Transurethral electric vaporisation of prostate as an alternate to trans urethral resection in benign prostatic hyperplasia

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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
Patients with bladder outflow obstruction symptoms resulting from benign prostatic hyperplasia (BPH) were given transurethral electric vaporisation of the prostate (TUEVP). A 24Fr size resectoscope was used with the cutting mode of diathermy set to 400 watts. The comparator treatment was transurethral resection of the prostate (TURP), in which a 24Fr size resectoscope was used with cutting loop and 30 degrees telescope. Spinal or epidural anaesthesia was used for both treatments and prophylactic antibiotic administered preoperatively. Five per cent dextrose water was used for irrigation purposes, and a 22Fr three-way Foley’s urethral catheter was inserted after surgery. A 0.9% saline solution was used for postoperative bladder irrigation, with the urethral catheter removed after 72 hours in the TURP group and after 24 hours in the TUEVP group.

Type of intervention
Treatment.

Economic study type
Cost-effectiveness analysis.

Study population
Men suffering from bladder outflow obstruction symptoms due to BPH were selected for the study. Patients were excluded if they suffered from bleeding disorders, diabetes mellitus, cardiac failure, neurological disorders, renal function impairment, or liver disorders. They were also excluded if they had vesical calculi, urethral strictures, carcinoma prostate, or a prostate larger than 50 g.

Setting
The setting was secondary care. The economic study was carried out in Pakistan.

Dates to which data relate
The effectiveness and resource use evidence referred to 1996 - 1968. No price year was given.

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

Link between effectiveness and cost data
The same patients provided both the effectiveness and the cost data. The costing appears to have been carried out prospectively.
Study sample
The sample size of the cohort was not determined in the planning phase of the study. In addition, power calculations were not performed retrospectively. No method of sample selection was described, and no patients were reported to have been excluded from the cohort. Fifty patients were included in the study, 25 in each of the two groups. The mean age was 67.2 (+/- 7.47) years in the TURP group and 64.14 (+/- 7.86) years in the TUEVP group.

Study design
The design of the study was unclear. The method of allocating patients to the two groups was not described. The patients were followed up for 6 months. Loss to follow-up was not reported, neither was blinding of the outcome assessment.

Analysis of effectiveness
It was not reported whether the analysis was conducted on an intention to treat basis or on treatment completers only. However, it appears that the intention to treat approach has been used. The primary health outcomes used were:

postoperative data (including volume of irrigating fluid used, duration of irrigation, duration of catheter, hospital stay, and the postoperative serum sodium level);
early complications (clot retention, haemorrhage, TURS, fever, and retention of urine after catheter removal);
late postoperative complications (secondary haemorrhage, epididymo-orchitis, urinary tract infection, retrograde ejaculation, stricture urethra);
postoperative symptom score (International Prostatic Symptom Score, I-PSS) at week 2, month 3 and month 6;
the post micturating residual volume at week 2, month 3 and month 6; and
the mean peak flow rate at week 2, month 3 and at month 6.

Baseline data on the mean age, the mean weight of prostate and preoperative serum sodium level were given. Although the mean age of the TURP group was 3 years more than that of the TUEVP group, the authors reported that the difference was not statistically significant.

Effectiveness results
Postoperatively, the mean volume of irrigating fluid used, (p=0.008), the mean duration of irrigation, (p=0.0001), the mean duration of catheter, (p=0.0001), and the mean hospital stay, (p=0.0046), were less in the TUEVP group than in the TURP group. The postoperative serum sodium level was lower in the TURP group than in the TUEVP group, (p=0.0001).

In terms of early complications, the clot retention rate was 12% in the TURP group and 4% in the TUEVP group, (p=0.001), and the haemorrhage rates were 16% (TURP) and 0% (TUEVP), respectively, (p=0.08). None of the other early complications were significantly different between the two groups.

There were no significant differences in the late postoperative complications between the two groups.

Only differences that were statistically significant between the two groups are reported in the following results.

The postoperative symptom score was:
at week 2, 11.04 (+/- 2.48) in the TURP group and 12.76 (+/- 2.20) in the TUEVP group, (p=0.008);
at month 3, 6.04 (+/- 2.42) in the TURP group and 8.72 (+/- 2.23) in the TUEVP group, (p=0.0001); and
at month 6, 3.36 (+/- 1.85) in the TURP group and 5.36 (+/- 1.85) in the TUEVP group, (p=0.0002).

The post micturating residual volume was:

at week 2, 39.2 (+/- 14.35) in the TURP group and 48.68 (+/- 13.07) in the TUEVP group, (p=0.0456); and
at month 6, 11.48 (+/- 2.18) in the TURP group and 28.4 (+/- 19.56) in group B, (p=0.003).

The mean peak flow rate was 15.88 (+/- 3.02) in the TURP group and 13.84 (+/- 1.75) in the TUEVP group, (p=0.0028).

**Clinical conclusions**
The authors concluded that morbidity was better for patients in the TUEVP group than in the TURP group, but the results in terms of outflow obstruction were slightly worse.

**Measure of benefits used in the economic analysis**
No summary measure of benefits was produced. Therefore, the authors carried out a cost-consequences analysis.

**Direct costs**
No discounting was carried out as the costs were incurred during less than 2 years. The authors did not describe the direct costs included in the analysis, nor report the study perspective or the price year. The quantities and the costs were not analysed separately. The costs were estimated using actual data obtained from the hospital, while the resources were measured from 1996 - 1998.

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

**Indirect Costs**
No indirect costs were estimated.

**Currency**
Pakistani rupees (R).

**Sensitivity analysis**
No sensitivity analysis was carried out.

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

**Cost results**
The cost of treatment was R5,584 (+/- 1,000) in the TURP group and R4,160 (+/- 732) in the TUEVP group, (p=0.0001).

It was unclear whether the costs of adverse effects were included.
Synthesis of costs and benefits
The costs and benefits were not combined as the study was a cost-consequences analysis.

Authors' conclusions
Transurethral electric vaporisation of the prostate (TUEVP) was less expensive than transurethral resection of the prostate (TURP). It produced better health outcomes than TURP in terms of morbidity, but slightly worse outcomes in terms of relief of obstruction symptoms.

CRD COMMENTARY - Selection of comparators
The choice of the comparator (i.e. TURP) was justified by the fact that it represented current practice, in terms of surgical treatment, in the authors' setting. You should decide if the comparator represents current practice in your own setting.

Validity of estimate of measure of effectiveness
The source of the effectiveness data was a single study. There were several weaknesses of the analysis. For example, it was unclear how patients had been allocated to the treatment groups and, therefore, whether or not the study design was appropriate for the hypothesis. It was also unclear how the study sample had been chosen and whether or not it was representative of the study population. Finally, it was not clear that the patient groups were comparable at analysis, as the TURP patients were older than the TUEVP patients. No power calculations were reported. This introduces the possibility that the results may be prone to bias. Otherwise, it appears that the authors performed appropriate statistical analyses (although the test used was not reported) to test if differences between the two groups were statistically significant.

Validity of estimate of benefit
The authors did not derive a summary measure of health benefit. The health benefits are therefore those associated with the effectiveness outcomes, and the reader is referred to the comments in the 'Validity of estimate of measure of effectiveness' field (above).

Validity of estimate of costs
From the cost perspective adopted, it was unclear whether all the relevant categories of cost had been included as the authors did not break down the total costs into any components. Also it would appear that no costs after the initial operation were included. This omission would appear to make the TURP costs more favourable in comparison with TUEVP, so the authors' conclusions would have been strengthened by including costs other than those relating to the operation. The costs were not reported separately from the quantities, thus the analysis could not be easily extrapolated to other settings. The resource use quantities were taken from a single study, while the unit costs were taken from the authors' setting. No statistical, sensitivity or any other kind of analysis of the quantities or prices was conducted. No price year was given, which will hinder any future reflation exercises. Discounting was not applied, which was appropriate given the short time horizon of the study.

Other issues
The authors made appropriate comparisons of their effectiveness results with those from other studies. They did not present their results selectively, but could have given more detail on the selection of the study sample and allocation between treatments. The authors did not address the issue of generalisability, apart from stating that their surgeons were relatively inexperienced in TUEVP and that the high rate of illiteracy in their patients would produce unreliable subjective symptom scores. The authors did not point out weaknesses in their study. They believed that if their surgical skills were better, and if they selected patients differently according to prostate size, they would obtain better outcomes for TUEVP and thus get similar results to those obtained in other studies. Bearing in mind these points, the authors' conclusions do not entirely reflect the scope of the analysis.
Implications of the study
The authors concluded that, in their setting, although TURP has slightly higher morbidity and is costlier than TUEVP, its results in terms of relieving outflow obstruction are significantly better than TUEVP, thus it is a more effective procedure. However, TUEVP, with lower morbidity and cost, is more suitable for relatively smaller obstructions. The authors also suggested that, once their surgical expertise in vaporisation skills is achieved, the combined procedure of vaporisation plus resection ("Vapor-Cut") may be considered the future technique of choice in their setting.

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