

main infusion fluid perioperatively. Study solutions were supplied in identical bottles dressed in opaque covers. The primary outcome was chest tube drainage over 24 h. Blood transfusions, thromboelastometry variables, perioperative fluid balance, renal function, mortality, intensive care unit, and hospital stay were also assessed. **Results:** The median cumulative blood loss was not different between the groups (HA: 835, HES: 700, and RL: 670 ml). However, 35% of RL patients required blood products, compared with 62% (HA) and 64% (HES group; $P=0.0003$). Significantly, more study solution had to be administered in the RL group compared with the colloid groups. Total perioperative fluid balance was least positive in the HA group [6.2 (2.5) litre] compared with the HES [7.4 (3.0) litre] and RL [8.3 (2.8) litre] groups ($P<0.0001$). Both colloids affected clot formation and clot strength and caused slight increases in serum creatinine. **Conclusions:** Despite equal blood loss from chest drains, both colloids interfered with blood coagulation and produced greater haemodilution, which was associated with more transfusion of blood products compared with crystalloid use only.

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Clinical review: What are the best hemodynamic targets for noncardiac surgical patients?

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ABSTRACT

Perioperative hemodynamic optimization, or goal-directed therapy (GDT), has been show to significantly decrease complications and risk of death in high-risk patients undergoing noncardiac surgery. An important aim of GDT is to prevent an imbalance between oxygen delivery and oxygen consumption in order to avoid the development of multiple organ dysfunction. The utilization of cardiac output monitoring in the perioperative period has been shown to improve outcomes if integrated into a GDT strategy. GDT guided by dynamic predictors of fluid responsiveness or functional hemodynamics with minimally invasive cardiac output monitoring is suitable for the majority of patients undergoing major surgery with expected significant volume shifts due to bleeding or other significant intravascular volume losses. For patients at higher risk of complications and death, such as those with advanced age and limited cardiorespiratory reserve, the addition of dobutamine or dopexamine to the treatment algorithm, to maximize oxygen delivery, is associated with better outcomes.