A cost-effective analysis of adjuvant therapies for the treatment of stage I endometrial adenocarcinoma

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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 evaluated the cost-effectiveness of four adjuvant treatment options for stage one endometrial adenocarcinoma treated primarily with surgical staging. The authors concluded that, compared with observation, high dose rate vaginal brachytherapy was the most cost-effective adjuvant treatment strategy following surgical staging. There were a few limitations, but the reporting of the methods and results was good. The authors’ conclusions appear to have been appropriate, but should be considered with caution in view of the methodological limitations.

Type of economic evaluation
Cost-effectiveness analysis, cost-utility analysis

Study objective
The objective was to determine the most cost-effective adjuvant treatment program for stage one endometrial adenocarcinoma treated primarily with surgical staging.

Interventions
An adjuvant treatment programme used one of the following four options for patients, who had undergone surgical staging: observation, high dose rate vaginal brachytherapy, external beam pelvic radiation, or a combination of external beam pelvic radiation and vaginal brachytherapy.

Location/setting
USA/secondary care.

Methods
Analytical approach:
The authors used a decision-tree model to combine the cost and effectiveness data from a range of different sources. The time horizon was five years and the authors did not state a perspective.

Effectiveness data:
The estimates of clinical effectiveness were selected from a literature review. The sources were a randomised controlled trial and some retrospective reports. The main clinical parameters were the probability of complications from treatment and the probability of recurrence.

Monetary benefit and utility valuations:
The utility estimates for each of the health states in the model were based on estimates from surveys of nine clinicians (seven gynaecologic oncologists and two radiation oncologists). The instruments used to derive the utilities were not reported.

Measure of benefit:
The measure of benefit was quality-adjusted survival.

Cost data:
The actual costs of direct patient care associated with each of the treatment options were obtained by a review of hospital records for all patients with stage one endometrial cancer, treated within the University of Virginia Health
System between 1995 and 2005. All costs were in US dollars ($).

Analysis of uncertainty:
One-way sensitivity analyses were performed, by varying the estimates of each of the probabilities, utilities, and costs from minimum to maximum of the identified estimates, to assess their effect on the incremental cost-effectiveness ratio.

Results
The quality-adjusted five-year survival was 77% for observation, 76% for a combination of external beam pelvic radiation and vaginal brachytherapy, 83% for external beam pelvic radiation alone, and 85% for high dose rate vaginal brachytherapy alone.

The total costs were $437million for observation, $2.93billion for a combination of external beam pelvic radiation and vaginal brachytherapy, $1.14billion for external beam pelvic radiation, and $970million for high dose rate vaginal brachytherapy.

Compared with observation, the incremental costs of high dose rate vaginal brachytherapy were $65,900 and external beam pelvic radiation were $113,400 per survivor. A combination of external beam pelvic radiation and vaginal brachytherapy was dominated (more costly and less effective) by all other treatment options.

The sensitivity analysis suggested that these results were robust to variations in key inputs across plausible ranges.

Authors’ conclusions
The authors concluded that adjuvant external beam pelvic radiation used in isolation or in combination with high dose rate vaginal brachytherapy was not cost-effective, and that, compared with observation, high dose rate vaginal brachytherapy improved survival at a cost of $65,900 per survivor.

CRD commentary
Interventions:
The treatment options seem to have been appropriate as these were the current practice in the authors’ setting and observation appears to have been the relevant comparator. The treatments were adequately described.

Effectiveness/benefits:
The authors stated that they identified the probabilities of each event from a thorough literature review, but the details of this review were not provided. It is not possible to ascertain whether the best evidence was used. The authors did provide some detail of how the sources were selected where there were alternatives. The estimates of utility for each health state were based on experts’ opinion. No discount rate was applied to benefits.

Costs:
The authors did not specify a perspective, but all the costs relevant to the perspective of a health care system appear to have been included. The costs were not standardised to a cost year. The cost data were calculated from records between 1995 and 2005 and you may want to consider whether possible trends in adjuvant treatment for stage one endometrial adenocarcinoma may have lead to bias in the relative cost estimates for each treatment. No discount rate was applied to the costs.

Analysis and results:
Overall, the reporting of the analytical approach was good, and the model structure was fully reported and supplemented with diagrams. The use of an incremental analysis was appropriate to determine the relative cost-effectiveness of the strategies. The issue of uncertainty was addressed to some extent using one-way sensitivity analysis. Multivariate or probabilistic sensitivity analyses would have been useful to more fully ascertain the parameter uncertainty and enhance the generalisability of the study. The level of reporting was good, including base-case estimates of effectiveness and cost data. Discounting would have been relevant given the long-term horizon of the analysis, but it was not performed. The authors acknowledged some limitations of their study.
Concluding remarks:
Overall the quality of this cost-effectiveness analysis was satisfactory, and the reporting of key model inputs and results was transparent. There were a few limitations and although the authors' conclusions appear to be appropriate on the basis of the evidence reported, they should be considered with a degree of caution.

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