

Closed-Chest Cardiac Massage, J.A.M.A. 193: 681 (Aug. 23) 1965.)

CARDIOVERSION Problems of electro-conversion include several of direct concern to the anesthesiologist in addition to the obvious calculated risk of a short intravenous anesthetic in the presence of significant cardiac disease. Among these are unrecognized post-shock hypoventilation from the anesthetic or premedication, synergy between muscle relaxants and concurrent quinidine therapy, and electrical burns due to arcing between defibrillator electrodes and monitoring electrodes which have been placed too close to each other. The advantages of transient narcosis, as compared to shocking heavily premedicated conscious subjects, outweigh the disadvantages, and the contribution of adequate ventilation supervised by an anesthesiologist is acknowledged. (Paulk, E. A., and Hurst, J. W.: *Clinical Problems of Cardioversion, Amer. Heart J. 70: 248 (Aug.) 1965.*)

COUNTERSHOCK Patients with mitral valvular disease and atrial fibrillation were restored to normal rhythm after external direct-current countershock. Systolic and mean pressures in the right and left ventricles and in the pulmonary and brachial arteries were not systematically altered, with a tendency, however, to a decrease in ejection pressures in the right heart and increase in the left heart. Mean right atrial and right ventricular end-diastolic pressures as well as left ventricular end-diastolic pressure decreased significantly. Cardiac output and index and stroke volume and index increased; pulmonary vascular and systemic resistances decreased. (Reale, A.: *Acute Effects of Countershock Conversion of Atrial Fibrillation Upon Right and Left Heart Hemodynamics, Circulation 32: 214 (Aug.) 1965.*)

ATRIAL SYSTOLE A properly timed atrial contraction results in a significant improvement in cardiac function in patients with heart block. There is not only augmented ejection time, mechanical systole, systolic pressure, isometric contraction time, tension time index and peak derivative of brachial pressure but also a significant decrease in the mean

rate of systolic ejection. Although the contribution of atrial contraction on cardiac function occurs at all ranges of ventricular rate, its influence is greatest in the 50 to 80 beats per minute range. The optimal P-R interval is 1 to 300 milliseconds. (Benchimol, A., and others: *Contribution of Atrial Systole to Cardiac Function at a Fixed and at a Variable Ventricular Rate, Amer. J. Cardiol. 16: 1 (July) 1965.*)

ATRIAL CONTRIBUTION The relationship between heart rate, synchronous and asynchronous atrial-ventricular activity and cardiac output was explored in patients with complete heart block. Studies were made of ventricular or His-bundle pacing at control rate, right ventricular outflow tract catheter electrode pacing, and both synchronous and atrial synchronous pacing. Thirty-four paired observations were made during equal atrial and ventricular pacing rates. The cardiac index is significantly decreased during ventricular as opposed to atrial pacing at the same heart rate. The average cardiac index during ventricular pacing was 2.63 liters/minute/m. and during synchronous or atrial synchronous pacing the average was 2.90 liters/minute/m. The contribution of atrial systole to the maintenance of cardiac output is demonstrated (Samet, P., and others: *Atrial Contribution to Output in Complete Heart Block, Amer. J. Cardiol. 16: 1 (July) 1965.*)

ATRIAL TRANSPORT The quantity of ventricular filling and output is determined chiefly by the length of diastole, but the state of the myocardium and the temporal relation between atrial and ventricular systoles are also important factors. Atrial contraction occurring after ventricular contraction and closure of the A-V valves is ineffective because at this time the ventricle is a closed cavity and there is merely a tendency to cause backflow and congestion of the systemic and the pulmonary veins. Normally, the piston-like downward movement of the A-V junction during ventricular systole enlarges the atrium and the vena cava. Whereas the grossly normal heart can compensate for loss of atrial contraction, the severely damaged heart may depend on atrial contraction to obtain good end-diastolic

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volume. Clinical observations in 390 cases of acute myocardial infarction revealed that independent atrial activity leads sometimes to serious hemodynamic consequences due to a fall in blood pressure. Beat-to-beat variations in blood pressure caused by asynchronous atrioventricular contractions sometimes produce a cyclic inequality of the peripheral pulse, which can be detected by palpation, sphygmomanometry or digital plethysmography. (Valero, A.: *Atrial Transport Dysfunction in Acute Myocardial Infarction*, *Amer. J. Cardiol.* 16: 22 (July) 1965.)

EXPERIMENTAL HEART BLOCK Effects of acute and chronic complete heart block on the mechanical function of the heart were studied in dogs. Surgically-produced heart block resulted in profound bradycardia. There was an immediate decrease in cardiac output, increase in stroke volume, decrease in aortic (and pulmonary artery) diastolic pressure, but no change in aortic systolic pressure. End-diastolic volume increased due to increased filling time. The heart adjusted to the increased diastolic load acutely by dilatation and chronically by hypertrophy. Heart failure ensued when the heart block persisted beyond four months. Each atrial contraction was associated with a forward and backward movement of blood (atrium to ventricle and back to atrium) and closing and opening of the A-V valve. Atrial contraction made no overall contribution to ventricular volume except immediately preceding ventricular tension and fiber length (optimal PQ interval 0.085 to 0.125 sec.). Brockman, S. K.: *Cardiodynamics of Complete Heart Block*, *Amer. J. Cardiol.* 16: 72 (July) 1965.)

EXPERIMENTAL HEART BLOCK Direct and reflex activation of the cardiac sympathetics and parasympathetics in dogs with complete heart block shows that (1) the ventricle is almost solely under the control of the efferent sympathetic nerves, (2) the vagus nerve has a negligible effect on the ventricle, and (3) severe cardiac depression and ventricular arrest may be mediated through reflex diminution of cardiac sympathetic tone but not through the vagus nerve. Vagal fibers may supply the bundle of His

and its branches but the vagus had no direct effect upon the ventricles. The positive inotropic and chronotropic effects of stimulation of the cardiac sympathetics were striking. Activation of the carotid sinus (carotid hypertension) reflexly induced a ventricular negative inotropic and chronotropic effect. The vagus played no role in this effect but it was mediated by reflex inhibition of the cardiac sympathetics. An increase in pressure within the carotid sinus reflexly induced a decrease in ventricular contractility. (Brockman, S. K.: *Reflex Control of the Heart in Complete A-V Block*, *Amer. J. Cardiol.* 16: 84 (July) 1965.)

LEFT BUNDLE BRANCH BLOCK In a group of 146 patients studied over the past decade who exhibited electrocardiographic findings of a complete left bundle branch block, the life expectancy after diagnosis averaged 36 months. The finding duplicated that of a previous study 15 years ago (Johnson, R. P., and others: *Amer. Heart J.* 41: 225, 1951) and emphasized the fact that invariably there is serious underlying organic disease associated with such an abnormality and that recent advances in the management of heart disease have not influenced the prognosis in this condition. (Smith, S., and Hayes, W. L.: *Prognosis of Complete Left Bundle Branch Block*, *Amer. Heart J.* 70: 157 (Aug.) 1965.)

PACEMAKER COMPLICATIONS Two problems encountered during implantation of electronic pacemakers for the treatment of heart block are of interest to the anesthetist. One is the hazard of aspiration pneumonitis following seizures preoperatively which may indicate tracheostomy at time of implantation; the other is the block of myocardial response to the electrical impulses by the repeated administration of large doses of succinylcholine. (Lawrence, G. H., Paine, R. M., and Hughes, M. L.: *Management of Complications Associated with the Use of Implantable Electronic Cardiac Pacemakers for the Relief of Complete Heart Block*, *Amer. J. Surg.* 110: 177 (Aug.) 1965.)

CENTRAL VENOUS PRESSURE A method of cannulating the subclavian vein