Effects of preinduction and intraoperative warming during major laparotomy

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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
Active warming before and during operation of patients undergoing major abdominal surgery.

Type of intervention
Secondary prevention.

Economic study type
Cost-effectiveness analysis.

Study population
Patients undergoing major abdominal surgery for cancer or inflammatory bowel disease, lasting for more than 2 hours and performed via a median laparotomy. Patients' weights were within 20% of ideal body weight, and tympanic membrane temperature was between 36.5 degrees C and 37.5 degrees C.

Setting
Secondary care. The economic study was carried out in Heidelberg, Germany.

Dates to which data relate
The effectiveness and resource use data were collected between November 1995 and October 1996. 1996 prices were used.

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

Link between effectiveness and cost data
Costing was undertaken retrospectively on the same sample of patients.

Study sample
Power calculations were not used to determine the sample size. 40 patients undergoing major abdominal surgery were randomly allocated to either the study (20 patients) or the control group (20 patients).

Study design
This was a randomised controlled trial carried out in a single centre. Patients were followed up until the morning after the day of the operation. There was no loss to follow up.
Analysis of effectiveness
Even though it was not explicitly stated, the analysis of the clinical study seems to have been based on intention to treat. The primary health outcomes measured in the study were central body temperature, vasoconstriction, intraoperative blood loss, transfusion requirements, and time of discharge from PACU. Groups were shown to be comparable with respect to patients’ characteristics.

Effectiveness results
From 15 minutes after intubation until the end of surgery, central body temperature was significantly higher in the prewarmed group (p<=0.01) and remained higher for the first 180 minutes after arrival in the PACU. Twelve of 20 patients in the control group showed significant vasoconstriction after the surgery and in the first 120 minutes in the PACU; only 4 of the 20 prewarmed patients had detectable vasoconstriction. Intraoperative blood loss was significantly less in the normothermic group (635 (507) ml versus 1070 (803) ml, p<=0.05). Warmed patients were given significantly less blood products on admission to the PACU (30 (134) versus 240 (432) ml/patient, p<= 0.05) and were discharged after 94 (42) minutes compared with 217 (169) minutes in the control group, (p<= 0.01).

Clinical conclusions
Maintenance of intraoperative core normothermia helped to reduce blood loss and save blood products.

Measure of benefits used in the economic analysis
No single measure of benefit was introduced by the authors.

Direct costs
Only hospital costs were considered. These included salaries for the nurses and the anaesthetists, costs for anaesthetic equipment, and the medical treatment required by the patient. All costs referred to the University of Heidelberg. Resource quantities were not reported separately from costs. 1996 prices were used. Discounting was not applied because of the short duration of the trial.

Statistical analysis of costs
Unpaired, two-tailed t tests were used in the analysis of costs.

Currency
UK pounds sterling (£). An exchange rate of 1 to DM2.8 was assumed for the calculation of costs.

Sensitivity analysis
No sensitivity analysis was performed.

Estimated benefits used in the economic analysis
Not applicable.

Cost results
The costs of treatment from the beginning of preinduction warming until discharge from the PACU were 408 (105) for an aggressively warmed patient and 534 (250) for a control patient, (p<= 0.05).

Synthesis of costs and benefits
Not applicable.
Authors' conclusions
The authors concluded that maintenance of normothermia reduced blood loss and transfusion of blood products, as well as reducing costs for anaesthetic treatment.

CRD COMMENTARY - Selection of comparators
Selection of the comparator was justified as that was the common practice in the authors' setting. You, as a database user, should consider whether this applies to your own setting.

Validity of estimate of measure of benefit
Results are based on a randomized trial, although no power calculations appear to have been carried out to show that the sample size was appropriate.

Validity of estimate of costs
Costs were provided on the method of estimation of costs. Resource quantities were not reported separately. No costs were calculated for two of the devices used in the intervention even though they were relevant. The authors explained their decision by stating that these devices were already present in the department.

Other issues
Comparisons with other studies were made by the authors. Results may not be generalisable to other settings or countries.

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