Pediatric Liver Transplant Surgery – No More Hypothermia?
M.T. Gal, J. Katz, L.B. Kachko, R. Steinberg
Section of Pediatric Anesthesia and Department of Pediatric Surgery, Schneider Children’s Medical Center of Israel, Petah Tiqwa, 49202, Israel

Introduction: One of the major challenges in anesthesia for pediatric liver transplant surgery is maintaining normothermia during the surgery. Although forced air warming devices were considered more effective in temperature control than water mattress(1), it has been shown by a recent study that water blanket is capable to transfer more heat than convective air warming when wrapped around the patient’s body(2). In a clinical study performed recently in small children undergoing major abdominal surgery, water filled garment (ThermoWrap™) proved safe and more effective than convective warming in maintaining intraoperative normothermia(3).

Case Report: We used the Allon™ 2001 Thermoregulation System (MTRE Advanced Technology Ltd., Israel) for eleven cases of pediatric liver transplant (n=8) and combined liver and kidney transplant (n=3) surgery in the period between October 17, 2001 and July 2, 2003. The Allon™ 2001 System has three parts: 1. two temperature sensors, one measuring core temperature and one measuring skin temperature; 2. a proprietary algorithm controlled heat pump supplying warm/cold water to the 3. water-channeled garment worn by the patient in such fashion that it covers 40-70 per cent of the body surface area. The system is designed to keep patient temperature in a narrow range around the user-defined set point anywhere between 19 and 40 degree Celsius.

The system was activated at the beginning of the surgery and was used uninterruptedly through the procedures. The set point was 37 degree Celsius. Operating Room temperature was kept at 21 degree Celsius in all cases. Intravenous fluids and blood products were not warmed. Core temperature values were recorded by a handheld computer attached to the Allon™ 2001 System (5 cases) or by the patient monitor (6 cases).

Results: Age of the children ranged between 11 months and 9 years (mean 5 years) and duration of the surgery ranged between 8-14 hours (mean 9.9 hours). Hypothermia was completely avoided in six patients. In two cases there was mild hypothermia (T>35 degree Celsius) for less than 20 minutes, one patient was mildly hypothermic for 240 minutes. Two patients experienced core temperature less than 35.0 degree Celsius. The minimum core temperature recorded was 34.6 degree Celsius. This occurred after anesthesia induction during prolonged attempt for central line establishment, when the patient was only partially covered by the garment. All patients survived the procedure. The anesthesia team did not take any action in thermoregulation apart from activating the Allon™ 2001 System at the beginning of anesthesia. There were no adverse reactions related to the use of the water filled garment.

Discussion: Water filled garment (ThermoWrap™) with microprocessor-controlled Allon™ 2001 System was very effective, safe and simple to use in these demanding cases. Since its introduction to our practice, it became standard of care in major surgeries except for cardiac and neurosurgery.

References: