Warming Solution for Neonatal Surgeries in Nigeria
Taiwo Lawal¹, Akinwale Coker¹, Robert Murphy², Matthew Glucksberg², David Gatchell²
¹University of Ibadan, Ibadan, Nigeria and ²Northwestern University, Evanston, Illinois

Background

The outcome of neonatal surgery is intricately linked to the control of environmental temperature pre-, intra- and post-operatively.

Anaesthesia, provision of a conducive environment for surgery and administration of intravenous fluids, blood and blood products combine to decrease the core temperature by up to 1.6°C during surgery (Figure 1), with studies having documented this temperature drop to be associated with increased perioperative morbidity and mortality.

In resource challenged-settings, such as Nigeria, neonatal surgery is performed by using less appropriate alternatives such as hot water bottles and consumer grade electric blankets (Figure 2), which are associated with occasional morbidities.

Objectives

To design a cost effective, affordable and easily maintained warming device to use in operating theatres and in the Post Anesthesia Care Unit (PACU) in the care of surgical neonates.

The prototype was developed during three years of collaborative efforts between the Faculty of Technology and College of Medicine, University of Ibadan and the McCormick School of Engineering and Feinberg School of Medicine at the Northwestern University.

The process involved identification of environmental challenges, selection of appropriate materials to achieve set goals and designing a cost effective and efficient prototype that will be manufactured locally.

Safety requirements

Physical Failure Response: A critical component of the hardware should fail if the pad experiences electrical surge

Electrical Failure Response: The software should stop delivering power to the pad in the event of an electrical surge.

Safety Standards/Medical Grade: All components of the device should be made with medical grade materials.

Conclusion

The prototype is maintenance-friendly and has multiple inbuilt safety mechanisms, LCD display and a comfortable surface for the patient.

The collaboration resulting in this life-saving device has proved to be a meaningful one between the University of Ibadan and the Northwestern University.

What is next?

Testing of the prototype in clinical trials (bench testing concluded).

Disclosure: Funding for the project received from the National Institutes of Health (NIH) Grant No conflict of interest.

Correspondence

Dr. Taiwo Lawal
Department of Surgery,
College of Medicine, PMB 5017, Ibadan 200212
+2348069614811
takeemlawal@gmail.com