Holmium laser resection of the prostate is more cost effective than transurethral resection of the prostate: results of a randomized prospective study

Fraundorfer M R, Gilling P J, Kennett K M, Dunton N G

Record Status
This is a critical abstract of an economic evaluation that meets the criteria for inclusion on NHS EED. Each abstract contains a brief summary of the methods, the results and conclusions followed by a detailed critical assessment on the reliability of the study and the conclusions drawn.

Health technology
Holmium laser resection of the prostate (HoLRP) for patients with benign prostatic hyperplasia and urodynamically proved obstruction.

Type of intervention
Treatment.

Economic study type
Cost-effectiveness analysis.

Study population
The study consisted of male patients with symptoms of bladder outflow obstruction, an American Urological Association (AUA) score of 8 or greater, independent peak urinary flow rate (Qmax) of 15 ml/s or less, and bladder outflow obstruction confirmed by pressure flow urodynamic studies (Schafer grade of 2 or more). Exclusion criteria were: aged over 80 years, previous prostatic or urethral surgery, a diagnosis of prostate cancer, postvoid residual volume greater than 400 ml and transrectal ultrasound (TRUS) prostate volume greater than 100 cm³.

Setting
Secondary care. The economic study was conducted at the Department of Urology, Tauranga Hospital, Tauranga, New Zealand.

Dates to which data relate
Effectiveness and cost dates were not stated. The randomised trial was published in 1999 and the cost-effectiveness analysis was published in 2000.

Source of effectiveness data
Effectiveness data were derived from a single study.

Link between effectiveness and cost data
Costing was undertaken prospectively on the same patient sample as that used in the effectiveness analysis.

Study sample
120 male patients with symptoms of bladder outflow obstruction, an American Urological Association (AUA) score of 8 or greater, independent peak urinary flow rate (Qmax) of 15 ml/s or less, and bladder outflow obstruction confirmed by pressure flow urodynamic studies (Schafer grade of 2 or more) were randomised to either TURP (59) or HoLRP.
Power calculations related to the sample size were not reported.

**Study design**
This was a randomised, single-centre, prospective study. The duration of follow-up was 12 months.

**Analysis of effectiveness**
The analysis was based on intention to treat. The main health outcomes considered were: resection time (minutes), catheterisation time (hours), nursing contact time (minutes), hospital stay (hours), blood transfusion (n) and after discharge-Qmax (mL/s), AUA score and Schafer grade, unscheduled clinic visits, readmissions and complications. Quality of life, sexual function and continence were also assessed using questionnaires.

**Effectiveness results**
The effectiveness results were as follows:

- **Resection time (minutes):** HoLRP group 41 +/-23.1 (range: 16 - 108) versus TURP group 25.3 +/-14.7 (range: 8 - 68), (p<0.001);

- **Catheterisation time (hours):** HoLRP group 20.0 +/-11.39 (range: 11.8 - 96.2) versus TURP group 37.2 +/-15.92 (range: 13.2 - 90.7), (p<0.001);

- **Nursing contact time (minutes):** HoLRP group 36.1 +/-26.7 (range: 11 - 174) versus TURP group 105.6 +/-116.5 (range: 38 - 665), (p<0.001);

- **Hospital stay (hours):** HoLRP group 26.2 +/-11.71 (range: 16.2 - 96.2) versus TURP group 47.5 +/-17.37 (range: 19.9 - 98.3), (p<0.001);

- **Blood transfusion (n):** HoLRP group 0 versus TURP group 4.

The urodynamic outcomes at six months (Qmax (mL/s), AUA score and Schafer grade) were not significantly different between the two groups, but the flow rates were better in the HoLRP groups at 12 months (25.2 +/-11.9 (6-63) for HoLRP versus 20.4 +/-8.5 (6-44) for TURP, p<0.05).

Results of questionnaires on quality of life and sexual/continence function were not detailed. Groups were well matched in terms of age, TRUS volume, residual volume, Qmax and AUA score.

**Clinical conclusions**
Holmium laser resection of the prostate (HoLRP) for patients with benign prostatic hyperplasia and urodynamically proved obstruction is a safe procedure.

**Measure of benefits used in the economic analysis**
As the clinical outcomes at 1 year were equivalent, the authors conducted a cost-minimisation analysis.

**Direct costs**
Direct hospital costs were considered in the analysis, namely: preoperative components, blood group and hold, operating room set-up/disposable and time, anaesthesia, recovery, catheter, fibre or loop, irrigation fluid, blood products, hospital stay, nursing extras, unplanned events in year 1, outpatient visits, operating suite, specific consumables, accommodation. Medical salary costs (urologist and anaesthesiologist) were not included. Quantities and costs were not presented separately and costs were not discounted due to the short duration of the study. Costs were obtained from the Tauranga hospital finance department and represent the actual cost of the goods and services provided, as opposed to the price to the purchaser. The price year was not stated.
Statistical analysis of costs
No statistical analysis was performed.

Indirect Costs
Indirect costs were not considered.

Currency
New Zealand dollars (NZ$).

Sensitivity analysis
No sensitivity analysis was performed.

Estimated benefits used in the economic analysis
See effectiveness results above.

Cost results
Total cost for HoLRP was NZ$2,012 versus NZ$2,663 for TURP, a saving of NZ$651 (24.5%).

Synthesis of costs and benefits
Not applicable.

Authors’ conclusions
Because the costs were lower and the clinical outcomes out to 1 year were equivalent, HoLRP was more cost-effective than TURP. On the basis of these savings, a minimum of 93 cases per year is required to recover the capital and service costs of the HoLRP procedure.

CRD COMMENTARY - Selection of comparators
The reason for the choice of the comparator (TURP) is clear, as both procedures, HoLRP and TURP, were used in the authors’ setting and TURP is generally considered to be the standard procedure against which new technologies and techniques must be measured. You, as a database user, should consider if the same applies to your own setting.

Validity of estimate of measure of effectiveness
The analysis was based on a randomised, single-centre, prospective trial, which was appropriate for the study question. The study sample was representative of the study population, but no power calculations were reported to have been used in determining the sample size. Patient groups were shown to be comparable in their baseline characteristics and appropriate statistical analyses were undertaken on the effectiveness data.

Validity of estimate of measure of benefit
The analysis of benefits was based upon the therapeutic equivalence of treatment alternatives. The economic analysis, therefore, was primarily based on costs.

Validity of estimate of costs
Apart from medical salaries, all other categories of costs relevant to the hospital perspective adopted were included in
the analysis. However, in terms of limitations: quantities and costs were not reported separately and costs were not statistically analysed.

**Other issues**
The patient sample appears to have been appropriate for the study population. Relevant comparisons were performed with other studies dealing with the same topic. Although the issue of generalisability was not discussed, the limitations of the cost analysis make generalisability of the findings somewhat problematic.

**Implications of the study**
The urodynamic outcomes at six months (Qmax (mL/s), AUA score and Schafer grade) were not significantly different between the two groups, but the flow rates were better in the HoLRP group at 12 months. The results of the economic analysis add support to the choice of HoLRP.

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