INTRODUCTION

A growing armamentarium of surgical techniques is available for treatment of Benign Prostatic Hyperplasia (BPH). Transurethral Resection of Prostate (TURP) has become the gold standard, on account of its capability to remove obstructing prostatic tissue, with durable clinical efficacy. Hemorrhage and risk of transurethral resection syndrome (TURS) are significant disadvantages, and many patients requiring surgery are elderly and/or have significant co-morbidities.

In the past 20 years, various technologies have been developed for treatment of prostatic enlargement. Many promised some advantage that could not be sustained, due to insufficient capability for tissue removal, untoward side-effects and sometimes difficult operative learning curve. Among these, early laser procedures, now historical, could only achieve coagulative ablation; they relied on sloughing of necrotic tissue, and have long since been superseded.

The 21st Century has witnessed major advances in laser engineering, providing operations for vaporization and enucleation of the prostate. Nevertheless, clinical performance has been limited by the technological ability to regulate sufficiently high laser power, at therapeutic wavelengths for tissue removal, simultaneous haemostasis and adaptability for dedicated vascular coagulation. This report describes a new 150W Thulium:Yag (Tm:Yag) laser system and clinical experience in its use for surgical treatment of BPH.1

The Cyber TM 150W is a diode pumped solid state laser system able to operate both in CW and pulsed mode, emitting a 2010 nm wavelength. It offers great absorption in interstitial water, with optical penetration of only 0.2 mm. The 150W laser produces a instantaneous vaporcut effect for a precisely controlled, haemostatic incision into prostatic tissue, highly suited for enucleation, regardless of gland vascularity. Since the laser-tissue interaction does not depend on hemoglobin absorption, tissue vascularity does not contribute to its performance or depth of tissue penetration. Thus, the same vaporcut effect occurs in scarred and poorly vascularised tissue.

Vaporesection refers to simultaneous vaporization and resection, for prostatic enucleation.2 The Tm:Yag laser system uses this to great effect, unique on account of the combination of power, wavelength and fiber design. Using the continuous mode, the laser combines simultaneous vaporization at the incision with minimal bubble effect, shallow coagulation at the incision margin, size reduction of the enucleated fragment, and haemostasis. For dedicated haemostasis, the power can be reduced, and the distance of the fiber tip from the tissue can be increased.3-5

The Cyber TM 150W, used in pulsed mode, is highly effective for bladder stones, bladder neck contractures, and urethral strictures. It can also be used, thanks to its high dynamic power range, at low power for treatment of recurrent bladder tumors, ureteric strictures and ureteric tumors.5,6 The Quanta System’s Cyber TM 150W laser system offers a high specification platform for diverse urological procedures used in everyday urology practice. The BPH procedure is only one of many surgical procedures possible with this laser platform.

OBJECTIVE

This clinical study enrolled 16 male patients with symptomatic benign prostate enlargement, aged between 53 and 75 years. Of these, 2 were in urinary retention with a catheter in-situ, showing a very critical situation, extremely difficult, if not impossible, to be treated with conventional methods or any other laser based technique.

The Tm:Yag BPH procedure is performed in a retrograde fashion, from verumontanum to bladder neck, at 150W power. Obstructing prostatic tissue is enucleated from the prostatic surgical capsule. The median lobe is dissected first, followed by the two lateral lobes. Haemostasis is secured at low power.

The tissue fragments are small, and easily evacuated at the end of the procedure using an Ellik evacuator. There is no need for morcelation of tissue fragments as for HoLEP (Holmium Laser Enucleation of Prostate) procedures.7

The enucleated tissue is sent for histological examination.
A Foley catheter is then placed, until the patient is sufficiently ambulatory for a voiding trial, and usually removed within 12-24 hours.

The follow-up visits were scheduled 3 and 6 months after the laser procedure.

RESULTS AND CONCLUSIONS

Pre-operative prostate volume measured by transrectal ranged between 40 and 87 cc. All patients voided following surgery, and at 3 month follow-up they have reported improved symptoms and voiding function. The 6-month follow-up visit, still incomplete, has already provided positive outcomes. In all cases, histological examination of tissue fragments confirmed benign prostatic hyperplasia.

The end-firing fiber is reusable, and a fiber tip that degrades during an operation can be cleaved, contributing to overall cost effectiveness. Enucleated tissue can be sent for histological examination, however clinical concern about underlying prostatic malignancy should be investigated prior to the procedure, following standard practice, based on DRE findings and PSA level.

Initial experience suggests that the procedure has a shorter learning curve than other laser techniques, and obstructing tissue can be removed with a shorter operative time. The laser appears highly effective, adaptable and no safety concerns have arisen.

250,000 Joules can be delivered in a lasing time of less than 30 minutes. These observations warrant a multicentre randomized study for formal prospective evaluation.

The Quanta System’s Cyber TM 150W is a high specification laser system for treatment of BPH. It is also highly effective for treatment of bladder stones and can also be used in a variety of other urological procedures.

REFERENCES


