

Title: USEFULNESS OF SWAN-GANZ CATHETERS IN LEFT MAIN CORONARY DISEASE

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**Introduction.** Patients undergoing myocardial revascularization procedures and who have concomitant stenosis of the left main coronary artery (LMCA) are at greater risk for having perioperative complications and mortality than patients without LMCA disease. To assist in the perioperative management of these patients, physicians at some centers routinely insert Swan-Ganz pulmonary artery (PA) catheters in patients with LMCA disease. The rationale for this invasive technique is that the Swan-Ganz catheter aids in the detection and management of perioperative complications particularly during induction of anesthesia and prior to initiation of cardiopulmonary bypass (CPB). Considerable debate among cardiac anesthesiologists as to the necessity of placing Swan-Ganz catheters preoperatively, and in fact, their usefulness in the management of these patients continues to plague the clinician. The present, retrospective study was undertaken in an attempt to assess the usefulness of Swan-Ganz catheter placement in patients with LMCA disease.

**Methods.** Records of 25 consecutive patients with  $\geq 50\%$  LMCA stenosis who underwent myocardial revascularization and who were anesthetized by the same anesthesiologist were divided into 2 groups. Group I consisted of the first 10 patients who had had a PA line placed by the investigator preoperatively. Group II consisted of the next 15 patients who had had no PA line placed preoperatively. Twenty-four of twenty-five patients were anesthetized utilizing diazepam, pancuronium, fentanyl,  $O_2/N_2O$  with occasional halothane adjuvant. One patient was anesthetized using morphine sulfate,  $O_2/N_2O$  and dimethyl curare. All patients had direct placement of a left atrial line as soon as the pericardium was opened and all 25 patients received hypothermic-cardioplegia solution during CPB as a method of myocardial preservation. The following variables were then examined for Group I and Group II: Age, sex, weight, B.S.A., previous myocardial infarction, degree of preoperative ventricular dysfunction, degree of LMCA stenosis, number of vessels grafted, anesthesia time, time on CPB, aortic cross-clamp time, lowest myocardial temperature obtained, number of interventions before, during and after CPB, number of intraoperative complications, number of interventions in ICU, length of stay in ICU, number of hospital days post-op and number of patients demonstrating perioperative myocardial damage (by serial EKG and CK-MB determinations), the mean data from each group was compared using the non-paired Student's t-test.

**Results.** There was no significant difference between Group I and Group II for variables analyzed except for the following: (1) time on CPB was greater for Group I,  $p < .0291$ ; (2) aortic cross-clamp time was greater for Group I,  $p < .0380$ ; (3) the number of interventions prior to CPB was greater in Group II  $p < .0161$ ; (4) the number of intraoperative complications was greater in Group II,  $p < .0241$ . In Group I, 7 patients demonstrated no evidence of perioperative myocardial damage, 2 patients demonstrated probable evidence of perioperative myocardial damage and 1 patient demonstrated definite evidence of perioperative myocardial damage (with massive infarction). In Group II, 14 patients demonstrated no evidence of

perioperative myocardial damage and 1 patient demonstrated probable evidence of perioperative myocardial damage.

**Discussion.** Previous communications and discussions directed at the question of the need to use a Swan-Ganz catheter in patients with LMCA stenosis undergoing myocardial revascularization have been based upon the compilation of findings, experience and personal preferences of different clinicians within the same institution<sup>1,2</sup>. Since it is the experience of a single physician, this study eliminates the important variable of personal biases and practice variations of multiple clinicians and concentrates solely on the questions of Swan-Ganz catheter usefulness. The greater incidence of intraoperative complications in Group II (hypotension, hypertension, ischemia) and thus a greater number of interventions in this group were easily recognized clinically without the Swan-Ganz catheter. They were treated appropriately and had no discernable effect upon the result of the surgical procedure. Finally, the single definite myocardial infarction occurred in Group I while the patient was on CPB and was readily apparent to all. In conclusion, the data and results of this study under the conditions described clearly indicate that the use of a Swan-Ganz catheter (not without inherent risks and financial costs) was of negligible importance in the perioperative management and overall outcome of the surgical procedure.

#### References.

1. Stone PH, Goldschlager N.: Left main coronary artery disease: review and appraisal. *Cardiovas Med* 4: 165-178, 1979.
2. Lake C.: Value of Swan-Ganz catheter in left-main coronary artery diseased patients. Semi-Annual Meeting, Association of Cardiac Anesthesiologists, Hollywood, Florida, February 16, 1979.

#### LEFT MAIN P A STUDY

	GROUP I (n=10)	GROUP II (n=15)
Age	53.90 $\pm$ 2.50	56.93 $\pm$ 2.01
Weight	77.56 $\pm$ 3.04	77.61 $\pm$ 2.83
B.S.A.	1.93 $\pm$ .05	1.967 $\pm$ .044
Prior MI	.60 $\pm$ .16	.867 $\pm$ .165
% LMCA	75.50 $\pm$ 5.33	66.933 $\pm$ 8.818
Anes time	348.0 $\pm$ 22.93	318.371 $\pm$ 18.243
Myocardial temp	10.2 $\pm$ .88	10.27 $\pm$ 1.28
No. grafts	4.10 $\pm$ 0.38	4.27 $\pm$ 0.32
CPB time	140.77 $\pm$ 14.85*	108.200 $\pm$ 8.998
Aortic cross clamp time	82.00 $\pm$ 9.93†	63.13 $\pm$ 5.04
Complications		
Intra op	0.20 $\pm$ 0.13	.667 $\pm$ 0.159‡
Interventions a CPB	0.10 $\pm$ 0.10	0.47 $\pm$ 0.17*
Interventions p CPB	2.10 $\pm$ 0.77	1.00 $\pm$ 0.195
ICU intervent	1.20 $\pm$ 0.44	1.20 $\pm$ 0.20
ICU stay	32.76 $\pm$ 9.43	28.20 $\pm$ 5.02
Hosp stay	8.60 $\pm$ 0.56	9.13 $\pm$ 0.38
Ventricular Dysfunction		
None	2	5
Moderate	6	7
Severe	2	3
Myocardial Damage		
None	7	14
Probable	2	1
Definite	1	0

\*  $p < .0291$ , †  $p < .0380$ , ‡  $p < .0161$ , §  $p < .0241$