Cost-utility model comparing docetaxel and paclitaxel in advanced breast cancer patients

Brown R E, Hutton J

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
Docetaxel and paclitaxel chemotherapy in the management of advanced breast cancer patients.

Type of intervention
Treatment.

Economic study type
Cost-utility analysis.

Study population
Patients with advanced breast cancer.

Setting
Oncology centres and the home. The economic study was conducted in the USA, Germany, Italy, the Netherlands, Spain and the UK.

Dates to which data relate
Effectiveness data were collected mainly from two studies published in 1997, and costs data relate to the same year.

Source of effectiveness data
Effectiveness data were obtained from previously completed studies.

Modelling
The model used was a modified Markov process that began with the first cycle of docetaxel or paclitaxel and followed patients through 3-week cycles until death within 3 years. The model estimated the differences in costs of direct medical resource utilisation and patient outcomes, in terms of quality of life and survival for patients receiving docetaxel or paclitaxel after failing previous chemotherapy. The chemotherapy doses tested in the model were 100 mg/m² for docetaxel and 200 mg/m² for paclitaxel.

Outcomes assessed in the review
The main health outcomes assessed in the review were: overall response rate, evaluable response rate, progressive disease, time to progression, mortality at 12 months, infection with hospitalisation and/or i.v. antibiotic, febrile neutropenia (FN) with hospitalisation and/or i.v. antibiotic, febrile neutropenia without hospitalisation, death associated with infection or FN, severe neurotoxicity, severe edema, discontinuation with cardiac toxicity, severe skin conditions, and cycles of chemotherapy.
Study designs and other criteria for inclusion in the review
The two taxoids have not been compared in head-to-head trials. In order to compare them directly, the authors used data from trials in which each is compared with the anthracycline, doxorubicin, used at a dose of 75 mg/m². The probabilities of model events were obtained primarily from the latest available randomised clinical trials: Paridaens et al. (1997) and Chan et al. (1997).

Sources searched to identify primary studies
The Handbook of Cancer Chemotherapy, the Journal of Clinical Oncology, the Cancer Journal, Pharmacoeconomics, and Health Economics were amongst the sources referenced. Details of how studies were identified were not given in the paper.

Criteria used to ensure the validity of primary studies
The studies used for extracting the bulk of the data were randomised trials.

Methods used to judge relevance and validity, and for extracting data
Randomised clinical trials relating to chemotherapy for advanced cancer patients were used. No further details were provided.

Number of primary studies included
Data relate primarily to two clinical trials: Paridaens et al. (1997) and Chan et al. (1997).

Methods of combining primary studies
Each study provided separate inputs to the model.

Investigation of differences between primary studies
Not detailed.

Results of the review
The probabilities of events used in the model are shown below.

Overall response rate, base case: docetaxel 47.8%, paclitaxel 25%.

Evaluable response rate: docetaxel 52%, paclitaxel 25%.

Progressive disease, base case: docetaxel 12.4%, paclitaxel 31%.

Time to progression, base case: docetaxel 26 weeks, paclitaxel 16 weeks.

Mortality at 12 months: docetaxel 35%, paclitaxel 35%.

Infection with hospitalisation and/or i.v. antibiotic, base case: docetaxel 2.5%, paclitaxel 4%.

Febrile neutropenia (FN) with hospitalisation and/or i.v. antibiotic, base case: docetaxel 5.7%, paclitaxel 7%.

Febrile neutropenia without hospitalisation, base case: docetaxel 10.7%, paclitaxel 10%.

Death associated with infection or FN: docetaxel 1.2, paclitaxel 0.

Severe neurotoxicity: docetaxel 8%, paclitaxel 9%.
Severe edema: docetaxel 5%, paclitaxel 0%.

Discontinuation with cardiac toxicity: docetaxel 0.6%, paclitaxel 0.6%.

Severe skin conditions: docetaxel 1.9%, paclitaxel 5%.

Time to response: docetaxel 9 weeks, paclitaxel 9 weeks.


**Methods used to derive estimates of effectiveness**
Estimates of effectiveness were also based on the authors' assumptions.

**Estimates of effectiveness and key assumptions**
Where data were not available, paclitaxel was assumed equal to docetaxel (base case values). In particular the time to response for both drugs was estimated to be 9 weeks.

**Measure of benefits used in the economic analysis**
Quality-adjusted life years (QALYs) were used as the benefit measure in the economic analysis. Utility scores for the model were obtained from the USA, Germany, Italy, the Netherlands, Spain and UK nurses. The scores, ranging from 1 for perfect health and 0 for death, were obtained using the standard gamble methodology recommended by Furlong et al.

**Direct costs**
Direct health service costs were considered, namely: physician and nurse time, chemotherapeutic agents, antibiotic regimens, in-patient or out-patient management of infections and febrile neutropenia, progressive and terminal disease palliative medication, monitoring tests and hospital days. US data sources were used for costing. Unit costs were obtained for 1997 or inflated as necessary. Costs were not discounted.

**Indirect Costs**
Indirect costs were not considered.

**Currency**
US dollars ($).

**Sensitivity analysis**
Sensitivity analyses varied parameter values to use the response rate for docetaxel evaluable patients, decreased the toxicity rates of paclitaxel, decreased TTP for docetaxel, changed utilities to the average of six European countries, manufacturers' list prices for docetaxel, and paclitaxel and decreased prices for paclitaxel.

**Estimated benefits used in the economic analysis**
The cumulative QALYs per patient, for an equivalent time frame, were 0.867 for docetaxel versus 0.6605 for paclitaxel.

**Cost results**
Costs per patient were $15,683 for docetaxel, from the start of chemotherapy until death for a patient having an average
7 chemotherapy cycles. The cost per patient for a patient having 6 cycles of paclitaxel was $13,904.

**Synthesis of costs and benefits**
The incremental cost per QALY was $8,615 for docetaxel versus paclitaxel, calculated as cost of docetaxel - cost of paclitaxel/ utility of docetaxel- utility of paclitaxel.

**Authors' conclusions**
For decision-makers faced with selecting a taxoid therapy, docetaxel would appear to be a cost-effective option.

**CRD COMMENTARY - Selection of comparators**
The reason for the choice of the comparator is clear, as both cancer chemotherapies are used in the treatment of advanced breast cancer. You, as a database user, should consider if this applies to your own setting.

**Validity of estimate of measure of benefit**
QALYs were used, a valid measure of benefit. The probabilities for the model were extracted from randomised trials, which strengthens the validity of the final results. However, it would have been helpful to have reported the methods used to identify and review the literature, in order to assess the quality of the model.

**Validity of estimate of costs**
The cost analysis is detailed and all the important cost components are considered. Resource consumption was estimated by 3 US oncologists and refers to a US Medicare setting. A broader societal perspective, in which costs to patients and others in society were also taken into consideration, could have been considered in the analysis.

**Other issues**
Extensive sensitivity analyses were performed to account for the uncertainties in the data. The authors made appropriate comparisons with similar studies. Costs may not be generalisable to other countries.

**Implications of the study**
A randomised trial comparing the two taxoids 'head-to-head' would be beneficial.

**Source of funding**
Rhone-Poulenc Rorer supported the modelling research.

**Bibliographic details**

**PubMedID**
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**Other publications of related interest**


**Indexing Status**
Subject indexing assigned by NLM

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