Plasma exchange versus intravenous immunoglobulin for myasthenia gravis crisis: an acute hospital cost comparison study

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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.

CRD summary
The study examined costs of intravenous immunoglobulin for patients with myasthenia gravis crisis compared with plasma exchange. The authors concluded that intravenous immunoglobulin was a cost-saving treatment for myasthenia gravis crisis. The analysis was satisfactory. The authors’ conclusion are appropriate but limited in scope and focus only on costs.

Type of economic evaluation
Cost-effectiveness analysis

Study objective
To evaluate intravenous immunoglobulin (IVIG) for patients with myasthenia gravis crisis compared with plasma exchange (PLEX).

Interventions
Intravenous immunoglobulin of 400mg/kg for five days and plasma exchange with an exchange frequency of 5.5.

Location/setting
USA/secondary care.

Methods
Analytical approach:
A decision tree model was developed to compare the two treatment options over the short term. The main focus of the comparison was resources incurred as a consequence of treatment choice. The authors did not state the perspective of their study.

Effectiveness data:
Clinical data came from published trials. The key clinical endpoint was prevalence of side effects during plasma exchange or intravenous immunoglobulin. Side-effects included death, bleeding, catheter occlusion, infection, nausea, hypotension and DVT (deep vein thrombosis). Data were derived from two prospective myasthenia treatment studies.

Monetary benefit and utility valuations:
None.

Measure of benefit:
No summary benefit was used. The authors stated that there was no evidence to establish clear clinical dominance of one over the other. An assumption of equal benefit was made.

Cost data:
Costs include those associated with professional services, hospitalisation (included intensive unit care), medicines, intravenous immunoglobulin, plasma exchange, albumin, laboratory tests and catheter costs (included catheter placement and catheter removal). Costs of treating side-effects were considered. Most cost data were collected from the Billing Office at the University of Rochester, supplemented where necessary from the literature. In-patient use of resources was based on a clinical study conducted at four major USA tertiary centres. All costs were reported in United
States dollars ($).

Analysis of uncertainty:
One-way sensitivity analysis was conducted to test the uncertainty of key model inputs such as number of plasma exchanges, intravenous immunoglobulin dosing, mass of patients and time in intensive care. The most influential input (time spent in the intensive care unit) was further tested in two-way sensitivity analysis.

Results
Cost per patient was $101,140 for plasma exchange and $78,814 for intravenous immunoglobulin (a difference of $22,326).

Sensitivity analysis showed that the results were sensitive to intravenous immunoglobulin dosing, hospital length of stay and number of plasma exchange days required.

Authors’ conclusions
The authors concluded that intravenous immunoglobulin was a cost-saving treatment for myasthenia gravis crisis.

CRD commentary
Interventions:
Selection of the comparators was appropriate as the two possible options considered for patients with myasthenia gravis crisis.

Effectiveness/benefits:
The authors stated that the clinical evidence was from best available studies but did not report their methods for identifying the studies. A brief description of the selected studies (such as design and sample size) was reported. The assumption of equal benefit was not discussed in detail and it was clear from the evidence that the adverse effect profiles were different; it was possible that these differences would have an impact on health-related quality of life outcomes.

Costs:
The study perspective was not reported explicitly but appeared to be of the hospital as hospital-related categories were included. Details of the model used to estimate the costs were provided. Sources of cost data reported clearly. Most of the costs were presented only as macro-categories. The breakdown of unit costs and resource quantities aided transparency and generalisability to other settings.

Analysis and results:
The model was presented in a diagram along with all the relevant details. The assumption of equal benefits seemed bold based on the evidence presented but if this was clinically sound the remainder of the analysis was satisfactory. The issue of uncertainty was investigated using one-way and two-way sensitivity analysis and all of the results were reported clearly. The authors acknowledged that the quality of the available data was a limitation to their study and highlighted other potential limitations. Their call for more clinical trails was supported by the lack of data available for the analysis.

Concluding remarks:
The analysis was satisfactory. The authors’ conclusions are appropriate but limited in scope and focus only on costs.

Bibliographic details

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