

181 LEFT VENTRICULAR EJECTION PATTERNS IN CHILDREN WITH OUTFLOW OBSTRUCTION

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The pressure/volume changes during early (E_3), mid (M_3) and late (L_3) thirds of ejection were analyzed in 20 normal children (N), 7 aortic coarctation (Co), and 20 aortic stenosis (AS). Mean peak systolic gradient was 30 mmHg in Co, and 31 in AS. Ejection fraction at E_3 , M_3 , and L_3 were 0.33, 0.36 and 0.27 for N; 0.35, 0.37 and 0.28 for Co; 0.24, 0.41 and 0.28 for AS. Tension-time index (TTI) in mmHg-sec, stroke index (SI), output index (OI), ejection rate (SI/sec) and SI/TTI ratio in cc/mmHg-sec/m² were obtained. These are summarized below (P values vs N: * - < .05; ** - < .001).

GP	OI (lit/m/m ²)			SI/sec (cc/sec)			SI/TTI Ratio		
	E_3	M_3	L_3	E_3	M_3	L_3	E_3	M_3	L_3
N	2.18	1.61	0.78	226	166	81	3.91	1.67	0.81
Co	2.29	1.55	0.75	242	163	82	3.18	1.54	0.64
AS	1.55	1.99	0.88	162	203	90	2.51	1.78	0.84
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Normal ejection is characterized by maximal flow and high output/force ratio during E_3 . This pattern is absent in AS but is preserved in Co due to unobstructed flow to aorta and presence of collaterals.

182 EFFECT OF EXPERIMENTAL CYANOSIS ON PLATELET SURVIVAL

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In order to determine the effect of cyanosis on platelet survival, experimental cyanosis was produced in dogs by anastomosing the left atrial appendage to the main pulmonary artery. The six cyanotic animals used in this study had arterial O₂ saturations of 71%-85% and elevated hematocrits. By one month following surgery, the ⁵¹chromium-labeled autologous platelet half-life (P_{HL}) decreased 15%-60% from preoperative values: two cyanotic dogs had progressive reduction of P_{HL} at two and three months. No reduction in P_{HL} occurred in three sham operated control animals.

Survival of platelets exchanged between cyanotic and control animals was determined. Platelets from cyanotic dogs studied in control animals had a 69%-87% shorter survival than the autologous P_{HL} of the control animals, indicating an abnormality intrinsic to the platelet produced in the cyanotic dog. Normal platelets from control animals transfused into cyanotic dogs had the identical reduced survival of autologous platelets in that cyanotic animal, suggesting that some determinant of transfused platelet survival is extrinsic to the platelet.

Three months after shunt closure in two dogs, the reduced P_{HL} has persisted.

183 MEDICAL MANAGEMENT OF SEVERE SYSTEMIC HYPERTENSION IN INFANTS WITH COARCTATION OF THE THORACIC AORTA.

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16/56 infants (ages 2 wks to 6 mos) with isolated coarctation of the thoracic aorta presented with congestive heart failure and severe systemic hypertension ranging from 210/140 to 150/80 mmHg. Because of the surgical risks in symptomatic infants and the probability of recoarctation, conventional anticongestive medical management was instituted. The response to the anticongestive measures was markedly enhanced by diminishing afterload with chronic oral propranolol (.05-1.0 mg/kg/day) with maximal antihypertensive effects noted by 1-4 wks. Rebound hypertension was noted in 4 patients with propranolol withdrawal. This clinical response noted is consistent with high renin hypertension. No complications related to beta blockade have been seen in the infants treated. From this data we conclude that the antihypertensive effects from propranolol far outweigh the negative inotropic effects in the treatment of coarctation of the aorta. Further, the treatment of severe hypertension in infants with coarctation of the aorta may allow deferral of surgery to a more optimal size and clinical status.

184 PACEMAKERS IN YOUNG PATIENTS: 1976. Victor Whitman, William Berman, Jr., G. Frank O. Tyers, (Spon. by Nicholas M. Nelson), Penn State Univ., Hershey Medical Center, Depts. of Pediatrics and Cardiothoracic Surgery.

We have reviewed our recent experience with 10 young patients requiring chronic cardiac pacing. Details of the performance of the most recent two generators are summarized. Six patients required pacing for symptomatic congenital complete heart block, two for postoperative complete heart block, one for heart block associated with idiopathic myocardopathy and one for the sick sinus syndrome. Pacemaker generators were implanted beneath the pectoral muscle to eliminate cutaneous erosion in small or slender patients. Seven patients underwent transvenous pacemaker electrode implantation into the right ventricle. Although our patients have had a variety of generators, we currently use the Brownlee-Tyers, rechargeable silver modified mercury-zinc generator, with a proven life span of 6 years and an anticipated life span of 20 years. All patients have been monitored transtelephonically. In those requiring change, all on an elective basis, the average conventional generator life span has been 27 months (range 20-44 months). None of the Brownlee-Tyers generator units have required replacement. No wire fractures have occurred, though one transvenous electrode required repositioning 1 month following insertion. No long term electrode complications have occurred in children with transvenous placement including one patient in whom the electrode was placed at 7 years of age and followed for 9 years. The improved prognosis detailed in this report is the result of improved generator and electrode construction, surgical technique, and monitoring methods.

185 EARLY LIGATION OF PDA, EFFECT ON BPD AND POSTOPERATIVE VENTILATOR TIME. Leighton S. Whitsitt, Melvin Baden, Richard C. Traugott, and Robert L. Treasure, Newborn Svc, Brooke Army Med. Ctr., San Antonio, TX. (Spon. by R. Steele)

A retrospective and prospective study was undertaken to determine whether early ligation of PDA (7 days of age or less) resulted in a decreased incidence of BPD and shorter period of ventilatory support in infants with RDS and cardiopulmonary failure.

The diagnosis of a PDA was made on clinical grounds (murmur, hyperactive precordium and pulses) with several infants having aortographic and/or echocardiographic confirmation of a PDA prior to surgery. The early group consisted of 16 infants (B.W. 1240 gms, C.A. 29.2 weeks), operated on at a mean of 4.8 days, while the late group consisted of 20 infants (B.W. 1175 gms, G.A. 28.5 weeks) operated on at 14.4 days.

Infants developing clinical and X-ray evidence of BPD (15 of 36, 41%) received assisted ventilation for 8.2 days preoperatively and 16.6 days postoperatively. Infants not developing BPD received assisted ventilation for 5.9 days preoperatively and 3.0 days postoperatively. Infants operated on early (≤ 7 days) received 4.7 days of ventilatory support postoperatively of whom only 25% (4/16) developed BPD. Infants operated beyond 7 days required 16.6 days of ventilatory assistance postoperatively. Among this group 55% developed BPD (11/20). The combined mortality was 36% (13/36) with 35% (7/20) in the late group and 37% (6/16) in the early group. There was 1 perioperative death and 12 late deaths. These data indicate that while there was no statistical difference in mortality, there was a significant decrease in total duration of ventilatory time and BPD in the early treated group.

186 THE INFLUENCE OF INDOMETHACIN ON NEONATAL RENAL FUNCTION. By John Winther, Morton P. Printz, Stanley A. Mendoza, Stanley E. Kirkpatrick, and William F. Friedman. Div. of Pediat. Cardiol., Univ. of Calif., San Diego, School of Medicine.

Transient renal dysfunction has been observed in premature infants receiving indomethacin (indo) to inhibit prostaglandin (PG) synthesis and hence constrict their patent ductus arteriosus. The present study was designed to evaluate in 14 newborn lambs the influence of high (7.5 mg/kg) and low (0.2 mg/kg) doses of indo. on renal blood flow (RBF), glomerular filtration rate (GFR), and urine flow (V). The latter indices of renal function were studied by ¹³¹I-hippuran and ¹⁴C-inulin clearances in conscious, chronically instrumented lambs over a 24-hour period. Both indo. doses reduced RBF significantly at 4 hours (high 12.4 ± 1.2 (SE), low 12.8 ± 1.0 ml/kg/min) but only high-dose animals were significantly lower than the control group at 12 (8.2 ± 0.8 , $p < 0.025$) and 24 hours (6.5 ± 0.9 , $p < 0.001$). PGE levels, determined by radioimmunoassay, correlated directly with alterations in RBF/GFR was unaltered in all groups. Urine flow was significantly lower than in the control group at 24 hrs. only in the high-dose indo. group (0.08 ± 0.2 vs 0.15 ± 0.1 cc/kg/min, $p < 0.025$). Filtration fraction rose significantly at 12 hrs. in both indo. groups. Thus, these data suggest that the renal dysfunction observed transiently in some human prematures may be dose-related and support the need to carefully monitor renal function in continued clinical applications of a pharmacological approach to constriction of the ductus arteriosus.