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Effect of Depriving Newborn of Placental Blood upon Early Postnatal Blood Picture.

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Within the last few years, the collection of postpartum placental blood for "blood banks" has been strongly advocated not only in Russia[1] but also in Canada[2] and in this country.[3, 4, 5] It has been pointed out that this is an inexhaustible and "lucrative" source of blood, satisfactory for transfusion purposes, and that its collection has no deleterious effect upon the mother. Possible effects upon the child have been disregarded because it has already become a rather common obstetrical practice to clamp the umbilical cord promptly at birth in spite of the fact that most of the placental blood normally drains into the body of the infant within a few minutes when the umbilical cord is not clamped immediately after delivery.[6] When the cord is clamped immediately, the infant is deprived of an alarming proportion of its total blood volume and usable iron at the very beginning of extra-uterine life. We have obtained proof that this blood-letting at birth affects the blood picture of the newborn significantly. The practice should be strongly condemned.

We have determined the amount of hemoglobin and number of red blood corpuscles in blood taken from the mother on the day of birth, in cord blood at birth, in blood from the newborn (heel) 15 to 75 minutes after birth, and from the infant at one, 3 to 4, and 6 to 7 days after birth in 2 series of patients. In one series of 25, the umbilical cord was clamped within 30 seconds after delivery; in another series of 29, clamping was delayed until pulsations had

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† Department of Medicine. This investigation was conducted at the Cook County Hospital, on the service of Dr. David S. Hillis, whose cooperation is greatly appreciated by the authors.

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ceased and the placenta had separated. Hemoglobin was determined in grams percent with a calibrated Hellige-Sahli instrument. Red blood corpuscle counts were made with a Spencer hemocytometer (N.B.S.). Reticulocyte counts were obtained in 4 infants whose cords had been clamped immediately and in 4 in which clamping had been delayed.

Complete data will be published in a future article. The umbilical cord blood at the end of gestation in both series contained about 15.7 g of hemoglobin per 100 cc and about 4.5 millions of red corpuscles per cmm. Within a brief period of time after birth—averaging less than an hour in our experiments—the amount of hemoglobin and number of corpuscles in the newborn's blood increased markedly. Values rose to 21.3 g % Hb and 5.93 millions R.B.C. in those infants allowed to retrieve their placental blood. In those deprived of the placental blood by immediate clamping of the umbilical cord, the values rose only to 18.9 g % and 5.57 millions R.B.C. in the same interval. The amount of hemoglobin and number of corpuscles increased further during the course of the first postnatal day (22.5 g % Hb and 6.22 million R.B.C.) in the infants receiving their normal share of placental blood, but not in those deprived of it. The former group maintained higher values throughout the period under investigation.

One difference between the two experimental groups manifested itself on about the fourth day of life. Hemoglobin reached a peak in both series at that time, but those infants deprived of placental blood at birth exhibited an increase in hemoglobin, amounting to 1.4 g % above the one day average; while the other group showed a rise of only 0.5 g %. In neither series did the red corpuscle count rise.

Reticulocytes reached a peak at one day after birth. In a group of 4 infants whose cords were clamped immediately, this amounted to 8.3 % as compared with 4.7% in the 4 infants of the other group.

Our experiments have demonstrated that failure to allow the placental blood to return in large measure to the infant at the time of delivery is equivalent to submitting the newborn to a hemorrhage. Acceleration of hemopoiesis appears to occur in an attempt to make up this loss. It can not be doubted that a drain is placed upon the infant's iron reserve, and at this time in life it can ill afford such a loss, for it must get along with what iron it has in its body at birth until the nursing period is passed.

Our experiments may help to reconcile a persistent disagreement in the literature regarding hemoglobin and corpuscular values in

man at birth.[7] Some investigators have obtained results comparable with our determinations in cord blood and others have found higher values similar to ours in blood drawn from the infant after delivery. The exact source and time of collection of newborn blood have not always been stated. The difference which we have found between cord (venous) blood at the moment of birth and capillary blood from the infant less than an hour later is truly surprising but may be more apparent than real. A similar difference between venous and capillary blood has been reported in pernicious anemia but not in normal adults.[8] It is possible that macrocytes in the blood of infants as well as of P.A. patients block some of the capillaries and thus effect a concentration of corpuscles.

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Cerebellar Action Potentials in Response to Stimulation of Cerebral Cortex.

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The problem of functional localization in the cerebellum is one which has received considerable attention. Recent comparative anatomical studies[1] and ablation experiments[2] have supported a division of the cerebellum based on afferent fiber connections. Recently Dow[3] has recorded action potentials in the cerebellum as a result of stimulating various afferent fiber tracts, and his results are in accord with Larsell's anatomical findings. The present work is an attempt to explore by the oscillographic method the projections of the cerebral cortex to the cerebellar cortex.

Methods and Results. Twelve cats, under barbiturate anesthesia, were used in this work. The method of stimulating and recording is described elsewhere.[4] Single electrical shocks were

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