Consolidation paclitaxel is more cost-effective than bevacizumab following upfront treatment of advanced epithelial ovarian cancer

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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
The objective was to assess whether consolidation paclitaxel was cost-effective, compared with bevacizumab, following initial treatment of advanced epithelial ovarian cancer. The authors concluded that consolidation paclitaxel was more cost-effective than bevacizumab. Bevacizumab would have to significantly improve survival over paclitaxel, to be cost-effective. Too little information was provided on the clinical evidence synthesis methods and the costs, and there was too much uncertainty in the clinical and utility parameters to be confident in the authors' conclusions.

Type of economic evaluation
Cost-utility analysis

Study objective
The objective was to assess whether consolidation paclitaxel was cost-effective, compared with bevacizumab, following initial treatment of advanced epithelial ovarian cancer.

Interventions
The three interventions were six 21-day cycles of carboplatin and paclitaxel; six cycles of carboplatin and paclitaxel, followed by twelve 28-day cycles of paclitaxel maintenance; and one cycle of carboplatin and paclitaxel maintenance, then an additional five cycles plus bevacizumab, then 16 cycles of bevacizumab.

The paclitaxel dose was 135mg or 175mg (maintenance) per m², given intravenously over three hours. The carboplatin dose was area under the curve 7.5 or 6 (with maintenance paclitaxel). The bevacizumab dose was 15mg per kg.

Location/setting
USA/in-patient secondary care.

Methods
Analytical approach:
A decision-analytic Markov model of the progression of cancer and the risk of neuropathy and bowel perforations, with the different treatment regimens, was used with a hypothetical cohort of patients with advanced-stage epithelial ovarian cancer. Disease progression was further affected by whether a patient had optimal or suboptimal residual disease, after initial treatment. The average age of patients entering the model was 58 years. The time horizon was 10 years. The authors reported that a health care system perspective was adopted.

Effectiveness data:
The clinical and effectiveness data were from published studies and expert opinion. The main effectiveness estimates were the progression-free survival (PFS) and the overall survival. These data were from three phase III clinical trials, each of which evaluated one of the three interventions.

Monetary benefit and utility valuations:
The utility estimates were the opinion of a panel of three gynaecological oncology experts. The utilities were estimated for the different chemotherapy treatments and recovery periods, PFS, cancer recurrence, neuropathy, and bowel perforation.
Measure of benefit:
Quality-adjusted life-years (QALYs) gained were the benefit measure and future benefits were discounted at an annual rate of 3%.

Cost data:
The direct costs included those of chemotherapy and its administration, major complications (bowel perforation and neuropathy), and surveillance. These costs were from the hospital, Medicare rates, national databases, reimbursement schedules, and the Red Book. All costs were reported in US dollars ($) and future costs were discounted at an annual rate of 3%. The price year was 2009.

Analysis of uncertainty:
One- and two-way sensitivity analyses were performed, by varying the model parameters over ranges of plausible values.

Results
The average cost per patient was $18,877 for carboplatin and paclitaxel, $23,886 with paclitaxel consolidation, and $122,899 with bevacizumab consolidation. The average QALYs gained were 2.99 for carboplatin and paclitaxel, 3.36 with paclitaxel consolidation, and 3.31 with bevacizumab.

Paclitaxel consolidation was associated with an incremental cost per QALY gained of $13,402 over carboplatin and paclitaxel. It was dominant over bevacizumab consolidation, as it was more effective and less costly.

The sensitivity analyses showed that bevacizumab consolidation was cost-effective (at a threshold of $100,000 per QALY gained) if it improved survival by 6.1 years more than paclitaxel consolidation.

Authors’ conclusions
The authors concluded that, despite some limitations to their study, consolidation paclitaxel was more cost-effective than bevacizumab. Bevacizumab would have to significantly improve survival over paclitaxel, to be cost-effective.

CRD commentary
Interventions:
The interventions were reported clearly and in detail.

Effectiveness/benefits:
The authors reported the sources for the main effectiveness parameters, but they did not report how the published studies were identified and it is not possible to determine if all the relevant data was analysed. The authors stated that they estimated the clinical parameters based on estimates in the literature, but they did not describe their methods. A lack of evidence for the effectiveness of bevacizumab consolidation led the authors to assume it was the same as that for paclitaxel consolidation. They suggested that this was biased towards bevacizumab, based on preliminary evidence, but bevacizumab was less beneficial than paclitaxel in the model due to the risk of bowel perforation. The quality of life data were the expert opinion of only three clinicians, which the authors acknowledged was a limitation. They did not report if a systematic review was undertaken to identify any relevant utilities.

Costs:
The perspective was explicitly reported, but the details of the costs were brief, making it difficult to determine the categories analysed. For example, it was unclear if the costs of hospitalisation due to ovarian cancer progression or relapse were included. The sources for the costs, the price year, time horizon, discount rate, and currency were reported.

Analysis and results:
The costs and effectiveness data were synthesised in a decision-analytic Markov model. Appropriate details of the model, including a diagram, were reported. The uncertainty was assessed in one- and two-way sensitivity analyses, but no probabilistic sensitivity analysis was undertaken and this could have assessed the overall model uncertainty. The main limitation reported by the authors was that the effectiveness of the three interventions was from three different clinical trials, each with a different patient sample.
Concluding remarks:
Too little information was provided on the clinical evidence synthesis methods and the costs, and there was too much uncertainty in the clinical and utility parameters to be confident in the authors’ conclusions.

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