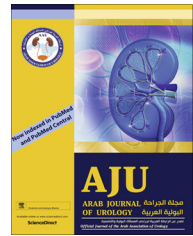




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### ORIGINAL ARTICLE

# Bilateral same-session ureterorenoscopy: A feasible approach to treat pan-urinary stone disease

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#### KEYWORDS

Uteroscopy;  
Bilateral;  
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Flexible ureterorenoscopy;  
Treatment outcomes

#### ABBREVIATIONS

ASA, American Society of Anesthesiologists;  
BSSU, bilateral same-session ureteroscopy;  
KUB, kidney–ureter–bladder radiograph;  
LOS, length of hospital stay;

**Abstract Objectives:** To assess treatment effectiveness and safety of bilateral same-session ureterorenoscopy (BSSU) for the management of stone disease involving the entire urinary system.

**Patients and methods:** We reviewed the records of 64 patients who underwent BSSU for the treatment of bilateral ureteric and/or kidney stones. Size, number, location per side, and the total burden of stones were recorded. Data on stenting, lithotripsy, and stone retrieval, and details of hospital stay and operation times were investigated. Treatment results were assessed using intraoperative findings and post-operative imaging. The outcome was considered successful in patients who were completely stone-free or who had only residual fragments of  $\leq 2$  mm.

**Results:** The outcome was successful in 82.8% of the patients who received BSSU (54.7% stone-free and 28.1% insignificant residual fragments). The success rate per renal unit was 89.8%. There were no adverse events in 73.4% of the patients. The most common intraoperative complication was mucosal injury (36%). The complications were Clavien–Dindo Grade I in 9.4% and Grade II in 7.8%. Grade IIIa and IIIb (9.4%) complications required re-treatments. Statistical evaluation showed no association between complication grades and stone, patient, or operation features. Stone burden had no negative impact on BSSU results. The presence of impacted proximal ureteric stones was significantly related to unsuccessful outcomes.

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PCNL, percutaneous nephrolithotomy;  
SFR, stone-free rate;  
SWL, shockwave lithotripsy

**Conclusion:** BSSU is safe and effective for the management of bilateral urolithiasis. BSSU can prevent recurrent surgeries, reduce overall hospital stay, and achieve a stone-free status and complication rates that are comparable to those of unilateral or staged bilateral procedures.

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## Introduction

The treatment of bilateral urolithiasis has traditionally been staged procedures due to concerns of the possible simultaneous traumatising of both sides of the urinary system. Currently, in cases of bilateral ureteric stone impaction, semi-rigid ureteroscopy is often attempted bilaterally in a single stage [1–3]. Flexible ureterorenoscopy is usually carried out for ipsilateral nephrolithiasis whilst treating ureterolithiasis [4–6]. Reports on the efficiency of a single-stage, bilateral ureteroscopic treatment of stones in the entire urinary system are still scarce.

Owing to the improvement of endoscopic technology and skills, the treatment of all stones in the entire urinary tract has become an attainable goal in a single operative session. Bilateral same-session ureterorenoscopy (BSSU) has been proposed to reduce overall operative times and anaesthetic requirements, which are factors associated with increased morbidity [1–3,5–9]. In our practice, patients recommended to undergo ureteroscopic stone treatment have been counselled on the option of undergoing BSSU for all stones of clinically significant size. This approach may be warranted urgently or as elective management of bilateral symptomatic or asymptomatic stones. As 32–58% of asymptomatic stones of significant size cause symptoms or require intervention within several years, we have aimed to clear all accessible stones in the urinary tract in a single operative session [10–11].

In the present study, we analysed our experience with BSSU used for the treatment of stone disease involving the whole urinary system. We investigated the clinical operative data and perioperative course of this approach to determine its effectiveness and safety.

## Patients and methods

From 2010 through 2016, 64 adult patients underwent BSSU. The indications for the procedure were bilateral nephrolithiasis, bilateral ureteric obstruction, and unilateral ureteric obstruction with ipsilateral/contralateral kidney stones. Patients with pan-urinary stones were deemed suitable for BSSU depending on clinical judgements of safety, indication, patient preference, and the failure of previous treatments.

## Pre- and postoperative evaluation

Surgical planning involved imaging with unenhanced CT, ultrasonography, and/or a kidney–ureter–bladder radiograph (KUB). Stone size was measured as the greatest dimension in millimetres, and stone burden represented the sum of all the maximum sizes of stones at the given location. Patients were preoperatively tested and treated to ensure sterile urine. Informed consent of patients suitable for BSSU was taken after a comprehensive discussion of the procedure.

Treatment success was intraoperatively assessed by endoscopy and postoperatively assessed by radiological imaging. KUB/ultrasonography was done at  $\leq 4$  weeks of a patient's operation. The outcome was considered successful in patients who were totally stone free or who had only residual fragments of  $\leq 2$  mm too small for retrieval.

Complications were assessed according to the modified Clavien–Dindo grading system. All abrasions, thermal injuries, and submucosal false passages were defined as mucosal injuries. Perforation encompassed injuries caused by misguided wires, laser fibres, or accessory instruments through the ureteric wall; the propulsion of stone fragments through the ureter/collecting system; or defects of any size on the ureteric wall created by dilatation or passage of a ureteroscope or access sheath. Intrarenal urothelial tears, incisions, and punctures were also described as perforations.

The operation (OR) time denoted the whole interval of anaesthesia, which began with induction and consisted of the positioning and preparation periods and the duration of the endoscopic operation, and which ended with the extubation of the patient.

## Techniques and instruments

BSSU was carried out under general anaesthesia, and all patients received i.v. cephalosporin or aminoglycoside for prophylaxis. Semi-rigid 8–9 F, Digital or Flex X2 7-F (Storz®) flexible ureteroscopes were used by three experienced endourologists. Several instruments (baskets, graspers, etc.) were used for stone extraction and/or positioning depending on the surgeon's choice. Ureteric access sheath (11/13 F or 12/14 F) was not the standard technique in BSSU cases and used upon the

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