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Title : DETERIORATION OF RIGHT VENTRICULAR FUNCTION AFTER MYOCARDIAL REVASCULARIZATION  
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**Introduction.** Ventricular dysfunction immediately after revascularization is commonly assumed to originate in the left ventricle. Therefore, both monitoring and therapy are focused on left ventricular function during this critical time. Because the right ventricle can be affected by coronary artery disease and is subjected to the same stresses (fibrillation, cannulation, manipulation, hypothermia, and deprivation of normal coronary blood flow), we questioned whether significant right-ventricular dysfunction occurs immediately after revascularization. If so, overall patient morbidity and mortality may be reduced by evaluating and treating right, as well as left, ventricular function after revascularization. Using Starling curves, we studied right ventricular function before and after myocardial revascularization.

**Methods.** With approval of the Committee on Human Research, we studied 22 men scheduled for coronary artery surgery. Preoperative ejection fractions ranged from 0.26 to 0.81. Anesthesia consisted of morphine sulfate (1.5 to 3 mg/kg iv) and diazepam (0.25 to 0.50 mg/kg iv). Ventilation (with 100% oxygen) was controlled. After pericardiotomy, measurements were made with the patient in the horizontal position. Filling pressures were then altered by changing body position from horizontal to 30° Trendelenburg and then to 30° reverse-Trendelenburg. These three sets of measurements (i.e., while the patient was in three different positions) were made at the following eight times: control; 15 min and 1 hr after bypass; and 2, 4, 8, 18, and 24 hr after surgery, in the intensive care unit. For each patient, eight right-ventricular function curves (stroke work vs. central venous pressure, RVSWI vs. CVP) were constructed, one curve for each of the eight time periods.

**Results.** The ventricular function curves for one patient are shown in Figure 1. Compared with the pre-bypass curve (control), the post-bypass curves are depressed immediately (1/4 hr) after bypass. After this, right-ventricular function improves, but remains depressed over the entire 24-hr period. Right-ventricular hemodynamics for all 22 patients are shown in Table 1, and a quantization of the function curves is shown in Figure 2, in which changes in right- and left-ventricular function are contrasted.

**Discussion.** This study demonstrates that significant right ventricular depression occurs immediately after myocardial revascularization, persists for at least 24 hr, and is of the same magnitude as left-ventricular depression. Possible etiologies include preexisting right coronary artery disease (16/22 patients), ischemic changes during bypass, and effects of lung collapse during bypass on afterload. Thus, significant right-ventricular dysfunction following revascularization and warrants special attention in terms of monitoring and therapy.

Table 1. Right Ventricular Hemodynamics

	Pre-Bypass	1/4 Hr	1 Hr	2 Hr	4 Hr	8 Hr	18 Hr	24 Hr
PVR (dynes·sec·cm <sup>-5</sup> )	71 (±4.1)	103 (±3.8)	52 (±1.9)	114 (±3.6)	102 (±3.1)	88 (±3.4)	96 (±2.2)	61 (±3.6)
CVP (mm Hg)	2.9 (±0.40)	8.3 (±0.73)	4.4 (±0.51)	7.6 (±0.62)	5.4 (±0.79)	4.8 (±0.62)	4.5 (±0.59)	3.3 (±0.52)
RVSWI (g·m/M <sup>2</sup> )	6.2 (±0.24)	4.6 (±0.21)	6.4 (±0.22)	5.4 (±0.26)	5.5 (±0.20)	5.3 (±0.19)	5.6 (±0.18)	5.8 (±0.18)

Values (mean ± SE) are averaged over 22 patients.

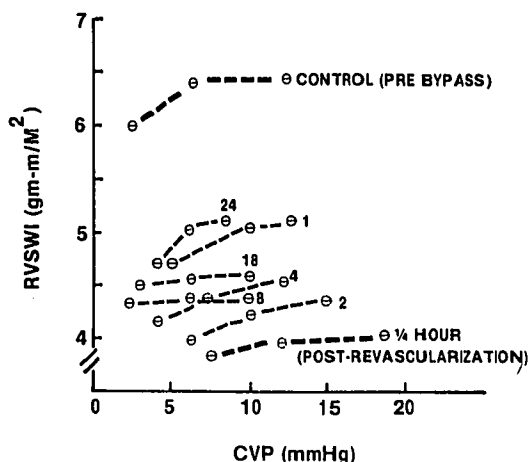


Fig. 1. Time course of right ventricular dysfunction following revascularization.

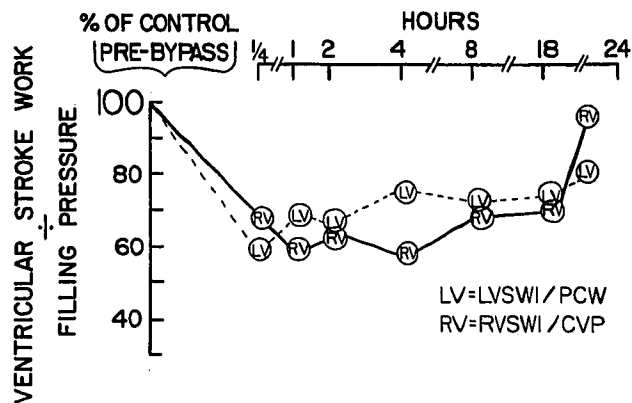


Fig. 2. Comparison of right and left dysfunction following revascularization.