Abstract

Patient Temperature Management with Mistral-Air Koala Underbody Convective Air in "Port-Access" Cardiac Surgery

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Background and goal:
Postoperative hypothermia adversely affects hemodynamics and recovery after cardiac surgery with and without cardiopulmonary bypass (CPB). Prewarming with forced air has been proved to be effective in preventing the redistribution hypothermia after the induction of anaesthesia.

This study was designed to evaluate the performance of a new Mistral-Air forced air warming system on perioperative patient temperature during "Port-access" surgery. A Mistral-Air Koala Full Underbody blanket, Made of reflective material was used. (TSCI B.V., Amersfoort, The Netherlands).

Methods:
19 patients undergoing Port-Access ("Heart-Port") heart valve surgery were selected, of them 4 were excluded due to severely depressed cardiac function.

On arrival to the operating room, all patients were placed on the operating table over a Koala Full Underbody and the Mistral-Air Plus convective air blower functioned at 43°C until the start of CPB and from the beginning of rewarming till the end of surgery.

Patient's skin surface was covered from the trunk to the legs, except the arms, for ECG monitoring and arterial line and central vein cannulation. After positioning for surgery, the Underbody was taped to the patient sides.

- OR ambient temperature was kept between 19 and 21°C.
- Intravenous fluids were warmed to 38°C using a blood and fluid warmer.

Nasopharyngeal and bladder temperatures were monitored and registered just after anaesthesia induction, and at 10 minutes intervals during surgery, and also at the ICU until tracheal extubation. AN infrared camera was used to document heat distribution around the patient at different stages during surgery.

"Heart-Port" Surgery

- External defibrilator pads
- One lung ventilation
- Transesophageal
- Echocardiography
- Right minithoracotomy
- Extrathoracic arterial and vein cannulation
- Intraaortic endoclamp
- Cardiopulmonary Bypass
- Video assisted mitral / tricuspid valve surgery

Patient Data
(data shown as mean ±SD, percent and range)

Age (years)	66 ±12.5	(34-82)
Weight (kg)	67.86 ±13.15	(50-93)
Height (cm)	162.46 ±9.63	(147-180)
Ejection Fraction (%)	62 ±7	(45-75)
CPB Time (min)	150 ±41	(75-226)
Clamp Time (min)	109 ±37	(45-201)
Surgical Time (min)	234 ±45	(180-280)
Case Time (min)	356 ±49.2	(285-435)

Nasopharyngeal Temperature data (°C)
(data shown as mean ±SD, percent and range)

Anaesthesia Induction	36.04 ±0.37	(35.4-36.6)
Induction ±30min	36.31 ±0.45	(35.6-37.2)
Start CPB	36.37 ±0.39	(35.5-37.1)
CPB lowest temp	33.7 ± 1.04	(31.1-34.6)
End CPB	36.78 ± 0.16	(36.5-37.1)
Departure from OR	36.55 ±0.29	(36-36.9)
ICU arrival	36.5 ±0.46	(35.8-37.2)
Extubation	36.4 ±0.39	(36.2-37.6)

Results

- Patient prewarming avoided the central temperature decrease usually seen after the induction of anaesthesia.
- Temperature afterdrop was only 0.26°C from the end of cardiopulmonary bypass until the patient was ready to be transferred from the operating room to the ICU.
- Normothermia was maintained during ICU stay and hyperthermia was not observed in any case.
- The Mistral-Air Koala Full Underbody was proved to be effective in patient warming and temperature management during Port-Access ("Heart-Port") heart valve surgery.

Conclusions

Patient prewarming with Mistral-Air Koala Full Underbody convective air:

- Attenuates body core temperature redistribution after anaesthesia induction
- Increases pre CPB temperature, allows adequate and uniform patient rewarming and limits afterdrop after cardiopulmonary bypass, helping to achieve early extubation criteria.
- The reflective material maintains the heat around the patient not disturbing the surgical team.