

Title: THE EFFECT OF HEPARIN-COATED PULMONARY ARTERY CATHETERS ON LABORATORY-ACTIVATED COAGULATION TIME

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**Introduction.** The purpose of this study is to determine the effects of heparin-coated pulmonary artery catheters on laboratory-activated coagulation time of samples drawn from different sites in relation to the catheter.

**Method.** After approval from our internal review board informed consent was obtained from seventeen patients undergoing elective cardiac surgery with cardiopulmonary bypass. After normal induction of anesthesia and placement of standard hemodynamic monitoring devices a four-lumen heparin-bonded Swan-Ganz catheter was inserted. (American Edwards 93A-831H-7.5 Fr). Activated coagulation times (ACTs) were measured at baseline after systemic heparinization, every 30 minutes while on cardiopulmonary bypass and after protamine was given for reversal. An external jugular venous line was placed in lieu of a peripheral line. Simultaneous ACTs were drawn from the external jugular line remote from the Swan-Ganz catheter, the side port of the introducer sheath, and the central venous pressure line of the pulmonary artery catheter. All lines were cleared by aspirating 5 cc of blood before each sample.

**Results.** The heparin-coated pulmonary artery (PA) catheter was found to affect laboratory-activated coagulation time significantly prior to systemic heparinization when samples were obtained from either the side port 157 sec ( $p < .001$ ) or the central venous line 132 s ( $p < .001$  of the PA catheter) when compared with the external jugular

sample 101 s ( $P < .001$ ). No significant difference was found between ACTs from external jugular side port and central venous sites after systemic heparinization: 435s, 443s, 433s or after protamine 102, 105, 112s respectively.

**Discussion.** Currently most institutions use either the laboratory ACT or Hemochron<sup>R</sup> method to determine adequate anticoagulation while on cardiopulmonary bypass. This study shows that the initial baseline determined for ACT will be more than 55% above the actual value if taken from the side port of the heparin-coated PA catheter prior to cardiopulmonary bypass (a common sampling port). This error changes the calculated dose response curve described by Bull et al<sup>2</sup> used to individualize heparin and protamine dosage and would result in a greater amount of protamine being given for heparin reversal than needed. This study also shows that after systemic heparinization and after protamine reversal of heparin that there is no significant difference in ACT whether drawn through the heparin-coated PA catheter or an external jugular line.

#### References.

1. Hattersly PG: Activated coagulation time of whole blood. JAMA 196:436, 1966
2. Bull BS, et al: Heparin therapy during extracorporeal circulation. J Thoracic Cardiovascular Surgery 69:685-689, 1975