Cost-effectiveness analysis of subtraction scintigraphy in patients with acute lower gastrointestinal tract hemorrhage

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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 determined the clinical and economic impact of using subtraction scintigraphy as an adjunct to conventional scintigraphy for patients with acute lower gastrointestinal haemorrhage in comparison with conventional scintigraphy alone. The analysis demonstrated that the adjunct of subtraction scintigraphy led to fewer deaths and complications and to lower costs for the Australian health care system. Although the authors reported some aspects of the analysis in detail, some doubts remain about the quality of the evidence used. Thus, the authors’ conclusions should be considered with some caution.

Type of economic evaluation
Cost-effectiveness analysis

Study objective
The primary objective of the study was to determine the clinical and economic impact of using subtraction scintigraphy as an adjunct to conventional scintigraphy for patients with acute lower gastrointestinal haemorrhage (LGIH) in comparison with conventional scintigraphy alone.

Interventions
Three diagnostic strategies were considered:

- conventional scintigraphy alone (CS);
- CS plus reference subtraction scintigraphy plus alternate sequential subtraction scintigraphy (CS, RSS and ASSS); and
- CS plus ASSS.

Location/setting
Australia/outpatient setting.

Methods
Analytical approach:
The study used clinical data from a series of patients’ charts to determine the accuracy and clinical impact of the three diagnostic modalities. A decision analytic model was developed to model the direct costs and potential risks of procedures for the three strategies. The time horizon of the analysis was not clear. The authors did not mention the perspective of the analysis, although it appears to have been that of the Australian third-party payer.

Effectiveness data:
The decision model was populated with both primary data from the authors’ institution and published evidence. Data on the accuracy of the three diagnostic strategies were derived from a retrospective clinical study with a repeated-measures design including randomised control and experimental groups. Forty-nine patient studies, which were randomly interpreted by 4 independent physicians, were included in the sample. Other epidemiological and clinical data (e.g., mortality rates for patients with LGIH, surgery-associated mortality) were taken from published studies. The methods used to identify published data were not described. The key clinical end points were the false- and true-positive rates of
the diagnostic modalities.

Monetary benefit and utility valuations:
None.

Measure of benefit:
The model outputs that were not combined with the costs, owing to the cost-consequences framework of the analysis, were the number of deaths and complications related to the diagnostic procedures. Death or complications could be generated not only in true-positive patients, but also by unnecessary procedures performed on patients with false-positive results.

Cost data:
The categories of costs included in the analysis were diagnostic procedures (those under examination and others such as angiography), embolisation and surgery. A breakdown of the cost items was not given. The costs were derived from the Australian Government Medicare Benefits Schedule. The price year was not explicitly reported. The costs were in Australian dollars (AUD). Discounting was not applied.

Analysis of uncertainty:
A deterministic sensitivity analysis was performed in order to address the issue of uncertainty around key model inputs (i.e. angiogram complication rate and surgery-associated mortality with or without localisation of bleeding). Worst- and best-case scenarios were presented.

Results
In a hypothetical cohort of 1,000 patients, the CS alone strategy led to 34 deaths, 83 complications and a total cost of AUD 943,128. Almost 30% of these were due to unnecessary procedures in false-positive patients.

The strategy of CS, RSS and ASSS resulted in 28 deaths, 70 complications and a total cost of AUD 869,284.

The strategy of CS and ASSS led to 26 deaths, 64 complications and a total cost of AUD 787,344.

Deaths and complications due to false-positive results were much lower with CS, RSS and ASSS or CS plus ASSS than with CS alone.

The sensitivity analysis did not substantially alter the conclusions of the base-case analysis. The combined strategies were more effective and less expensive than CS alone in all scenarios.

Authors' conclusions
The authors concluded that, in the Australian health care setting, the use of subtraction scintigraphy as an adjunct to CS for patients with acute LGIH led to economic and clinical advantages over CS alone.

CRD commentary
Interventions:
The rationale for the choice of the diagnostic strategies was appropriate in that they are likely to be the relevant options in the authors’ setting. However, they may also be appropriate in other health care systems.

Effectiveness/benefits:
The analysis of the clinical data was based on both primary and secondary sources of estimates. The random analysis of patients’ charts by 4 independent physicians was carried out in an attempt to improve the validity of retrospective data, which are usually considered to be a weak source of evidence. Furthermore, the sample of patients was small and statistical analyses were not performed to improve the reliability of these estimates. The methods and conduct of the review of the literature, which was presumably carried out to identify secondary data, were not reported. Moreover, details of the design of these sources were not given. Thus, it is difficult to judge the validity of these estimates.

Costs:
There was little information on the cost analysis. For example, the authors did not report explicitly the perspective of the analysis. The sources of the costs were given, but other details on resource use, price year and the need for discounting were not presented. The costs and quantities were not presented separately, perhaps due to the accounting system in the authors' setting, where costs are presented as macro-categories.

Analysis and results:
A cost-consequences analysis was undertaken. Thus, the costs and benefits were not combined. Extensive information on the decision analytic model was given. The assumptions made in the analysis were also explicitly reported. However, the issue of uncertainty was only partially explored in the sensitivity analysis in which only a few clinical items were varied.

Concluding remarks:
Overall, the quality of the study was good but the provision of more details, especially on the cost analysis, would have been helpful in terms of assessing the validity of the estimates used in the model. The authors' conclusions appear to be valid within the limitations of the analysis.

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