Meta-analysis of holmium laser enucleation versus transurethral resection of the prostate for symptomatic prostatic obstruction

Tan A, Liao C, Mo Z, Cao Y

CRD summary
This reasonably well-conducted review concludes that holmium laser enucleation of the prostate is a safe and minimally invasive technique, with similar effects to transurethral resection of the prostate, for the relief of symptoms in patients with symptomatic prostatic obstruction. However, the reliability of this conclusion is limited by its reliance on a limited number of small, varied trials.

Authors' objectives
To compare the clinical effectiveness of holmium laser enucleation of the prostate (HoLEP) with transurethral resection of the prostate (TURP) for symptomatic prostatic obstruction.

Searching
MEDLINE, EMBASE and the Cochrane Library were searched from 1990 to 2007; the search terms were reported. The reference lists of retrieved articles and reviews were checked for additional studies. Articles in all languages were included.

Study selection
Study designs of evaluations included in the review
Randomised controlled trials (RCTs) were included.

Specific interventions included in the review
Studies comparing HoLEP with TURP were eligible for inclusion. The authors did not provide information on the specific techniques used, other than to state that various different holmium laser enucleation devices, energy sources and power settings were used, and there were differences in operative techniques.

Participants included in the review
Studies including patients with symptomatic prostatic obstruction were eligible for inclusion. Where reported, the mean age of the included participants ranged from 64.5 to 71.7 years; the mean International Prostate Symptom Score (IPSS) ranged from 21.6 to 26.0; the mean prostate size ranged from 49.9 to 77.8 g; the mean postvoid residual volume (PVR) ranged from 84.0 to 238 mL; and the mean peak urinary flow rate (Qmax) ranged from 4.5 to 8.4 millimetres per second.

Outcomes assessed in the review
The primary outcomes were Qmax, PVR, IPSS and quality of life, while secondary outcomes included operating time, length of hospital stay, blood loss, catheterisation time and adverse events (urethral stricture, stress incontinence, blood transfusion and reintervention). The outcomes were assessed at baseline, and 6 and 12 months post-intervention.

How were decisions on the relevance of primary studies made?
Two reviewers independently assessed the relevance of each study and resolved any disagreements by consensus.

Assessment of study quality
Two reviewers independently assessed the validity of the included studies using the Jadad scale; any disagreements were resolved through consensus. The studies were awarded a score of between 0 and 5. Studies with a score of 2 or less were described as low quality, while those with a score of 3 or more were described as high quality.

Data extraction
Two reviewers independently extracted the data and resolved any disagreements by consensus. Primary study authors were contacted for further information where necessary. Means and standard deviations were calculated for continuous
variables using the methods of Cochran, while binary outcomes were calculated using the methods of Yusuf.

**Methods of synthesis**

**How were the studies combined?**
Pooled effect sizes with 95% confidence intervals (CIs) were calculated using a fixed-effect model, except in cases where significant statistical heterogeneity was found, in which case a random-effects model was used. Weighted mean differences (WMD) were used for continuous variables. Publication bias was assessed using funnel plots and Egger’s test.

**How were differences between studies investigated?**
Heterogeneity between the studies was assessed using the chi-squared and I-squared statistics. The effects of individual trials were investigated in a sensitivity analysis.

**Results of the review**

Four RCTs (n=460) were included.

The mean quality assessment score was 3 on the Jadad scale. Only one study reported the method of randomisation and only two reported an assessment of statistical power.

There were no statistically significant differences in Qmax between HoLEP and TURP at 6 months or 12 months post-intervention, although significant statistical heterogeneity was detected in each case. Statistically significant benefits in favour of HoLEP were found for catheterisation time (WMD -1.79 hours, 95% CI: -2.65, -0.93), duration of hospital stay (WMD -2.39 days, 95% CI: -3.82, -0.95), blood loss (WMD -0.27 mg/decilitre, 95% CI: -0.50, 0.04) and overall complication rate (8.2% versus 16.2%, p=0.019). However, HoLEP was associated with significantly longer operating times (WMD 1.81 hours, 95% CI: 0.73, 2.90). No significant differences between the two interventions were evident in terms of urethral stricture, stress incontinence, blood transfusion or reintervention. However, with the exception of blood loss and complication rates, significant heterogeneity was detected for all outcomes. Sensitivity analyses identified one trial as the main source of heterogeneity in all cases.

There was no evidence of publication bias.

**Authors’ conclusions**

Evidence suggests that HoLEP is a safe and minimally invasive technique, with similar effects to TURP in terms of relief of symptoms at 12 months. HoLEP takes longer to perform, but is associated with fewer complications, significantly less blood loss, and a shorter hospital stay and catheterisation time.

**CRD commentary**

This reasonably well-conducted review addressed a clear review question using reliable methods. There may, however, be some risk of publication bias as there were no specific attempts to locate unpublished material and the authors’ assessments of bias are unlikely to be reliable given the small number of included studies. The quality assessment suggested that the trials were of moderately high quality, but their sample sizes were small and at least one of the studies was responsible for significant levels of statistical heterogeneity. Overall, the authors’ conclusion is supported by the data presented, but it may not be reliable given its reliance on only a limited number of small heterogeneous trials.

**Implications of the review for practice and research**

The authors did not state any implications for practice or further research.

**Funding**

Not stated.

**Bibliographic details**

PubMedID
17729384

DOI
10.1002/bjs.5916

Indexing Status
Subject indexing assigned by NLM

MeSH
Humans; Laser Therapy /instrumentation; Lasers, Solid-State; Male; Prostatic Hyperplasia /physiopathology /surgery; Randomized Controlled Trials as Topic; Transurethral Resection of Prostate /adverse effects /instrumentation; Urinary Retention /physiopathology /surgery; Urination /physiology

AccessionNumber
12007003746

Date bibliographic record published
10/03/2008

Date abstract record published
01/09/2008

Record Status
This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.