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GUEST EDITORIAL

Khaya-warmer: blood warming in a resource-constrained setting

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This edition of the journal features an article by Kenny and colleagues, reporting the findings of an elegant study exploring the feasibility of a cost-effective option for prewarming stored blood to a temperature that is compatible with transfusion into a human subject.[1]

This was an experimental, laboratory-based study to prove the concept that using readily available materials and harnessing the power of gravity, it would be possible to warm stored blood to a physiologically acceptable temperature. A secondary outcome of the study considered whether this could be achieved at clinically relevant flow rates, because the risk of unintended hypothermia is ever present when rapid infusions of blood and fluids are required.

The experimental setup utilises materials that are commonly found in any healthcare facility equipped to administer intravenous fluids and blood to patients and would thus be easy to acquire and/or assemble by regular staff providing care in that facility.

In reporting their results, the researchers confirm the feasibility of such a system because they were able to achieve their targeted blood outflow temperature of 35°C and realise a mean flow rate of 25.4 ml/min. This translates to an average of one unit of packed red blood cells transfused per ten minutes (range 7.6–13.4 minutes).

This is an impressive feat, given that only in severe trauma resuscitation, complicated obstetrics or complex surgery would far more rapid infusion rates be required, a fact that is true mostly for the tertiary and regional hospitals, which tend to be relatively better-resourced.

The authors' cost comparisons between this experimental setup and common commercially available blood warmers show a multiple-fold difference in the procurement outlay required for the latter.

In terms of performance, all these systems achieve physiologically acceptable outflow temperatures. However, the commercially available devices deliver significantly larger volume flow rates, making them particularly suited to when rapid transfusions are required. These systems are at least 70 times more expensive than the experimental system being reported.

This study is unique in that it achieves contact heating by immersion of the transfusion line in a heated water bath, whereas previous options have mostly involved the use of an electrically heated contact plate.[2]

Kenny's research is timely, coming as it does at a time when the public health service is experiencing increasing pressure due to competing demands in the social services basket exceeding funding capacity because of population growth, rapid urbanisation, economic stagnation, and ever-tighter fiscal policy.

The public health service is not spared these budget cuts and at a local facility level the budgeting process is not likely to prioritise blood warmers over other items deemed essential for routine care.

This is where an affordable alternative becomes crucial for the delivery of safe, quality care because the prevention of unintended hypothermia will help mitigate some of the complications that increase the cost of care. These include wound infections, perioperative myocardial events, coagulopathy, and prolonged hospital stay.[3,4,5]

These study results prove the viability of the concept, and as indicated by the authors, the next phase(s) of the research must explore manoeuvres to increase the flow rate whilst maintaining a constant outflow temperature. This is an important next step in the development of the concept of the Khaya-warmer, if it is to effectively address the care limitations occasioned by the fiscally constrained environment in which public hospitals must function.

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