A thoracostomy tube guideline improves management efficiency in trauma 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
The introduction of practice guidelines (PGs) for thoracostomy tube (TT) insertion, which constitutes the primary treatment for haemopneumothorax caused by a blunt or penetrating thoracic injury, was investigated. The PG described prophylactic antibiotic use, TT suction management and radiographic surveillance.

Type of intervention
Treatment.

Economic study type
Cost-effectiveness analysis.

Study population
The study population comprised trauma patients, aged between 15 and 80 years, who were admitted to the trauma centre during the 3 months after the introduction of the PG. The control group consisted of a cohort of critically-ill matched patients from the 9 months before PG. Patients were excluded if they required prolonged antibiotic therapy or multiple chest radiographs, or if they had other infections. The target population was the same as the study population.

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

Dates to which data relate
The dates of the effectiveness study were not reported in the paper. The dates of the costs were also not reported.

Source of effectiveness data
The effectiveness evidence was derived from a single study.

Link between effectiveness and cost data
It is unclear whether the costing was undertaken prospectively or retrospectively, but it appears to have been conducted on the same patient sample as that used in the effectiveness study.

Study sample
The sample size was not determined in the planning stage of the study. Patients were selected for inclusion in the study if they were admitted to the Level 1 trauma centre during the study. The authors did not state whether any patients refused to participate. Patients were excluded if they required prolonged antibiotic therapy or multiple chest radiographs, or if they had other infections. Sixty-one patients were included in the study, 14 before the PG was implemented and 47 after.
Study design
In design terms, this was a comparative study with historical controls that was conducted in a single centre. The data for the controls were collected in the 9 months before the introduction of the PG, while the data for the study group were collected in the 3 months after its introduction. The loss to follow-up was not reported.

Analysis of effectiveness
It appears that all of the patients included in the study have been accounted for in the analysis. The primary health outcomes used in the study were:

the duration of chest tube therapy,
the percentage of patients with 24-hour antibiotics,
the percentage of patients with preremoval chest radiograph, and
the percentage of patients with complications.

The patients were comparable at analysis in terms of age, injury severity and Glasgow Coma Scale scores.

Effectiveness results
The number of chest tube days was 7.0 (+/- 1.3) in the pre-PG group and 4.2 (+/- 0.4) in the post-PG group, (p=0.04).

The proportion of patients with 24-hour antibiotics was 50% in the pre-PG group and 74% in the post-PG group, (p=0.10).

The proportion of patients with preremoval chest radiographs was 93% in the pre-PG group and 55% in the post-PG group, (p=0.02).

The percentage of patients with complications was 0% in the pre-PG group and 6% in the post-PG group.

Clinical conclusions
The post-PG group averaged 3 fewer days of TT therapy than the pre-PG group.

Measure of benefits used in the economic analysis
The authors did not derive a summary measure of benefit. In effect, a cost-consequences analysis was performed.

Direct costs
It appears that only the hospital costs have been included in the analysis. The savings in radiological costs were reported, but the source of this cost was not provided. The resource quantities and the costs were not reported separately. Discounting was not relevant as the study lasted for only one year.

Statistical analysis of costs
A statistical analysis of the costs was not carried out.

Indirect Costs
The indirect costs were not reported.
Currency
US dollars ($).

Sensitivity analysis
Sensitivity analyses were not carried out.

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

Cost results
The authors reported that the reduction in the preremoval chest radiographs represent a $3,000 savings in radiological fees for the group of patients.

Synthesis of costs and benefits
The costs and benefits were not combined.

Authors' conclusions
The practice guideline (PG) enhanced the management efficiency of thoracostomy tube (TT) insertion in trauma patients with a chest injury. The PG led to a more appropriate use of prophylactic antibiotics, a shorter duration of TT therapy and a decreased frequency of chest radiographs. This was achieved without any adverse outcomes.

CRD COMMENTARY - Selection of comparators
The comparator was justified on the grounds that it was current practice. You should decide if this is a widely used health technology in your own setting.

Validity of estimate of measure of effectiveness
The analysis was based on a comparative study with historical controls. The analysis would have been more appropriate for the hypothesis had a randomised controlled trial been undertaken. The study sample was representative of the study population and the patient groups were shown to be comparable at analysis.

Validity of estimate of measure of benefit
The authors did not derive a measure of health benefit. The analysis was therefore categorised as a cost-consequences study.

Validity of estimate of costs
Although it would appear that the costs were estimated from the health care provider point of view, only savings in radiological fees were reported. All other costs were excluded from the analysis. The costs and the quantities were not reported separately. No statistical analysis of the quantities or prices was conducted.

Other issues
The authors made appropriate comparisons of their findings with those from other studies. However, the issue of generalisability to other settings was not addressed. The authors do not appear to have presented the results selectively. The authors reported several limitations of their study. First, the study was limited by the historical controls and the small sample size. Second, there were more patients in the study group than in the control group, owing to a lack of documentation. Third, patients with infections requiring antibiotics were excluded from the study, which eliminated a
large number of patients with chest injuries.

**Implications of the study**
The authors did not state any implications.

**Source of funding**
None stated.

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