Preoperative acute hypovolemic hemodilution with hydroxyethylstarch: an alternative to acute normovolemic hemodilution?

Abstract:
Acute normovolemic hemodilution (ANH) may help to reduce demand for homologous blood but requires extra time and apparatus. A more simple procedure is acute hypervolemic hemodilution (HHD), where hydroxyethylstarch is administered preoperatively without removal of blood. In a prospectively randomized study we compared ANH (preoperatively 15 mL/kg autologous blood removal and replacement with 15 mL/kg of hydroxyethylstarch with HHD (15 mL/kg of hydroxyethylstarch administered preoperatively) in 49 patients undergoing hip arthroplasty. To avoid excessive intravascular volume, we used the vasodilating effect of isoflurane. No significant differences were found between groups (ANH, n = 23; HHD, n = 26) for intraoperative blood loss (ANH versus HHD, median [minimum-maximum]); 545 [295-785] mL versus 520 [315-825] mL) and postoperative blood loss (730 [525-945] mL versus 780 [495-895] mL), postoperative hemoglobin, hematocrit, platelet count or coagulation variables, and transfusion requirements (ANH 43% versus HHD 35% of patients received homologous blood) (P> 0.05). Heart rate did not change significantly in either group. In the ANH group mean arterial blood pressure (MAP) decreased after hemodilution (P< 0.05) while in the HHD group MAP did not change over time. Mean time required to perform ANH was 58
(46-62) min versus HHD 16 (12-19) min (P< 0.05). Costs for ANH were $63.60 USD and for HHD $32.75 USD (labor costs not included). In orthopedic patients undergoing hip replacement with a predicted blood loss of about 1000 mL, HHD seems to be a simple as well as time- and cost-saving alternative for ANH.