

Blood Conservation Strategies / Autologous Transfusion

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Case study of blood recycling device, Hemafuse, in urban Kenyan surgical theatres

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Introduction: Hospitals across Sub-Saharan Africa face blood banking obstacles with a 50% shortage of donor blood and reduced capacity in blood processing (WHO Global Database on Blood Safety, 2011 Schantz-Dunn and Nour). Emergency maternal and trauma cases are particularly affected by this lack of blood including ruptured ectopic pregnancy with laparotomy. The use of autologous blood transfusion has been effective in treating laparotomy cases (2001 Selo-Ojeme, 2003 Selo-Ojeme, Onwude, and Onwudiegwu). Patient's own blood, rather than donor blood, maintains better red blood cell health, without contamination, (2007 Selo-Ojeme, and Feyi-Waboso; 2017 Sikorski, Rizkalla, Yang, Frank) and would also address concerns of disease burden and infrastructure. Sisu Global Health created the Hemafuse™ autologous transfusion system as an alternative to donor blood for cases of internal bleeding. Hemafuse™ is a handheld device that can salvage, filter, and recycle blood from hemoperitoneum or haemothorax and then provide blood to be re-transfused quickly during the same surgery. Multiple units of blood can be salvaged in each surgery. Hemafuse™ can be used in cases of abdominal bleeding, ruptured ectopic pregnancy, and trauma-related surgery.

Methods: Hemafuse™ was used at two Level 5 Hospital in Kenya for three case studies where it intervened to stabilize three women with ruptured ectopic pregnancy. Blood was salvaged from the patient using Hemafuse™ and re-transfused back to the same patient during the surgery. Hospital staff trained on the device performed the surgeries.

Results: Each patient had a pre-transfusion haemoglobin level between 6.5-9 g/dL prior to surgery with 1-1.5 L estimated blood loss. Blood salvaged by Hemafuse™ was the only source of blood used in the surgery and Hemafuse™ was able to salvage at least a unit (450 mL) of blood per case. Each patient presented with no reactions and were discharged in a few days. Hemafuse™ was able to provide blood where donor blood was delayed or not available and allowed the surgeries to begin at least one hour sooner than they might otherwise have commenced, translating to better transfusion outcomes for both patients (2018 Holcomb and Jenkins; 2014 Stranden-Spinella).

Conclusion: These cases suggest the safety of a manual autologous blood salvage device in cases of first trimester haemorrhage.