Cost savings associated with changes in routine laboratory tests ordered for victims of trauma

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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
An admission trauma protocol, for patients admitted to the emergency department of a hospital, was under evaluation. The protocol had two categories of admission, Trauma Blue (severe injury likely) and Trauma Yellow (severe injury unlikely). The conditions necessary to qualify for Trauma Blue were a Glasgow coma scale score of less than 13, systolic blood pressure of 100 mmHg at any time, significant head, chest, abdominal or proximal long bone injury, or the suspected need for operative or intensive care management. All other patients were placed in the Trauma Yellow category. The objective of the admission protocol was to reduce the use of laboratory services for victims of trauma. The laboratory tests for Trauma Blue patients included arterial blood gas, lactate, acetone, ethanol, blood type and screen, and urinalysis. The laboratory tests for Trauma Yellow patients included venous blood gas and ethanol. Other laboratory tests were performed only if required as additional tests (protocol deviations).

Type of intervention
Diagnosis.

Economic study type
Cost-effectiveness analysis.

Study population
The study population comprised trauma patients admitted to the emergency department.

Setting
The setting was a hospital trauma centre. The economic study was carried out at the Trauma Center of the Morristown Memorial Hospital, New Jersey, USA.

Dates to which data relate
The effectiveness and resource use data were gathered in 1998 for the intervention group. No dates were reported for the control group, although the data were clearly collected before 1998. The price year was not reported.

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

Link between effectiveness and cost data
The costing was conducted on the same patients who provided the effectiveness evidence. It was carried out retrospectively in the control group and prospectively in the intervention group.
Study sample
All 148 patients admitted during a 3-month period were included in the intervention group. The mean age of these patients was 34.6 years and 109 were men. Initially, 100 patients consecutively admitted at the trauma centre were included in the historical control group, but only 87 of these had complete records that could be used in the study. The mean age of these patients was 34.3 years and 62 were men. No power calculations to determine the sample size were reported.

Study design
This was a prospective cohort study with historical controls, which was carried out in a single centre. The patients were monitored until they left the responsibility of the trauma physician. The patients were allocated to the study groups according to when they were admitted (before or after the introduction of the new protocol). The outcome assessment was based on data collected by the institution's trauma coordinator and trauma nurse register.

Analysis of effectiveness
It appears that all of the patients included in the initial study sample were taken into account when estimating the effectiveness. The outcome measures used in the analysis were injuries that the protocol had missed and adverse effects resulting from the new intervention. The patients in the two groups were shown to be similar in terms of their demographic characteristics and cause of injury.

Effectiveness results
Of the 148 patients included in the intervention group, 60 were classified as major trauma (Blue panel) and 88 as minor trauma (Yellow panel). Under the new diagnostic protocol there were no missed injuries and no adverse effects.

Clinical conclusions
The new admission trauma protocol did not harm patient care, thus it was considered to be as effective as the previous protocol.

Measure of benefits used in the economic analysis
No summary benefit measure was calculated in the study because the two interventions were considered equally effective. The study was therefore classified as a cost-minimisation analysis.

Direct costs
Discounting was not carried out since the costs were incurred during less than one year. The quantities of the different tests carried out were given, but the individual test prices were not. The cost of the laboratory tests under the two systems was broken down into the categories of alcohol, blood type and screen/crossmatch, blood gas (arterial or venous), and other. The costs of additional tests (protocol deviations) were included. Clearly, the types of tests conducted depended on the protocol. The cost/resource boundary was that of the hospital, and the hospital provided the cost data. The price year was not reported.

Statistical analysis of costs
A statistical analysis of the costs was carried out to analyse the statistical significance of the difference between the groups.

Indirect Costs
No indirect costs were recorded.
Currency
US dollars ($).

Sensitivity analysis
No sensitivity analysis was carried out.

Estimated benefits used in the economic analysis
See the 'Effectiveness Results' section.

Cost results
The average cost of the laboratory tests was $99 per patient in the historical control group and $68.41 per patient in the intervention group, \((p<0.0001)\). This led to a cost-saving of $30.59 per patient (more than $20,000,000 a year at the trauma centre).

Synthesis of costs and benefits
Not relevant because a cost-minimisation analysis was carried out.

Authors’ conclusions
The new admission trauma protocol reduced costs because of the reduced laboratory tests conducted. It did not cause any harm to patients in terms of missed injuries or adverse effects.

CRD COMMENTARY - Selection of comparators
The choice of the comparator was justified since it had been current practice in the authors’ setting. You should decide if the comparator represents current practice in your own setting.

Validity of estimate of measure of effectiveness
The analysis used a prospective cohort study with a historical control group. The study sample is likely to have been representative of the study population since there was no sample selection. Only patients whose charts were complete were included in the analysis. The patients were shown to be comparable at analysis. However, the authors did not investigate the potential impact of any confounding factor, which may have played a role, due to the lack of randomisation. The size of the sample was not determined on the basis of statistical considerations. There were no objective measures of effectiveness to enable the reader to judge that the admission trauma protocol had not harmed patient health. In addition, the outcome measures used in the analysis were not quantified. These issues should be considered when interpreting the results of the analysis and evaluating the internal validity of the study.

Validity of estimate of measure of benefit
There was no summary measure of benefit because a cost-minimisation analysis was performed.

Validity of estimate of costs
Laboratory tests were included in the analysis, but other hospital costs were not. The quantities were given but not the prices. The costs were broken down into four broad categories. The quantity data came from the authors’ setting. No sensitivity analysis of the quantities was carried out and the cost estimates were specific to the study setting. No price year was given, thus limiting the transferability of the total costs to other settings. Statistical tests were conducted when the total costs observed in the two groups were compared. The authors stressed that costs rather than charges were used.
Other issues
The authors made appropriate comparisons of their results with the findings from other studies. The issue of generalisability to other settings was not addressed and the limited breakdown of the cost data into prices and quantities would make this difficult. The authors were confident that their results showed that the new admission procedure lowered costs and left the patients no worse off. However, they did not carry out any follow-up after the patients were admitted, and they did not assess the costs after admission to the emergency department.

Implications of the study
The authors advocated the introduction of admission trauma procedures similar to their own in order to lower costs without harming patients.

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None stated.

Bibliographic details

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Other publications of related interest


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