Title: CLINICAL TRIAL OF THE ATRIOVENTRICULAR PACEPORT® THERMODILUTION CATHETER AND TRANSLUMINAL ATRIAL BIPOLAR PACING PROBE

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Introduction. It is often difficult to predict the need for perioperative pacing in critically ill patients. Indications for placement of Swan-Ganz® (SG) catheters are well-accepted. Use of the SG Pacing-TD® Catheter in cardiac surgery has been described.[1] However, several deterrents exist including: 1) varying success in achieving pacing, and 2) electrode displacement. The newer Paceport® catheter provides ventricular (Vt) pacing with a separate pacing probe which allows for more stable Vt pacing and more reliable capture.[2] Yet, situations exist in which atrial (At) or A-V sequential (AVS) pacing may be beneficial in the perioperative period. Our goal in this study was to evaluate a newer model AVS Paceport® SG, which adds At pacing capability.

Methods. Twenty-three cardiac surgical patients and one abdominal aortic aneurysm patient participated in this study. All patients were ASA class III. Ages ranged from 45-79 (10 F, 14 M). Narcotic-based anesthetic technique was used. After induction, the right internal jugular vein was cannulated with an 8F sheath introducer. The study catheter (A-V Paceport® SG, model 93A-991H7.5 F, American Edwards) was inserted using standard technique. Continuous pressure monitoring of the right ventricular (RV) port during insertion assured correct placement of the RV port 1-2 cm distal to the tricuspid valve. The RV port was used for insertion of the Vt pacing probe. The right atrial (RA) port permitted insertion of the At pacing probe. Time from placement (insertion time) of the catheter into the sheath to successful positioning was recorded. The Vt probe was advanced through the catheter until capture was obtained (Medtronic 5330 generator). Threshold and distance of the probe into the RV were recorded. A similar procedure was repeated with the At probe. Both probes were withdrawn into the catheter during bypass to prevent perforation. The pacing sequence was repeated in the immediate post-bypass period and the patient was followed post-operatively until catheter removal.

Results. The catheter was successfully inserted in all 24 patients. Average insertion time was 85 s (45-330 s). Pressure and cardiac output (CO) measurements were obtained during the perioperative period without difficulty. In 9/24 patients the catheter was inserted 1-2 cm. further after initial wedging to insure proper placement of the RV port. No permanent wedging was noted. Vt capture was obtained in all cases both pre-bypass and post-bypass and was used up to 10 days continuously post-operatively. Initial threshold mean was 3.8 mA (range 1.5-7.0 mA). Vt pacing was reliable, and no specific problems were noted with the Vt probe itself. Atrial capture was successful in 23/24 patients pre-bypass. The At probe would not pass through the catheter hub in the remaining patient and that patient was removed from further study. In 3 of the remaining 23, multiple attempts to position the wire were required for stable At capture pre-bypass. Initial mean threshold was 4.9 mA (range 1.5-10.0 mA).

Post-bypass At reinsertion/capture required multiple attempts in 4/23 patients, and in one additional patient the At probe could not be reinserted into the catheter at all. Continuous At or A-V sequential (AVS) pacing was used without difficulty in the remaining 22 patients intraoperatively. In 8/22 patients, extended At pacing was used postoperatively, the longest for 93 hours. In one patient, At capture was confirmed for 10 days on a daily basis but only the Vt probe was used for continuous pacing. In 2/22 patients, the At probe port clotted secondary to inadequate continuous flush technique. No major complications were noted. Minor complications included: diaphragmatic stimulation in 1/22, intermittent pacing during balloon inflation in 1/22 and the above mentioned probe insertion failure in 2/24. Cardiac outputs (CO) were noted to increase an average of 42% (range 8-78%) with At, or AVS pacing over Vt pacing alone.

Discussion. Hartzler, et al[3] noted that At pacing postoperatively increased CO compared with Vt pacing. We also observed increased CO with At pacing. The study catheter permits atrial, ventricular, and AVS pacing along with hemodynamic measurements. Atrial capture was initially obtained in 23/24 patients. The catheter functioned well in the majority of patients in the post-bypass period. Catheter positioning did not require fluoroscopy and thresholds were acceptable, i.e., less than 10 mA. The unit may also be effective in pacing emergencies, especially if the catheter is already present.

In contrast, the study catheter has an increased number of ports requiring proper maintenance and flushing. In this study we also noted, at probe insertion, failure in 2/24 patients and difficult At capture in several other patients.

In conclusion, the Atrioventricular Paceport® thermodilution catheter and transluminal atrial bipolar pacing probe can be used effectively in patients undergoing cardiac surgery. Use of the study catheter results in the hemodynamic benefits of AVS pacing.

References.

1. Zaidan JR, Freinere S: Use of a pacing pulmonary artery catheter during cardiac surgery. Ann Thorac Surg 35:633-636, 1983
2. Colardyn F, Vandenbogaerde J, De Niel C, Jordaens L: Ventricular pacing via a Swan Ganz catheter: a new mode of pacemaker therapy. Acta Cardiologica XLI:23-29, 1986
3. Hartzler GO, Maloney JD, Curtis JJ, Barnhorst DA: Hemodynamic benefits of atrioventricular sequential pacing after cardiac surgery. Am J Cardiol 40:232-236, 1977

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