Cost-effectiveness of treatments for dysfunctional uterine bleeding
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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
Several treatments for dysfunctional uterine bleeding (DUB) were studied. These were:

oral contraceptives (OCs),

first-generation ablation techniques (those requiring hysteroscopic visualisation of the endometrial cavity such as rollerball and endometrial resection),

second-generation ablation techniques (those not requiring visualisation such as thermal balloon or microwave endometrial ablation), and

hysterectomy.

Type of intervention
Treatment.

Economic study type
Cost-effectiveness analysis.

Study population
The hypothetical study population comprised pre-menopausal women of at least 40 years of age who had a diagnosis of DUB due to benign causes and who did not desire future fertility.

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

Dates to which data relate
The effectiveness evidence was obtained from papers published between 1994 and 2003. The cost data were obtained from sources published between 1992 and 2004. The price year was not reported.

Source of effectiveness data
The effectiveness data were derived from a review and synthesis of published data, supplemented with authors’ assumptions.

Modelling
A decision analytic model was created to synthesise the observed effectiveness and cost data. The model extended over a period of 18 months. The model compared 10 treatment scenarios, in brief:
OCs for 18 months;
OCs for 3 months plus hysterectomy, first-generation ablation or second-generation ablation;
OCs for 6 months plus hysterectomy, first-generation ablation or second-generation ablation;
OCs for 9 months plus hysterectomy, first-generation ablation or second-generation ablation.

The surgical treatments were only carried out if the planned period of medical therapy was unsuccessful. The model was constructed using DATA 4.0 software (TreeAge, Williamstown).

Outcomes assessed in the review
The outcomes observed were:

the probability of improvement in DUB after OCs, hysterectomy, first-generation ablation and second-generation ablation;

the probability of requiring or requesting hysterectomy after first-generation ablation and second-generation ablation;

and

the probability of requiring or requesting repeat ablation after first-generation ablation and second-generation ablation.

Study designs and other criteria for inclusion in the review
The authors searched randomised clinical trials, non-randomised controlled trials and case-series studies reporting outcomes, adverse events or costs associated with DUB treatments and published between 1966 and 2003. Studies were included if they were published in English.

Sources searched to identify primary studies
The authors searched PubMed and handsearched the bibliographies of key review articles.

Criteria used to ensure the validity of primary studies
The authors reported that only large (more than 300 patients) case series or cohort studies were selected for the analysis.

Methods used to judge relevance and validity, and for extracting data
Two reviewers trained in health services research and the principles of critical appraisal abstracted data from the relevant papers.

Number of primary studies included
A total of 18 studies were used to inform the effectiveness estimates.

Methods of combining primary studies
Not reported.

Investigation of differences between primary studies
The authors do not appear to have investigated differences between the primary studies.

Results of the review
The probability of improvement in DUB was 47% for OCs, 100% for hysterectomy, 90% (range: 81 to 95) for first-generation ablation, and 90% (range: 85 to 99) for second-generation ablation.

The probability of requiring or requesting hysterectomy was 5.6% (range: 1.77 to 14.7) after first-generation ablation and 3.5% (range: 0 to 9) after second-generation ablation.

The probability of requiring or requesting repeat ablation was 5.0% (range: 0 to 11) after first-generation ablation and 1% (range: 0 to 1.9) after second-generation ablation.

Methods used to derive estimates of effectiveness
Numerous authors’ and experts’ assumptions were used to support the development of the decision model.

Estimates of effectiveness and key assumptions
Assumptions referred to treatment scenarios rather than specific estimates of effectiveness.

Measure of benefits used in the economic analysis
The authors used the number of DUB-free months as their summary measure of health benefits. This was derived from the decision model.

Direct costs
The costs were estimated from the third-party payer perspective. They were derived from published scientific literature (found during the review of effectiveness data) and using publicly available fee and coding guides dating from 1992 to 2004. The analysis encompassed the costs of medications and devices, physician services and procedures, and hospital costs (including facility fees, anaesthesiaology services and laboratory fees). The costs of hysterectomy were derived from diagnosis-related groups. Services used for the treatment of adverse events were informed by clinical experts. The resource use quantities and unit costs were not reported separately. There was no report of discounting being carried out, despite the time horizon extending to 18 months. The costs were reported per patient over a given period of time or per episode.

Statistical analysis of costs
The costs were treated deterministically, although some cost ranges were explored in the sensitivity analyses.

Indirect Costs
The authors explicitly stated that they did not address the costs of convenience for women after menstrual products ceased to be required. Indirect costs, such as the broader costs to society, were not relevant to the perspective adopted but may be relevant if a broader societal perspective were to be adopted.

Currency
US dollars ($).

Sensitivity analysis
One-way sensitivity analyses were carried out to test the robustness of the model to changes in the underlying variables.

Estimated benefits used in the economic analysis
The benefits were reported graphically, so it is not possible to report exact values. The benefits of each treatment strategy declined as the period of OCs only increased. The benefits of first- and second-generation ablation and of
hysterectomy were very similar.

Cost results
The expected costs of each treatment strategy were reported graphically, so it is not possible to report exact values.

OCs only was the least expensive strategy, followed by second-generation ablation and first-generation ablation.

Hysterectomy was the most expensive strategy.

Synthesis of costs and benefits
Early treatment with second-generation ablation was reported to be the most cost-effective strategy.

Second-generation ablation gave an additional 7.6 DUB-free months in comparison with OCs at an additional cost of $215.

Second-generation therapy dominated first-generation therapy.

Hysterectomy offered greater benefits at a significantly greater cost.

Sensitivity analyses showed that the "overall results are not sensitive to most variation in treatment success rates and assumptions about the use of OCs after ablation”. However, the results were altered if amenorrhea was used as the outcome measure, in which case hysterectomy became the most cost-effective alternative.

Authors’ conclusions
The most cost-effective strategy for treating dysfunctional uterine bleeding (DUB) is a short treatment trial with oral contraceptives (OCs) followed by second-generation endometrial ablation.

CRD COMMENTARY - Selection of comparators
The authors compared four technologies for the treatment of DUB. This choice was justified with a discussion of treatment guidelines and a review of clinical practice which revealed some uncertainty in the evidence surrounding treatments and, therefore, differences in the treatments chosen.

Validity of estimate of measure of effectiveness
The authors carried out a systematic review of the literature in order to observe effectiveness data for input into their decision analytic model. The methodology underlying their literature search and the identification of relevant data was clearly reported. The primary estimates were combined in order to estimate base-case parameter values; some discussion on how these data were combined would add to the readers' understanding of the inputs into and, therefore, outputs from the model. In addition, the study would have benefited from a discussion of comparability of the parameters observed from the review. For instance, the authors used sensitivity analysis to explore the impact of data variation but did not report reasons for such variation.

Validity of estimate of measure of benefit
The number of DUB-free months was used as a summary measure of health benefit. This measure potentially enables comparisons with similar studies addressing DUB but does not enable broader comparisons with a range of health technologies. The authors noted different outcome measures as a weakness of the body of literature around DUB.

Validity of estimate of costs
The costs were estimated from the perspective of the third-party payer and the unit costs relevant to this perspective where included. The sources used represented a national perspective. Thus, it might be interesting to compare these
outcomes with local sources, such as claims databases for a specific health care reimbursement organisation, to assess generalisability to a given setting. The resource use quantities and prices were not reported separately, which would make it difficult to replicate the calculations or to gauge the accuracy of the estimation of quantities. The cost analysis would have been improved by some statistical analyses on the costs to ascertain whether the total expected costs were statistically different. This would have enabled the reader to decide whether small changes in cost estimates over time or setting would affect the principal results and conclusions, and so assess the generalisability of the results. A price year was not reported and, despite the time horizon extending to 18 months, discounting was not carried out.

Other issues
The authors did not draw comparisons of their own results with those published already, but did note the paucity of results in this area with which to draw comparisons. The issue of generalisability to other settings was addressed and noted as a limitation of the study, as most DUB studies occurred outside of the USA. The authors might have presented their results in a table as well as graphically in order to improve understanding of the exact results. Nevertheless, the study was well designed and provided results and drew conclusions that related well to the initial scope and objectives. Several limitations in addition to the generalisability were noted. For example, the lack of homogeneity of the study population and the lack of a single clinical trial comparing the technologies of interest head-to-head.

Implications of the study
The authors did not make any recommendations for policy or practice as a result of their study.

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