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ROLE OF THE RENIN-ALDOSTERONE SYSTEM IN HYPERTENSION OF COARCTATION OF THE AORTA. Linda A. Linday, Mary Allen Engle, Lenore S. Levine, Maria I. New. Cornell University Medical College-The New York Hospital, Departments of Pediatrics, Pharmacology, and Medicine, New York, New York 10021

The role of the renin-aldosterone system in the etiology of hypertension due to coarctation of the aorta was evaluated in pre-operative adolescents hospitalized in the Pediatric Clinical Research Center. Five patients aged 12-20 years were studied. Blood pressure was 146/82 to 170/115 in 4 patients and 130/84 mm Hg in a 12 year old. Variable sodium (Na) diets were administered during hospitalization. Patients received normal Na (100-150 meq/day), low Na (10 meq/day), and high Na (250 meq/day) diets for a minimum of 3 days/diet. Potassium (K) intake was maintained at 50 meq/day. Daily 24-hour urinary aldosterone (aldo), Na, and K excretions were obtained. Plasma renin activity (PRA) was measured at rest and after ambulation. Patients received no medication. All were in K balance and had normal serum K. The aldosterone response to changes in dietary Na was qualitatively and quantitatively normal when compared to the nomogram of New et al. The response of PRA to differential Na diets was also qualitatively normal. However, PRA was more variable than previously reported in adults. In some patients, the response of PRA to ambulation and/or low Na diet was higher than reported adult standards. The significance of this response requires further evaluation. We conclude that the renin-aldosterone system was intact in these hypertensive adolescents with coarctation of the aorta.

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AUTONOMIC CONTROL OF HEART RATE: DECREASED RESPONSES AND ALTERED SYMPATHETIC VAGAL INTERACTIONS IN PUPPIES. Sharon E. Mace (Spon. by J. Liebman).

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Heart rate responses to autonomic stimulation were compared in 11 adult dogs and 4 pups. Adults had greater heart rate changes. The mean % changes in heart rate at the highest stimulation frequencies used are shown in the table:

	Vagal		Sympathetic	
	Right	Left	Right	Left
Adult	-67.9	-32.2	+37.9	+21.4
Pups	-20.0	- 7.7	+24.8	+ 9.5

Combinations of vagal and stellate stimulation were given to determine the effects of simultaneous vagal and stellate stimulation. Both adults and pups had a significant vagal-sympathetic interaction such that the vagal effects became greater the higher the background level of sympathetic activity. However, in the pups, the interactions were less pronounced than in the adults. Thus, both the vagi and the sympathetics are functionally incomplete in young puppies and the interactions between the two systems are not fully developed either.

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REPAIR OF TRANSPOSITION OF THE GREAT ARTERIES WITH INTACT SEPTUM: RESULTS OF MUSTARD AND SENNING OPERATION. Gerald R. Marx, Thomas J. Hougren, William I. Norwood, Donald C. Fyler, Aldo R. Castaneda, Alexander S. Nadas, Harvard Medical School, Children's Hospital Medical Center, Department of Pediatric Cardiology, Boston, Ma.

To compare the results of the Mustard (M) and Senning (S) operations, we reviewed 125 consecutive patients (pts) that had repair of d-transposition of the great arteries with intact septum. From 12/72 to 2/78 69 pts had M repair; age at operation (op) was 3 days (d) to 12 years (y), median 11 months (m), and median wt 7.3 kg. Mean follow up was 41 m and 57 (82%) had postoperative (postop) catheterization (cath). From 3/78 to 10/80 56 had S repair, age 7 d to 3 y, median 6 m, and wt 6.9 kg. Mean follow up was 10 m and 29 (52%) had postop cath. Within 30 d of op 8 (12%) of M pts died and 6 (9%) died later. Three (5%) S pts died early, 1 (2%) died late. Systemic venous obstruction (SVOB) occurred in 36 (52%) of M pts, reoperation (reop) required in 12. SVOB occurred in 4 (7%) S pts, three required reop. Pulmonary venous obstruction (PVOB) developed in 3 (4%) M pts, all required reop. Six (11%) of S pts had PVOB, 5 had reop. In late follow up of 59 M pts, 29 had sinus rhythm (SR), 15 junctional rhythm (JR), 10 sick sinus syndrome (SSS), 3 ectopic atrial rhythm (EAR) and 2 atrial flutter. In 51 S pts, 43 had SR, 6 JR, 1 EAR, 1 SSS.

When compared to the Mustard operation, the Senning has a higher incidence of PVOB. However, the lower incidence of mortality, SVOB, and arrhythmias, favors continued use of the Senning repair at our institution.

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PULMONARY HYPERTENSION ALTERS THE BENEFICIAL HEMODYNAMIC EFFECT OF DOPAMINE. Gerald R. Marx, Marlene Rabinovitch, Walter J. Gamble, Lynne Reid, (Spon. by Alexander S. Nadas), Harvard Medical School, Children's Hospital Medical Center, Departments of Cardiology and Pathology, Boston, Ma.

Our clinical observations suggested that dopamine (D) may be ineffective in improving cardiac output (CO) in pts. with acute or chronic pulmonary artery hypertension (PH). We therefore evaluated the response to intravenous D at dosage 15 & 25 ug/kg/min (D15, D25) in 16 adult male Sprague-Dawley rats. Twelve were normal (N) rats and 5 had PH produced after 2 wks. in chronic hypobaric, i.e. air at 380mmHg (CH rats); all were studied in room air and after acute PH was caused by 2 hrs. hypoxia (10% O₂). Pressures (P) in mmHg and saturations were monitored by indwelling catheters in pulmonary artery (PA) left ventricle (LV) aorta and jugular vein. Direct measurement of O₂ consumption permitted calculation of CO (cc/min/kg-Fick principle) and pulmonary and systemic resistance (Rp, Rs). During the study, 7 rats died - 6N rats during or after infusion of D in hypoxia (H): 4 of these 6 had a rise in LV end diastolic P or Rs not seen in rats that lived (p < 0.05). Mean values in 9 living rats are tabulated (*denotes p < 0.05 from baseline (b)).

Rat Group	n	CO				Rp				Rs			
		(b) Ppa	(b)	D15	D25	(b)	D15	D25	(b)	D15	D25		
N	5	20	375	415	451*	.04	.04	.04	.26	.27	.27		
+H		27	398	312	337	.05	.06*	.07	.26	.29	.31		
CH	4	33	334	347	346	.08	.12	.09	.32	.33	.35		
+H		48	304	283	240*	.14	.14	.17	.36	.38	.45		

Thus D increased CO only in N rats; it actually decreased CO in CH+H rats. Our data suggest that D may be ineffective when there is PH and, in the presence of acute hypoxia, may be detrimental.

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ALTERED SYMPATHETIC SYSTEM ACTIVITY IN A SUBGROUP OF JUVENILE ESSENTIAL HYPERTENSIVES AND SIBLINGS. Wallace W. McCrory, Arthur A. Klein, Richard Rosenthal, and Mary A. Engle.

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Hyperactivity of the sympathetic nervous system has been implicated in the pathogenesis of essential hypertension (E.H.). To evaluate sympathetic system activity (SSA) in E.H. in children, we compared Blood Pressure (BP) and heart rate (HR) with Plasma Norepinephrine (PNE) and Epinephrine (PEPI) levels measured by radioenzymatic assay in resting state (RES) and after postural challenge by standing 15 Min. (STD). Subjects include 21 normal controls (NC) 19 borderline hypertensives (BH), BP > 90% for age, 9 significant hypertensives (SH) BP > 95% for age and 14 normotensive siblings of hypertensives (NS) 12-18 years of age. SH had higher RES HR (73+3/Min.) than NC (66+2/Min. p < .05). RES PNE levels were significantly higher in BH (455+37 pg/ml) and SH (373+37 pg/ml) than N.C. (281+12 pg/ml, p < .01) or NS (316+24 pg/ml). In 13 of 19 BH (67%), 5 of 9 SH (56%) and 6 of 14 NS (43%) RES PNE levels were above highest NC level (350 pg/ml) identifying subgroups with increased SSA at rest among Hypertensives and Normotensive Siblings. With Hemodynamic response to STD HR in SH rose more (+22+2, p < .05) than NC (+13+2) and response of mean arterial pressure (NC +13.7+2 MM Hg) was blunted in BH (+3.9+2, SH (-7.3+3) and NS (+3+3 p < .01). Some Hypertensives and NS had a hypotensive response not seen in NC. Rise in PNE was blunted in BH and SH (+40% & +48%) compared with NC (+95%). PEPI levels rose more in BH and SH than NC. PNE levels were directly and significantly related to Systolic BP LV and STD in BH & NS, not in NC. Findings offer support for hypothesis that altered SSA contributes to presence of Hypertension in some young subjects. Presence of altered SSA in some NS of hypertensives could reflect a genetic factor accounting in part for their increased risk of developing E.H.

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TRANS-AORTIC OCCLUSION OF COLLATERAL ARTERIES WITH DETACHABLE VALVED BALLOONS IN A CASE OF TETRALOGY OF FALLOT. C. Mark Mehlinger, Verity S. Grinnell, Grant B. Hieshima, Philip Stanley, Paul R. Lurie. Harbor-UCLA Medical Center, Div. of Neuroradiology; Univ. of Southern California School of Medicine, Childrens Hospital of Los Angeles, Depts. of Radiology and Pediatrics, Los Angeles

A 5-year-old boy had at birth severe tetralogy with near-atretic right ventricular outflow and most of pulmonary blood supply via 6 large collaterals from the descending aorta. At age 3 he had extensive resection of right ventricle and pulmonic valve without closure of ventricular septal defect. Catheterization at age 5 showed arterial oxygen saturation 89%, bidirectional shunt through large ventricular septal defect with QP/QS 1.5 and absence of pulmonic valve. The collateral arteries were still large; 2 communicated with pulmonary trunk. Detachable valved balloons were inflated in 3 of the arteries, eliminating about 80% of the collateral blood flow without changing arterial oxygen saturation during the procedure or exercise tolerance thereafter. This advance in transvascular therapy has been applied previously to arteriovenous fistulae in brain and other organs and renal hypertension and tumors. Present application has many advantages over direct surgical ligation: (a) safer, only sedation and local analgesia with similar aftercare to that of diagnostic catheterization; (b) occlusion tentative permitting check of arterial oxygen saturation; (c) completeness of occlusion assessable during procedure. Risks: (a) inadvertent detachment of balloon, (b) deflation of detached balloon.