Percutaneous dilational tracheostomy in neurosurgical 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 use of percutaneous dilational tracheostomy (PDT), to prolong ventilatory support in the treatment of neurosurgical patients, was examined. PDT is simple to learn and perform and can be administered at the bedside.

Type of intervention
Treatment.

Economic study type
Cost-effectiveness analysis.

Study population
The study population comprised all neurosurgical patients who had undergone tracheostomy at the authors’ institute since 1996. The population included patients who were being treated for closed head injury, stroke, quadriplegia, subarachnoid haemorrhage, and other neurosurgical diagnoses classed as "other". The target population appears to have been the same as the study population.

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

Dates to which data relate
The effectiveness data were collected between January 1996 and April 2003. The dates of the resources and prices used appear to be the same as those for the effectiveness data.

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

Link between effectiveness and cost data
The costing was undertaken on the same patient sample as that used in the effectiveness study. It appears that the costing has been undertaken prospectively.

Study sample
The sample size was not determined in the planning stage of the study. All patients who underwent a tracheostomy between January 1996 and April 2003 were included in the study. Of the 87 tracheostomy procedures performed in the study period, data for 6 patients were unavailable. This was because of incomplete records and patients being lost to follow-up. These patients were excluded from the study. There were 38 patients in the TST group and 43 in the PDT group.
Study design
This was a single-centred, retrospective cohort study. The data were collected between January 1996 and April 2003.

Analysis of effectiveness
The primary health outcomes used in the analysis were:

the number of days the patient was intubated prior to tracheostomy;

procedural complications;

post-procedural bleeding;

stomal infections; and

the length of stay.

Six patients were excluded because of incomplete data. Patients who presented with cerebrovascular accidents were more likely to undergo PDT. A one-way analysis of variance was used.

Effectiveness results
The time from intubation until tracheostomy was 8 days (mean 7.97, standard deviation, SD=4.68) for PDT-treated patients and 13 days (mean 13, SD=6.32) for TST-treated patients, (p<0.001).

The time from tracheostomy placement to discharge was 12.8 days (mean 12.8, SD=8.43) for PDT-treated patients and 14.7 days (mean 14.65, SD=11.8) for TST-treated patients, (p<0.423).

There was no significant difference between procedural complications in the two groups.

The length of stay was 21 days (mean 20.8, SD=9.39) for PDT-treated patients and 28 days (mean 27.7, SD=12) for TST-treated patients, (p<0.005).

Clinical conclusions
For the creation of a tracheostomy in neurosurgical patients, PDT is a safe alternative to TST.

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
The perspective adopted was not reported. The costs of the procedures were the only costs recorded in the analysis. These costs included the neurosurgical professional fees, supply charges, facility fees and anaesthesia professional fees. The source of the resources used was not stated in the study, but it appears to have been a secondary source (retrospectively taken from medical records in the authors’ institute). The costs and the quantities were not reported separately. The price year was not reported. The authors did not report whether discounting was undertaken.

Statistical analysis of costs
The data were deterministic.

Indirect Costs
The indirect costs were not included in the analysis.

**Currency**
US dollars ($).

**Sensitivity analysis**
Sensitivity analysis was not undertaken.

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

**Cost results**
The neurosurgical professional fees were the same for both groups ($865.00).

The supply charges for PDT were $185.97, compared with $233.33 for TST.

The facility fees (operating room fees) for PDT were $0.00, compared with $383.33 for TST.

The anaesthesiology professional fees were $550.00 for TST.

The total costs per patient were $1,050.97 for the PDT group and $2,031.66 for the TST group. Thus, there was a total cost-saving per patient procedure of $980.69.

**Synthesis of costs and benefits**
The costs and benefits were not synthesised.

**Authors' conclusions**
Percutaneous dilational tracheostomy (PDT) is a safe alternative to traditional methods for the creation of a tracheostomy in neurosurgical patients. PDT can be performed at the bedside and, therefore, minimises the need for patient transportation and use of the operating room. PDT is associated with reduced hospital stay.

**CRD COMMENTARY - Selection of comparators**
A justification was given for the comparator used. It is the 'gold' standard treatment. 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 retrospective cohort study, which was inappropriate for the study population. A randomised controlled trial would have been more appropriate. The study sample was representative of the study population. The patient groups were not shown to be comparable at baseline, as patients who presented with cerebrovascular accidents were more likely to undergo PDT. This is despite the fact that the authors stated that no patients were excluded from the TST group in favour of PDT.

**Validity of estimate of measure of benefit**
The authors did not derive a summary measure of health benefit. The analysis was therefore categorised as a cost-consequences study.
Validity of estimate of costs
The cost perspective adopted in the study was not reported. The costs and the quantities were not reported separately. A statistical analysis of the quantities and prices was not performed. The price year was not reported.

Other issues
The authors made appropriate comparisons of their findings with those from other studies. The issue of generalisability to other settings was not addressed. The authors do not appear to have presented their results selectively.

Implications of the study
The authors stated that comparative outcome measures are needed to assess the long-term benefits of early PDT in neurosurgical patients.

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None stated.

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