

**DECREMENTS IN COGNITIVE FUNCTION FOLLOWING
CORONARY ARTERY SURGERY: A PROSPECTIVE STUDY**

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Conflicting reports have been published regarding the incidence of cognitive decrements following coronary bypass surgery.^{1,2} The current data were collected in an ongoing study of neuropsychological outcome as a function of various perfusion management techniques during cardiopulmonary bypass. Results regarding neurological outcome are presented elsewhere.

Methods: After institutional approval and obtaining written informed consent, 82 patients (70 males, 12 females, mean age 60.8 yr, education = 11) were enrolled. Functioning was assessed within cognitive domains known to be vulnerable to compromise by vascular insufficiency (concentration, psychomotor speed, dexterity, verbal learning). Reliable and valid neuropsychological tests were administered preoperatively (at baseline), at 7 d postoperatively (mean = 7.8 d), and at 8 wk

follow-up (mean = 48.9 d). At baseline 82 patients, at 7 d 69 patients, and at 8 wk 57 patients were evaluated. Mean age, education, and distributions of gender did not vary across evaluations. A sample-wide mean and standard deviation (SD) were computed within each cognitive domain at baseline. As in previous studies,^{2,3} performance was considered to have deteriorated for a given patient if postoperative or follow-up scores dropped by > 1 SD below the baseline score. Given the known mild practice effects on tasks employed, this is believed to be a reasonably conservative criterion for deterioration in performance.

Results: At 7 d 46% of patients showed impairment within at least one dimension. At follow-up 17% of patients showed deterioration, though only one patient was impaired in more than one domain, and within each cognitive domain no more than 3 patients were impaired.

Discussion: These data are consistent with data from other North American centres,¹ and are possibly indicative of less long-term morbidity than suggested by European studies.²

References: 1. Bashein et al. *Anesthesiology* 72:7-15, 1990. 2. Carella et al. *Acta Neurol Scand* 77:158-63, 1988 3. Shaw et al. *Br Med J* 291:1384-7, 1985.

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**TITLE: TRANSESOPHAGEAL DOPPLER MITRAL
FLOW INDICES AND VENTRICULAR RELAX-
ATION.**

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Impaired relaxation of the left ventricular (LV) myocardium is a hallmark of ischemic heart disease, but its quantitation requires intracardiac LV pressure measurements. LV diastolic function can also be evaluated with Doppler ultrasound-derived indices of mitral flow, peak-early filling velocity (E) and peak-early to peak-atrial velocity ratio (E/A). The aim of this investigation was to determine the relaxation constant (T) from hemodynamic, M-mode and Doppler transesophageal ultrasound measurements, and to study the relationship between T and the standard, Doppler-derived indices of diastolic function.

Ten anesthetized patients undergoing myocardial revascularization were studied after institutional approval and informed consent. A transesophageal transducer/scanner providing a 4-chamber view from the base of the heart (Aloka SSD-870, Corometrics) was operated in the pulsed Doppler mode to determine transmitral blood flow and in the M-mode to determine aortic valve leaflet closure. A radial arterial catheter was used to measure diastolic notch pressure (DP) while peak-left atrial v-wave pressure (VP) was measured from balloon-occluded pulmonary artery

catheter tracings. E and the E/A ratio were measured from Doppler tracings. Isovolumic relaxation time (IVR) was determined from aortic valve closure to beginning of trans-mitral LV inflow. DP and VP were used to estimate LV pressure at aortic valve closure and mitral valve opening, respectively. Isovolumic LV pressure decay was expressed as $VP = DP \cdot e^{-IVR/T}$ from which $T = IVR / \ln(DP/VP)$ was calculated. Analysis of results, presented as mean \pm standard deviation, was with the aid of Pearson product-moment correlation.

Mean peak E was 39 ± 12.6 cm sec⁻¹ (range: 20-59 cm sec⁻¹), while the mean E/A ratio was 0.80 ± 0.30 (range: 0.46-1.37). T was 55 ± 15.6 msec (range: 33.5-78.1 msec). No significant linear correlation was found between T and peak E ($r=0.03$), or T and E/A ($r=0.09$).

Using transesophageal echocardiography, and simple mathematical, and physical relations we have derived the LV relaxation time constant in anesthetized patients with coronary artery disease. T values reported here are in good agreement with previously published results. In addition, this study demonstrates that in ischemic heart disease, the relationship between early filling and ventricular relaxation is not linear. While peak E is determined, in part, by T the left atrial v-wave and systemic arterial pressures are also known to be of import. Until the relative weight of each of these determinants is clearly established, it is unlikely that Doppler indices of mitral flow will be useful in the diagnosis of intraoperative myocardial ischemia.