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A comparison of the warming capabilities of two Baragwanath Rewarming Appliances with the Hotline® fluid warming device

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Background: Accidental intraoperative hypothermia is a common and avoidable adverse event of the perioperative period and is associated with detrimental effects on multiple organ systems and postoperative patient outcomes. In a resource limited environment the prevention of intraoperative hypothermia is often challenging. Resourceful clinicians overcome these challenges through creative devices and frugal innovations. This study aims to investigate the thermal performance of two such Baragwanath Rewarming Appliances (BaRA) against that of the Hotline® in an attempt to describe an optimal setup of these devices.

Methods: This was a quasi-experimental laboratory study that measured the thermal performance of two BaRA devices and the Hotline® under a number of scenarios. Independent variables fluid type, flow rate, warming temperature and warming transit distance were sequentially altered and temperatures measured along the stream of fluid. DeltaT was calculated as the difference between entry and exit temperature for each combination of variables for each warming device.

Results : A total of 219 experiments were performed. The BaRA A configuration at a temperature of 43ºC with a transit distance of 200 cm either matched or exceeded the DeltaT of the Hotline® over all fluid type and flow rate combinations. The BaRA B configuration does not provide comparable thermal performance to the Hotline®. Measured flow rates were noticeably slower than manufacturer quoted values for all intravenous (IV) cannulae used.

Conclusion: A warm water bath at 43ºC with 200 cm of submerged IV tubing provides thermal performance comparable to the Hotline, with all fluid type and flow rate combinations.

Keywords: perioperative hypothermia, frugal innovation, warming devices