Residual fragments after percutaneous nephrolithotomy: cost comparison of immediate second look flexible nephroscopy versus expectant management

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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 examined the clinical and economic impact of immediate second-look flexible nephroscopy versus expectant management for patients with residual fragments after percutaneous nephrostolithotomy. The authors concluded that, compared with observation, nephroscopy was cheaper only for patients with residual fragments greater than 4mm. The study focused on the economic impact of the interventions and had some methodological limitations that might affect the validity of the authors’ conclusions.

Type of economic evaluation
Cost-effectiveness analysis

Study objective
This study examined the clinical and economic impact of immediate second-look flexible nephroscopy versus expectant management for residual fragments after percutaneous nephrostolithotomy.

Interventions
Second-look flexible nephroscopy one day after percutaneous nephrostolithotomy was compared with expectant management. The strategies were compared for residual fragments greater or smaller than 4mm.

Location/setting
USA/hospital and out-patient.

Methods
Analytical approach:
The analysis used a decision-tree model, with a 37-month time horizon, based on the availability of published patient follow-up data. The authors did not explicitly state the perspective adopted.

Effectiveness data:
The clinical data were from a retrospective review of the medical records of 527 patients who were treated between April 1999 and January 2007 at the authors’ institution. The natural history of patients with residual fragments was from studies identified by a literature review. These studies had to specify whether the residual fragments were symptomatic and whether surgical intervention or conservative management was used. The outcomes from the authors’ retrospective review were incorporated with the pooled analysis of endpoints from the literature and weighted averages were calculated. The proportion of patients who had symptomatic events that required secondary procedures was the key outcome.

Monetary benefit and utility valuations:
Not considered.

Measure of benefit:
The main outcomes of the analysis were the percentage of patients with symptomatic residual fragments and the percentage of these who required surgery.

Cost data:
The economic analysis included the costs of emergency room visits with computed tomography, secondary surgical procedures, daily hospitalisation, room and board, antibiotics, laboratory tests, analgesia, intravenous fluids, nephroscopy, and wages lost. These costs were from the authors’ institution. Professional fees were from 2007 Medicare reimbursement rates in Texas. The cost of the nephroscopy was the mean of 179 consecutive cases at a large metropolitan hospital. The wages lost were based on the median wage in Texas. All costs were in US dollars ($).

Analysis of uncertainty:
One-way sensitivity analyses were carried out on the likelihood of a symptomatic stone event, the likelihood of requiring surgical intervention, and the surgery cost. Two-way sensitivity analyses were performed on a wide range of scenarios and costs.

Results
In patients with residual fragments of 4mm or less, who received expectant management, the proportion with symptomatic residual fragments was 40%, and 57% of these patients required surgery. The cost of expectant management was $1,743 for residual fragments of 4mm or less and $4,674 for residual fragments greater than 4mm.

The cost of nephroscopy was $2,475, making it more expensive than expectant management in patients with residual fragments of 4mm or less, but cheaper for those with residual fragments greater than 4mm.

The sensitivity analysis showed that the model results were highly dependent on the likelihood of a symptomatic stone event, the likelihood of requiring surgical intervention, and the cost of surgery.

Authors’ conclusions
The authors concluded that, compared with observation, second-look flexible nephroscopy was only cheaper for patients with residual fragments greater than 4mm.

CRD commentary
Interventions:
The comparators were appropriately selected as the intervention was compared against a conservative approach. The size of the residual fragments could be used as a criterion for the selection of either approach.

Effectiveness/benefits:
Data from a literature review were synthesised with those from a cohort of patients from the authors’ institution. Limited information on each approach was reported. The evidence from the authors’ cohort was based on a retrospective review of patients’ charts, rather than a prospective study with a good design and an appropriate sample size. The authors did not assess the homogeneity of the published studies and their results were pooled, weighted only by the sample size. These points might limit the clinical analysis.

Costs:
A broad perspective appears to have been considered, but it was not explicitly reported. The costs of complications were not included because of the infrequent need for intervention after treatment. The cost categories were reported, with some details of the unit costs. The price year was not clearly reported and this limits the possibility of making reflation exercises in other time periods. The data sources were reported, but the authors acknowledged that the costs reflected a regional billing system and might not be generalisable to other health care settings.

Analysis and results:
The results were clearly reported. The costs and benefits were not synthesised and a cost-consequences analysis was conducted. The uncertainty was investigated by considering alternative scenarios that might reflect other health care settings, but only some inputs were varied. The analysis did not include benefit measures that might be relevant to the patients, such as their preference for quality of life, but instead focused on the differences in costs of the two options.

Concluding remarks:
The study focused on the economic impact of the interventions and had some methodological limitations that might affect the validity of the authors’ conclusions.
Funding
Not stated.

Bibliographic details

PubMedID
19913809

DOI
10.1016/j.juro.2009.08.135

Original Paper URL
http://jurology.com/article/S0022-5347(09)02357-X/abstract

Indexing Status
Subject indexing assigned by NLM

MeSH
Cost-Benefit Analysis; Decision Support Techniques; Humans; Kidney Calculi /economics /surgery; Nephrostomy, Percutaneous /economics; Second-Look Surgery

AccessionNumber
22010000082

Date bibliographic record published
04/08/2010

Date abstract record published
09/03/2011