

TITLE: CONCOMITANT CAROTID AND CORONARY ARTERY SURGERY: ANESTHETIC MANAGEMENT, MORBIDITY, AND MORTALITY

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INTRODUCTION: The optimal management of concomitant carotid artery stenosis in patients requiring coronary surgery remains debatable with data published supporting either staged or simultaneous repair.^{1,2} This study was designed to evaluate the results of simultaneous repair at our institution.

METHODS: Retrospective comparison of 62 patients (P) who underwent concomitant carotid endarterectomy and coronary bypass surgery (Gp CC) at Emory University from 1974 to 1981 and a computer-selected matched population of 83 P who underwent coronary artery bypass surgery alone (Gp C) was performed. Details of monitoring, anesthetic management, and adjunctive therapy were analyzed in each group. Review of hospital records and follow up contact with the patients or local physician at 24 months post-operatively was undertaken. Statistical analysis was performed by chi square analysis ($P < .05$).

RESULTS: Clinical descriptors of both groups are presented in Table 1. The neurological presentation of Gp CC was as follows: 1) asymptomatic bruit 59%, 2) transient ischemic attack (TIA) 34%, 3) prior stroke with TIA 7%, 4) >75% unilateral carotid stenosis 75%, and 5) >75% bilateral carotid stenosis 25%. Prior to induction of anesthesia patients were cannulated with a pulmonary artery catheter (PAC) or central venous catheter (CVP) as outlined in Table 2. In Gp CC, the PAC and CVP catheters were inserted in the contralateral internal jugular vein in 72%, external jugular vein in 15%, antecubital vein in 13% of P. Intraoperative monitoring consisted of lead II and V₅ continuous electrocardiograms, arterial pressure, and PAC or CVP. All were continuously displayed on an oscilloscope and recorded. 71% of Gp CC had single channel electroencephalograms recorded. Drugs received by P prior to cardiopulmonary bypass (CPB) are listed in Table 3. During endarterectomy, the PaCO₂ and BP were maintained in the normal range and during CPB mean blood pressures were kept between 60-100 mmHg. Weaning from CPB required drugs as listed in Table 4.

5 P in Gp CC (8%) manifested transient neurological symptoms postoperatively consisting of slurred speech (1 P), unilateral motor paresis (1 P), and contralateral extremity weakness (3 P) with complete resolution prior to discharge. One patient (1.8%) experienced permanent stroke. 50% of P with neurological sequelae were shunted during endarterectomy. One patient developed a postoperative myocardial infarction. There were no identified anesthetic or surgical mishaps for patients in Gp CC with neurological sequelae. There were no deaths. Comparison with Gp C is shown in Table 5. There were no significant differences between groups regarding mortality, stroke, anginal status, myocardial infarction, or postoperative capabilities. Myocardial revascularization was more complete in Gp C.

DISCUSSION: This data supports the concept of the combined procedure. Anesthetic management was

essentially no different than that for coronary artery surgery alone with the exception of the use of more PAC catheters, more frequent vasopressor administration, and EEG monitoring. We feel we can recommend concomitant surgery in P requiring both procedures.

Table 1 : PRE-OP COMPARISON MATCHED GROUPS (MEAN VALUES)

DESCRIPTOR	Gp CC	Gp C
Age	59.8	55.6
Unstable Angina	57%	56%
Pre-Op M.I.	54%	64%
LVEDP > 16 mmHg	26%	24%
Triple vessel disease	41%	27%

Table 2 INVASIVE CATHETERS

	Gp CC	Gp C
PAC	81%	39%*
CVP	19%	61%*

Table 3: DRUGS PRIOR TO CPB.

	Gp CC	Gp C
Diazepam 0.25-0.5 mg/kg	94%	95%
Morphine 0.5-1.5 mg/kg	61%	88%*
Fentanyl 20-100 ug/kg	37%	17%*
N ₂ O	79%	78%
Halothane or Enflurane	53%	62%*
Vasopressors	50%	22%*
Nitroglycerin	68%	54%

Table 4: WEANING FROM CPB

	Gp CC	Gp C
Nitroglycerin	35%	41%
Nitroprusside	29%	20%
Vasopressor	27%	20%
Inotrope + vasodilator	5%	7%
I A B P	2%	1.2%
Temporary pacing	10%	7%

Table 5 POSTOPERATIVE COMPARISON

DESCRIPTOR	Gp CC	Gp C
Coronary Grafts	2.9	2.9
Complete Revascularization	66%	84%*
30 day hospital mortality	0	1.2%
Peri-operative M.I.	2%	2.8%
Stroke with disability	1.8%	0%
Survival at 24 months	98%	94%
Rehospitalization for stroke	3.7%	1.2%
Angina Improved	92%	96%
Activity Not Restricted	78%	88%
Activity mildly restricted	18%	10%

REFERENCES. 1. Ennix CL, Lawrie GM, Morris GC, et al: Improved results of carotid endarterectomy in patients with symptomatic coronary disease. An analysis of 1,546 consecutive operations Stroke 10: 122-125, 1979.
2. Mehigan JT, Buch WS, Pipkin RD, et al: A planned approach to coexistent cerebrovascular disease in coronary artery bypass candidates. Arch Surg: 112:1403-1409, 1977.