

# Audit of Temperature Management in Cardiac Surgical Patients in Immediate Postoperative Period.

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**Introduction:** Peri-operative hypothermia has been linked to several complications. These include increased cardiac events, wound infection, excess blood loss; prolonged ventilation and increased length of hospital stay <sup>1</sup>.

*University Hospitals of Birmingham* cardio-thoracic theatres perform a variety of procedure on cardiopulmonary bypass, with varying cooling end-points. Following rewarming it was noticed that in spite of reaching a core temperature of 37°C, patients cool down rapidly in theatre and were hypothermic on transfer to the ICU.

This audit was done to confirm this observation and to inspect the scale of the problem.

**Methods:** This prospective audit was done over a period of 4 weeks. All elective cardiac surgical patients were included. The primary variables recorded were patient temperature in theatre following rewarming and then again on reaching ICU.

The secondary variables recorded were time taken to reach 36°C on the ICU following return from theatres, major cardiac events (acute left ventricular failure, arrhythmias causing hemodynamic changes, tamponade) total blood loss and time to extubation. Although not a specific endpoint of this audit, we also noted the presence or absence of warming devices used in theatre.

**Results:** All patients were normothermic [35-37.9(36.45)<sup>0</sup>C] following separation from bypass. There was, however, a significant reduction in temperature by the time the patients was admitted onto ICU [30.4-35.1 (33.5) C]. This reduction in temperature occurred in the time between separation from CPB and transfer of the patient to ICU.

The blood loss was in keeping with the expected blood loss following cardiothoracic procedures [115-830(371) mls]. The time taken to reach 36°C [2.1-12 (6.9) hrs] may account for the delay in extubation of patients [13-168 (38.5) hrs]. It was also noted that the patients included in the audit had no active warming devices used during or following rewarm. Major cardiac events (mostly Atrial Fibrillation associated with hemodynamic changes) occurred in 4/40 (10%) of the patients.

**Discussion:** The audit showed that the temperature immediately following separation from CPB was acceptable (mean of 36.5<sup>0</sup>C), but the temperature on admission to ICU (mean of 33.5<sup>0</sup>C), was less than the recommended temperature of 34<sup>0</sup> C <sup>4</sup>. It has been suggested that in cardiac surgical patients, it should take no longer than 4 hrs to reach 36°C on ICU. 4 hour period was considered because Perioperative hypothermia persisted for more than four hours included the decisive period for establishing an infection <sup>2</sup>. Our audit showed a mean time of 6.9 hrs to reach 36 C. Extubation however, occurred on average 38.5 hrs following admission to ICU; the reason for this significant delay was not obvious. This was only a secondary observations and this finding was not investigated.

References:

1. Harper CM, McNicholas T, Gowrie-Mohan S. Maintaining Perioperative normothermia: A simple, safe, and effective way of reducing complications of surgery. *BMJ* 2003;326: 721-22.
2. Miles AA, Miles EM, Burke J. The value and duration of defense reactions of the skin to the primary lodgement of bacteria. *Br J Exp Pathol* 1957;38:79-96