TITLE: PULMONARY ARTERY VS. CENTRAL VENOUS PRESSURE MONITORING IN PATIENTS UNDERGOING ABDOMINAL AORTIC RECONSTRUCTIVE SURGERY

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**INTRODUCTION:** Since the pulmonary artery catheter (PAC) was introduced into clinical use in the early 1970's, the popularity of this invasive monitor has grown exponentially. It has been recommended that the PAC be used routinely for procedures which will require cross-clamping the abdominal aorta.[1] Outcome data to support the routine use of PACs in patients having abdominal aortic reconstructive surgery (AARS) is lacking. A prospective study was undertaken to determine if outcome was improved in patients who had PAC versus central venous pressure (CVP) monitoring during AARS.

**METHODS:** With the approval of the Human Investigations Committee, 112 patients presenting for elective AARS were considered for entry in the study. All patients were referred to a cardiologist for evaluation preoperatively and were judged ready for AARS. Where indicated, dipyridamole-thallium scans, cardiac catheterization, PTCA, or CABG surgery were performed prior to AARS. Patients were excluded from the investigation if, at the time of surgery, they were known to have cor pulmonale, uncompensated congestive heart failure, documented cardiomyopathy, poor left ventricular function (ejection fraction <40%), catheterization proven valvular heart disease, renal failure (BUN >60) or declined consent. After obtaining informed consent, the eligible patients were randomized to have either a CVP or PAC catheter inserted preoperatively after diazepam 10mg po and local anesthesia. One of three anesthesiologists were responsible for the management of all patients. Anesthesia was induced with thiopental, sufentanil and vecuronium and maintained with a balanced technique of sufentanil, oxygen, air and low-dose isoflurane as needed. In the patients managed with PAC, hemodynamics obtained included RA, PA and PCW pressures, cardiac output, and SVR. Post-operatively, all patients were initially cared for in a critical care unit. Results analyzed included patient mortality, incidence of enzyme and/or ECG evidence of myocardial infarction, life-threatening dysrhythmias, pulmonary edema, renal failure and ventilatory failure. Length of ICU and post-operative hospital stay, and cost of hospitalization (excluding professional fees) were also examined. Statistical significance was evaluated by Students t-test ($P<0.05$).

**RESULTS:** Thirty-two patients (29%) were excluded from randomization for one of the previously mentioned medical exclusion criteria and 14 patients (12%) declined consent. Sixty-six patients (59%) were then randomized to 33 with CVP and 33 with PAC. Sex, age, duration of surgery and blood loss were not statistically different between groups. There was no hospital mortality or perioperative myocardial infarction in either group. Two patients in the CVP group and four patients in the PAC group had postoperative dysrhythmias treated without sequelae. One patient in the CVP group developed transient pulmonary edema which responded appropriately to diuresis. Of interest, no patient in the CVP group required conversion to a PAC in order to manage any perioperative problem. No patients developed new renal failure or ventilatory failure. Finally, there was no difference between groups in hospital costs or length of ICU or post-operative stay.

**DISCUSSION:** This prospective, randomized study failed to support a prevailing feeling held by many authorities in vascular anesthesia that data obtained from pulmonary artery catheterization is beneficial for the management of all patients during AARS.[2] However, when interpreting such outcome data, the practice situation and severity of patient illness should be considered. Patients with peripheral vascular disease frequently have multi-system disease.[3] In our study, only patients with uncompensated cardiopulmonary or renal disease were excluded. Our lack of perioperative mortality and low perioperative morbidity is lower than usually reported for AARS, but it is consistent with our previous study in this patient population.[4]

The role of CVP versus PAC in the twenty-nine percent of our patients excluded due to severity of illness remains to be defined, although in this select group we continue to recommend PAC use.

In conclusion, based on the outcome data in this study, it appears that CVP monitoring is adequate in the majority of patients undergoing AARS and that routine PAC use may be unwarranted.

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