Hemodilution Technique Cut Need for Transfusion

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NEW YORK — Acute normovolemic hemodilution markedly reduced the need for blood products, compared with standard intraoperative management in a randomized trial of patients undergoing major hepatic resection.

In the 130-patient study, the red blood cell transfusion rate in patients managed with ANH was half that of patients who received standard management, Dr. William H. Jarnagin reported at the annual meeting of the American Surgical Association.

ANH "should be used routinely when moderate to high blood loss is anticipated," concluded Dr. Jarnagin, vice chair of surgical services and chief of the hepatopancreatobiliary service at Memorial Sloan-Kettering Cancer Center, New York.

Hepatic resection often entails major blood loss. While transfusion of allogeneic blood products can often be lifesaving, it has many downsides, including increased risks of blood-borne infectious diseases, acute lung injury, transfusion reactions, immunomodulation, and other serious complications, as well as substantially higher direct and indirect costs of care.

ANH is a low-tech blood conservation technique that avoids exposing patients to the risks of allogeneic transfusion while preserving blood bank supplies for the situations where they are truly needed.

ANH involves intraoperative removal of whole blood by gravity collection prior to starting the resection. The lost volume is replaced with crystalloid and colloid. That way a smaller volume of the patient's red blood cell (RBC) mass is lost per volume of surgical blood lost. At the end of the operation, after hemostasis is attained, the patient's blood is transfused back.

"Compared with other blood conservation strategies, ANH has several advantages: It is technically and logistically simple, and there are minimal equipment requirements and no storage or administrative costs, no delay in procedure scheduling, and no waste of autologous units," Dr. Jarnagin explained.

He presented a single-center prospective trial involving 130 patients undergoing resection of three or more hepatic segments

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DR. JARNAGIN

who were randomized to ANH or standard intraoperative management. In the ANH group, blood was removed to a target hemoglobin of 8.0 g/dL. Patients had a median of 2,250 mL of blood removed; the hemodilution took 37 minutes on average to complete.

The RBC transfusion rate was 25% in controls and 13% with ANH, for a 50% reduction. Intraoperatively, a hemoglobin below 7.0 g/dL required transfusion; only 1.6% of patients managed with ANH required an intraoperative transfusion, versus 10% with standard management.

Historically, roughly 50% of patients at Sloan-Kettering undergoing major hepatic resection have required allogeneic transfusions. With contemporary techniques, the rate in the usual-care group in this study was just half that. "In fact, ANH wasn't necessary in many of our patients," the surgeon noted.

ANH proved most useful for patients with an operative blood loss of at least 800 mL, which was actually the median blood loss in the study. Among that population, 42% of controls required allogeneic RBC transfusion, compared with 18% in the ANH group. Moreover, 21% of patients in the ANH group required fresh frozen plasma, compared with 48% on standard intraoperative management.

Sixty-day major morbidity rates were similar at about 30% in the two study arms.

Discussant Dr. William C. Chapman said the well-designed study provides convincing evidence that ANH is safe and effective. He predicted that as a result ANH will be instituted at many centers in selected high-risk patients.

"I don't think there's any doubt that this strategy works," said Dr. Chapman, professor of surgery and chief of the section of transplantation at Washington University, St. Louis. ■