Benign prostatic hypertrophy (BPH) remains endemic among aging men and is thought to affect more than 3.2 million men in the UK alone.1 The proliferation of prostatic tissue in BPH can result in bladder outflow obstruction (BOO). Untreated, it is associated with progressive storage and voiding lower urinary tract symptoms (LUTS) as well as increasing risks of acute and/or chronic urinary retention and the need for surgery. The economic impact of BPH and its sequelae is predicted to increase with rising life expectancy.2

The impact of LUTS on men’s health-related quality of life (including mental health), risk of falls and potential earnings should not be underestimated.3 The barriers to optimal treatment for those affected are not fully understood. Many men will defer intervention due to embarrassment or lack of awareness of symptom severity, or through simply accepting a change in the way they void as age-related and normal. Some men present to their healthcare provider purely due to concerns that their symptoms relate to prostate or bladder cancer rather than as a result of their impact on quality of life. When treated, non-adherence with medication may be an issue due to side-effects or lack of efficacy.

Initial therapy
The immediate aim of BPH treatment, initially with medical therapy, is to relieve bothersome urinary symptoms. Advances in pharmacotherapy mean that many patients can be appropriately managed in primary care, avoiding urinary retention and surgical intervention entirely. The Medical Therapy of Prostatic Symptoms (MTOPS) study generated medium-term data with follow-up at 4.5 years, and reported a delay in clinical progression of BPH in patients with a prostate volume of >25ml and a PSA of >1.5ng/ml with combination therapy using an alpha blocker with a 5-alpha-reductase inhibitor.4 This was later supported in the four-year results from the randomised double-blind Combination of Avodart and Tamsulosin (CombAT) Trial.5 Post-hoc analyses confirmed significant relative risk reduction in ‘clinical deterioration’ and ‘symptom progression’ with the long-term use of combination therapy in patients with a prostate volume of >40ml and PSA >1.5ng/ml.

GreenLight laser: green for go in benign prostatic hypertrophy

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The surgical management of benign prostatic hypertrophy continues to evolve. In the last issue we looked at the role of prostatic artery embolisation in its management. In this article the authors discuss the role of GreenLight laser XPS photoselective vaporisation of the prostate as an alternative to the gold standard transurethral resection of the prostate for bladder outflow obstruction.

Figure 1. GreenLight XPS photoselective vaporisation of the prostate is an evidence-based alternative to standard therapy and should be discussed with patients.
Some of the common indications for consideration of BOO surgery are shown in Box 1. Historically, failure of medical therapy would prompt referral to urology for uroflow studies prior to undergoing a transurethral resection of the prostate (TURP) (or open prostatectomy in large glands). The former remains the gold standard to which newer surgical modalities are compared, but is associated specifically with permanent dry orgasm (up to 75%), bleeding (2–10% requiring transfusion or re-operation) and transurethral resection syndrome (0.4–2%).

GreenLight XPS (GL-XPS) is an evidence-based alternative to TURP (Figure 1). Newer techniques of ejaculation preservation, with conservation of ejaculatory ducts at the apex and preservation of the bladder neck, can reduce the rate of dry orgasm to approximately 50%. The risk of bleeding is minimal. The six-month safety and efficacy results of a European multicentre randomised trial (the GOLIATH study) comparing GL-XPS versus TURP reported that the rate of a grade III bleeding adverse event after GL-XPS was 2.9% compared with 6.8% in TURP group (p=0.165). The transfusion rate was zero in the GL-XPS group. Of note, one patient required two transfusions in the TURP group. The incidence of TUR syndrome within the same dataset for GL-XPS was negligible.

### Box 1. Indications for bladder outflow obstruction (BOO) surgery

- LUTS refractory to pharmacotherapy
- Urinary retention with subsequent failed trials without catheter
- High pressure urinary retention/obstructive uropathy
- Recurrent urinary tract infections or bladder stones
- Repeated episodes of bleeding from the prostate
- Patient choice

### The GL-XPS procedure

GreenLight laser is so-called due to its short wavelength (532nm), which falls within the visible green zone of the electromagnetic spectrum. The disseminated energy is administered via a sidefiring laser fibre passed through an adapted transurethral irrigating laserscope. The enlarged prostate is targeted with the laser using a non-touch sweep-stroke technique using continuous saline irrigation (no risk of TUR syndrome). GL-XPS is almost exclusively absorbed by oxyhaemoglobin (not water), which facilitates the vaporisation of prostatic tissue and haemostasis of bleeding vessels simultaneously.

The concept of a laser prostatectomy has evolved significantly since the first functional canine studies in 1996 using an 80W laser. It was proposed as a safer alternative to TURP. The introduction in 2006 of the GreenLight 120W High Performance System (HPS) was superseded in 2010 by the GreenLight 180W Xcelerated Performance System (XPS). The procedure takes on average 60–90 minutes (depending on prostate size) under a light general anaesthetic. The increased power of the XPS MoXY laser fibre has resulted in increased vaporisation efficacy of prostate tissue, and a significant reduction in bleeding from pulse coagulation. This is reflected in the reduced operative time/hospital stay and length of catheterisation compared to previous vaporisation laser technologies. The laser fibre is water-cooled, allowing efficient energy transfer from fibre to tissue throughout the procedure with no reduction in power. This was an issue with the HPS due to heat damage of the fibre tip.

One downside of GL-XPS is the lack of tissue available for histological analysis (unlike TURP and HoLEP [holmium laser enucleation of the prostate] techniques) and the potential for missed detection of incidental prostate cancer. We would argue that BOO surgery is not a diagnostic tool for prostatic malignancy. We advocate standardised MRI imaging and biopsy techniques if indicated following initial assessment with clinical examination and PSA, prior to surgical management of BOO.

### NICE approval

The GOLIATH study is the only published multicentre multinational randomised trial to evaluate the GLXPS versus TURP. The trial, in 281 ‘low-risk’ patients (with prostates <100ml and not on anticoagulation) followed up at six months and two years, concluded that GL-XPS was non-inferior to TURP in relation to functional outcomes of Q-max, International Prostate Symptom Score (IPSS), PSA reduction and complication rates, with similar operative lengths. Mean catheterisation time for GL-XPS was statistically superior to that for TURP patients: 40.8 hours versus 59.9 hours (p<0.001), contributing to reduced hospital stay. There was a significantly lower short-term reoperation rate within 30 days in the GLXPS group (2.9% versus 9.8%; p=0.025) and comparable improvements in storage symptoms were also cited.

In 2016 NICE guidance was updated, supporting GL-XPS for treating BPH in ‘non-high-risk patients’. It should be noted, however, that the European Association of Urology (EAU) Guidelines support GLXPS as ‘safe and effective’ for patients both receiving anticoagulation medication, and for patients in retention.

The move towards day case surgery comes at a time of national bed shortages, which often result in the cancellation of elective surgical procedures such as TURP. GLXPS can be used as a day case procedure, whereas TURP patients normally require routine hospital admission for one to three nights.
following an uncomplicated operation. Cost-modelling analysis by NICE estimated a cost reduction potential of £60 per GL-XPS patient compared to TURP. Extrapolating their data on the basis of proportional day case procedure numbers in low risk patients for both modalities, NICE predicted an annual saving with GL-XPS of £2.3 million in NHS England.\(^{12}\)

In spite of its NICE endorsement, GL-XPS is not yet provided in all urology units. It remains our duty as clinicians to ensure that each patient is aware of ‘any reasonable alternative or variant treatments’,\(^{12}\) to explain operative options beyond those available in one department, and to refer accordingly.

**Conclusion**

In our experience, GLXPS is a safe and efficacious day case option for the treatment of BPH, regardless of comorbidities and anticoagulation. It should be offered as an option to patients considering BOO surgery.

**References**

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