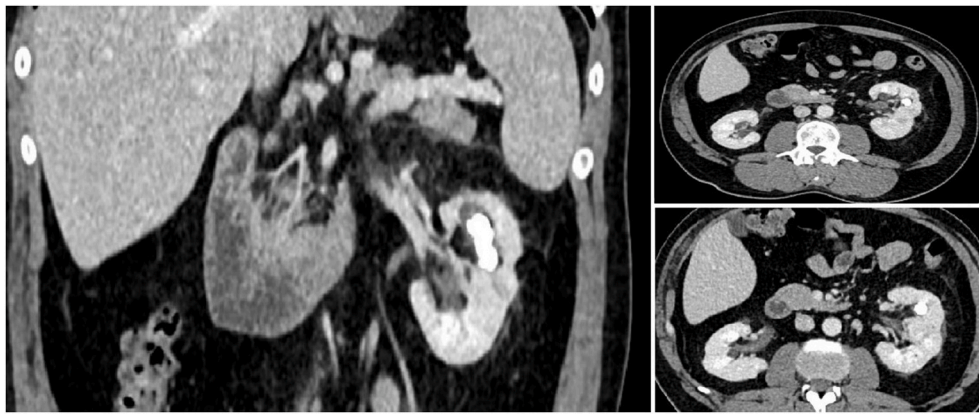


Fig. 1. Pre-operative CT scan: Left kidney lithiasis at the site of superior calyx.

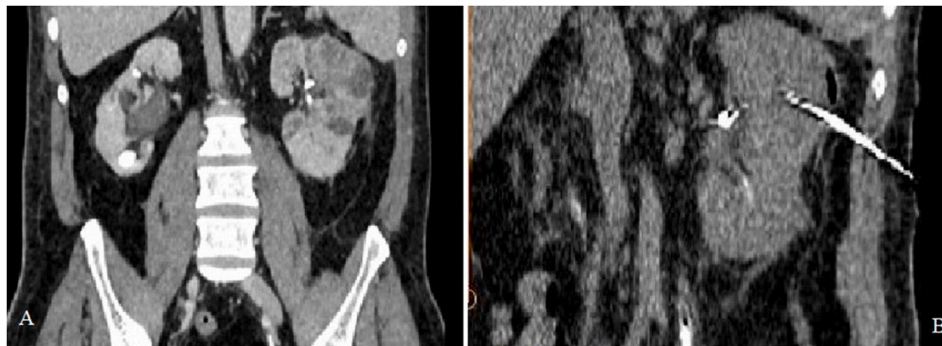


Fig. 2. a) post-ureteroscopy CT scan: Left renal parenchyma with signs of pyelonephritis; b) post-drainage CT scan: renal abscess of left kidney.

abscess. Therefore a CT-guided renal drain was placed (Fig. 2B) and the ureteral stent replaced. On the tenth day, the patient continued to be feverish and was subjected to CT scan, which showed no change from previous control. Following the persistence of the septic situation and no improvement in the radiological exams, multidisciplinary counselling with anesthesiologists, radiologists and infectivologists was performed and counselled for a left open nephrectomy (Fig. 3). On the first day after surgery, the patient was already not pyretic with decreasing inflammation indexes. Patient was discharged on 7 days post-OP. Histological examination showed multifocal Xanthogranulomatous pyelonephritis.

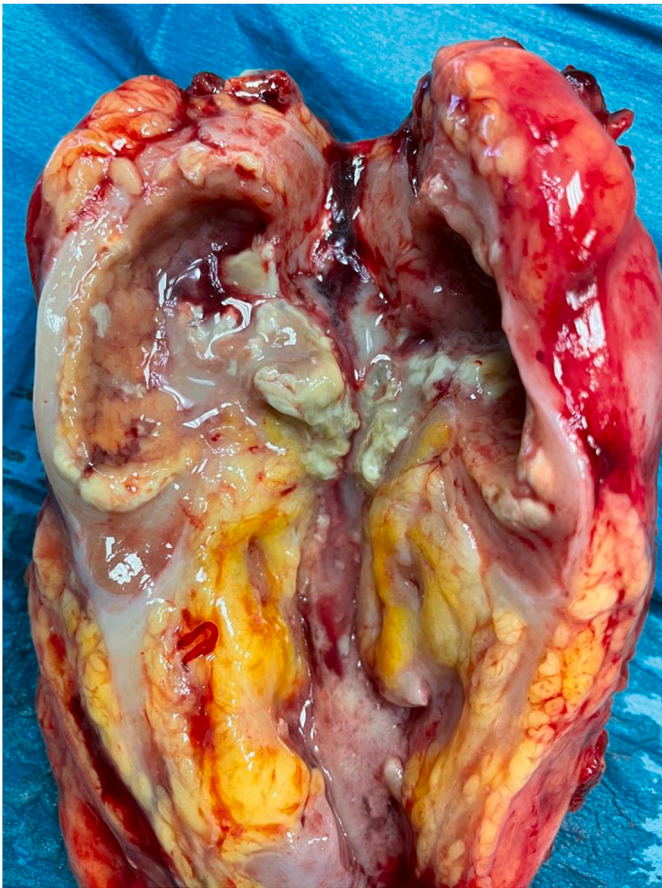
## Discussion

The f-URS is considered a safe and effective procedure, as reported by several articles in the literature. Bernardinelli et al. described complications after f-URS in 356 patients and only 15% presented with complications,<sup>2</sup> intra-operative and post-operative of 6.7% and 8.4% respectively. Complications were reported using the Clavien Dindo Classification and most were type I-II. Only 0.5% of patients (2/356 pts), experienced a type III complication, developing obstructive pyelonephritis treated with ureteral stent placement and antibiotic therapy. The safety and efficacy of URS, whether rigid or flexible, is also supported by our experience in paediatric urolithiasis.<sup>3</sup> Out of 25 s-URS and 24 f-URS only two type I and two type II complications occurred. These articles might suggest that there are no major complications after f-URS and that the case report described is an exception. In fact, there are few major complications after f-URS reported in the literature. Cindolo et al.,<sup>1</sup> reported major complications after s-URS and f-URS in 12 procedures in multicentre study involved 12 hospitals. Of this 12 pts, 6/12 underwent radical nephrectomy for post-procedural complications related to renal bleeding or perirenal haematoma. Five patients underwent to nephrectomy for haemorrhagic complication, one for acute sepsis; this last patient

had a past history of arachnoid cyst that caused an incomplete paraplegia and neurogenic bladder, ischemic cardiopathy and with preoperative urine culture that showed an *Escherichia coli*. Despite these five nephrectomies done for bleeding, we reported perirenal haematoma, which occurred 4 times (0,16%) after 2497 URS procedures in our experience.<sup>4</sup> In these cases conservative therapy was sufficient, only one patient developed subsequent renal hypotrophy. There's still not universal nomogram revealing the best treatment for kidney stones in order to achieve a higher stone free rate (SFR) while minimising risk. Micali et al.,<sup>5</sup> recently proposed a nomogram based on 2605 patients treated for kidney stones in 14 urological centres. This nomogram examines variables (e.g. urinary infection, stone density, etc.) that allow the surgeon to choose the best option between SWL, URS and PNL for complete stone clearance. The case described must make us reflect that although ureteroscopy is considered a minimally invasive and feasible procedure, it is not without complications, even major ones. Before surgery, the counselling with the patient should be as complete as possible.

## Conclusion

Ureteroscopy is considered a safe and effective method with complications not exceeding grade III according to the Clavien-Dindo classification; however, major complications are possible. Acute sepsis in most cases can be treated with conservative therapy, but this is not always effective and in some cases radical nephrectomy may be necessary. In this case a main sepsis was resistant to the all antibiotic used, induced our team to take the only effective solution to solve the clinical condition. This case report emphasized the need not underestimate the potential risk of endourological procedures which sometimes can hide more serious condition than it appears.



**Fig. 3.** Left Kidney: the image shows pus and inflammation in renal parenchyma comparable with Xanthogranulomatous pyelonephritis.

#### Consent

All procedures performed in the study involving human participants

were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. Informed consent was obtained from the participant included in the study.

#### Declaration of competing interest

The authors declare that they have no conflicts of interest.

#### Acknowledgements

None.

#### Abbreviations

URS	Ureteroscopy
PNL	nephrolithotomy
SFR	stone free rate
SWL	shockwave lithotripsy

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