Cost-effectiveness of pegfilgrastim versus 6-day filgrastim primary prophylaxis in patients with non-Hodgkin's lymphoma receiving CHOP-21 in United States

Lyman G, Lalla A, Barron R, Dubois RW

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 aim was to assess the cost-effectiveness of primary prophylaxis against febrile neutropenia, using pegfilgrastim versus six days of filgrastim, for patients with non-Hodgkin's lymphoma, who were receiving myelosuppression chemotherapy and were at a 20% risk or higher. The authors concluded that primary prophylaxis with pegfilgrastim was cost-effective compared with six-day filgrastim. Generally, the methods and results were presented clearly and the authors’ conclusions appear to be robust.

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

Study objective
The aim was to assess the cost-effectiveness of primary prophylaxis, with pegfilgrastim, against febrile neutropenia in patients aged 65 years or older, who had non-Hodgkin's lymphoma, were receiving myelosuppression chemotherapy, and were at a risk of 20% or higher.

Interventions
Primary prophylaxis with pegfilgrastim (6mg injection once per cycle) was compared with filgrastim (5μg/kg/day intravenously for six days per cycle).

Location/setting
USA/hospital and out-patient.

Methods
Analytical approach:
This economic evaluation was based on a decision-tree model that reflected the usual clinical practice. Three scenarios were evaluated and the time horizon was lifetime. The authors did not state the perspective.

Effectiveness data:
The clinical evidence was derived from published studies that were relevant to the study population. The key model inputs included the risk of febrile neutropenia, the relative risk of febrile neutropenia, and febrile neutropenia fatalities.

Monetary benefit and utility valuations:
The utility valuation was based on two studies that used the European Quality of life (EQ-5D) questionnaire to assess patient preferences.

Measure of benefit:
The main summary benefit measure was quality-adjusted life-years (QALYs). The other benefit measure was life expectancy. These benefits were discounted at an annual rate of 3%.

Cost data:
The cost categories were the acquisition and administration of pegfilgrastim and filgrastim, and the hospitalisations, physician services, out-patient services, and other care related to febrile neutropenia. These cost data were collected from national statistical sources and relevant literature. All costs were presented for total categories, in 2006 US dollars.
Analysis of uncertainty:
A one-way sensitivity analysis was undertaken for the key model inputs and a probabilistic sensitivity analysis was conducted to assess the overall uncertainty in the model outcomes.

Results
The costs of primary prophylaxis were $15,603 with pegfilgrastim and $15,343 with filgrastim, and the difference was $260.

The first scenario considered only the effect of the prophylaxis on the incidence and cost of febrile neutropenia; the incremental cost-effectiveness ratio (ICER) for pegfilgrastim compared with filgrastim was $2,167 per febrile neutropenia event avoided.

The second scenario assumed that prophylaxis also reduced febrile neutropenia-related mortality or short-term mortality; the ICER for pegfilgrastim versus filgrastim was $5,532 per LY year gained and $6,190 per QALY gained.

The third scenario assumed that prophylaxis reduced febrile neutropenia-related mortality (short-term) and improved the long-term survival; the ICER for pegfilgrastim versus filgrastim was $1,494 per LY year gained and $1,677 per QALY gained.

One-way sensitivity analysis revealed that the most influential inputs were the cost of pegfilgrastim, the relative risk of febrile neutropenia, and the febrile neutropenia fatality rate. Probabilistic sensitivity analysis demonstrated that, at a willingness-to-pay of $50,000 per QALY, pegfilgrastim had a 90% likelihood of being cost-effective.

Authors’ conclusions
The authors concluded that primary prophylaxis with pegfilgrastim was cost-effective compared with six-day filgrastim.

CRD commentary
Interventions:
The selection of the comparators was appropriate in that they were the available strategies for patients undergoing chemotherapy.

Effectiveness/benefits:
Little information was provided on the identification of the primary sources of data and about these sources, which makes it impossible to ascertain if these sources were appropriate and valid. The use of QALYs and life expectancy as benefit measures appears to have been appropriate for this disease.

Costs:
The authors did not state the perspective, but the cost categories appear to be consistent with a health care system perspective, as the direct medical costs were considered. The authors provided a satisfactory justification for the exclusion of chemotherapy costs, direct non-medical costs, and indirect costs. The costs were presented as total categories, which could limit the transferability of the analysis to other settings. References were provided for all of the cost data, but these sources were not described and the components of the cost categories were not listed. The price year and the adjustment method were reported. Those costs incurred beyond the first year of treatment were not considered and discounting was not necessary.

Analysis and results:
The model was well described and a diagram was presented. Appropriately, an incremental analysis was used to synthesise the costs and benefits and the results were clearly presented and discussed. The issue of uncertainty was also appropriately addressed and fully discussed. A tornado diagram and a cost-effectiveness acceptability curve were presented to illustrate these results. The results of the base case for all three scenarios were presented, but the results of the sensitivity analysis were only presented for the second scenario, which was assumed to be the reference case.

Concluding remarks:
Only limited details of the identification of the model parameters were given, but the methods and results were clearly
presented and the authors’ conclusions appear to be robust.

**Funding**
Funded by Amgen Inc.

**Bibliographic details**

**PubMedID**
19192985

**DOI**
10.1185/03007990802636817

**Original Paper URL**
http://informahealthcare.com/doi/abs/10.1185/03007990802636817

**Indexing Status**
Subject indexing assigned by NLM

**MeSH**
Antineoplastic Combined Chemotherapy Protocols /adverse effects; Cost-Benefit Analysis; Cyclophosphamide /adverse effects; Decision Support Techniques; Doxorubicin /adverse effects; Filgrastim; Granulocyte Colony-Stimulating Factor /economics /therapeutic use; Humans; Neutropenia /chemically induced /drug therapy; Prednisone /adverse effects; Probability; Quality-Adjusted Life Years; Recombinant Proteins; Treatment Outcome; United States; Vincristine /adverse effects

**AccessionNumber**
22009101539

**Date bibliographic record published**
03/02/2010

**Date abstract record published**
10/11/2010