Improved cost-effectiveness and efficiency with a slower shockwave delivery rate

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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**
The aim was to assess the impact of a slower shockwave delivery rate on the efficiency and costs of extracorporeal shockwave lithotripsy, for patients with renal calculi of 20mm or less. The authors concluded that a slower delivery rate of 70 per minute was associated with a significant reduction in costs and an improvement in treatment efficiency. The limitations of the study design and potential biases mean that the authors’ conclusions should be considered carefully.

**Type of economic evaluation**
Cost-effectiveness analysis

**Study objective**
The aim was to assess the impact of a slower shockwave delivery rate on the efficiency and costs of extracorporeal shockwave lithotripsy (ESWL) for patients with renal calculi of 20mm or less.

**Interventions**
ESWL at a shockwave delivery rate of 70 per minute was compared with a shockwave delivery rate of 100 per minute, for patients with radio-opaque renal calculi of 20mm or less in diameter.

**Location/setting**
UK/out-patient.

**Methods**
Analytical approach:
This study was based on one observational study with a short time horizon, covering the period of treatment and follow-up. The authors stated that the perspective of the UK NHS was adopted.

Effectiveness data:
The clinical data came from a case-controlled study, which took place between August 2007 and August 2008. The sample included 102 patients, with 51 in each group. An audit was undertaken to identify consecutive patients who had received ESWL at a delivery rate of 70 per minute and these were compared with a random selection of patients who received ESWL at a delivery rate of 100 per minute. The two groups were shown to be comparable in their demographic and clinical characteristics at baseline, with no significant differences apart from the number of stents before the procedure. The groups were followed-up, for a minimum of six months, until their final clinical outcome. The primary clinical outcome was the rate of successful treatment, which was defined as patients being stone-free or asymptomatic with insignificant residual fragments of less than 3mm.

Monetary benefit and utility valuations:
Not relevant.

Measure of benefit:
No summary benefit measure was used. The key clinical endpoints were the rates of treatment success, re-treatment, and additional procedures.

Cost data:
The costs were from the costing department of the hospital in which the study was conducted. The cost per session was calculated based on the costs of the lithotripsy machine; its maintenance and service; medical and nursing staff;...
overheads for administration; and pharmaceutical and utility costs. These per session costs were defined by the authors as perceived costs. Other costs, such as those of additional procedures, hospital stay, and administration, and pharmaceutical, radiology, anaesthesia, medical and nursing costs were considered as actual costs. Both the perceived costs and the actual costs were presented. The resource consumption was from the sample of patients enrolled in the clinical study. All costs were in UK pounds sterling (£).

Analysis of uncertainty:
No sensitivity analysis was undertaken.

Results
The rate of patients who were stone-free after first treatment was 66.7% in the slow group (70 per minute) and 25.5% in fast group (100 per minute; p<0.001). The rate of re-treatment was 22% in the slow group and 45% in the fast group (p=0.013). The rate of additional procedures was 12% in the slow group and 29% in the fast group (p=0.02).

The mean perceived cost of ESWL was £297 in the slow group and £394 in the fast group (p=0.013). The mean actual cost was £497 in the slow group and £1,002 in the fast group (p=0.001).

Authors’ conclusions
The authors concluded that a slower shockwave delivery of 70 per minute was associated with a significant reduction in costs and an improvement in treatment efficiency.

CRD commentary
Interventions:
The two interventions were clearly described and they were relevant comparators in the authors’ setting. Other treatment options were not discussed.

Effectiveness/benefits:
The analysis was based on a case-controlled study. The study group was prospectively selected from patients undergoing ESWL at a delivery rate of 70 per minute, while the control group was selected retrospectively from patients who had undergone ESWL at a delivery rate of 100 per minute. Such a comparison is open to time-related biases, such as changes in treatment or epidemiological patterns. Whilst the baseline characteristics were shown to be comparable, the observational nature of the study means that bias was likely to be present. A power calculation was not carried out to determine the appropriate sample size and with 102 patients it is possible that the results were obtained by chance.

Costs:
The analysis of costs was consistent with the perspective stated. The cost categories were well described, but the costs were presented as category totals. The price year was not reported, making it difficult to carry out reflation exercises for other time periods. Overall the reporting of the costs was sufficient, but more detail would have enhanced the generalisability of the results.

Analysis and results:
A summary measure of benefit was not derived and the costs and outcomes were not synthesised. In effect, a cost-consequences analysis was performed. The use of clinical outcomes makes it difficult to compare these results with those of other interventions for different indications. The results of the study were clearly reported and appropriate statistical tests were conducted to look for significant differences. The clinical outcomes were compared with those of other studies, to some extent, and the authors noted and discussed some limitations to their results.

Concluding remarks:
The limitations of the study design and potential biases mean that the authors’ conclusions should be considered carefully.

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