What is the most cost-effective treatment for 1 to 2-cm bulbar urethral strictures: societal approach using decision analysis

Wright J L, Wessells H, Nathens A B, Hollingworth W

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 study examined two treatments, direct vision internal urethrotomy (DVIU) and urethroplasty (UPL), for short bulbar urethral strictures.

Type of intervention
Treatment.

Economic study type
Cost-effectiveness analysis.

Study population
The study population comprised a hypothetical cohort of patients with a 1- to 2-cm bulbar urethral stricture.

Setting
The setting was inpatient and outpatient. The economic study was carried out in the USA.

Dates to which data relate
The effectiveness data were derived from studies published between 1986 and 2003. No dates for resource use were reported. The price year was not explicitly stated, but direct costs were evaluated using 2004 prices while indirect costs referred to 2003 values.

Source of effectiveness data
The effectiveness evidence was derived from a synthesis of published studies.

Modelling
A decision model was constructed to assess the cost-effectiveness of four alternative strategies in a hypothetical cohort:

- UPL;
- one DVIU attempt followed, in case of failure, by UPL;
- two DVIU attempts before performing UPL; and
- three DVIU attempts before UPL.

The structure of the decision tree was represented. The time horizon of the model was not reported.
Outcomes assessed in the review
The outcomes estimated from the literature were the probabilities of success associated with urethroplasty, first DVIU, second DVIU and third DVIU.

Study designs and other criteria for inclusion in the review
Clinical estimates were derived from the literature, but the authors did not explicitly state whether a systematic review of the literature was undertaken. No information on the primary studies was provided.

Sources searched to identify primary studies
Not reported.

Criteria used to ensure the validity of primary studies
Not reported.

Methods used to judge relevance and validity, and for extracting data
Not reported.

Number of primary studies included
Ten primary studies provided the clinical data.

Methods of combining primary studies
Not reported.

Investigation of differences between primary studies
Not reported.

Results of the review
The rate of success was:

0.95 (range: 0.76 to 0.98) for UPL,

0.50 (range: 0.39 to 0.73) for first DVIU,

0.20 (range: 0.00 to 0.77) for second DVIU, and

0.05 for third DVIU.

Measure of benefits used in the economic analysis
The summary benefit measure was the overall success rate. This was estimated using the decision model.

Direct costs
The analysis of the costs was conducted from a societal perspective. It included the direct medical costs associated with hospitalisations, procedures, professional fees and preoperative evaluation (visit, complex uroflowmetry, retrograde urethrography and basic laboratory values). The unit costs were not presented separately from the resource quantities. The costs were estimated on the basis of Medicare reimbursement rates (converted into actual costs using the authors’
institution cost-to-charge ratio) and current procedural terminology. The sources of resource use were not explicitly reported. Discounting was presumably not relevant as the costs were incurred during less than 2 years. The price year was not explicitly reported but the direct costs were evaluated at 2004 prices.

**Statistical analysis of costs**
The costs were treated deterministically.

**Indirect Costs**
The indirect costs (i.e. productivity losses due to the disease) were considered in the analysis, which was appropriate given the societal perspective. The costs were derived from lost wages obtained from the Bureau of Labor and Statistics in 2003. Days of missed work appear to have been based on the authors’ opinion. The unit costs and the quantities of resources used were presented separately. As in the analysis of the direct costs, no discounting was carried out.

**Currency**
US dollars ($).

**Sensitivity analysis**
A univariate sensitivity analysis was performed to assess the robustness of the cost-effectiveness ratios to variations in success rate and operative costs. Alternative ranges of success rates were derived from the literature. The sources of the ranges of costs were not reported.

**Estimated benefits used in the economic analysis**
The overall success rate was:

- 0.975 with DVIU once before UPL;
- 0.980 with DVIU twice before UPL;
- 0.950 with UPL; and
- 0.981 with DVIU three times before UPL.

**Cost results**
The total costs per patient were:

- $8,575 with DVIU once before UPL;
- $9,285 with DVIU twice before UPL;
- $10,222 with UPL; and
- $10,466 with DVIU three times before UPL.

**Synthesis of costs and benefits**
Average and incremental cost-effectiveness ratios (CERs; i.e. the cost per successfully treated patient) were calculated to combine the costs and benefits of the alternative strategies.

The average CER was:
$8,795 with DVIU once before UPL;

$9,474 with DVIU twice before UPL;

$10,760 with UPL; and

$10,669 with DVIU three times before UPL.

The ICER was $141,962 with DVIU twice before UPL, and $1,181,168 with DVIU three times before UPL. UPL was dominated by DVIU twice before UPL, which was both more effective and less expensive. Thus, since it is unlikely that society would be willing to pay more than $140,000 for a successfully voiding patient, the strategy of DVIU once before UPL was the most cost-effective.

The sensitivity analysis revealed that the cost-effectiveness of UPL depended on the success rate of DVIU. For example, primary UPL was the most cost-effective strategy when the success rate of DVIU was less than 35%. Changes in the costs or in the success rates of other strategies did not substantially alter the conclusions of the analysis.

**Authors’ conclusions**
The most cost-effective strategy for the treatment of short urethral strictures was to reserve urethroplasty (UPL) for patients in whom one attempt at direct vision internal urethrotomy (DVIU) had failed.

**CRD COMMENTARY - Selection of comparators**
The authors provided a justification for their choice of the comparators, which were appropriately selected. In addition, different attempts before UPL were considered in order to reflect current treatment patterns. You should decide whether they are valid comparators in your own setting.

**Validity of estimate of measure of effectiveness**
The effectiveness data were derived from published evidence. It was not stated whether the primary studies were identified through a systematic review of the literature, and the authors did not report the methods and conduct of such a review. Therefore, the primary studies might have been identified selectively. It was not possible to evaluate the validity of the primary studies since no details of the design or other characteristics of the sources of data were reported. Similarly, the approach used to combine the primary data was not described and the issue of heterogeneity across the primary studies was not addressed. However, the issue of uncertainty was investigated in the sensitivity analysis.

**Validity of estimate of measure of benefit**
The summary benefit was a specific measure which would not be comparable with the benefits of other health care interventions. The impact of the interventions on quality of life was not investigated, even though it might have been relevant for patients with urethral strictures.

**Validity of estimate of costs**
The analysis of the costs was carried out from a societal perspective. This represents a strength of the study since all the relevant categories of costs were included. Extensive information on the sources and details of the indirect costs was provided, but few details of the direct costs were presented. The unit costs and the resource quantities were not presented separately for the direct costs, which could limit the possibility of replicating the analysis in other settings. No statistical analyses of the costs were carried out, but the impact of changing cost estimates was tested in the sensitivity analysis. The price year was not explicitly reported but the costs referred to 2003/04 values, which will help in reflating costs in other time periods.
Other issues
The authors reported the results from other published studies and provided possible explanations for some of the discrepancies with the current findings. The issue of the generalisability of the study results to other settings was not explicitly addressed, but the use of sensitivity analysis enhances the external validity of the study. The analysis referred to patients with short urethral strictures and this was reflected in the authors’ conclusions. The authors noted that complications were not modelled in the analysis, thus their impact could not be evaluated. Other limitations of the analysis could arise from several factors affecting the effectiveness of the alternative strategies, such as spongiform fibrosis and surgeon volume.

Implications of the study
The study results support the use of one DVIU before UPL for the treatment of short urethral strictures. The authors stated that future studies, based on a multicentre design, should be performed to corroborate the results from the current analysis.

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