

HEMOSTATIC RESUSCITATION IN ELECTIVE SURGERY CAUSING MASSIVE BLEEDING AND EMERGENCY SURGERY AFTER MASSIVE BLEEDING: A COMPUTER SIMULATION

Jong Hun Jun, MD

Hanyang University Hospital, Seoul, South Korea

Background: Appropriate blood component therapy might be different between patients who receive elective surgery causing massive bleeding and patients who receive emergency surgery after traumatic massive bleeding, because trauma patients bleed undiluted blood initially and replacement typically lags behind blood loss. We compared them using computer simulation in assumption that coagulopathy begins in less bleeding volume.

Method: We modified multi-compartment dynamic model developed by Hirshberg, and implemented it using STELLA 9.0. In this model, blood pressure changes as blood volume fluctuate, and bleeding rate and transcapillary refill rate are controlled by blood pressure. Using this simulation, we compared elective surgery scenario and trauma case scenario. In both scenario, patients started to bleed at the rate of 50 ml/min. In elective surgery scenario, fluid was administered to maintain blood volume. But In trauma case scenario, no fluid was supplied up to 30 minutes and no blood was supplied up to 50 minutes. Each unit of PRBC was given when hematocrit decrease to 27%, FFP was transfused when plasma was diluted to 30% , and PC was transfused when platelet count became 50,000 /cc.

Results: Transfusion of FFP and PC was required at less bleeding volume in trauma case scenario. In both scenario, appropriate PRBC: FFP ratio was 1: 0.47 until PC infusion was started, and PRBC: FFP: Platelet ratio was 1: 0.35 : 0.39 after PC infusion was started.

Conclusion: Coagulopathy begins in less bleeding volume when fluids are not administered, but it does not alter blood compartment ratio.

