Cost analysis and clinical impact of weekly ventilator circuit changes in patients in intensive care unit

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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
Weekly versus 72-hour ventilator circuit changes in patients in the intensive care unit.

Type of intervention
Treatment.

Economic study type
Cost-effectiveness analysis.

Study population
Patients undergoing ventilation therapy in the intensive care unit.

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

Dates to which data relate
The data in the effectiveness analysis were collected from January to September 1993. The date of the price data was not stated.

Source of effectiveness data
The evidence for the final outcomes was derived from a single study.

Link between effectiveness and cost data
The costing was undertaken retrospectively on the same resources used for the patients.

Study sample
Power calculations were not used to determine the sample size. There were 88 consecutive patients in the 72-hour change group and 146 in the weekly change group.

Study design
The study was a non-randomized controlled trial carried out in a single centre. The duration of follow-up was one week.

Analysis of effectiveness
It is not clear whether the analysis of the clinical data was based on intention to treat or on treatment completers only. The main clinical measure was ventilator-associated pneumonia rate. There were no significant differences between patients in either group in terms of age, sex, diagnosis, underlying disease or conditions, and duration of ventilation.

**Effectiveness results**
The pneumonia rates in the two groups were as follows:

Weekly Change Group: 9 patients (6.2% or 0.74 per 100 ventilator days);

72 hour Change Group: 8 patients (9.1% or 1.29 per 100 ventilator days).

The difference between the two groups was not statistically significant (chi-square= 0.33, p= 0.44).

**Clinical conclusions**
The study revealed that the extension of the circuit interval from 72 hours to 1 week did not increase the risk of nosocomial pneumonia.

**Measure of benefits used in the economic analysis**
The main benefit measure was ventilator-associated pneumonia rate.

**Direct costs**
Only health service costs were considered. Quantities were reported separately from the costs. The cost per circuit change was divided into the cost for material and the cost of respiratory therapist time. The price year was not reported.

**Indirect Costs**
Not calculated.

**Currency**
US dollars ($).

**Sensitivity analysis**
No sensitivity analysis was carried out.

**Estimated benefits used in the economic analysis**
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Weekly Change Group: 9 patients (6.2% or 0.74 per 100 ventilator days);

72 hour Change Group: 8 patients (9.1% or 1.29 per 100 ventilator days).

The difference between the two groups was not statistically significant (chi-square= 0.33, p= 0.44).

**Cost results**
The cost per circuit change was $26.46. The intervention group used 214 circuits versus 469 circuits for a 72-hour change strategy. The monthly and annual cost savings were $1,686.53 and $20,241.90, respectively.
Synthesis of costs and benefits
No synthesis was undertaken since the weekly change policy was a weakly dominant strategy.

Authors' conclusions
Weekly circuit changes in patients undergoing ventilation therapy in the intensive care unit are cost-effective and do not contribute to increased rates of nosocomial pneumonia.

CRD COMMENTARY - Selection of comparators
No justification was given for the choice of the comparator (72-hour circuit changes). You should consider whether this approach is relevant to your own setting.

Validity of estimate of measure of benefit
Lack of randomisation and sensitivity analysis may cast doubts on the validity of the estimate of the measure of the benefit.

Validity of estimate of costs
Adequate details of the methods of cost estimation (especially in the case of the cost of respiratory therapist time) were not given.

Other issues
The issue of generalisability to other settings/countries was not addressed.

Source of funding
None stated.

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