

199 EFFECTS OF ACUTE ABDOMINAL DISTENSION ON CENTRAL HEMODYNAMICS, REGIONAL BLOOD FLOW, AND RENAL FUNCTION
 J.C. Ring, D.L. Smith-Wright, S. Einzig, B.K. Borgwardt, B.P. Fuhrman; Dept. of Peds., U. of Mn.; Mpls., MN 55455

Children may develop acute abdominal distension (AAD) following major operations, trauma, or infection, and may have renal dysfunction unrelated to their underlying disease. We studied the effects of AAD alone on central hemodynamics, regional blood flow (BF), and creatinine clearance (CrCl). Six adult mongrel dogs (13-19kg) were anesthetized with alpha-chloralose, volume ventilated, and acutely instrumented to measure heart rate (HR), right atrial (RAP), wedge (PAWP), aortic (AoP), inferior vena caval (IVCP), and abdominal pressures. AAD was accomplished by inflating the abdomen to 20 mmHg with nitrogen. Cardiac index (CI) and BF to heart (H), skeletal muscle (SM), liver (L), and renal cortex (RC) were measured by injecting 15 micron radioactive microspheres into the left ventricle. Measurements were made and urine and blood collected during 30 min pre-inflation and post-deflation control periods and during 60 min of AAD. AAD markedly depressed CI (36%)* without altering HR or AoP. RAP (43%)* and PAWP (27%)* rose, as did pulmonary (63%)* and systemic (66%)* vascular resistances, but left (27%) and right (22%) ventricular stroke-work fell; thus, decreased CI did not result from increased afterload. CI decreased due to impaired myocardial contractility or, if transmural ventricular filling pressures fell with AAD, to decreased preload. L (56%) and RC (32%)* BF fell more than SM (3%) or H (20%) BF. Redistribution of BF was not explained by perfusion pressure changes. Decreased CrCl (84%) results, at least in part, from decreased RC BF. (*p < 0.05 vs. pre-inflation control)

200 ALTERATIONS IN REGIONAL BLOOD FLOW PRODUCED BY HIGH SALT DIET. A. P. Rocchini, K. P. Gallagher. (Spons. A. Rosenthal). Univ. of Mich, Ann Arbor.

Previously we documented that a high salt diet (NaD) prevents fatal hemorrhagic shock (HS) by blunting the response of the renin-angiotensin-system (RAS). To determine if the improved survival was associated with improved tissue perfusion, we examined the ability of a NaD (9 gms NaCl/day for 6 weeks) to alter regional blood flow (BF) during HS. Six dogs received the NaD for 6 weeks and 5 dogs received a normal (NI) diet for 6 weeks. HS was induced by bleeding into an overhanging reservoir until the mean pressure was reduced to 35 mmHg. Prior to and at 0.5, 1.5 and 2.5 hrs of HS, BF was measured in the heart, gut (GI), and kidney using microspheres.

Prior to and at 0.5 hrs of HS there were no differences in BF between the two groups of dogs, however at both 1.5 and 2.5 hrs the Na dogs experienced a significant and progressive increase in both GI and heart BF (p<.01). In addition, plasma renin activity increased less in the NaD dogs (0.8±.2 to 38±9 vs. 3.1±2.6 to 169±37 ngAl/ml/hr. p<.001 NaD vs. NI). Thus a Na diet improved regional BF during HS. This improved perfusion may be due to blunting of the RAS.

		0	.5	1.5	2.5
GI (ml/gm)	NI	.35±.06	.09±.01	.10±.02	.09±.01
	Na	.44±.06	.12±.01	.16±.03*	.21±.04*
Renal (ml/gm)	NI	3.9±.1	.20±.1	.36±.2	.44±.8
	Na	4.3±1.4	.26±.1	.37±.1	.61±1.9*
LV endo (ml/gm)	NI	1.12±.3	.48±.10	.49±.09	.39±.11
	Na	1.36±.27	.61±.10	.74±.12*	.96±.33*
LV mid (ml/gm)	NI	1.09±.36	.51±.11	.52±.07	.42±.09
	Na	1.26±.26	.62±.12	.82±.17*	1.11±.28*
LV epi (ml/gm)	NI	.92±.3	.51±.11	.49±.12	.38±.09
	Na	.98±.13	.59±.11	1.1±.1*	1.36±.28*
Endo/epi (ml/gm)	NI	1.2±.33	.9±.1	1.0±.09	1.0±.01
	Na	1.28±.33	1.0±.1	.68±.17*	.71±.3*

Means±SD; *p<.05 Na vs. NI; †p<.05 .5 vs. 1.5 or 2.5

201 COMMON CAROTID ARTERY (CCA) FLOW IN NEWBORN INFANTS BY PULSED DOPPLER AND ACCURACY ESTIMATES IN PUPPIES:
 T Raju, M Go, A Narula, J Ryva, D Schmit, B Braverman and D Vidyasagar; Department of Pediatrics and Radiology University of Illinois Medical Center, Chicago, Illinois.

Pulsed Doppler (PD) devices to compute blood flow volume and velocity have not been used in newborn infants. We studied CCA diameter (D), flow velocity (V), and volume (Q), in 17 healthy term and 3 preterm (30-33 wks) infants, with a PD device (ATL, Mark IV). Infants were placed on their sides and a 7.5 MHz transducer was used. The Doppler line and cursor were placed over the CCA on video display so that the phase angle was less than 70°. V and Q were computed. In term infants the CCA D was 3-4 mm, V=51±12.6 and Q=57±13 ml/min. Combined CCA flow/kg was 32.3±6.8 ml. In preterm CCA D was 2-3 mm; V and Q were 47±7 cm/sec and 46±14 ml/min. respectively. (All Vales x ± SD) The technique accuracy was tested in a puppy model by surgically exposing CCA, and measuring flow with an electromagnetic (EM) flow probe and a flow meter (Gould SP2202). PD device with 7.5 MHz transducer was also used simultaneously to assess flow. In eight 5-13 weeks old puppies, the results were: CCA diameter, 2.5-3.5 mm, EM measured flow 80 ± 22 ml/min and PD flow 78.7 ± 24 ml/min. In 26 paired measurements the regression equation was: PD flow = -1.3 + EM flow X 1.0, r=0.93, (p<0.01). We conclude: Pulsed doppler device can be successfully used to compute V and Q, noninvasively even in the very small vessels of newborn infants. The technique is accurate as the correlation with EM and PD measured flow in puppies with similar sized vessels is good. This technique has a potential for measuring flow in infants with risk for cerebral bleed and brain damage.

202 USE OF INTRAVENOUS DIGITAL VIDEO SUBTRACTION ANGIOGRAPHY FOR EVALUATION OF PALLIATIVE SYSTEMIC TO PULMONARY ARTERY SHUNTS IN PATIENTS WITH CONGENITAL HEART DISEASE David J. Sahn, Lillian M. Valdes-Cruz, Kenneth H. Gerber, Theron W. Oviatt, Gerald Pond, M. Paul Capp, Arizona Medical Ctr., Tucson and University of California San Diego Medical Ctr., San Diego, CA.

We utilized outpatient intravenous digital subtraction angiography (DVSA) as a diagnostic followup procedure for assessing shunt function and pulmonary artery (PA) size in 17 patients, age 3 mos.-23 years, with pulmonary atresia (n=13), severe tetralogy of Fallot (n=3) or tricuspid atresia (n=1). Each patient received standard sedation for 0.3-0.5 cc/kg injections of Hypaque 76 into the superior vena cava after percutaneous brachial or femoral vein cannulation. DVSA allowed visualization of 4 Pott's anastomoses, 3 left-sided Blalock-Taussig (BT), 3 right-sided BT, 1 Gortex ascending aortic to left pulmonary artery shunt, 1 Glenn anastomosis and 6 Waterston shunts. Shunt function, video densitometric flow distribution to the lungs and PA size could be assessed, and bronchial collaterals were visualized. Two stenotic BT shunts were imaged. In 6 patients judged ready for further surgery, cardiac catheterizations were performed, and the DVSA images compared quite favorably to the selective angiograms obtained at catheterization. Our study suggests that outpatient DVSA can be applied as an aid to the timing and planning of cardiac catheterization and additional surgical procedures in patients with systemic-to-pulmonary artery shunts.

203 COST EFFECTIVENESS IN PEDIATRIC CARDIOLOGY. Myles Schiller, Allan Shapiro, Rubin Cooper, Samuel Ritter, Marc Rieth, and Richard Golinko. Department of Pediatrics, SUNY, Downstate Medical Center and Brookdale Hospital Medical Center, Brooklyn, New York.

The usefulness and cost-effectiveness of non-invasive procedures performed on 77 infants and children at their initial cardiac evaluation were determined. Over a 6 month period, patients (pts) seen for the first time in the pediatric cardiology clinics at Downstate Medical Center and Brookdale Hospital Medical Center, were examined separately by 3 board certified pediatric cardiologists. In addition, a chest X-ray, electrocardiogram (ECG), and echocardiogram were obtained on each patient and the results were compared with published standard norms for age. Dr. A performed a history (H) and physical (P) only. Dr. B performed an H and P and reviewed the ECG and chest X-ray only. Dr. C performed an H and P and reviewed the echocardiogram only. Each doctor then independently classified a patient as having (I) definite heart disease, (II) possible heart disease, or (III) no heart disease. The 3 doctors agreed in 68 pts (88%). In 9 pts there was an interobserver disagreement. 2 pts were classified as I and II and 7 pts were classified as II and III. No pts were classified as I and III or I, II, and III. We conclude that routine non-invasive studies are not necessary at initial cardiac evaluation in order to differentiate heart disease from no heart disease. Therefore, selective use of these studies should result in significant reduction of health care costs. (Supported by HHS Grant #1R01 HS04935-01).

204 CARDIAC DYSFUNCTION IN HEMOLYTIC UREMIC SYNDROME (HUS). Kumudchandra J. Sheth, Allen D. Wilson, Nancy Haworth (Spon. Steven L. Werlin), Med Coll of Wis, Dept of Peds, Milwaukee, WI.

In HUS, myocardial involvement is infrequent and attributed to metabolic complications of acute renal failure or anemia. To better define the incidence of cardiac dysfunction, we studied ECG and Echo-cardiograms (ECHO) in 12 children (6M, 6F; ages 1½-9yr) with HUS which was mild (1), moderately severe (7) or severe (4). At the time of studies, all pts were stable [peritoneal dialysis (11), diuresis (1)] with normal serum chemistry and acid base status. Average Hgb was >8g/dl. 2/12 had mild hypertension. The studies were repeated in 48hr (3), 1mo (2), 8mo (1), 18mo (1). SGOT levels were elevated in 6/6. 5/12 showed ECHO evidence of myocardial dysfunction e.g: increase in left atrial and ventricular (LV) size, reduction in LV shortening and ejection fractions and prolongation of LV systolic time interval ratio. Except LV size, all ECHO changes improved minimally at 48hr but markedly at 1mo, were normal at 8mo (1). Persistent LV thickness at 18mo was associated with hypertension and renal insufficiency (1). There were 5 abnormal ECGs-persistent sinus tachycardia (4), decreased voltage (2), LV hypertrophy (2), ST segment depression (2), T wave inversion (1). 4/5 abnormal studies were in children with severe and 1 in moderately severe HUS. of 5 HUS pts with cardiac dysfunction, 2 recovered, 2 developed hypertension and renal failure, 1 died, while 6/7 pts without cardiac dysfunction recovered & 1 died. Conclusions: Cardiac dysfunction (1) occurs in 40% of HUS, 2) is associated with severe HUS 3) cannot be accounted by metabolic derangements or anemia.