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## URINARY EXCRETION OF PROSTAGLANDIN E FOLLOWING THE ADMINISTRATION OF FUROSEMIDE AND INDOMETHACIN TO SICK LOW BIRTHWEIGHT INFANTS. Zvi Friedman, Laurence M.

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Urinary excretion of prostaglandin E was measured in seven sick low birthweight infants. Four had severe hyaline membrane disease, one had chronic bronchopulmonary dysplasia and all received furosemide. Two infants suffered from patent ductus arteriosus and received indomethacin. Urinary volume and the excretion of sodium, calcium and prostaglandin E were determined in these infants before and after the administration of these drugs. Following furosemide administration, urine volume and the excretion rates of sodium and calcium were significantly increased; such changes were not seen following the administration of indomethacin. Prostaglandin E excretion rate was increased from  $0.4 \pm 0.04$  to  $1.3 \pm 0.2$  ng/mg Cr (mean  $\pm$  SEM) following furosemide administration but decreased from 1.0 to 0.4 (mean) ng/mg Cr following indomethacin administration. The mechanism(s) by which furosemide enhances urinary excretion of prostaglandin E may be an increase in prostaglandin synthesis, a decrease in their renal metabolism or both. However, indomethacin which is a prostaglandin synthetase inhibitor, decreases the urinary excretion of prostaglandin E in a dose-dependent fashion. These observations suggest the possibility that in patients receiving indomethacin furosemide therapy may be ineffective.

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## NEW ENGLAND REGIONAL INFANT CARDIAC PROGRAM (NERICP)

Effects on Care Delivery, Donald C. Fyler, Lucy P.

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NERICP is a voluntary association of all New England hospitals offering cardiac care for infants and dedicated to improving care for these babies. NERICP began in 1968 and has emphasized professional education, improved casefinding, transportation, nursing, and social service and monitoring of patient experience. There has been increased new case discovery, decreased unrecognized deaths in state vital statistics and earlier admission. Because the data are consecutive, epidemiologic studies are possible, hospital experience can be monitored and studies of determinants of survival are possible. Self evaluation by individual hospitals has resulted in gradual restructuring of case delivery in the region. From an original 11 hospitals offering definitive care for infants, 5 now offer full diagnostic and surgical service, 3 offer full diagnostic and limited surgical service, 2 offer only non invasive diagnostic evaluation and 1 has discontinued all pediatric cardiology. Multivariate analysis indicates that, before and during these transitions, variation in survival among infants arriving at NERICP hospitals (except for one full service hospital with poor results) are not statistically significant. Successful management by limited service hospitals is accomplished through informed surgical referral. These changes in care delivery are believed to be an individual hospital response to reliable regional information about the available patient pool and the problems of management identified by NERICP.

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## EFFECT OF DC COUNTERSHOCK (CS) ON THE MYOCARDIUM OF THE NEWBORN PIGLET.

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DC countershock (CS) has produced myocardial necrosis in adult patients and experimental animals. No data exist concerning the vulnerability of the newborn myocardium to CS. Accordingly, the dose-response of the piglet (mean age 8.2 days) myocardium to CS was assessed using the radionuclide Technetium 99m Pyrophosphate (TP) which selectively accumulates in necrotic tissue. Injury was deemed present if samples of heart muscle 24 hours post CS had a TP uptake 3 times control values. Ten animals given  $<125$  joules/kg (J/kg) as single or multiple shocks showed no accumulation of radionuclide. Two of 5 piglets receiving 125 to 160 J/kg inclusively showed myocardial lesions with 7.0  $\pm$  9.7% injured free wall and a weighted average sample to normal ratio (S:N) of 3.5  $\pm$  4.8. All 6 animals given  $>160$  J/kg had gross necrotic lesions and averaged 18.2  $\pm$  8.4% free wall injury with an S:N of 15.6  $\pm$  7.5.

These studies indicate the myocardial necrosis only occurs with very high levels of CS in the newborn piglet and suggest the relative safety of the recommended dosage level of 2 J/kg for single or multiple applications in the newborn infant.

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## ECHOCARDIOGRAPHIC STUDY OF PULMONARY VASCULAR RESISTANCE (PVR) IN POLYCYTHEMIC NEONATES. Constance

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Polycythemia in the newborn may be associated with increased pulmonary vascular resistance (PVR). Echocardiography has recently been shown to be a useful non-invasive method of evaluating PVR. Twenty-five term infants were studied with serial echocardiograms using simultaneous strip chart recordings of the echocardiogram and EKG at 100 mm. sec. Echocardiograms were taken on the 1st, 2nd and 4th day of life and/or prior to and within 12 hours following partial exchange transfusions. The RPEP, RVET, LPEP, LVET, mitral EF slope and LA/Ao ratio were measured in the standard manner. The infants were divided into 3 groups: Gr-I, with central Hct values  $<65$  (n=8), Gr-II, central Hct 65-69 (n=11), and Gr-III, central Hct  $>70$  (n=6). Eight infants including the six in Gr-III, had partial exchange transfusions. The RPEP/RVET and LA/Ao ratio were higher in Gr-II and Gr-III, as compared to Gr-I. There was an apparent decrease in the LPEP/LVET and mitral EF slope in Gr-II and Gr-III, as compared to Gr-I. Following exchange transfusion, the RPEP/RVET declined 23% compared to a 3% increase in Gr-I over the same period of time. From day-1 to day-4, there was a 30% decline in the mean RPEP/RVET in infants after exchange compared to a 17% decline in Gr-I. The data indicates that echocardiography is useful in evaluating PVR in polycythemia. Serial echocardiographic determinations are helpful in monitoring the response to exchange transfusion.

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## RELATIONSHIP BETWEEN THE ANTERIOR MITRAL LEAFLET MOTION AND LEFT VENTRICULAR SIZE IN THE ECHOGRAM.

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The amplitude of the anterior mitral leaflet (AML) in the echocardiogram (E) depends on the size of the AML, free flow across the mitral apparatus and the left ventricular (LV) end-diastolic volume. Under normal conditions, it is possible that there is a constant relationship between these factors. To assess this relationship between AML and LV end-diastolic diameters (LVD), we studied 200 normal children between 5-14 years of age with body surface area (BSA) of 0.7 to 1.59. Strip chart E were obtained of the LV in the standard fashion by means of a 2.25 M Hz transducer. Inner LVD was measured in millimeters at the onset of the Q wave of the EKG. Maximum vertical AML amplitude between C and E points was also measured in millimeters. The ratio between AML and LVD was calculated. Our results for the mean and 1 standard deviation were as follows:

AML/LVD Males = 0.55 (0.05) and Females = 0.56 (0.05)

There was no significant difference statistically between these values in these growing children at any BSA. This study shows that there is a narrow range in the ratio between AML and LVD in children. Alterations in the ratio from this normal range may support pathology, even though the AML and LVD are within their own normal values.

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## SEX DIFFERENCES IN AORTIC ROOT SIZE IN CHILDREN BY ECHOCARDIOGRAPHY. Lily George, James W. Mathewson,

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Differences in aortic root (Ao) size have been reported among normal adult male (M) and female (F) population. However, there is no data available on such a possibility in children. Thus, we studied 110 M and 90 F, normal school children, 5-14 years of age and with body surface area (BSA) of 0.7 to 1.59 by echocardiography (E). Strip chart E recordings of the Ao with the valve motion inside were obtained in the standard fashion by means of a 2.25 M Hz transducer focused from the 3rd or 4th left intercostal space. Inner Ao diameter was measured in millimeters at the onset of the Q wave of the EKG for several cardiac cycles and averaged. Our results for the mean and 1 standard deviation for the M and F children with different BSA were as follows:

BSA	0.70-0.99	1.00-1.19	1.20-1.39	1.40-1.59
M	17.1 (1.8)	19.9 (1.6)	20.1 (1.7)	23.3 (2.3)
F	16.6 (1.6)	18.4 (1.6)	20.0 (0.9)	21.9 (2.0)

In this study there is only statistically significant differences ( $p < 0.01$ ) in Ao size between M and F children in the group with BSA of 1.00-1.19. This may suggest that the sex differences in the Ao sizes in adult population probably establish in young adulthood than during childhood.