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Does Systemic Anticoagulation Increase the Risk of Internal Jugular Vein Cannulation?

To the Editor:—The known complications of central vein catheter insertion include hemo-, pneumo-, and chylothorax, infection, heart block, dysrhythmias, pulmonary artery rupture, right atrial rupture with tamponade, brachial plexus trauma, and hematoma. The literature addressing the risks of internal jugular vein catheterization in patients anticoagulated with heparin is sparse and contradictory.^{1*} The purpose of this study was to determine if, in our institution, patients who were anticoagulated preoperatively with heparin are at an increased risk of complications compared to our nonanticoagulated patients when internal jugular catheters are inserted.

From May 1988 to September 1990, 516 consecutive internal jugular cannulations by three anesthesiologists administering anesthesia for cardiac surgery at our institution were studied. The anticoagulated patients had a heparin infusion adjusted according to a protocol used by the cardiologists at our institution, attempting to keep the patient's partial thromboplastin time (PTT) at 1.5 times control. Those patients receiving heparin infusions preoperatively had their infusions discontinued on arrival to the operating room. The catheters were inserted within 15 min of discontinuing the infusions. Each patient's heparin in status and most recent PTT were recorded by the anesthesiologist inserting the catheter, as were any intraoperative complications such as dysrhythmia or carotid cannulation. A nurse clinician blinded to the patient's preoperative heparin status evaluated each patient on arrival to the cardiac care unit immediately after surgery for hematoma and followed each patient's clinical course, recording any other complications potentially related to internal jugular cannulation. This nurse clinician measured the size of any apparent hematoma and followed each patient through resolution of the hematoma.

Each catheter was inserted according to the individual anesthesiologist's preferred technique, which usually involved a 25-G finder needle followed by the placement of an 18-G angiocath, or cannulation with an 18-G needle. If an angiocath was used, it was transduced prior to wire insertion. No attempt was made to control insertion technique. If the anesthesiologist cannulated the carotid artery with either the 18-G angiocath or needle, pressure was held for 1–3 min at each individual's discretion. The data were evaluated using the Mantel-Haenszel odds ratio.

Of the 516 patients studied, 252 (49%) were anticoagulated prior to surgery. Of the 22 hematomas recorded, 13 were in anticoagulated patients, for a rate of 5.2%. The incidence of hematoma in nonanti-

coagulated patients was 9 in 264 (3.4%). The odds of developing a hematoma for a patient who was anticoagulated was 1.54 times greater than for a nonanticoagulated patient (odds ratio 1.54; 95% exact confidence limits: $0.60 < 1.54 < 4.16$; $P = 0.326$). No patient's hematoma required drainage or prolonged the time of tracheal intubation. There was a total of 22 arterial punctures—12 in anticoagulated patients and 10 in nonanticoagulated patients. Of the 22 patients in whom carotid puncture occurred, 7 developed hematomas and 15 did not. Of the 7 who developed hematomas, 4 were anticoagulated and 3 were not. Of the 15 patients in whom carotid puncture did not result in hematoma, 8 were anticoagulated and 7 were not.

Although no increased risk of hematoma or other complication was found with regard to preoperative coagulation status, caution should be used in making causal inferences regarding these results. Patient comorbidities (e.g., morbid obesity or previous carotid endarterectomy), PTT status prior to surgery, or other significant variables were not controlled for in this study. Further, whether a patient was anticoagulated or not was dependent on the patient's cardiologist. This could lead to selection bias in this sample.

This study was not blinded from the anesthesiologists' point of view as the coagulation status of each patient was known in advance. However one would think that the higher percentage of urgent/emergent procedures in the anticoagulated patients and the resultant hurried pace of catheter insertion would more than offset any possible increase in caution applied to anticoagulated patients. Furthermore, no attempt was made to randomize patients to one group or another.

In summary, I have found that the internal jugular vein catheterization in anticoagulated patients in our institution carries no increased risk of hematoma formation when performed by one of the anesthesiologists routinely performing cardiac anesthesia. Certainly, future study under more controlled conditions is needed to validate these results.

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