Perioperative cost-finding analysis of the routine use of intraoperative forced-air warming during general endotracheal anaesthesia

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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
Using forced air warming (FAW) in patients at low risk for perioperative cardiac complications who were having general anaesthesia for a surgical procedure.

Type of intervention
Treatment.

Economic study type
Cost-effectiveness analysis.

Study population
Patients at low risk for perioperative cardiac complications who were having general endotracheal anaesthesia for an elective surgical procedure scheduled for at least 2 hours.

Setting
Hospital. The economic study was conducted in Baltimore, the USA.

Dates to which data relate
Not reported.

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

Link between effectiveness and cost data
Costing was prospectively performed on the same patient sample as that used in the effectiveness analysis.

Study sample
Power calculations were not used to determine the sample size. The study sample consisted of 100 patients randomly assigned to the FAW cohort (n=48) with an average (standard deviation) age of 43 (2) years or to the RTC group (n=47) with an average (SD) age of 47(2) years.5 patients were excluded from the study after randomisation.

Study design
Randomised, controlled trial, conducted in a single centre. The duration of the follow-up was until discharge. No loss to follow up was reported. A block randomisation (in blocks of 10) was performed. A blinding protocol was implemented.
to blind the anaesthesia providers and PACU staff to the use of FAW. A questionnaire was used to check the effectiveness of the blinding protocol implemented.

**Analysis of effectiveness**
The principle used in the analysis of effectiveness was "treatment completers only". The clinical outcome measure were the time from completion of surgical dressing until tracheal extubation, time to attainment of post-anaesthesia care unit (PACU) discharge criteria, and patient criteria assessed by both personal interview using a five-point scoring system and a horizontal visual analog scale. The study groups were comparable in terms of age, sex distribution, weight, and height.

**Effectiveness results**
The FAW group had a mean (SD) time from the end of surgery until extubation of 10 (1) minutes versus 14 (1) minutes in the RTC group, (p<0.01). The time to attainment of PACU discharge criteria were 80 (6) minutes and 80 (6) minutes, respectively (not significant). A total of 86% of patients in the FAW group evaluated their care as good or excellent versus 95% in the RTC group (not significant).

**Clinical conclusions**
Patients in the RTC group generally required more time to reach the PACU nursing criteria of being awake enough for discharge.

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

**Direct costs**
Costs were not discounted due to the short period of the study. Quantities were reported separately from the costs. Cost items were reported separately. The cost analysis covered the costs of FAW including the retail costs for the blankets and warming units, the PACU costs including the costs of warmed cotton blankets, the cost of medications, and the costs of intraoperative and PACU care including the costs of basic supplies, equipment, and institutional overhead. Anaesthesia provider costs were based on the Medicare payment fee schedule on a per-minute basis. The perspective adopted in the cost analysis was stated to be that of society. The source of cost data was the study institution. The date of the price data was not explicitly specified.

**Indirect Costs**
Not considered.

**Currency**
US dollars ($).

**Sensitivity analysis**
A sensitivity (threshold) analysis was conducted on the effect of altering the fixed rather than the variable costs.

**Estimated benefits used in the economic analysis**
Not applicable.
Cost results
It was reported that the use of FAW would result in $15 additional costs if all intraoperative costs were assumed to be fixed versus $29 in the case of assuming them to be variable.

Synthesis of costs and benefits
The threshold analysis established that if more than 36% of operating room costs were variable the use of FAW would be less costly than the use of RTC.

Authors' conclusions
Routine intraoperative FAW significantly reduces time until extubation and use of cotton blankets in the post-anaesthesia care unit. These results suggest that the influence of FAW on net total perioperative costs depends on patient and surgical characteristics and institutional factors related to cost accounting.

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

Validity of estimate of measure of effectiveness
The estimates of effectiveness are likely to be internally valid given the use of a randomised design and blinding.

Validity of estimate of costs
Quantities were reported separately from the costs and adequate details of methods of cost estimation were given. Cost results seem to be of limited generalisability as they were very sensitive to the assumptions made in the economic analysis.

Other issues
The dates of the effectiveness, resource use, and price data were not reported. It was stated that the results of the study may not be generalisable to an older population. A comprehensive sensitivity analysis would have been helpful.

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