Cost-effectiveness of saline-assisted hysterosonography and office hysteroscopy in the evaluation of postmenopausal bleeding: a decision analysis
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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
The use of saline-assisted hysterosonography (HSG) and office hysteroscopy (OH) to diagnose the cause of postmenopausal bleeding (PMB) was assessed. No further details of the technologies were reported.

Type of intervention
Diagnosis.

Economic study type
Cost-effective analysis.

Study population
The target study population comprised a hypothetical cohort of women presenting with PMB for the first time.

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

Dates to which data relate
The effectiveness data were collected from studies published between 1997 and 1999. Resource use related to 1997. The price year also appears to have been 1997, although this was not explicitly stated.

Source of effectiveness data
The effectiveness data were derived from a review of completed studies, supplemented with some authors’ assumptions.

Modelling
A decision analytic model was created using DATA 3.0 (TreeAge Software) to simulate the diagnosis and treatment of a hypothetical sample of patients. A Monte Carlo simulation, using 100 trials based on a normal distribution, was used to combine the clinical and cost data.

Outcomes assessed in the review
The review assessed parameters for input into the model. The parameters assessed were the sensitivity and specificity of HSG, OH and hospital hysteroscopy, and the probability of anatomical abnormality.

Study designs and other criteria for inclusion in the review
Not stated. However, the studies included one randomised crossover design and two prospective studies.
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
Seven studies were included in the review.

Methods of combining primary studies
Baseline point estimates were taken from a single study. Further studies were used to define the ranges for the sensitivity analysis.

Investigation of differences between primary studies
Not reported.

Results of the review
HSG was 85% (range: 85 - 100) sensitive and 100% (range: 80 - 100) specific.

OH was 77% (range: 77 - 100) sensitive and 92% (range: 72 - 100) specific.

Hospital hysteroscopy was 90% (range: 70 - 100) sensitive and 92% (range: 70 - 100) specific.

The clinical probability of anatomical abnormality was 0.7 (range: 0.4 - 0.8).

Methods used to derive estimates of effectiveness
The authors made some assumptions to supplement their estimates.

Estimates of effectiveness and key assumptions
The authors assumed that the probability of bleeding after a false-negative finding was 1.0 (range: 0.0 - 1.0). They also assumed that the probability of bleeding after a true-negative finding was 0.0 (range: 0.0 - 1.0).

Measure of benefits used in the economic analysis
The summary measures of benefit used were the number of abnormalities treated and the number of abnormalities not treated.

Direct costs
The analysis was carried out from a societal perspective. The costs for HSG, hysteroscopy, hysterectomy, myomectomy, dilation and curettage, and primary care physician visits were taken from actual Medicare reimbursements for southeast Michigan and were based on 1997 prices. The unit costs per diagnostic or therapeutic procedure were reported and the quantities were determined within the decision model. The authors did not report
whether discounting was carried out. However, they appear to have been concerned with the immediate costs of treatment and used point estimates for costs, thus rendering discounting unnecessary in this instance.

**Statistical analysis of costs**
No statistical analysis of the costs was reported.

**Indirect Costs**
Despite the analysis being carried out from a societal perspective, the authors reported that productivity losses were not included due to the population not being of working age. This reasoning is appropriate for older persons not in work. However, the authors could have reported average ages to give the reader more confidence in this decision.

**Currency**
US dollars ($).

**Sensitivity analysis**
A one-way sensitivity analysis was carried out to assess the impact of sensitivity, specificity and cost.

**Estimated benefits used in the economic analysis**
HSG alone detected 69.0 abnormalities per 100 patients tested, failed to detect 1.1 abnormalities, and gave unnecessary treatment to 0 patients.

HSG and hospital hysteroscopy detected 63.0 abnormalities per 100 patients tested, failed to detect 7.0 abnormalities, and gave unnecessary treatment to 0 patients.

OH alone detected 68.4 abnormalities per 100 patients tested, failed to detect 1.6 abnormalities, and gave unnecessary treatment to 2.4 patients.

OH and hospital hysteroscopy detected 63.0 abnormalities per 100 patients tested, failed to detect 7.0 abnormalities, and gave unnecessary treatment to 0.2 patients.

**Cost results**
The cost per patient was $5,480 for HSG alone, $5,142 for HSG and hospital hysteroscopy, $5,748 for OH alone, and $5,275 for OH and hospital hysteroscopy.

**Synthesis of costs and benefits**
The cost per abnormality treated was $7,948 for HSG alone, $8,162 for HSG and hospital hysteroscopy, $8,405 for OH alone, and $8,373 for OH and hospital hysteroscopy.

The authors stated that HSG was a dominant strategy. In addition, HSG alone continued to have the lowest cost per abnormality treated until the cost of HSG was greater than $391 (when OH was preferable), or the specificity of HSG was less than 0.83 (when OH and hospital hysteroscopy was preferable).

**Authors' conclusions**
Hysterosonography (HSG) alone "enabled the detection and treatment of the most abnormalities and missed treating the fewest abnormalities". The authors therefore stated that HSG dominated all other strategies.
CRD COMMENTARY - Selection of comparators
The authors compared OH and HSG to determine which test was optimal for the initial diagnosis of women with PMB. Four diagnostic strategies were identified. The authors gave a very valuable discussion of diagnostic alternatives and the 'gold' standard technique. They also acknowledged differences in practice patterns among settings. OH and HSG were chosen as the comparators since they were being considered as replacements for endometrial biopsy in the authors' setting.

Validity of estimate of measure of effectiveness
The authors did not state that a systematic review of the literature was carried out. Effectiveness estimates from published work and authors' assumptions were combined, using a decision analytic model, to estimate the costs and effects of the diagnostic alternatives. This technique allows information from a variety of sources to be incorporated. The studies were chosen selectively to provide information relevant to the model. Specific references were chosen to give base-case estimates and remaining references informed the sensitivity analysis. It was unclear how the authors selected which study was to provide the base-case estimates. A sensitivity analysis allowed the authors to explore differences in the estimates between the primary studies.

Validity of estimate of measure of benefit
The summary measures of health (abnormalities treated, abnormalities not treated, and unnecessary treatments) were obtained directly from the effectiveness analysis. Given the diagnostic nature of the study, these measures were appropriate.

Validity of estimate of costs
The analysis was carried out from a societal perspective. However, it did not include wider effects on the economy in terms of lost productive time due to the age of the patients involved. Although it was good that the authors considered such issues, it may be inappropriate to assume that, due to the population involved, there was no loss of economic productivity. Nevertheless, the authors discussed this point explicitly and made clear their intentions. Thus, the reader should assess whether such an assumption is relevant to their setting and to adjust for potential wages lost if necessary. The analysis appears to have focused on the costs of the tests. It was unclear whether such reimbursement costs included elements of overheads and clinician time that were relevant to this study.

When reporting the costs per patient treated for each strategy, the addition of hospital hysteroscopy to either HSG or OH reduced the expected cost per patient. The reason for this was not apparent to the reader and the authors did not discuss it. The overall cost differences were not very large, suggesting that small omissions in cost may affect the results. To help explain this issue the authors carried out a threshold analysis, which suggested that the cost of HSG must increase to greater than $391 for this alternative to be no longer preferable. The unit costs were reported separately.

Other issues
The authors were unable to compare their results with those from other studies, as they stated that other studies had centred on estimating the cost of diagnosing endometrial cancer or hyperplasia. Therefore, direct comparisons were not possible. The issue of generalisability to other settings was addressed in the sense of acknowledging differences in practice patterns. Whilst the sensitivity analysis improved the generalisability of the results, the authors did not explicitly discuss this. The results were not presented selectively and the conclusions drawn accurately reflected the scope of the study. Several limitations were discussed. For example, the negative effect of missed cases was not considered and intangible costs, such as the less invasive nature of HSG, were not included. The authors suggested that including these elements would have biased the results further in favour of HSG.

Implications of the study
Whilst the authors did not make any specific recommendations for policy or practice, HSG was clearly reported to be a dominant strategy. The authors also suggested that the adoption of HSG would also require knowledge of the
performance characteristics of other diagnostic tests in a particular institution. Further work was not discussed.

**Source of funding**
None stated.

**Bibliographic details**

**PubMedID**
11724038

**Other publications of related interest**

**Indexing Status**
Subject indexing assigned by NLM

**MeSH**
Algorithms; Ambulatory Surgical Procedures /economics; Computer Simulation; Cost-Benefit Analysis; Decision Support Techniques; Diagnosis, Differential; Female; Humans; Hysteroscopy /economics; Postmenopause /blood; Sensitivity and Specificity; Ultrasonography /economics; Uterine Hemorrhage /diagnosis /ultrasonography

**AccessionNumber**
22002006235

**Date bibliographic record published**
30/09/2004

**Date abstract record published**
30/09/2004