Uterine artery embolization, hysterectomy, or myomectomy for symptomatic uterine fibroids: a cost-utility 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.

CRD summary
This study assessed the comparative cost-effectiveness of hysterectomy, myomectomy, and uterine artery embolisation for the treatment of patients with symptomatic uterine fibroids. The authors concluded that hysterectomy was the most cost-effective treatment as it was both more effective and less expensive than the other procedures, for patients who did not have a preference for uterus-conserving interventions. The analysis was based on a valid approach and was well presented. The authors’ conclusions appear to be valid.

Type of economic evaluation
Cost-utility analysis

Study objective
This study assessed the comparative cost-effectiveness of hysterectomy, myomectomy, and uterine artery embolisation (UAE) for the treatment of adult women with symptomatic uterine fibroids.

Interventions
Two surgical procedures, which were hysterectomy and myomectomy, were compared with one non-surgical option, which was UAE.

Location/setting
Hong Kong/hospital.

Methods
Analytical approach:
The analysis was based on a Markov model with a five-year time horizon. The authors stated that the perspective society was adopted.

Effectiveness data:
The clinical evidence was identified through a systematic search of the MEDLINE database and it included randomised controlled trials (RCTs) or meta-analyses of RCTs that compared at least two of the three options being evaluated. The rate of procedural success was the key clinical input and was taken from four RCTs. The details of how multiple estimates, where available, for a single input were combined were not reported.

Monetary benefit and utility valuations:
The utility valuations were derived from a study of interviews with patients with menorrhagia. Some assumptions were made for the utility values associated with other conditions.

Measure of benefit:
Quality-adjusted life-years (QALYs) were the summary benefit measure and were discounted at an annual rate of 4%.

Cost data:
The economic analysis included three main cost categories: the initial intervention (procedure, hospitalisation, treatment of complications, salvage procedure for failed interventions, readmissions, and out-patient follow-up), re-intervention for symptomatic relapses or persistence (items as for initial intervention), and the indirect costs of productivity lost,
which were calculated using the human capital approach. Average wages in the Hong Kong population were used. Medical costs were based on official prices from the Hong Kong Gazette. All costs were presented in US dollars ($) and future costs were discounted at an annual rate of 4%.

Analysis of uncertainty:
A deterministic one-way sensitivity analysis was undertaken on all the inputs, using published or assumed ranges of values. A probabilistic sensitivity analysis was also undertaken to consider the simultaneous variability of the model inputs, using a Monte Carlo simulation with triangular distributions for the inputs.

Results
Over five years, the total costs were $8,847 with UAE, $9,036 with myomectomy, and $8,418 with hysterectomy. The QALYs were 4.245 with UAE, 4.273 with myomectomy, and 4.368 with hysterectomy. Hysterectomy was the dominant strategy as it was less expensive and more effective than the other interventions. The incremental cost per QALY gained with myomectomy over UAE was $6,750.

Hysterectomy became the dominant strategy after three years, while at one-year follow-up UAE was less costly and more effective. This was due to the lower rate of re-intervention over time associated with hysterectomy.

The deterministic analysis showed that the total costs were sensitive to variations in the rate of re-intervention in the myomectomy group, the relative cost of UAE compared with hysterectomy, and the cost of procedure and duration of hospitalisation in both the hysterectomy and myomectomy groups, but the findings were robust. The probabilistic analysis also showed that hysterectomy was the most effective option in more than 97% of cases and the least expensive option in almost 80% of cases.

Authors' conclusions
The authors concluded that hysterectomy was the most cost-effective treatment, as it was both more effective and less expensive than the other available procedures, for patients who did not have a preference for uterus-conserving interventions.

CRD commentary
Interventions:
The authors justified their selection of the comparators: hysterectomy and myomectomy were two conventional surgical procedures for treatment of symptomatic uterine fibroids, while UAE was a non-surgical alternative, which might be preferred when the avoidance of surgery or the conservation of the uterus were desired.

Effectiveness/benefits:
The clinical analysis was based on a valid approach that ensured the identification of the most relevant sources of data. The details of the literature review were reported and the inclusion of high-quality studies (RCTs and meta-analyses) enhances the validity of the clinical estimates. The authors appear to have used their own judgement to select the most appropriate estimate from the identified evidence. QALYs are an appropriate benefit measure for this patient population, given the impact of the disease on the quality of life. Almost all the utility values were based on authors’ assumptions rather than on peer-reviewed literature, but changes in these inputs did not substantially alter the results.

Costs:
The analysis of costs adopted a broad perspective and included all the relevant categories. The costs were often presented as macro-categories and a detailed description of the unit costs and quantities of resources was not provided. This reduces the transparency of the economic analysis. Similarly, the price year was not reported, which limits the possibility of making reflation exercises in other time periods. The sources of data were reported and reflected the authors’ setting.

Analysis and results:
The costs and benefits were appropriately reported and cost-utility ratios were calculated, when required. The issue of uncertainty was satisfactorily investigated using appropriate approaches and the results were clearly presented and discussed. The authors justified their use of a Markov model on the grounds of the recurrent nature of the disease. They
also stated that a longer time horizon would have introduced further uncertainty into the analysis. The model findings were validated using recent data. The authors stated that a potential limitation of their analysis was that most of the estimates had to be taken from studies conducted outside Hong Kong.

**Concluding remarks:**
The analysis was based on a valid approach and was well presented. The authors’ conclusions appear to be valid.

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