

EVALUATION OF A NEONATAL RECOVERY ROOM UNIT (NRRU). E.M. Ostrea, Jr., A.G. Capino, C.J. Chavez, Wayne State Univ., Hutzel Hosp. & Children's Hosp. of Mich., Dept. of Peds., Detroit, Mich. (Intr. by P.V. Woolley, Jr.)

A number of hospitals still exist with their neonatal ICU not within the vicinity of the delivery rooms. This means transporting compromised & unstable infants some distance to reach the ICU. At Hutzel Hosp. this problem was solved by the use of a NRRU in the delivery suite. This report evaluates our experience. The NRRU was designed as a miniature ICU & can accommodate 2 infants. High-risk infants with problems during delivery and those born with low APGAR scores were admitted to the NRRU for observation, stabilization of vital signs and/or further treatment. A nurse from the neonatal ICU was called to the NRRU if a patient was anticipated. The infants were transferred out of the NRRU only after vital signs had stabilized & skin temp. was at least 97 F.

RESULTS: During a 10-month period, 54 newborns were admitted to the NRRU: (1) transfusion for severe Rh (9%), (2) tracheal lavage due to meconium aspiration (6%), (3) APGAR (1 min) less than 5 (6%) & (4) normal APGAR but high-risk newborn (18%). The mean 1 min. APGAR =  $3.6 \pm 2.7$  with 89% requiring resuscitation. Mean birthweight =  $2183 \pm 954$  g. Mean duration of stay = 48.3 min. 43% of those admitted subsequently died but this group had a significantly lower gestational age, weight & APGAR score compared to those who survived ( $P < 0.005$ ). It cannot be concluded whether the NRRU has improved survival but the 58% survival of infants with mean APGAR of 3.6 is encouraging. One factor for this might be the better temp. of the babies upon arrival at the ICU (97.1 to 99). In contrast, skin temp. on admission to the NRRU =  $95.8 \pm 1.2$  F. It was also noted that working in the NRRU was more convenient because a pediatric nurse assisted & necessary equipment was on hand. The NRRU also prevented the holding up of a delivery room (mean = 48.3 min.) because of an infant. This allowed more time for the infant to stabilize completely before being transported. It is felt that a NRRU can be used for optimal care to infants.

THE ROLE OF A PEDIATRIC NURSE PRACTITIONER (PNP) IN A NEONATAL UNIT. E.M. Ostrea, Jr., H. Schuman, Hutzel Hosp., Detroit, Mich. (Intr. by P.V. Woolley, Jr.)

The Hutzel Hosp. in Detroit has an annual delivery rate of  $5686 \pm 96$  livebirths (LB) & a neonatal mortality & morbidity rate of  $18.6 \pm 1.0$  &  $286 \pm 30.2$  per 1000 LB, respectively. The prematurity rate is  $11.2 \pm 1.6\%$ . It was felt that with a significant number of high-risk & sick newborns requiring care, lesser attention was being given to the well newborns as far as more frequent examinations of the babies and communication with their mothers were concerned. A PNP was therefore utilized to correct this deficiency & this report summarizes her year's experience.

The PNP was placed in charge of the well & non-high-risk staff nursery. Her major responsibilities included: (1) daily chart & newborn rounds (2) initial newborn PE (3) rounds with mothers, & (4) daily report to the physician on the condition & problems in her nursery.

RESULTS: During the year of evaluation, the PNP performed 1312 initial newborn PE (excluding the number of subsequent PE's she performed during her rounds) & spent a total of 510 hours with the mothers particularly in answering her questions or the giving of instructions. This represents a 56% reduction in the routine load on the physician and a corresponding increase in the frequency of communication with the mother, most of whom were on Medicaid & with a mean age of 17 years. Her daily rounds has also enabled her to detect serious problems that subsequently developed in 20 newborns, such as: severe jaundice requiring exchange transfusion (8); sepsis (7); RDS due to aspiration pneum. (2); hypoglycemia (2) & major cong. anomaly (1). With the PNP, needless transfer of infants to the ICU for mere observation was avoided. This made efficient use of the ICU & prevented needless separation of the infant from his mother. The PNP also assumed other roles such as the teaching of nursing & medical students and as a coordinator with the Social Service in her unit. It is concluded that the PNP can play a significant role in the nursery.

RESPONSE TO SYSTEMIC ACIDOSIS IN FETAL PRIMATES. John B. Paton, Eddie S. Moore, David E. Fisher and Richard E. Behrman Depts. of Ped., Michael Reese Medical Center, Chicago; College of Physicians and Surgeons, Columbia U., New York.

The response of the fetus to systemic acidosis has been studied in 8 fetal baboons age 160 gestation. Lactic acid 4meq/kg fetal weight) was infused over a 15 min. period. pH,  $pCO_2$ ,  $HCO_3^-$ , base excess and lactate were measured in fetal blood and urine, amniotic fluid and maternal blood and urine. TA and  $NH_4$  were measured in amniotic fluid and in fetal and maternal urine. Fetal femoral artery blood pH fell from 7.22 to 7.16 after lactic acid infusion. After 18 min., the fetal blood pH had returned to control values. Fetal  $U_{pH}$  did not significantly change from the mean control value and there was no increase in TA or  $NH_4$ . The infused acid was distributed as follows during 75 min. following the infusion.

	Placental Clearance	Fetal Blood	Amniotic Fluid	Fetal Urine
% of Dose	82.3	8.1	4.5	0.2

These data support our hypothesis that fetal acid-base balance is primarily maintained by placental clearance of  $H^+$  as more than 82% of the infused acid is rapidly cleared by this organ. Fetal-amniotic fluid exchange is also an important homeostatic mechanism. The clearance of only 0.2% of the infused acid by the kidneys indicates no significant participation in acid-base homeostasis in utero by these organs. This is not inconsistent with our previous demonstration of a mature  $H^+$  secretory capacity for the fetal kidney.

MATERNAL EXERCISE AS A SCREENING TEST FOR UTEROPLACENTAL INSUFFICIENCY (UPI). J.J. Pomerance, L. Gluck, and V.A. Lynch, Univ. of Calif., San Diego, Sch. of Med., Dept. Ped and U.S. Naval Hosp., San Diego, Dept. Ob. and Gyn.

The majority of distressed fetuses and infants discovered during labor and delivery occur in seemingly normal pregnancies. Identification of these infants prior to labor was attempted by screening mothers for UPI with an exercise test at 35-37 weeks gestation. In addition, the relationship between maternal physical fitness (PF) and UPI was evaluated. Fetal heart rate was measured prior to and following maternal exercise. A change in the fetal heart rate of more than 16 beats per minute was considered to be a "positive" test. Five fetuses of 54 women tested had positive tests, 4 of whom subsequently developed fetal distress during labor and delivery. Seven additional infants developed fetal distress during labor and delivery; 6 of these, however, had compromised umbilical circulations. PF was unrelated to UPI in the subjects tested. It is suggested that women with "positive" exercise tests be monitored carefully during labor and delivery and perhaps advised to avoid strenuous activity in the interim.

EFFECT OF TEMPERATURE ON SURVIVAL OF INFANTS WITH RDS. Jeffrey J. Pomerance and Carol Madore, Univ. of Calif., San Diego Sch. of Med., Dept. Ped., Div. Perinatal Med., La Jolla, and The Maternal & Child Health Unit, State Health Dept., Berkeley, Calif. (Intr. Louis Gluck)

In 1900 Budin reported on the marked effect body temperature had on survival of premature infants. Despite this observation and many similar ones, some institutions still do not adequately prevent cooling of the newborn following delivery. The effect of temperature on survival of infants with RDS was evaluated in a collaborative prospective study of RDS in 9 selected California hospitals with intensive care nurseries. The 470 babies in the sample represent intramural infants only. Two hundred sixty-four survived (56%). Infants were divided into 3 groups according to their temperature on arrival in the ICU. Group I had deep body temperatures of  $< 34.5^\circ C$ ; Group II  $34.5-35.4^\circ C$ ; and Group III  $> 35.4^\circ C$ . The crude survival rates for the 3 groups were 22, 47, and 61% respectively. Indirect standardization for birth weight (BW) and gestational age (GA) produced adjusted survival rates of 32, 53, and 61% respectively ( $p < 0.001$ ). It is of interest to speculate how many infants might have lived had none of the newborns been allowed to become chilled. By applying BW-GA specific survival rates of Group III to Groups I and II, it is projected that an additional 33 infants would have survived. Supported by Maternal & Child Health Grant from California Dept. of Public Health

THE EFFECT OF UMBILICAL ARTERIAL CATHETERIZATION ON SUBSEQUENT LIMB BLOOD FLOW. W.F. Powers and P.R. Swyer. The Research Institute of The Hospital for Sick Children and the Department of Paediatrics, University of Toronto, Toronto, Canada.

The safety of umbilical artery catheters (UAC) has been questioned. Catheters are necessary for biochemical monitoring, and offer means of avoiding hypoxia and hyperoxia. Several necropsy studies and one angiographic report (Peds. 50: 6, 1972) demonstrate that UAC promote thrombosis that could compromise leg blood flow. Our studies suggest that UAC have no effect on subsequent limb blood flow.

Using venous occlusion plethysmography and a double strand mercury-in-"rubber" strain gauge, we measured blood flow simultaneously in both legs in 28 infants who had had UAC as neonates. Measurements were made under standard conditions and after stimulation of flow by two minutes of circulatory arrest. UAC tips were positioned at the aortic bifurcation. Mean duration of catheterization was 59.3 hrs. (range 4-144). Mean age at study was 67 days (range 29-135).

We compared the highest flow in each leg with the simultaneous flow in the opposite leg. Under conditions specifically chosen to accentuate circulatory differences, flow in the leg on the UAC side was on the average .5 ml/100 ml tissue/min > flow on the non-UAC side, a difference of 1% (analysis of variance,  $F(1, 83) = 0.157$   $p > .05$ ). This difference is of no biological importance.