

# Introduction and Objective

Laser incision (laser endoureterotomy: LE) and balloon dilatation (BD) are the treatments for ureteral strictures measuring ≤20 mm; however, these treatments are associated with a high risk postoperative restenosis. Endoscopic management of benign ureteral strictures has been described in the adult literature with failure rates of 12% to 38%. Therefore, this study aimed to investigate the effectiveness of a novel method to place multiple ureteral stents after LE and BD.

### Methods

In total, 10 patients who underwent endoscopic surgery for ureteral stenosis from January 2016 to March 2019 were included. All stenoses were iatrogenic rather than congenital. In LE, the stenosis site, including 5 mm before and after the site, was incised using a laser until the fat tissue outside the ureter was visible. A flexible ureteroscope was used for upper ureteral stenosis and a semi-rigid ureteroscope was used for middle or lower ureteral stenosis. In BD, the stenosis site was dilated with a balloon up to 15 Fr. In all cases, two 4.7-Fr ureteral stents were placed and removed 4-8 weeks after surgery. The improvement of hydronephrosis, surgical parameters, and complications were evaluated.

# Results

The stenosis site was confirmed in the upper ureter in six patients; in the middle ureter in three patients; and in the lower ureter in one patient, with an average distance of 9.7  $\pm$  5.6 mm. Preoperative hydronephrosis was grade G1 in one patient, grade G2 in one patient, grade G3 in four patients, grade G4 in four patients, and improved in nine patients (90%) 3 months after surgery. The average duration of surgery was 111  $\pm$  21 minutes, and no surgical complications over grade 3 were observed. The average duration of hospital stay was 4.1  $\pm$  0.5 days. The mean follow-up period was 661  $\pm$ 405 days, and no restenosis was observed in any of the eight patients.

# Conclusions

Placement of multiple ureteral stents after surgery for ureteral stenosis was effective.

- ureteral stones.
- strictures (US).



# Multiple ureteral stent placement reduces restenosis after incision and dilatation for ureteral stenosis

# Introduction and Objectives

Ureteroscopy (URS) has become the common treatment of middle and lower C Dationte > Although URS is less invasive and effective, it could cause significant complications such as intraoperative ureteral injury and postoperative ureteral (Geavlete P et al. J Endourol: 2006.) ■ It is reported that US generally occurs in 1-4%: however, it occurs in 7.8-24% in the case of URS for impacted stones. (Gdor Y et al. J Endourol: 2008, Fam XI et al. Korean J Urol: 2015.) ■ Laser endoureterotomy (LE) and balloon dilatation (BD) are the therapeutic options as endoscopic management of benign US. ■ They have been described with success rates of 27.5-74%. (Razdan S et al. BJU Int: 2005, May PC J Endourol: 2018.)

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# Results

|            | male                 | 7 (70.0)   |
|------------|----------------------|------------|
|            | female               | 3 (30.0)   |
|            | (kg/m <sup>2</sup> ) | 23.80±3.17 |
|            | right                | 7 (70.0)   |
|            | left                 | 3 (30.0)   |
|            | UPJ                  | 3 (30.0)   |
|            | U1                   | 3 (30.0)   |
|            | U2                   | 3 (30.0)   |
|            | U3                   | 1 (10.0)   |
| tricture   | URS                  | 4 (40.0)   |
|            | stone                | 3 (30.0)   |
|            | pyeloplasty          | 2 (20.0)   |
|            | other                | 1 (10.0)   |
| stricture  | (mm)                 | 9.7±5.6    |
| onephrosis | G1                   | 4 (40.0)   |
|            | G2                   | 4 (40.0)   |
|            | G3                   | 1 (10.0)   |
|            | G4                   | 1 (10.0)   |



- time :  $111.2 \pm 21.5$  minutes
- stay:  $4.1\pm0.5$  days

rative complication : no complications over grade 3 were observed of follow up :  $661.5 \pm 405.2$  days



ephrosis was improved in 9 patients (90%) 3 months after surgery. inction tended to improve (P=0.11).

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Placement of multiple ureteral stents after surgery for ureteral stenosis was effective.



# < Case >

- 69 years old, female
- She underwent endoscopic LE and BD for US at the other hospital.
- At the end of the surgery, a 6 Fr double J ureteral stent was placed.
- 3 months after the removal of the ureteral stent, restenosis was observed. consulted to our hospital
- We performed additional LE and BD and placed two 4.7 Fr ureteral stents. Image findings

# Surgical technique

|                             | the other hospital | our hospital      |
|-----------------------------|--------------------|-------------------|
| LE                          | 0.5J 10Hz          | 1.2J 10Hz         |
| BD                          | up to 12-Fr        | up to 15-Fr       |
| Placement of ureteral stent | a 6-Fr stent       | two 4.7-Fr stents |

- Ureteral stent was extracted 8 weeks after the surgery.
- Hydronephrosis was improved 14 weeks after the surgery.
- Abdominal CT indicated no restenosis 34 months after the surgery.

# Discussion

- $\succ$  The incision alone can't sufficiently expand the lumen.
- $\succ$  The dilation alone expands the lumen toward all round direction disproportionally. > Combination of LE and BD enables to expand the lumen equally centering on the incision line, which prevents restenosis. (Razdan S et al. J Urol: 2012.)
- Smaller stent can't maintain sufficient dilation of the lumen.
- $\succ$  Larger stent causes ischemia of the ureter, which tend to induce restenosis.
- > Placement of 2 smaller stents enables to maintain sufficient dilation. Mobility of the ureter saves bloodstream, which prevents restenosis. (Christman MS et al. J Urol: 2012.)



# Conclusions