Cost utility of docetaxel as induction chemotherapy followed by chemoradiation in locally advanced squamous cell carcinoma of the head and neck


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 examined the cost-effectiveness of induction chemotherapy with docetaxel plus cisplatin and 5-fluorouracil in comparison with cisplatin and 5-fluorouracil alone in patients with squamous cell carcinoma of the head and neck. The authors concluded that docetaxel plus cisplatin and 5-fluorouracil was a cost-effective induction chemotherapy strategy. The methodology was standard and appropriate, which should ensure the validity of the authors’ conclusions.

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

Study objective
This study examined the cost-effectiveness of induction chemotherapy with docetaxel plus cisplatin and 5-fluorouracil in comparison with cisplatin and 5-fluorouracil in patients with locally advanced squamous cell carcinoma of the head and neck.

Interventions
Induction chemotherapy with docetaxel plus cisplatin and 5-fluorouracil was compared with induction chemotherapy with cisplatin and 5-fluorouracil alone. The docetaxel therapy consisted of docetaxel 75mg per m² followed by cisplatin 100mg per m² on day one and 5-fluorouracil as a continuous infusion at 1,000mg per m² per day for four days. Patients also received ciprofloxacin 500mg twice a day for 10 days and dexamethasone 48mg during each three-week cycle. The cisplatin and 5-fluorouracil therapy consisted of cisplatin 100mg per m² on day one followed by 5-fluorouracil 1,000mg per m² per day as a continuous infusion for five days. The induction chemotherapy lasted for three cycles, which was nine weeks, and was followed by either surgery or chemoradiation.

Location/setting
UK/hospital.

Methods
Analytical approach:
The analysis was based on a Markov state-transition model with a lifetime horizon. The authors stated that the perspective of the health service payer, which was the UK National Health Service (NHS), was used.

Effectiveness data:
The clinical data on treatment efficacy and safety were derived from a published phase III randomised controlled trial (RCT), namely the TAX 324 trial (Posner, et al. 2007, see ‘Other Publications of Related Interest’ below for bibliographic details). No information on the methods of the trial was provided and only the results were reported. The key clinical inputs were the rates of disease progression with docetaxel therapy and cisplatin and 5-fluorouracil therapy.

Monetary benefit and utility valuations:
The utility values were derived from a RCT, called the TAX 323 trial (Vermorken, et al. 2007, see ‘Other Publications of Related Interest’ below for bibliographic details), which used the cancer-specific European Organisation for Research and Treatment of Cancer's Quality of Life Questionnaire (QLQ-C30). An algorithm was used to translate QLQ-C30 scores into European Quality of life (EQ-5D) questionnaire scores.
Measure of benefit:
Life-years (LYs) and quality-adjusted life-years (QALYs) were the summary benefit measures and were discounted at an annual rate of 3.5%.

Cost data:
The economic analysis included the costs of drugs, in-patient stay (medical ward or intensive care unit), specialist and nurse visits, diagnostic procedures, laboratory tests, visits to other health care professionals, and treatment of adverse events. The resource use data were derived from the literature (no further details were provided) and supplemented by guidelines from the National Institute for Health and Clinical Excellence (NICE) and opinions from a panel of three experts from both private and NHS settings in the UK. The doses for chemotherapy were based on the TAX 323 trial. The unit costs were based on official UK sources (the British National Formulary, National Tariff, and Personal Social Services Research Unit) and published studies. All costs were in UK pounds sterling (£) and the price year was 2006. Those costs incurred after the first year were discounted at 3.5% per annum.

Analysis of uncertainty:
A probabilistic sensitivity analysis was undertaken using pre-determined probability distributions for the model inputs. Confidence intervals (CIs) were reported and cost-effectiveness acceptability curves were generated.

Results
The expected costs were £32,440 (95% CI 30,250 to 34,682) with docetaxel therapy and £28,718 (95% CI 26,696 to 30,919) with cisplatin and 5-fluorouracil therapy.

The expected QALYs were 4.12 (95% CI 2.69 to 7.14) with docetaxel therapy and 2.04 (95% CI 1.45 to 3.96) with cisplatin and 5-fluorouracil therapy. The incremental cost per QALY gained with docetaxel therapy over cisplatin and 5-fluorouracil alone was £1,782.

The expected LYs were 5.37 (95% CI 3.58 to 9.02) with docetaxel therapy and 2.69 (95% CI 1.93 to 5.19) with cisplatin and 5-fluorouracil. The incremental cost per LY gained with docetaxel therapy was £1,389.

The probabilistic analysis indicated that there was a probability of 96.4% that docetaxel therapy would be cost-effective at a willingness-to-pay threshold of £20,000 per QALY.

Authors’ conclusions
The authors concluded that docetaxel plus cisplatin and 5-fluorouracil was a cost-effective induction chemotherapy strategy in comparison with cisplatin and 5-fluorouracil alone in patients with locally advanced squamous cell carcinoma of head and neck.

CRD commentary
Interventions:
The authors justified their selection of the comparators. The cisplatin and 5-fluorouracil-based strategy was a widely used therapy because it was highly active in squamous cell carcinoma of head and neck, while data from a RCT demonstrated the longer survival associated with the docetaxel plus cisplatin and 5-fluorouracil strategy. These two combination therapies appear to have been appropriately selected and a clear description of the treatment steps was provided.

Effectiveness/benefits:
All the clinical data for the model came from a published RCT, which is generally considered to be a valid source of evidence due to the strengths of the design, but the provision of key details on the setting and the patient sample would have been useful. The benefit measures were both appropriate for capturing the impact of the interventions on the most relevant dimensions of health, namely survival and quality of life. Some information on the derivation of the utility scores was provided.

Costs:
The economic analysis was satisfactorily conducted and presented. A breakdown of the cost items was provided and the
inclusion of the cost categories was consistent with the perspective. The unit costs and quantities of resources used were presented separately. Other details such as the price year, use of discounting, data sources, and assumptions were reported. The cost data were treated stochastically and CIs around the mean values were reported.

Analysis and results:
The costs and benefits were clearly reported. The use of an incremental approach to synthesise the costs and benefits was appropriate. The issue of uncertainty was satisfactorily investigated using an appropriate approach, and the results were clearly displayed. Recommended discounting was applied to both benefits and costs. The authors stated that this was the first study to assess the cost-effectiveness of docetaxel plus cisplatin and 5-fluorouracil versus cisplatin and 5-fluorouracil alone in patients with squamous cell carcinoma of head and neck. They also stated that the results should be considered specific to the UK, but as the differences between the two groups were mainly due to the treatment effect, it was likely that similar findings would emerge in other contexts.

Concluding remarks:
The methodology was standard and appropriate, which should ensure the validity of the authors’ conclusions.

Funding
Funding received from Sanofi-Aventis.

Bibliographic details

PubMedID
19731394

DOI
10.1002/hed.21096

Original Paper URL
http://onlinelibrary.wiley.com/journal/122589510/abstract

Other publications of related interest


Indexing Status
Subject indexing assigned by NLM

MeSH
Antimetabolites, Antineoplastic /economics /therapeutic use; Antineoplastic Combined Chemotherapy Protocols /economics /therapeutic use; Carcinoma, Squamous Cell /drug therapy /economics /radiotherapy; Cisplatin /administration & dosage; Cost of Illness; Cost-Benefit Analysis; Disease Progression; Fluorouracil /administration & dosage /economics; Great Britain; Head and Neck Neoplasms /drug therapy /economics /radiotherapy; Humans; Markov Chains; Neoadjuvant Therapy; Quality of Life; Quality-Adjusted Life Years; Radiation-Sensitizing Agents