

# GEL-BASED INTRAVASCULAR VOLUME EXPANDERS AND BLEEDING AFTER CARDIAC SURGERY

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## INTRODUCTION

Various reports have described an association between gel-based intravascular volume expanders and an increased propensity for coagulopathy and postoperative haemorrhage. We sought to determine whether the use of these intravenous fluids was associated with increased bleeding complications in patients undergoing cardiac surgery with cardiopulmonary bypass.

## METHODS

A comprehensive retrospective review was undertaken of all patients who underwent cardiac surgery with cardiopulmonary bypass at our institution between January and July 2005. Routine use of gel-based colloid volume expanders (Gelifusine, Vifor Medical SA, Switzerland) in the perioperative period was discontinued in June 2005. Postoperative surgical drainage, requirements for blood products, and incidence of re-operation to secure haemostasis was recorded in those patients who received gelifusine during the perioperative period, and compared with those patients who did not receive any gelifusine. Biochemical markers of coagulation status were also compared between the two patient groups.

## RESULTS

During the review period, 190 patients underwent cardiac surgery via full median sternotomy with cardiopulmonary bypass. One hundred and twenty-eight patients received intravenous volume expansion with gelifusine during the perioperative period, as compared with 62 patients who received alternate intravascular fluid supplementation. Mean postoperative bleeding was significantly greater in the gelifusine group than in the non-gelifusine group at six hours after surgery (520 +/- 325 mls vs. 340 +/- 195 mls,  $p < 0.001$ ), and at removal of the surgical drains (1384 +/- 817 mls vs. 981 +/- 498 mls,  $p = 0.001$ ). Twelve patients in the gelifusine group (9.4%) required re-operation to secure haemostasis, as compared with zero patients in the non-gelifusine group. More patients who received gelifusine required administration of some type of blood product in the perioperative period than those patients who did not receive gelifusine (68.8% vs. 33.9%,  $p < 0.001$ ), including red blood cells (65.6% vs. 33.9%,  $p < 0.001$ ), platelets (14.1% vs. 1.6%), cryoprecipitate (19.5% vs. 3.2%), and fresh frozen plasma (4.7% vs. 0%). Immediate postoperative platelet count was significantly lower in the gelifusine group than in the non-gelifusine group ( $p = 0.022$ ), as was the fibrinogen level ( $p = 0.033$ ).

## DISCUSSION

The use of gel-based colloid volume expanders in patients undergoing cardiac surgery with cardiopulmonary bypass is associated with increased bleeding complications and a concomitant greater requirement for transfusion of blood products. We suggest that alternate intravenous fluids be administered to such patients when intravascular volume supplementation is required in the perioperative period.