Economic and clinical impact of a pharmacy-based filgrastim protocol in oncology patients

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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.

Health technology
A pharmacy-based filgrastim protocol in oncology patients. A pharmacy sub-committee of the cancer committee at the study institution developed the protocol.

Type of intervention
Treatment.

Economic study type
Cost-effectiveness analysis.

Study population
The study population consisted of oncology patients receiving filgrastim at a private, non-profit 500-bed community hospital.

Setting
The study setting was hospital. The economic study was carried out in the USA.

Dates to which data relate
Effectiveness, resource use and cost data were collected between January and June 1996 and between November 1996 and April 1997. The price year was not reported.

Source of effectiveness data
Effectiveness data were derived from a single study.

Link between effectiveness and cost data
The costing was undertaken retrospectively and on the same patient sample as that used in the effectiveness analysis.

Study sample
Twenty-one patient charts were reviewed before the protocol was implemented and 34 charts were reviewed after implementation. Patients were selected on a one in four basis in both periods. Nine patients after implementation were excluded because they did not reach their nadir or an ANC of 1500 cells/cubic millimetre for two days or because they received one-time doses only. No power calculations were reported.

Study design
The study took the form of a retrospective before-and-after study carried out at a single centre. A follow-up evaluation
was carried out 6 months after implementation of the protocol.

**Analysis of effectiveness**
The analysis of the clinical study was based on treatment completers only. The primary health outcomes included ANC and white blood cell (WBC) count, documented infections, daily dose, discontinuation of therapy, and duration of therapy. At analysis, groups were shown to be comparable in terms of age, gender, and diagnosis.

**Effectiveness results**
Before implementation of the protocol, filgrastim was discontinued in 29% of patients when the ANC was 1000 cells/cubic millimetre and in 48% of patients when the ANC was greater than 1000 cells/cubic millimetre.

After implementation of the protocol, filgrastim was discontinued in 76% of patients when the ANC was greater than 1500 cells/cubic millimetre for two days after the nadir, 12% of patients did not have therapy discontinued at that point.

67% of patients were febrile before the protocol was implemented and 56% were febrile afterward.

10% of patients had documented infections before implementation, compared with 12% afterward.

The average ANC at which filgrastim was discontinued before and after the protocol was implemented was 6,839 and 5,538 cells/cubic millimetre, respectively.

The mean daily dose was 412 microgram before implementation and 375 microgram after implementation.

The mean duration of therapy was 4 days before implementation and 4.8 days after implementation.

Filgrastim was discontinued by a pharmacist in 32% of cases.

There was no significant difference in the rate of infections before and after implementation of the protocol (10% versus 12%, p>0.05).

There was no increase in episodes of febrile neutropenia. There were no cases of sepsis.

**Clinical conclusions**
A pharmacy-based protocol for discontinuing filgrastim therapy in oncology patients did not delay subsequent chemotherapy cycles or increase the infection rate.

**Measure of benefits used in the economic analysis**
Given that clinical effectiveness results were equal across groups, the authors conducted a cost-minimisation analysis.

**Direct costs**
Direct costs were not discounted due to the short time horizon of the study (less than one year). Quantities and costs were not reported separately. Direct costs related to drug costs. The quantity/cost boundary adopted was that of the health service. The estimation of quantities and costs was based on actual data. Costs and quantities were collected from the community hospital and costs of pharmaceuticals. The price year was not reported.

**Statistical analysis of costs**
The authors provided estimates of mean drug costs.

**Indirect Costs**
Indirect costs were not included.

**Currency**
US dollars ($).

**Sensitivity analysis**
No sensitivity analysis was conducted.

**Estimated benefits used in the economic analysis**
A pharmacy-based protocol for discontinuing filgrastim therapy in oncology patients did not delay subsequent chemotherapy cycles or increase the infection rate. Due to the cost-minimisation approach adopted the reader is referred to the effectiveness results reported above for specific details.

**Cost results**
Before implementation of the protocol, the mean drug cost per filgrastim dose was $169 and the mean drug cost per course of therapy was $893 per patient. After implementation of the protocol, the mean drug cost per filgrastim dose was $154 and the mean drug cost per course of therapy was $738 per patient.

**Synthesis of costs and benefits**
Cost and benefits were not combined. The results showed that a pharmacy-based protocol for discontinuing filgrastim therapy in oncology patients saved the study institution more than $22,000 in the first six months without delaying subsequent chemotherapy cycles or significantly increasing the infection rate. This suggests that the intervention is a weakly dominant strategy.

**Authors’ conclusions**
A pharmacy-based protocol for discontinuing filgrastim therapy in oncology patients saved a community hospital more than $22,000 in the first six months with no adverse impact on the drug’s effectiveness.

**CRD COMMENTARY - Selection of comparators**
A justification was given for the comparator used, namely no filgrastim protocol. You, as a user of the database, should decide if this health technology is relevant to your setting.

**Validity of estimate of measure of effectiveness**
The analysis was based on a before-and-after study, which was appropriate for the study question. The study sample was representative of the study population and patient groups were shown to be comparable at analysis. The analysis of effectiveness was handled credibly. However, in terms of limitations it is necessary to note that the authors’ choice of selecting only every fourth patient in each period, in conjunction with the before and after design, will limit the validity of the results due to potential bias and confounding variables. Analyses of new guidelines are often assessed using these methods but their limitations could be addressed using randomisation techniques and concurrent controls, thus improving the validity of the results.

**Validity of estimate of measure of benefit**
The analysis of benefits was based on the therapeutic equivalence of treatment alternatives. The economic analysis therefore included only costs. The authors did not consider improved quality of life resulting from fewer injections and, perhaps, more comprehensive patient monitoring.
Validity of estimate of costs
The authors only considered drug costs, but did not include professional fees. Moreover, quantities and costs were not reported separately. The price year was not reported which would make reflation exercises in other settings problematic. No sensitivity or statistical analyses on costs were reported, which makes it difficult to assess the validity of the cost estimates.

Other issues
The authors did make appropriate comparisons of their findings with those from other studies but did not address the issue of generalisability to other settings. The authors do not appear to have presented their results selectively. The study considered oncology patients receiving filgrastim and this was reflected in the authors’ conclusions. The authors noted that the sample size was fairly small and that data collection was retrospective. They also noted a slight increase in non-drug costs because more leukocyte differentials were ordered.

Implications of the study
The results support the development of a protocol for filgrastim use. They also support the early discontinuation of filgrastim without a compromise in clinical efficacy or safety. Additional studies should be conducted to confirm these findings.

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