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STENTING IN CASES OF URETERAL ORIFICE DAMAGE DURING LASER ENUCLEATION OF THE PROSTATE FOR BPH: IS IT WORTH IT?

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INTRODUCTION

In several patients with benign prostatic hyperplasia (BPH), the ureteral orifices may be in close proximity to the enlarged prostate due to considerable intravesical prostatic protrusion. In such cases, ureteral orifices are at risk of damage as they become involved in the surgery. We aimed to answer the question whether upper urinary tract stenting is necessary when ureteral orifices get damaged during thulium laser enucleation of the prostate (ThuFLEP).

MATERIALS AND METHODS

- OUR RETROSPECTIVE STUDY INCLUDED 340 PATIENTS
- PATIENTS AGED 67.2 (54-89) YEARS
- WITH INFRAVESICAL OBSTRUCTION (IPSS>20, QMAX<12) DUE TO BPH
- PATIENTS WITH URETHRAL STRICTURES, BLADDER STONES OR A HISTORY OF PRIOR PROSTATE SURGERY WERE EXCLUDED
- FOLLOWING SURGERY, UPPER URINARY TRACTS WERE MONITORED USING ULTRASONOGRAPHY ON DAY 1, 3, 7, 14 AND 30

WAVELENGTH 1.94 µm

ENERGY 8 JOULE

MAX. POWER 120 W

FIGURE 1. TM-FIBER LASER

For enucleation, we used Urolase (NTO IRE-POLUS, Russia), a 120 W thulium fiber laser (Tm fiber), and a 600 µm fiber (fig. 1). Tm fiber laser with wavelength of 1.94 µm precisely matches the major absorption peak of water, which is the principal tissue chromophore for this type of laser treatment. Laser energy absorption for Tm fiber is about 5 times higher than that at 2.1 µm wavelength of the Ho:YAG laser and ~ 2.5 times higher than the respective quantity at 2.0 µm wavelength of the Tm:YAG laser. Ablation threshold and penetration depth in the tissue are inversely proportional to the tissue absorption coefficient (tab. 1).

LASER	Wavelength, µm	Absorption coefficient, cm-1	Scattering coefficient, cm-1	Penetration in tissue, mm	Penetration in water, mm	Threshold of ablation, J/cm2
TM FIBER	1.94	105	2.1	0.15	0.21	24
TM:YAG	2.01	52.5	2.0	0.30	0.43	48
HO:YAG	2.14	22.5	1.8	0.68	1.00	111

TABLE 1. COMPARATIVE CHARACTERISTICS OF RELEVANT LASER SOURCES

RESULTS

IN 7 CASES, WE OBSERVED INTRAOPERATIVE DAMAGE OF THE URETERAL ORIFICE

Three patients with damaged ureteral orifices underwent intraoperative upper urinary tract stenting. During follow-up, no patients with a stent developed pelvicalyceal system dilatation or showed any signs of urine flow inhibition. The stents were removed two weeks after surgery. Ultrasonography showed no dilatation during further follow-up.

IN 4 CASES, A DECISION WAS MADE TO FORGO STENTING, TWO PATIENTS HAD NO SIGNS OF PELVICALYCEAL SYSTEM DILATATION WITHIN ONE MONTH OF FOLLOW-UP

Two patients had no signs of pelvicalyceal system dilatation within one month of follow-up. Two other patients without stents developed pelvicalyceal system dilatation (renal pelvis up to 1.5 cm; renal calyx up to 0.5 cm) with no clinical manifestation. Fourteen days following surgery, dilatation persisted in one patient.

ONE MONTH FOLLOWING SURGERY, NO PATIENTS SHOWED PELVICALYCEAL SYSTEM DILATATION (fig. 2)

As it was shown in table 1 penetration depth for most of laser devices is less than 1 mm, while during monopolar surgery coagulative necrosis may be up to 3 mm deep and the bladder wall thickness is only about 5 mm. Our data suggests that during laser surgery, only a small amount of tissue is vaporized, without any damage to deeper layers. And if no deep tissue layers are damaged, there may be no tissue sclerosis, and therefore no need for upper urinary tract stenting (fig. 3,4).

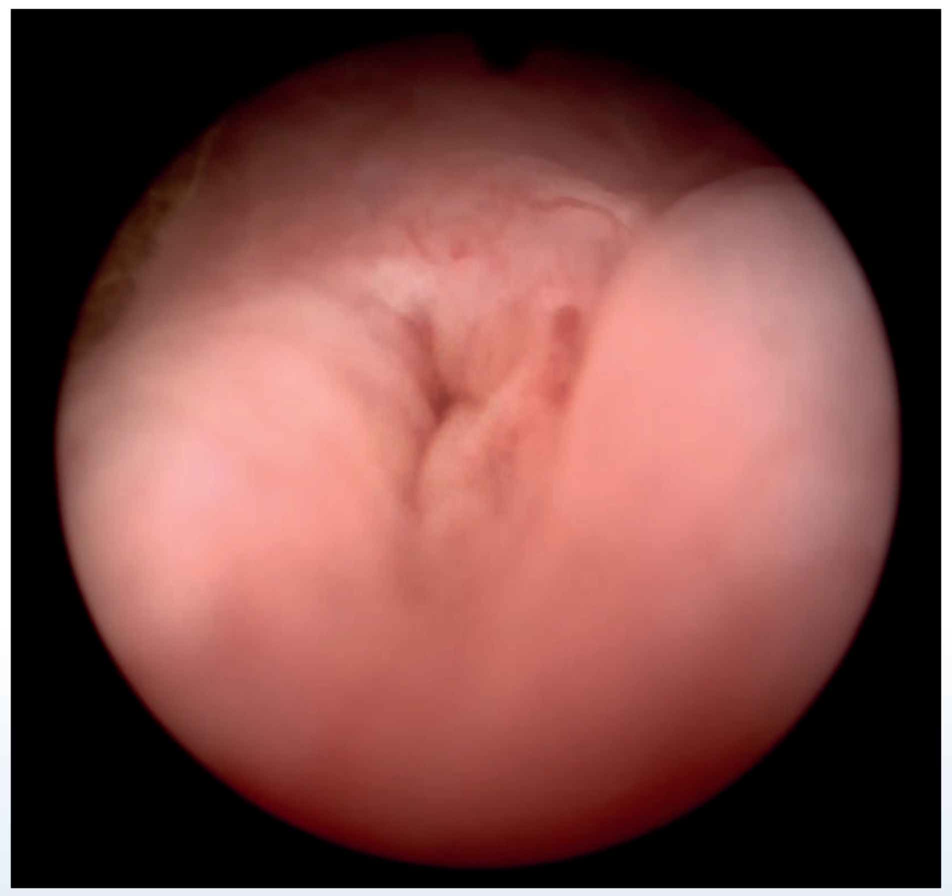

FIGURE 2. CYSTOSCOPY THREE MONTHS AFTER SURGERY

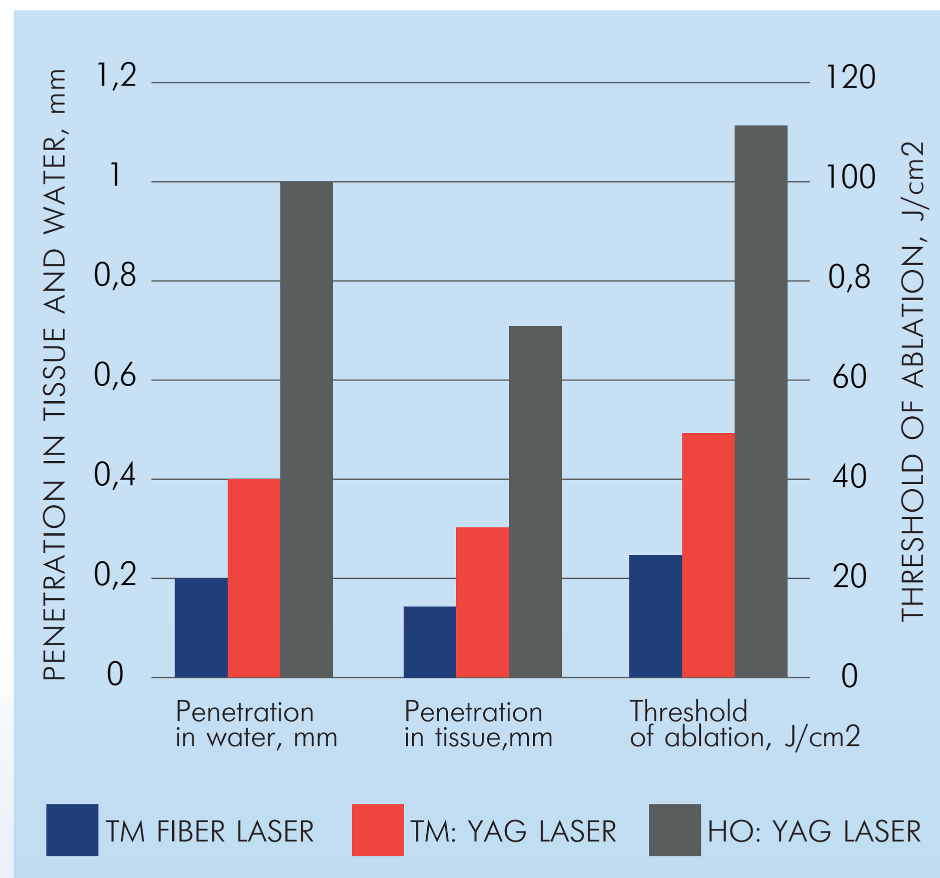

FIGURE 3. COMPARATIVE CHARACTERISTICS OF RELEVANT LASER SOURCES

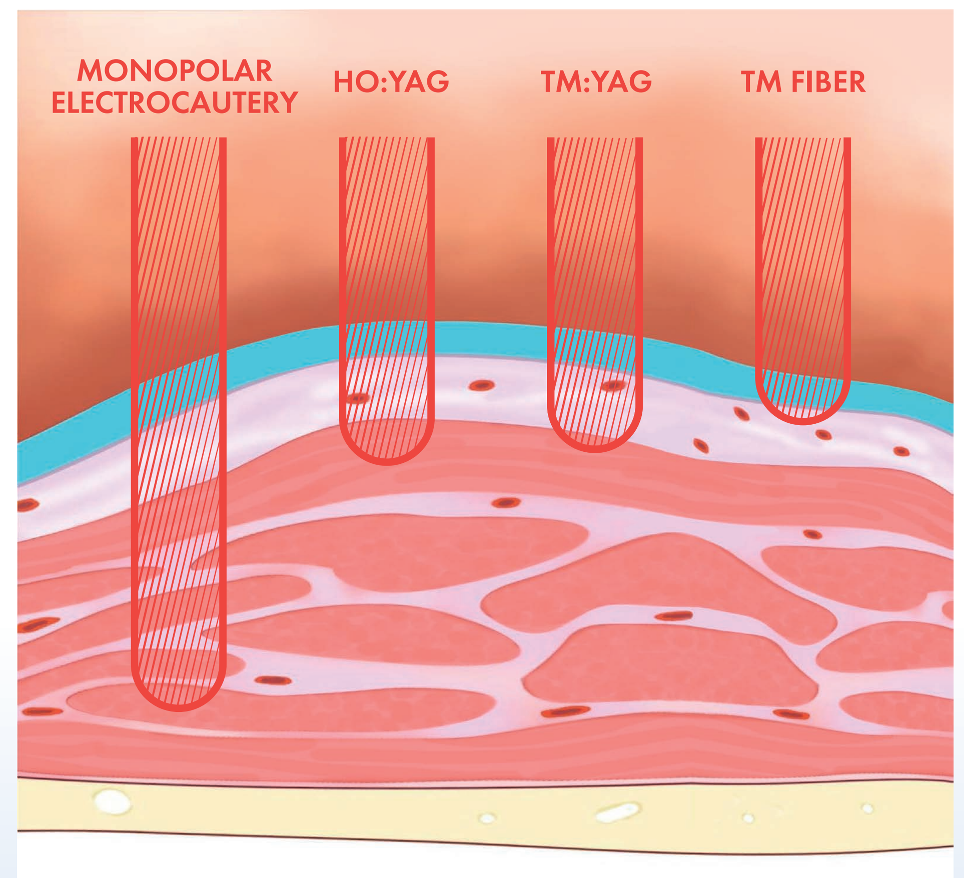

FIGURE 4. PRESUMABLE DEPTH OF BLADDER WALL PENETRATION OF DIFFERENT ENERGY SOURCES

CONCLUSION

- No upper urinary tract dilatation in the stenting group
- Dilatation of renal sinus in two patients with no stents
- No pelvicalyceal system dilatation in two patients without stents
- At one month, no signs of dilatation or urine flow inhibition