Lowering hospital charges in the trauma intensive care unit while maintaining quality of care by increasing resident and attending physician awareness

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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
Guidelines for the management of patients, daily education of residents about cost-effectiveness of test procedures and treatments, and increase in attending physician awareness of cost containment in the Trauma Intensive Care Unit (TICU).

Type of intervention
Diagnosis and treatment.

Economic study type
Cost-effectiveness analysis.

Study population
Patients admitted to the TICU.

Setting
Hospital. The economic study was carried out in South Carolina, USA.

Dates to which data relate
The data for the effectiveness analysis and resources used were collected from 1 January 1994 to 30 June 1994. 1994 prices were used.

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

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

Study sample
91 patients were included in the study. The intervention group included 46 patients and the comparator 45. The patients were managed by the trauma surgery teaching service of the institution, which included two trauma attending physicians, one chief resident, one third-year resident, and two interns. 8 patients were excluded (8% of the original 99 patients admitted to the TICU).

Study design
The study was a non-randomised trial with historical controls, carried out in a single centre. The mean duration of follow-up was 4.6 days (median 2.5 days) for the intervention and 7 (3) days, for the comparator. There was no loss to follow-up.

**Analysis of effectiveness**
The principle (intention to treat or treatment completers only) used in the analysis of effectiveness was not explicitly reported. The primary health outcomes used were mortality rate and rate of major complications. The groups were shown to be comparable in terms of age, mean injury severity scores (ISS), mean and median ICU days and gender.

**Effectiveness results**
The mortality rate in the intervention group was 6.5% and in the control group was 15.5% (p=0.16) The major complication rates were 20% and 24%, respectively (p=0.62).

**Clinical conclusions**
The authors argued that they "identified specific and simple measures" affecting the management of patients in the TICU “without compromising care”.

**Measure of benefits used in the economic analysis**
No summary benefit measure was identified in the economic study, and only separate clinical outcomes were reported.

**Direct costs**
The quantities were not reported separately. Cost items were reported separately. The costs measured were operating costs and costs of complications. The boundary adopted was not explicitly specified. The resource use estimation was based on actual data. The cost estimation was based on charges from the hospital bill. 1994 prices were used. The physician charges were excluded from the analysis.

**Statistical analysis of costs**
The Mann-Whitney U-test (two-tailed) was performed on total charges and individual charges (not normally distributed) for different categories, the results being reported as medians.

**Indirect Costs**
Not considered.

**Currency**
US dollars ($).

**Sensitivity analysis**
No sensitivity analysis was performed.

**Estimated benefits used in the economic analysis**
Not applicable.

**Cost results**
The total median charges for the intervention group (3-month period - "after the introduction of the intervention") were
$3,336 dollars per day. The total median charges for the comparator group (3-month period - "before the introduction of the intervention ") were $4,154 dollars per day. This implies a negative incremental cost difference for the intervention with respect to the comparator of $818 dollars per day. The p value was 0.0002. 2 out of 7 categories in which the costs were divided had p values less than 0.05: 'Medications' resulted in medians of $384 and $535 dollars per day, respectively (p=0.003) and 'Chest x-ray films' in $146 and $207 median dollars per day, respectively (p=0.001).

Synthesis of costs and benefits
A synthesis was not carried out since the intervention was the weakly dominant strategy.

Authors' conclusions
The authors concluded that "Increased awareness of cost factors and specific attempts to achieve patient cost reduction resulted in a demonstrable decrease in daily TICU charges, without compromising the quality of care”.

CRD COMMENTARY - Selection of comparators
The reason for the choice of comparator is clear.

Validity of estimate of measure of benefit
The estimate of measure of benefit may not be internally valid due to potential biases arising from the non-randomised nature of the study design.

Validity of estimate of costs
The resource quantities were not reported separately from the prices and adequate details of methods of cost estimation were not given. Charges were used rather than costs, however no adjustment was carried out using a cost to charge ratio. Physician charges were omitted from the analysis.

Other issues
Given the lack of randomisation and sensitivity analysis, the results may need to be treated with some caution. The issue of generalisability to other settings or countries was not addressed.

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