

HoLEP: the new 'gold standard' in bladder outflow surgery

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Transurethral resection of the prostate (TURP) has been the 'gold standard' procedure for benign prostatic hypertrophy (BPH) for many years. In this article the author describes Holmium Laser Enucleation of the Prostate (HoLEP) and questions why it is not more widely utilised.

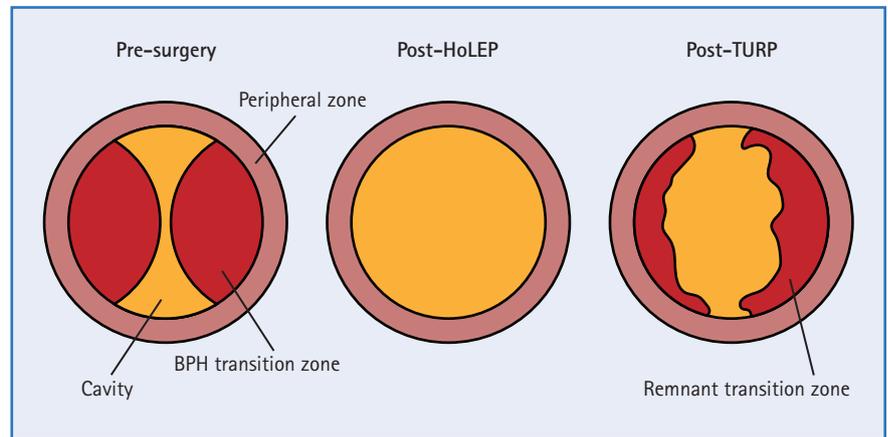


Figure 1. HoLEP allows a cleaner removal of obstructing prostate tissue than TURP. Blood loss and hospital stay following the operation are reduced

In 1945 Sir Terrence Millin presented a patient to the Royal Society of Medicine (RSM) on whom he had performed a retropubic prostatectomy eight days earlier. Before going to the RSM, Millin bought a large water ewer and plied his patient with beer in a local pub, before requesting his patient void in front of the learned fellows. There was universal amazement at the flow, and Millin became rapidly concerned that he had overdone the beer and the ewer might be insufficient! His full description of the technique subsequently appeared in the *Lancet*.

Sadly, the days of taking a grateful patient to the pub and then asking him to void in front of learned fellows belongs in the history books. However, the operation lives on, and the concept of removing the inner obstructive adenoma of the transition zone from the outer peripheral zone of the prostate has remained the fundamental principle of prostatic surgery ever since. In essence, all that has changed over the last

70 years is the energy source to remove the adenoma, with the finger being replaced by an array of differing energies. As technology has progressed, so the techniques have evolved. The dilemma for the clinician and patient is which technique is best.

Key advances have been the development of the rod lens cystoscope, allowing transurethral visualisation of the prostate, and the development of glycine irrigation to allow continuous vision cauterisation of the prostate (TURP). Most articles refer to TURP as the 'gold standard', although there is no such definition of what the gold standard actually is. Undoubtedly, it is a very successful operation that has stood the test of time and remains the index urological operation which virtually all urologists should be able to perform.

CHANGING TIMES

In the modern world, the advent of new technology challenges TURP's hallowed

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status. The playing field has also changed, principally due to the ageing population, who have larger prostates simply as a result of longevity. The success of medical management of prostatic obstructive symptoms typically delays the time to surgery by 10 years or more, with the consequence of having to operate on bigger prostates in increasingly comorbid patients.

How should the gold standard procedure be defined? From a patient point of view, it needs to be safe, with a low risk of transfusion. It needs a short hospital stay, with the option of day surgery, good functional outcome, to be painless, with minimal risk of the main complications, and durable, ideally a one-off operation. In addition, from a clinician perspective, it needs to be an operation easily undertaken using familiar equipment, with a short operating time, and an operation that yields tissue for histology and is suitable for all sizes of prostate in all patients, whatever their comorbidities (Box 1).

Flow is proportional to radius to the power of four (Poiseuille's Law) and pump pressure generated by the bladder. Therefore, provided the bladder has good residual contractility, the greater the volume of tissue removed, the greater the flow and the more impressive the result. The two major concerns of any prostatic surgery are urinary incontinence and the loss of sexual function, particularly ejaculation, both of which increase with the relative extent of tissue removed. Similarly, the durability of the operation is proportional to the extent of remnant tissue that continues to grow over time. HoLEP, when done well, removes all the adenoma.

TURP in a small prostate should be a relatively straightforward procedure, with easy haemorrhage control and a predictable length of stay of one or two nights with catheter/irrigation.

Box 1. Patient and clinician requirements from a 'gold standard' prostate operation

- Safe
- Low transfusion rates
- Short operating time
- Yields tissue for histology
- Suitable for all prostate sizes
- Short hospital stay
- Good functional outcome
- Pain free
- Low complications
- Can be used in comorbid patients

TURP in larger prostates can become an exponentially more difficult procedure due to haemorrhage and glycine absorption resulting from a prolonged operative time in order to adequately remove the obstructive adenoma. The consequence can be 'TURP' syndrome, which can be fatal, require transfusion, and result in a prolonged hospital stay and poor functional outcome due to an inadequately resected prostate. Similarly, the need for further surgery as a consequence of residual tissue is proportionally higher. In the larger prostate, the shine on TURP's status rapidly decreases.

NEW TECHNIQUE ON THE BLOCK

Unfortunately, there is no perfect technique that fulfils all the ideal requirements exactly; however, the modern-day HoLEP probably comes closest. This operation is the same as described by Millin 71 years ago, but it can now be done transurethrally, with negligible bleeding, as a day case. Lasers in prostate surgery have been around for many years, but the original techniques were largely ablative, resulting in insufficient channels and dysuria secondary to charred tissue – an issue that still affects ablative techniques, particularly green light (KTP) laser prostatectomy. The original HoLEP technique began in Tauranga, New Zealand, under the

guidance of Mark Fraundorfer and Peter Gilling.¹ The first step was to use pure Holmium laser frequency so that tissue was cut rather than ablated. Initially tissue was resected, but subsequently the enucleation technique developed using a modified resectoscope. The scope was used to add tension to the adenoma to allow enucleation along the tissue plane between the peripheral zone and the transition zone, which is the same plane in which Millin used his finger in 1945. The great advantages of the laser are its haemostasis and minimal tissue penetration, which allow extremely accurate dissection (Figure 1). Initially the enucleated lobes were resected using traditional TURP resection; however, the development of morcellation via an adapted offset lens nephroscope allowed the adenoma to be morcellated within the bladder and extracted, negating any need for glycine resection. This is the technique in use today.

“The benefits of HoLEP are well versed, so why is it offered by so few surgeons?”

BETTER THAN TURP?

Fraundorfer and Gilling sensibly performed a randomised trial versus TURP at the start of the HoLEP development, which has progressively reported over the years.^{2,3} At no stage has HoLEP ever been shown to be significantly inferior to TURP. Indeed, in many respects the results are superior, but without reaching significance – although the combination of patients dying and being lost to follow-up underpowers the study. Where significance has been achieved between the two techniques, it is largely on the basis of shorter catheterisation, hospital stay and reduced blood loss. The amount of tissue removed is statistically greater, resulting in a zero re-operation rate at seven years of follow-up, compared to 18% for TURP.

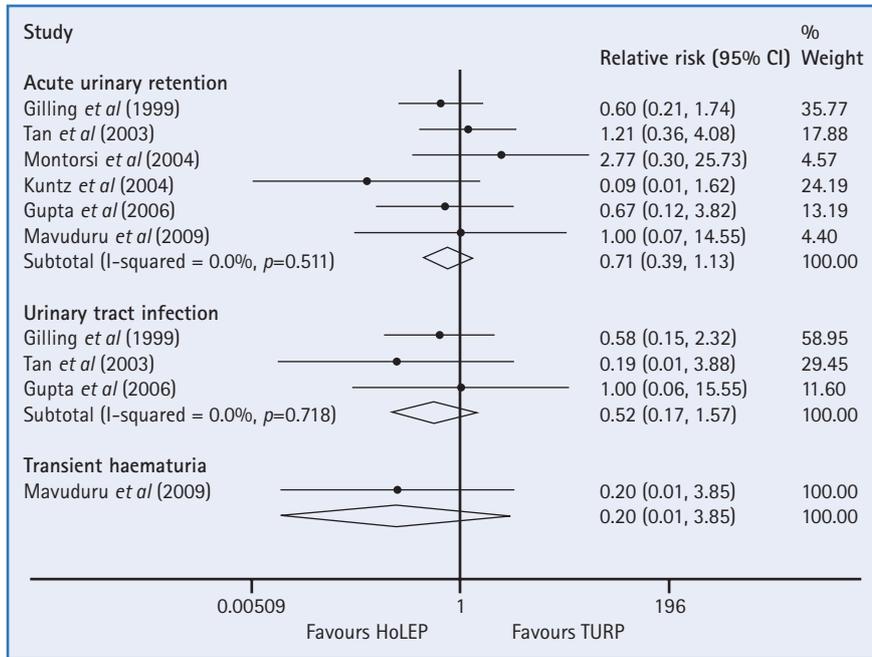


Figure 2. Comparison of HoLEP versus TURP

Systematic reviews of similar randomised trials favour HoLEP over TURP, but with little statistical significance (Figure 2).⁴ There is little value in performing a sufficiently large randomised trial to confirm superiority.

The success of HoLEP is demonstrated by the large number of tertiary referrals of 'challenging' prostates in terms of size (typically >100g), patients in terms of comorbidity and habitus, or the combination of both. I take particular pride in discharging home such patients from a high dependency unit bed the day after surgery.

Given the safety profile of HoLEP, particularly in very large prostates, it is questionably unethical to offer patients a traditional open prostatectomy. There are few contemporary, open retropubic prostatectomy series to report; however, the most recent report a transfusion rate of 23.5%.⁴ In my personal series of HoLEP, I have a 30-day transfusion rate of 0.4%.

The physiological advantages of HoLEP are hard to quantify, but on a postoperative

ward round the patients are typically awake and reading, look and feel well, and are happy to chat. This is in contrast to TURP patients, who are often lethargic, never reading and offer limited conversation. It is my view that even minor glycine absorption is significantly detrimental to the brain.

WHY THE SLOW ADOPTION?

So, why has HoLEP not been more widely adopted? The proponents and the urology world are well versed in its benefits, but why is it offered by so few surgeons? A recent publication would suggest that almost half of units intending to develop the service using experienced, but HoLEP-naive surgeons, abandoned it within 20 cases, and completion of cases by HoLEP was only 44%. It would seem that the learning curve is in excess of 20 cases, and that both the enucleation and morcellation components contribute to procedures being abandoned or converted to TURP.⁶

With enucleation it is essential to stay in the tissue plane, otherwise it is easy to 'get lost' within the prostate. With

morcellation the tissue tends to bounce off the morcellator. Both situations can be very frustrating to the surgeon.

For many urological surgeons, HoLEP is undoubtedly the new gold standard. Developments in morcellation to make it faster, safer and more reliable will aid the take-up rates, but above all, individuals need the perseverance and dexterity to complete the learning curve and make the procedure a success.

Declaration of interests: none declared.

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