Cost-effectiveness of medical expulsive therapy using alpha-blockers for the treatment of distal ureteral stones

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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.

CRD summary
This study investigated the comparative costs and health effects of medical expulsive therapy using alpha-blockers (tamsulosin) compared with simple observation for distal ureteral stones. The authors concluded that medical expulsive therapy was cost-effective. In the absence of significant therapeutic complications, the authors' conclusions appear to be appropriate.

Type of economic evaluation
Cost-effectiveness analysis

Study objective
The aim was to assess the costs and health effects of medical expulsive therapy using alpha-blockers for the treatment of distal ureteral stones. The hypothetical population comprised patients who had distal ureteral stones and no associated infection or fever, whose pain was well controlled, and who tolerated oral therapy.

Interventions
Medical expulsive therapy using alpha-blockers was compared against simple observation for patients with distal ureteral stones. The alpha-blocker was tamsulosin at a dosage of 0.4mg daily.

Location/setting
Germany, Turkey, UK, Italy, and USA/out-patient care.

Methods
Analytical approach:
A decision-tree model was constructed and the model parameters were generated from estimates in the published literature and the collection of primary data. The authors did not state the perspective.

Effectiveness data:
The main effectiveness data were spontaneous stone passage and the absolute risk reduction following medical expulsive therapy. These data were from published meta-analyses of randomised controlled trials. Estimates for spontaneous stone passage were from Hubner, et al. 1993 (see ‘Other Publications of Related Interest’ below for bibliographic details) and those for absolute risk reduction were from Hollingsworth, et al. 2006 (see ‘Other Publications of Related Interest’ for bibliographic details). Other clinical data were from published studies.

Monetary benefit and utility valuations:
Not relevant.

Measure of benefit:
The measure of benefit was the success rate, indicated by stone passage.

Cost data:
The cost categories included the direct costs of medical care, which was the cost of tamsulosin and surgical management, with observation or failure of medical expulsive therapy, that required subsequent ureteroscopy. For the USA, these were valued using metropolitan hospital data from 121 consecutive cases and, for the other four countries,
A published international cost survey was used (Chandhoke. 2002, see ‘Other Publications of Related Interest’ below for bibliographic details). All costs were presented in US dollars ($).

Analysis of uncertainty:
One-way and two-way sensitivity analyses varied the model assumptions to quantify the uncertainty in the results. The cost thresholds, at which the two options were equivalent, were estimated. The results of these analyses were presented in tables and graphs.

Results
In the USA, the mean costs were $1,493 for tamsulosin compared with $2,625 for observation. This cost advantage was also evident in the other four countries, where the mean costs ranged from $77 to $545 for tamsulosin compared with $88 to $927 for observation. The increased rate of spontaneous stone passage for tamsulosin over observation was 54%, which was a risk ratio of 1.54 (95% CI 1.29 to 1.85).

The cost advantage of tamsulosin was driven by the low cost of the alpha-blocker relative to the cost of ureteroscopy, which occurred more frequently with observation. Tamsulosin was marginally cheaper than observation in Germany because the cost of ureteroscopy in Germany was 5% of the cost of the same procedure in the USA. The results were robust to large changes in the costs of ureteroscopy, drug costs, and stone passage rates.

Authors' conclusions
The authors concluded that medical expulsive therapy using tamsulosin was cost-effective for patients with distal ureteral stones compared with observation alone, even when the success rate with tamsulosin was only marginally superior to that with observation.

CRD commentary
Interventions:
The indication, dose, and frequency of the tamsulosin were well described, but it was not clear why calcium-channel blockers and alpha-receptor antagonists were not evaluated. Medical expulsive therapy might not be feasible in some settings, for instance, alpha-blockers were not approved for the treatment of ureteral stones in the USA.

Effectiveness/benefits:
The effectiveness data were based on a selection of relevant published literature, pooled estimates from meta-analyses, and a few authors’ assumptions. These key studies should be consulted to assess whether they produced valid model inputs. The time horizon was not stated, which makes it difficult to assess the duration of the expected health benefits, but all health outcomes seemed to occur within one year of referral.

Costs:
The perspective was not stated, but it included the direct medical costs and appears to have been that of the service provider. The authors argued that medical expulsive therapy complications were not included because they were rare and mild and unlikely to incur higher costs than complications from ureteroscopy. Specific cost components were not itemised and the price year was not reported, both of which hinder reflation exercises.

Analysis and results:
An incremental cost-effectiveness analysis was appropriately performed. Sensitivity analyses tested the key variables, over wide ranges, to examine the stability of the base-case results. The authors acknowledged some limitations to their study including the omission of indirect costs, such as work time lost, and the inevitable cross-country differences in the clinical management of ureteral stones.

Concluding remarks:
In the absence of significant therapeutic complications, the authors' conclusions appear to be appropriate.

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Other publications of related interest
Hubner WA, Irby P, Stoller MI. Natural history and current concepts for the treatment of small ureteral calculi.

Hollingsworth JM, Rogers MA, Kaufman SR, et al. Medical therapy to facilitate urinary stone passage: a meta-

Chandhoke PS. When is medical prophylaxis cost-effective for recurrent calcium stones? Journal of Urology 2002;
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