Pegaspargase versus asparaginase in adult ALL: a pharmacoeconomic assessment


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
Remission-induction agents used as part of chemotherapy regimens for the treatment of acute lymphocytic leukemia (ALL) in adult patients. In particular pegaspargase and asparaginase.

Type of intervention
Treatment.

Economic study type
Cost-effectiveness analysis.

Study population
Adult patients with acute lymphocytic leukemia.

Setting
Hospital. The economic study was conducted in St Louis, MO, USA.

Dates to which data relate
Effectiveness data were mainly extracted from a product insert for Oncaspar (pegaspargase) published in 1994. Costs were estimated using 1994 resource data and 1994 prices.

Source of effectiveness data
Effectiveness data were mainly extracted from a product insert for Oncaspar (pegaspargase) by Rhone-Poulenc Rorer.

Outcomes assessed in the review
Rate of remission (in the treatment of adult patients with acute lymphocytic leukemia) and side-effects.

Study designs and other criteria for inclusion in the review
Product insert plus other unspecified studies reporting on side-effects.

Sources searched to identify primary studies
Not stated.

Criteria used to ensure the validity of primary studies
Not stated.
Methods used to judge relevance and validity, and for extracting data
Not stated.

Number of primary studies included
Approximately 3 studies.

Methods of combining primary studies
Not stated.

Investigation of differences between primary studies
Not stated, even when it would have been applicable.

Results of the review
Complete remission rates of 50% have been reported for both drugs. Moreover, pegaspargase showed a lower incidence (18% versus 73%) of hypersensitivity reactions.

Measure of benefits used in the economic analysis
Rate of remission in the treatment of adult patients with acute lymphocytic leukemia.

Direct costs
Costs were assessed from the patient's (payer's) perspective and were not discounted. Costs and quantities were analysed separately. Three different protocols or chemotherapy regimens involving various drug dosages were costed. Costs included any test dose cost, preparation and administration fees for both pharmacists and nurses, and hospitalisation and/or clinic visit charges. Since pegaspargase can be substituted for asparaginase without affecting the dosing of other agents used in the protocols, the costs of these other agents were not included. Charges for premedication doses were also excluded. Medication costs were based on average wholesale prices in 1994. Other costs were based on current actual data at the authors' institution and on average hospital charges in the St Louis area. The cost of treatment depends on the level of dosage, which depends on the surface area, or weight of the patient.

Currency
US dollars ($).

Sensitivity analysis
No sensitivity analysis was conducted.

Estimated benefits used in the economic analysis
The remission rate for both asparaginase and pegaspargase was 50%. Side effects of the agents were not considered in the economic analysis.

Cost results
Cost per single-dose vial: asparaginase $52.38; pegaspargase $980.00. To these medication costs were added the various other costs for each of the three common protocols investigated. The total high-dosage, in-patient costs for these three protocols are as follows (readers should refer to the article for low-dosage and outpatient costs):
1. Hoelzer Protocol: asparaginase $6,130.70; pegaspargase $2,340.00; saving = $3,790.70.

2. Linker Protocol: asparaginase $9,194.72; pegaspargase $4,680.00; saving = $4,514.72.


Synthesis of costs and benefits
A synthesis was not applicable since this was a cost-minimisation analysis in which the levels of effectiveness (remission rates) were assumed to be identical.

Authors’ conclusions
Generally, the substitution of pegaspargase for asparaginase where appropriate, could provide substantial savings for payers while retaining comparable clinical effectiveness. Pegaspargase offers a more advantageous dosing schedule, obviating lengthy hospitalisation or daily clinic visits for injections, an improved side-effect profile with a lower incidence of hypersensitivity reactions, and, possibly, less chance for resistance and hence treatment failure.

CRD Commentary
(a) Some institutions may have protocols using asparaginase in lower doses with less frequent injections that make it the more cost-effective agent. Thus the generalisability of the results depend on the particular protocol used.

(b) Cost-minimisation analysis depends crucially on the effectiveness of the two agents being identical. However, this claim is based on a manufacturer's product insert. The results of an independent clinical trial and information about that trial are needed to legitimise the claim of identical effectiveness.

(c) Certain relevant cost issues were not assessed such as the decreased adverse effects and hypersensitivity reactions associated with pegaspargase therapy which might reduce lengths of stay and hence hospitalisation costs as well as having a positive impact on patients' quality of life.

(d) Indirect costs were not considered where it seems likely that the indirect costs associated with the pegaspargase therapy would be lower due to reduced hospitalisation and/or clinic visits.

Implications of the study
(a) A clinical study of the relative effectiveness of pegaspargase and asparaginase (including relative survival rates) needs to be conducted.

(b) The authors stated the following implication for clinical practice: asparaginase should remain on the formulary as pegaspargase is not approved for first-line therapy. However, clinicians should investigate using pegaspargase earlier in certain patient populations.

Bibliographic details

Indexing Status
Subject indexing assigned by NLM

MeSH
Adult; Ambulatory Care /economics; Antineoplastic Agents /economics /therapeutic use; Asparaginase /administration & dosage /economics /pharmacokinetics /therapeutic use; Clinical Protocols; Comparative Study; Drug Costs /statistics & numerical data; Drug Hypersensitivity; Half-Life; Hospitalization /economics; Humans; Missouri; Polyethylene Glycols /administration & dosage /economics /pharmacokinetics /therapeutic use; Precursor Cell Lymphoblastic
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