Communications

Prophylaxis for Post-perfusion CABG Bleeding

To the Editor:

DelRossi et al reported a double-blind, randomized study utilizing epsilon aminocaproic acid (EACA) for prophylaxis against post-perfusion cardiopulmonary bypass bleeding. Several other investigators have also demonstrated the efficacy of EACA for the reduction of post-cardiotomy bypass bleeding. However, several important issues were raised by this article which, we believe, should be addressed before the routine application of EACA for cardiac surgical patients.

Of the group of 350 patients, 61 percent consisted of elective myocardial revascularization procedures. It is implied, though not stated, that only saphenous vein grafts were used. There was no mention of the role of the internal mammary artery as a conduit which could possibly alter the outcome, especially with the use of bilateral internal mammary arteries since more extensive chest wall dissection and hence postoperative bleeding is encountered.

Cardiopulmonary bypass times were not mentioned. The coagulopathy and cellular destruction associated with extended cardiopulmonary bypass perfusion may certainly alter total blood loss postoperatively.

Several other important factors related to post-perfusion hemorrhage are clinically relevant but were not mentioned. These include: 1) the use of aspirin and/or heparin immediately preoperatively; 2) the number of units of platelets, fresh frozen plasma and cryoprecipitate that may have been transfused postoperatively; 3) the use of desmopressin acetate; 4) the utilization of autotransfusion devices intraoperatively and postoperatively. Perhaps the authors could state whether any of these variables were used and whether there was any statistical difference between the control and the EACA-treated group.

In the placebo group there is a 3.3 percent reoperation rate for bleeding. It is not stated whether the patients exhibited any laboratory finding indicative of a hyperfibrinolytic state since no obvious bleeding site was identified at the time of re-exploration.

Finally, the study concludes that EACA should be utilized to decrease the total blood loss and the number of blood transfusions in routine elective cardiac operations. We think the ultimate test of EACA efficacy to reduce post-perfusion bleeding would probably be in patients with myocardial failure requiring the use of intraaortic balloon, emergency operations, reoperative myocardial revascularization, and reoperative valve replacements. We believe that EACA should not be utilized routinely but only in selected patients at higher risk for post-perfusion bleeding. In that regard, we are curious if the authors currently routinely treat all of their patients undergoing elective, low-risk cardiac operations requiring cardiopulmonary bypass with EACA, or if it is utilized only in selected circumstances, as we have indicated above. We would certainly appreciate hearing from the authors on this very controversial paper.

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REFERENCES


To the Editor:

We appreciate the interest of Drs. Cohn and Jones in our article. Our results indicated that prophylactic use of EACA may reduce the blood loss and transfusion requirements after operations using cardiopulmonary bypass (CPB), presuming that hyperfibrinolysis is one of the most important, although not unique, factors of post bypass bleeding. We did not concentrate our discussion on the procedure itself since 75 percent (not 61 percent) of the patients have undergone CABG (alone or combined with valve replacement) and 37 percent have had valvular procedures. To our knowledge, this is the first study where EACA is used prophylactically in a variety of operations necessitating CPB and not only in CABG. However, we mentioned clearly in the Methods that we included in the study only those patients in whom saphenous vein bypass was used. We did not use EACA in other series when the internal mammary artery would be employed for bypass so we could not comment more. Although not mentioned in the article, the CPB times were similar in both groups and no statistical difference was observed. As specified, we presented only relevant data.

Since acetyl salicylic acid (ASA) mechanism on platelet function is different (it covalently acetylates cyclooxygenase, blocking its activity and subsequent formation of thromboxane A2 from that of EACA (which inhibits the proteolytic activity of plasmin and the conversion of plasminogen to plasmin by plasminogen activator), we feel that the administration of ASA would have no impact on those patients receiving EACA, so there should be no distinction made in this regard. This could also be valid regarding the concomitant and/or preoperative use of sulfinpyrazone, dipyradomole, ticlopidine, some penicillins, furosemide, and other drugs that may induce platelet dysfunction.

The purpose of the study, as stated, was to compare EACA vs placebo and not against other pharmacologic manipulations (desmopressin, aprotinin, etc) which have been shown to conserve blood loss post-CPB. However, their mechanism of action is not established with certainty and there is only limited experience with these drugs. We certainly agree that a well-controlled, randomized study comparing all these agents would be of value.

In both groups, the contents of the oxygenator was returned to each patient at the end of the procedure as centrifuged blood. As stated, "blood transfusion" refers to packed red blood cells. Six patients (3.3 percent) in the control group required reoperation for diffuse bleeding. All of them have exhibited different degrees of hyperfibrinolysis manifested as consumptive coagulopathy with thrombocytopenia, hypofibrinogenemia, and increased fibrinogen split products in the plasma.

We do not advocate the prophylactic use of EACA as the only definitive treatment for post-CPB bleeding and we agree that certain subgroups of patients, particularly those who are prone to bleed more, would benefit most from this therapy. However, we subscribe to the concept that even in low risk elective operations using CPB, efforts should be directed toward decreasing blood loss. In our practice, we use EACA prophylactically in all cases with predetermined reasons for increased bleeding, and in approximately 70 percent of the elective cases.

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