

The Predictors and Impact of Core Temperature at Time of Admission to ICU in Adult Cardiac Surgical Patients

James Koziol¹, Roman Kluger²

¹ Royal Children's Hospital, Melbourne, Australia

² St Vincent's Hospital, Melbourne, Australia

Introduction: Adults undergoing cardiac surgery involving cardiopulmonary bypass usually receive mild intra-operative hypothermia (less than 36°C). This may expose them to a risk of hypothermia on admission to ICU. Post operative hypothermia has been associated with adverse outcomes in some studies³.

This study aims to identify factors associated with lower core temperatures on admission to ICU, and to determine if lower admission temperatures are associated with post-operative complications.

Methods: Data was prospectively collected from three ongoing databases:

1. The National Cardiac Surgery Database project.
2. The St Vincent's Hospital (Melbourne) Perfusion Database.
3. The St Vincent's ICU "Carevue" computerised clinical information system.

We extracted data on all patients undergoing cardiac surgery between April 2006 and March 2007 at St Vincent's Hospital (Melbourne). Patients undergoing deep hypothermic circulatory arrest were excluded. 390 patients were identified undergoing cardiac surgery involving cardiopulmonary bypass in this period.

Pre-operative variables, intra-operative data and post-operative outcome measures were collated and analysed using the Stata 9.2 statistical package. These were analysed with multivariable stepwise linear and logistic regressions to determine statistically significant associations. These were assumed at $p < 0.05$.

Results: The median ICU admission temperature was 35.3°C (5th to 95th percentile 34.1-36.3°C), as measured by thermistor on a pulmonary artery catheter. Significant predictors of hypothermia on admission to ICU included lower body mass index, short time between minimum temperature on bypass and end of cardiopulmonary bypass, low minimum cardiopulmonary bypass temperature, short cross-clamp time, a recent myocardial infarction, endocarditis, a low last temperature on cardiopulmonary bypass and increasing patient age. Interestingly, the time between the end of cardiopulmonary bypass and admission to ICU was not a predictor of hypothermia.

A low ICU admission temperature was a significant predictor of high chest tube drainage in the first 4 hours, exposure to blood products and return to theatre for management of haemorrhage. ICU admission temperature was not a significant predictor of intubation time, hospital stay or mortality at 30 days.

Conclusions: Hypothermia on admission to ICU is common, and is a major predictor of post operative blood loss, exposure to blood products and return to theatre for bleeding. Temperature management during bypass (minimum temperature, rewarming time and end bypass temperature) appear to be the modifiable factors to prevent ICU admission hypothermia.

¹ *Inslar et.al. 2000*