Supplementary Materials

Supplementary material associated with this article can be found in the online version at doi:10.1053/j.jvca.2019.05.022.

References


Comparison of Forced-Air and Warm Circulating-Water Warming for Prevention of Hypothermia and Blood Product Utilization During Open Cardiac Surgery

To the Editor:

PERIOPERATIVE HYPOTHERMIA, as defined by the Surgical Care Improvement Project as core temperature <36.0°C is well-known to be associated with multiple complications, such as delayed wound healing, increased surgical site infection, prolonged length of stay, delayed recovery from anesthesia, negative nitrogen balance, and increased postoperative discomfort.1–5 Other hypothermia-related complications more applicable to patients undergoing cardiac surgery are impaired platelet aggregation and coagulopathy; increased intraoperative blood loss and need for transfusion; increased risk of cardiac events (arrhythmias, myocardial infarction); and an overall higher mortality.6–10 Indeed, postoperative hypothermia has been associated with increased mortality, prolonged mechanical ventilation, increased risk of packed red blood cell transfusion, and length of stay in cardiac surgery patients.11 To address this problem, a wide range of active rewarming devices currently are available, with the convective forced-air warming blankets being the most widely adopted and best characterized in the literature.12–14 Recognizing hypothermia to be a problem in approximately one-third of our cardiac surgery patients despite the use of a convective forced-air warming device (Bair Hugger; 3M, Maplewood, MN), we chose to investigate the conductive, warm water–circulating device (Allon ThermoWrap; Belmont Medical Technologies, Billerica, MA) at Tufts Medical Center in Boston.

As part of a quality improvement project, we initially investigated the use of a conductive, warm water–circulating device in our patients undergoing transcatheter aortic valve replacement with general anesthesia. We believed that this cohort of patients represented a relatively homogenous sample with less intraprocedural variation. We found that the use of a conductive, warm water–circulating device resulted in significantly higher core intraoperative temperatures on arrival to the intensive care unit compared with the underbody convective forced-air warming device. The details of this study are published elsewhere.15 Results of our initial investigation lead us to expand our quality improvement initiative to open cardiac surgery patients. We conducted a retrospective analysis of patients who underwent elective coronary artery bypass grafting and valve procedures with the use of a convective forced-air warming device and compared postoperative temperatures with those of patients who were treated with the conductive, warm water–circulating device. A total of 249 patients were included in our study, 117 and 132 for forced-air and water-circulating warming devices, respectively. The lowest temperatures recorded during cardiopulmonary bypass were not statistically different (33.8 ± 1.4°C vs 34.0 ± 1.6°C; p = 0.24). Overall, the incidence of postoperative hypothermia was lower with the conductive, warm water–circulating device compared with the forced-air device (7.6% vs 29.9%; p < 0.0001).
in patients treated with the conductive, warm water/C0 as well. Importantly, the rate of temperatures < 36.7°C reported in the group warmed by the water-circulating device compared with that of patients treated with the convective forced-air warming device (0.8% vs 6.8%; p < 0.0001). The authors have no conflicts of interest to disclose.

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Conflicts of Interest
The authors have no conflicts of interest to disclose.
References


