CRITICAL CARE

† 163 COST ANALYSIS OF CARDIAC ARREST SURVIVORS. Peter A. Ahmann, Jean A. Wright, Beth Bailey, (Spon. by James F. Schwartz) Emory University School of Medicine, Department of Pediatrics, Atlanta.

A prospective study was begun to evaluate the outcome from cardiac arrest (CA) in a pediatric tertiary care center. One aspect of this study was to examine the economic aspects of CA in relation to patient outcome, proposing that from this recommendations could be made regarding better allocation of resources. CA data which included chart review for documentation of poor prognosis (DPP) prior to the arrest was recorded. Outcome was described as surviving arrest (SA) or survival to discharge (STD). Hospital costs were developed from actual patient charges from time of arrest to death/discharge. There are 43 patients entered; of which 13 STD. Of 43, 11 had DPP, and 1 STD. Of 31 with no DPP; 12 STD.

AVERAGE PATIENT COSTS FROM DATE OF ARREST			
	DPP	NO DPP	TOTAL
IMMEDIATE DEATH	$ 2,314	4,709	3,645
SURVIVED ARREST	$ 3,600	11,314	10,239
SURVIVED TO DISCHARGE	14,943	18,133	17,887
COST PER SURVIVOR	44,256	30,543	31,598

In contrast, the average cost per patient stay at this center is 5,575. In the first 3 catagories, greater resources were expended in the no DPP group. Many of these had surgical procedures performed which may account for this difference. Of 31 with no DPP 22 expired. Could these have been DPP's, but not written? Reaction now to cost/benefit inferences of treatments may direct wiser decision making and resource allocation in the future.

● 164 EFFECT OF ELEVATED INTRACRANIAL PRESSURE ON CEREBRAL BLOOD FLOW AND EVOKED POTENTIAL RESPONSES Joanne E. Backofen, Raymond C. Koehler, Robert W. McPherson, Mark C. Rogers, Richard J. Traystman. The Johns Hopkins Medical Institutions, Department of Anesthesiology and Critical Care Medicine, Baltimore, MD

We studied the relationship of cerebral blood flow (CBF) and cerebral O_2 uptake ($CMRO_2$) to somatosensory evoked potential (SEP) and brainstem auditory evoked response (BAER) under conditions of elevated intracranial pressure (ICP). Sheep were anesthetized with pentobarbital and pancuronium and ventilated. ICP was increased to a fixed level by infusing mock CSF into the lateral ventricle. ICP was raised to a calculated cerebral perfusion pressure of either 0, 20-25, or 50 mmHg. CBF was measured using the radiolabelled microsphere technique. $CMRO_2$ was calculated with sagittal sinus blood samples. When CBF fell, cerebral O_2 extraction increased. However, with CBF below 70% of baseline, $CMRO_2$ was not sustained by increased extraction. BAER interwave I to V latency increased below a midbrain blood flow of 15 $ml \cdot min^{-1} \cdot 100g^{-1}$. SEP central conduction time (CCT) determined from the latency differences between N_1 of foreleg SEP and C_2 increased below a CBF threshold of 15-20 $ml \cdot min^{-1} \cdot 100g^{-1}$ (50-65% reduction from baseline CBF). Changes in CCT were associated with a 25% decrease in $CMRO_2$ from baseline. Therefore, under conditions of elevated ICP, cerebral ischemia as defined by $CMRO_2$ appears to correlate with changes in evoked potential responses. The large threshold observed when evoked potentials are related to regional CBF is probably a function of the O_2 extraction reserve.

= 165 CEREBRAL BLOOD FLOW AUTOREGULATION WITH ELEVATED INTRACRANIAL PRESSURE DURING NORMOXIA AND HYPOXIA. Joanne E. Backofen, Cecil Borel, Raymond C. Koehler, M. Douglas Jones, Jr., Richard J. Traystman (Spon. by Mark C. Rogers), The Johns Hopkins Hospital, Departments of Anesthesiology/Critical Care Medicine and Pediatrics, Baltimore, MD

We assessed the ability to maintain cerebral blood flow (CBF) when intracranial pressure (ICP) is raised under normoxic and isocapnic hypoxic conditions in pentobarbital-anesthetized neonatal lambs (3-9 days old). ICP was increased by infusion of artificial CSF in the lateral ventricle to produce 8 mmHg stepwise decrements in cerebral perfusion pressure (CPP) from baseline (≈ 66 mmHg) down to a CPP of approximately 26 mmHg. In one group (n=6) of normoxic lambs (arterial O_2 content (CaO_2) = 14.8 ± .7 ml/dl), CBF ($ml \cdot min^{-1} \cdot 100g^{-1}$; microspheres) was unchanged from baseline (49 ± 7) down to a CPP of 34 mmHg (47 ± 6). At a CPP of 26 mmHg, CBF was decreased to 37 ± 5. In another group (n=6) of hypoxic lambs (CaO_2 = 7.6 ± .9 ml/dl; 49 ± 4% arterial O_2 saturation) baseline CBF (87 ± 11) was nearly twice that of the normoxic group. CBF was not significantly changed down to a CPP of 34 mmHg (78 ± 8), but was decreased at a CPP of 26 mmHg (73 ± 8). Cerebral fractional O_2 extraction (measured at sagittal sinus) was also maintained down to a CPP of 34 mmHg in both groups before it rose at 26 mmHg. Cerebral O_2 uptake was not different between groups and was not diminished with elevations of ICP in either group. We conclude that a) neonatal lambs are capable of CBF autoregulation with increasing ICP, and b) hypoxia sufficient to double baseline CBF but not diminish O_2 uptake does not impair CBF autoregulation.

166 THE USE OF A NEW STATISTICAL METHOD TO DEVELOP HIGH-MORTALITY ENTRY CRITERIA FOR NEW THERAPIES SUCH AS EXTRACORPOREAL MEMBRANE OXYGENATION(ECMO): Robert R. Beck,Billie L. Short,William Sacco,Jon Cronin,Kathryn Anderson, Marilea K. Miller. The George Washington School of Medicine, Children's Hospital National Medical Center,Department of Neonatology, Washington D.C.

High mortality entry criteria for new therapies such as ECMO require the use of retrospective data often with small numbers of patients. A new computer-generated statistical method called "Bootstrapping" has made this possible. We conducted a 2 year retrospective study of term infants(n=30) with respiratory distress admitted to our NICU to determine criteria that wouldpredict an 80% mortality for future pts. These criteria would permit an informed decision as to when to advance from conventional therapy to ECMO. Variables considered were: pH,pCO2,pO2,BE,MAP,FIO2,IMV, PIP,PEEP,AaDO2. At the time of maximal conventional therapy, all parameters were analyzed comparing survivors to nonsurvivors. Maximum,minimum,median, and quartile values for each variable were compared. To quantify the differences in the distributions, we compared an overlapping statistic for each variable which showed AaDO2 andPL predictive of survival. Graphing these result revealed an AaDO2 ≥605 with a PL ≥38 to predict 84% mortality. To confirm this Bootstrapping was applied. This method permits resampling with replacement of the original data base(X100) with recomputation of the mortality predicted by the variables of interest. With this method we determined that 75 out of 100 cycles would produce91% mortality with the median 84.6%. Bootstrapping allows small pop. to be analyzed with confidence.

† 167 TOXIC MYOCARDIAL DEPRESSION. Wm Berman Jr., Dan Riggs, Gail Wellenstein, Alice Cushing, and Steve Olsen. UNM, Alb, NM.

We reported previously negative inotropic effects of serum from children with bacterial sepsis on an isolated dog papillary muscle preparation (Ped Res 18:1132, 1984). We have now studied sterile filtrate of a broth culture of Staphylococcus aureus (SA) from an infant with sepsis and depressed myocardial function. We suspended dog left ventricular papillary muscles in 50 ml oxygenated buffer and allowed 30 min of stabilization at a stimulated rate of 60/min. We measured maximum force generated (Fmax, mg) and rate of change of force (dF/dt, gm/sec) for muscles which were 1 mm^2 in cross-sectional area and at 25 mg resting tension. Measurements were made before (C) and 10 minutes after addition of 0.3ml of the test solutions listed below to the 50 ml bath. Results were as follows:

	C	SA pH 7	SA boiled	SA pH 2	SA pH 12	SA dialyzed (out)	SA dialyzed (in)
N	6	6	2	4	4	3	3
Fmax	709	390	645	659	617	711	496
dF/dt	4.77	2.58	4.48	4.05	4.15	4.9	3.0
%change Fmax		-49	-9	-7	-13	0	-30

Results suggest a non-dialyzable (12-14,000 mol wt) heat labile, pH labile bacterial product depressed contractile performance of dog papillary muscles isolated and stimulated in a muscle bath.

168 QRS vs. LEVEL IN PREDICTING CLINICAL SEVERITY IN ACUTE TCA OVERDOSE. Mark T. Boehnert, Frederick H. Lovejoy, Jr.

From 1/6/84-6/6/84, 49 acute overdoses involving tricyclic antidepressants (TCA's) were followed for seizures and ventricular arrhythmias. Arrhythmias were defined as: idioventricular rhythms, ventricular tachycardia, ventricular fibrillation, prolonged bigeminy or trigeminy, and asystole. Patients were divided into two groups. Group 1 (N=13): QRS < 0.1 seconds. Group 2 (N=36): QRS ≥ 0.1 seconds. Results in Group 1: 100% survival, 0% seizures or arrhythmias. Mean TCA concentration was 792 ± 621 ng/ml (range 351-2677 ng/ml). Average age: 34.4 ± 19.7 yrs. Results in Group 2: 100% survival, 33% seizures, 13.9% ventricular arrhythmias. Mean TCA concentration 1473 ± 967 ng/ml. Average age: 33.8 ± 12.4 yrs. All seizures or arrhythmias occurred within 6 hours of the overdose and resolved by 24 hours. TCA concentration did not correlate with QRS duration, symptoms, or prognosis. A QRS duration ≥ 0.1 seconds did correlate with seizures ($p < 0.05$), while a QRS ≥ 0.16 seconds correlated with ventricular arrhythmias ($p < 0.0005$).

We conclude, in contrast to earlier reports, that: a) a QRS ≥ 0.1 seconds (and not peak TCA levels) identifies patients at high risk for seizures, b) similarly, a QRS ≥ 0.16 seconds identifies patients at high risk for ventricular arrhythmias, c) a QRS < 0.1 seconds effectively excludes patients from risk of seizures and/or ventricular arrhythmias, and d) seizures and/or ventricular arrhythmias occur within 6 hours and abate by 24 hours of an acute TCA overdose.