



Title	The Effectiveness and Cost Effectiveness of Microwave and Thermal Balloon Endometrial Ablation for Heavy Menstrual Bleeding: Systematic Review and Economic Modeling
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Reference	Health Technol Assess 2004;8(03). Feb 2004. www.ncchta.org/execsumm/summ803.htm

Aim

To estimate the clinical and cost effectiveness of microwave endometrial ablation (MEA) and thermal balloon endometrial ablation (TBEA) for heavy menstrual bleeding (HMB), compared with the existing (first-generation) endometrial ablation (EA) techniques of transcervical resection (TCRE) and rollerball (RB) ablation, and hysterectomy.

Conclusions and results

A systematic review of first-generation EA methods versus hysterectomy shows that EA had fewer complications and a shorter recovery period than hysterectomy for HMB. Satisfaction and effectiveness were high for both EA and hysterectomy. Costs were lower with EA, but the difference narrows over time. Our systematic review found that second-generation EA techniques are an alternative to first-generation techniques for HMB. Second-generation techniques may also offer an alternative surgical treatment to hysterectomy. Using the economic model to assess cost effectiveness, costs were slightly higher for MEA compared to TBEA, and differences in quality-adjusted life-years (QALYs) were negligible. Costs were slightly lower for MEA compared to TCRE and RB ablation, and MEA accrued slightly more QALYs. Compared to hysterectomy, MEA costs less and accrues slightly fewer QALYs. Costs were lower for TBEA compared to TCRE and RB ablation, and TBEA accrued slightly more QALYs. Compared to hysterectomy, TBEA costs moderately less and accrues moderately fewer QALYs. However, the data are too uncertain to draw firm conclusions.

Recommendations

Few significant differences distinguish the outcomes of first- and second-generation EA methods. Second generation methods have significantly lower operating and theatre times and avoid the risk of some adverse effects. Compared to hysterectomy, TCRE and RB are performed quicker, hospitalization is shorter, and return-to-work is faster. Hysterectomy has more adverse

effects and is more expensive, but retreatment leads this difference to decrease over time. Satisfaction with hysterectomy is initially higher, but the difference with EA is not significant after 2 years. The economic model suggests that second-generation techniques are more cost effective than first-generation techniques of EA for HMB. Both TBEA and MEA appear to be less costly than hysterectomy, although the latter results in more QALYs.

Methods

A detailed search strategy identified systematic reviews and controlled trials of MEA and TBEA versus first-generation techniques for EA. In addition to electronic database searching, reference lists were hand-searched and information sought from manufacturers of EA devices and from experts in the field. A deterministic Markov model was developed to assess cost effectiveness. Data for the model were taken from the best available source.

Further research/reviews required

Further research is suggested to directly compare the cost effectiveness of second-generation EA techniques, to carry out longer term followup for all methods of EA in RCTs, and to develop more sophisticated modeling studies.