

Case report

## Laparoscopic Management of Large Upper Ureter Steinstrasse after the Failed Endourologic Measures

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### HIGHLIGHTS

- In conditions that the conservative management is unsuccessful, the other options are SWL, ureteroscopic lithotripsy, and percutaneous nephrolithotomy. Open surgery reserved a last resort for dealing with the problem.
- The laparoscopic removal of ureteral stone is a viable option in steinstrasse that the conservative and endourologic management is failed and could be chosen as an alternative to open surgery.
- The true incidence is unknown but is mentioned between 1-4 % in stone size less than 2 cm to 13% in large stone.

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### ABSTRACT

#### Introduction

The steinstrasse or stone street is a rare complication after Shock wave lithotripsy (SWL). The true incidence is unknown but is mentioned between 1-4 % in stone size less than 2 cm to 13% in large stone.

#### Case presentation

we present a 37-year-old man with a proximal ureter steinstrasse. He was managed with laparoscopic ureterolithotomy as the SWL failed, and also, ureteroscopic access to the upper ureter failed due to the ureteral stenosis.

#### Conclusions

The laparoscopic removal of ureteral stone is a viable option in steinstrasse that the conservative and endourologic management is failed and could be chosen as an alternative to open surgery.

**Keywords:** Shock Wave Lithotripsy; Ureteral Stone; Steinstrasse; Laparoscopic Ureterolithotomy

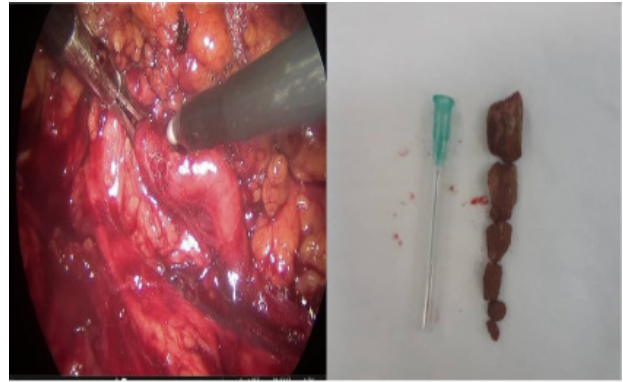
#### Introduction

The steinstrasse or stone street is a rare complication after Shock wave lithotripsy (SWL). The true incidence is unknown but is mentioned between 1-4 % in stone size less than 2 cm to 13% in large stone. Most of them are asymptomatic and pass spontaneously with conservative management (1). If the conservative management is

unsuccessful, the other options are SWL, ureteroscopic lithotripsy, and percutaneous nephrolithotomy. Open surgery reserved a last resort for dealing with the problem (2, 3). In this case report, we present a 37-year-old man with a proximal ureter steinstrasse. He was managed with laparoscopic ureterolithotomy as the SWL failed, and also, ureteroscopic access to the upper ureter failed due to



**Figure 1.** Steinstrasse in the proximal ureter (coronal and sagittal views)



**Figure 2.** Laparoscopic view of the ureteral stone

the ureteral stenosis.

### Case presentation

A 37-year-old man came to our clinic due to left flank pain. He underwent SWL for a mid-pole kidney stone two weeks ago. The laboratory data were in the normal range. He agreed to report his case anonymously after signing the informed consent. This case report is based on the CARE checklist. The Non-contrast spiral computed scan (CT) was done and revealed a steinstrasse in the proximal ureter with a size of about 4 cm with moderate hydroureteronephrosis. Figure 1 shows the stone burden in the proximal ureter.

The conservative management with hydration, analgesic and antibiotic therapy was started as the initial treatment. Due to the intractable pain, the patient underwent SWL of the impacted ureteral stones. The SWL was ineffective, so we decided to perform the ureteroscopic management, but also lithotripsy and stent insertion failed due to ureteral stenosis. The patient was scheduled for laparoscopic ureterolithotomy (LUL) with the standard method as an alternative to open surgery; six impacted stones were extracted from the upper ureter successfully. Figure 2 shows the laparoscopic view of the ureteral stone. The patient had no intraoperative complications during surgery. The double-j stent was inserted at the end of the procedure. He was discharged postoperative day two without any complications.

### Discussion

With the introduction of the new generation of SWL lithotripters, their success rates in renal stone fragmentation are increasing. The complications of shock wave lithotripsy such as hematoma, urinary tract infection, and colicky pain due to the passing of stone fragments are common in daily practice. Among the consequence of SWL, the steinstrasse is an uncommon complication. The risk factors for this complication mentioned in the literature are larger stone size (> 2 cm), stone location (more frequent in the renal pelvis stones

than other kidney sites), and the amount of shock wave energy level applied for stone fragmentation (4). The stone street is more frequent in the distal ureter compared to the proximal ureter. Most cases are asymptomatic, and it is anticipated that the majority of steinstrasse had a spontaneous passage with conservative management. The actual rate of patients that need the intervention is variable in different studies and is cited between 6% to 20 % (5,6). In the patient with a bulky stone burden, the probability of stone passage will decrease; the risk of complete ureteral obstruction and renal damage increases. The intractable pain, infection, complete obstruction, and low probability of stone passage are indications of the intervention. The viable options are SWL of leading stone that produces obstruction, ureteroscopic lithotripsy, PCNL, and if these measures fail, the open surgery is indicated as a last resort (7). In the case of large impacted fragments, the Holmium laser lithotripsy is another option to tackle this complication. Retrograde intrarenal surgery (RIRS) is another option; in this approach, we insert a ureteral access sheath in the ureter and use the flexible ureteroscopy and laser lithotripsy for stone fragmentation (8, 9).

In this case, we performed one session of SWL as a first modality; due to the intractable pain and no evidence of stone passage after SWL, ureteroscopic lithotripsy was tried as a second modality. The ureter orifice was stenotic at the point distal to the stone; the ureteroscopy and even Double-J stent insertion were unsuccessful. Finally, the laparoscopic ureterolithotomy (LUL) was performed with successful stone removal without any complications.

### Conclusions

The laparoscopic removal of ureteral stone is a viable option in steinstrasse. The conservative and endourologic management is failed and could be chosen as an alternative to open surgery.

### Authors' contributions

All authors contributed equally.

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**Conflict of interest**

The author declares that there is no conflict of interest.

**Funding**

There is no funding.

**Ethical statement**

The case agreed to report his issue anonymously after signing the informed consent. This case report is based on the CARE checklist.

**Data availability**

Data will be provided on request.

**Abbreviations**

LUL Laparoscopic ureterolithotomy  
RIRS Retrograde intrarenal surgery  
SWL Shock wave lithotripsy

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