Economic evaluation of treatment for benign prostatic hyperplasia: transurethral resection vs thermotherapy vs laser vaporization


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
The use of surgery for benign prostatic hypertrophy (BPH) patients. The surgical methods examined were transurethral resection of the prostate (TURP), visual laser ablation of the prostate (VLAP) and transurethral microwave thermotherapy (TUMT).

Type of intervention
Treatment.

Economic study type
Cost-effectiveness analysis.

Study population
The study population comprised patients who underwent TURP, VLAP or TUMT for BPH. Patients who were under examination or treatment for other conditions relating to the urinary system were excluded from selection. In addition, those patients who were transferred from or to other departments were excluded.

Setting
The setting was secondary care. The economic study was conducted at the Tokyo Medical University Hospital, Japan.

Dates to which data relate
The effectiveness data come from a single study conducted between January 1994 and March 2000. The cost data related to the same study period. The price year was not stated.

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

Link between effectiveness and cost data
The cost data for the single study were derived retrospectively from the same sample that formed the clinical study.

Study sample
Power calculations were not used to determine the sample size. The study sample comprised 46 patients who underwent TURP and 31 patients who underwent VLAP between January 1994 and May 1996, and 28 patients who underwent TUMT between January 1996 and January 1997. The median age was 68 years (range: 57 - 82) for the TURP group, 74 years (range: 58 - 87) for the VLAP group and 72 years (range: 51 - 80) for the TUMT group. The median volume of affected prostate was 47.8 cm³ (range: 22.2 - 114.1) for the TURP group, 32.4 cm³ (range: 18.8 - 70.3) for the VLAP
group and 32.7 cm³ (range: 17.8 - 75.1) for the TUMT group. The median amount of remaining urine was 62 mL (range: 3 - 520) for the TURP group, 25 mL (range: 5 - 350) for the VLAP group and 14 ml (range: 2 - 168) for the TUMT group. The median IPSS was 19 (range: 5 - 35) for the TURP group, 17 (range: 11 - 32) for the VLAP group and 17 (range: 7 - 34) for the TUMT group.

**Study design**
This was a non-randomised study that was carried out in a single centre. The follow-up period was until the last day of the patients' hospital visit. No loss to follow-up was reported.

**Analysis of effectiveness**
The analysis of effectiveness was conducted on an intention to treat basis. The outcomes assessed were:

- the duration of hospitalisation, outpatient visits and follow-ups;
- the number of cases for reoperation;
- the use of alternative surgical methods; and
- complications.

In terms of baseline characteristics, the TURP group was observed to contain slightly more serious cases than the VLAP and TUMT groups, according to the volume of affected prostate and amount of remaining urine.

**Effectiveness results**
The median number of hospitalised days was 21 days (range: 14 - 43) for the TURP group and 16 days (range: 7 - 35) for the VLAP group.

TUMT was carried out without hospitalisation.

The median number of outpatient visits was 11 days (range: 1 - 80) for the TURP group, 16 days (range: 1 - 85) for the VLAP group and 14 days (range: 4 - 71) for the TUMT group.

The median duration of follow-up was 12.4 months (range: 1.0 - 71.8) for the TURP group, 46.7 months (range: 14.2 - 129.8) for the VLAP group and 14.4 months (range: 1.0 - 49.8) for the TUMT group.

Among the TUMT group, 4 patients needed reoperation (1 received an additional TURP), while 5 others needed an alternative surgical method (TURP or transurethral needle ablation).

In terms of slight postoperative complications, one case (stricture of urethra) was observed in the TURP group and two cases (stricture of urethra and inflammation of the testes) were observed in the VLAP group. No complications were observed in the TUMT group.

**Clinical conclusions**
TUMT had the shortest treatment period and had a shorter follow-up than VLAP, but it had the highest recurrence rate.

**Measure of benefits used in the economic analysis**
No summary measure of benefit was used in the economic analysis. Therefore, the health benefits were those associated with the effectiveness results. As such, a cost-consequences analysis was performed.
The total medical costs for hospitalisation and outpatient treatments, exclusive of operation and anaesthetic fees, were presented using Japanese social insurance points. The quantities and the costs were not reported separately. Discounting was not carried out. The costs were calculated on the basis of the actual treatment payment details received by the hospital from the government. The costs for each patient were calculated from the month of their surgical operation until the last month of their hospital visit (if the patients were hospitalised before the operation, the costs were from the month of their hospitalisation). The price year was not stated.

Statistical analysis of costs
No statistical analysis of the costs was carried out.

Indirect Costs
No indirect costs were included.

Currency
Japanese social insurance points. These were not converted into a specific currency but were a proxy for resource usage/costs.

Sensitivity analysis
No sensitivity analysis was performed.

Estimated benefits used in the economic analysis
See the 'Effectiveness Results' section.

Cost results
The median total costs were 59,395 points (range: 42,651 - 155,988) for the TURP group, 66,784 points (range: 36,169 - 120,867) for the VLAP group and 14,927 points (range: 3,374 - 84,777) for the TUMT group.

The total costs were divided by the treatment period (number of days) and follow-ups (number of months).

The median total costs were 1,822 points/day (range: 1,145 - 2,492) and 1,733 points/month (range: 771 - 214,013) for the TURP group, 2,104 points/day (range: 1,061 - 2,849) and 2,104 points/month (range: 605 - 95,405) for the VLAP group, and 1,197 points/day (range: 685 - 2,175) and 1,390 points/month (range: 251 - 23,139) for the TUMT group.

When the cases of reoperation and changes to other surgical methods were considered, the median costs for the TUMT group were 1,073 points/day (range: 685 - 2,176) and 1,046 points/month (range: 251 - 2,314) for the patients who did not need additional surgical treatments. The median costs were 1,167 points/day (range: 819 - 1,287) and 1,403 points/month (range: 645 - 1,878) for patients who had a reoperation, and 1,576 points/day (range: 1,222 - 1,686) and 1,753 points/month (range: 1,523 - 2,804) for those patients who needed changes to other surgical methods.

Synthesis of costs and benefits
Not applicable due to the cost-consequences approach adopted.

Authors' conclusions
Transurethral microwave thermotherapy (TUMT) was the most cost-effective method, followed by transurethral resection of the prostate (TURP). However, TUMT resulted in higher recurrence rates than TURP and visual laser ablation of the prostate (VLAP), leading to higher costs in some cases. Thus, the selection of surgical methods for benign prostatic hypertrophy (BPH) has to be carried out very carefully.
CRD COMMENTARY - Selection of comparators
The rationale and justification for the choice of the comparators (TURP, VLAP and TUMT) was clear. TURP has been the main treatment method in the past. You should decide if the choice of the intervention and comparators is applicable to your own setting.

Validity of estimate of measure of effectiveness
The effectiveness data were derived from a non-randomised study and may, therefore, be subject to selection bias and confounding. In this regard, the patient groups were shown not to be identical, as the TURP group contained slightly more serious cases. Since no power calculations were reported it is unclear whether the sample was sufficiently large to detect statistically significant differences. The analysis of effectiveness was handled credibly, but no statistical analyses were performed. Descriptive statistics (median, range) were, however, given and the reporting was clear.

Validity of estimate of measure of benefit
The health benefits used in the study were left disaggregated and, as such, a cost-consequences analysis was performed.

Validity of estimate of costs
The authors used social health insurance points to proxy costs, which is a valid approach for the Japanese context. However, this method restricts the potential for replication of the results in other settings, as the opportunity costs were not presented. The cost results are, therefore, only useful in determining the relative differences in resource use between TURP, VLAP and TUMT. The generalisability of the results is constrained by the fact that the costs and quantities were not reported separately and a price year was not provided (although a price year would be of use only to a Japanese context in view of the use of social insurance points). Discounting was not performed, but this is justifiable since all the costs were incurred during a short time (less than 1 year).

Other issues
The authors mentioned other studies in relation to the level of invasiveness of the interventions, complication rates and cost, although these did not involve direct comparisons of results. Due to the use of social insurance points to proxy true costs, the generalisability of the results outside of Japan would be problematic. The relative direction of the results in resource use terms would, however, be useful to other health care settings.

Implications of the study
The results tended to support TUMT as the most cost-effective alternative with some caveats, as TUMT may also lead to higher costs due to worse recurrence rates. Thus, a degree of judgement is needed in choosing surgical methods for BPH as the use of TURP (lower recurrence) may be more satisfactory in some aspects, but incur very high costs in the event of complications (although none were observed in the present study).

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