ALTERATIONS IN FETAL RABBIT PROTHROMBIN TIME AT DIFFERENT STAGES OF GESTATION AND DURING ASPHYXIA

A.A. Orekhova

From Biochemical Laboratory (Chief-Doctor Biological Sciences A. D. Braun) and Section for Newborn (Scientific Director-Active Member AMN SSSR Prof. A. F. Tu) Institute of Obstetrics and Gynecology (Director-Corresponding Member AMN SSSR Prof. A. Beloshapko) AMN SSSR, Leningrad

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It is well known that, in comparison with the adult, the newborn has a marked prolongation of its prothrombin time [1, 2, 3, 8].

In the opinion of many authors this is the result of exogenous and endogenous vitamin K deficiency [4, 5, 6, 8, 10].

However, our preceding observations have demonstrated that the prothrombin time in the newborn begins to diminish beginning with the 3rd to 5th day of life even when these infants receive no vitamin K.

In addition, it has been shown that the liver of infants dying as a result of intracranial hemorrhages had adequate amounts of vitamin K even when the prothrombin time during life had been shown as being prolonged. Evidently, the prolongation of the prothrombin time in the newborn must be associated not only with K hypovitaminosis but also with many other factors.

The present study had as its goal the observation of prothrombin time changes in the period of intrauterine ontogenesis and the alterations which occur when the fetus enters into extraterine life, i.e., starts the period of pulmonary respiration and, also, how prothrombin time is affected in the fetus by asphyxia.

EXPERIMENTAL METHODS

The experiments were conducted upon intratubal rabbit fetuses. The pregnant rabbit received an injection subcutaneously of a 5% solution of hexanastab, the dose being 4 cc per 1 kg of animal weight. After the rabbit had gone to sleep, it was placed into a bath of physiological saline the thermostatic control being set at a temperature of 37.5-38°, the abdominal cavity was opened, the uterine horns brought out and the fetuses removed in turn. The blood for determining the prothrombin times was taken from the fetal heart. The fetal prothrombin time determinations were made by the Kazantseva modification of the Quick method [2, 3].

EXPERIMENTAL RESULTS

Prothrombin time in the period of intratubal ontogenesis. In 16 fetuses aged 20 to 24 days it was not possible to determine the prothrombin time by the Quick-Kazantseva method as the blood did not coagulate even after two hours.

In fetuses at the stage of 26-28 days of intratubal life (35 experiments) the prothrombin time fluctuated between 70 to 90 seconds, averaging 40.4 ± 0.6 seconds. Shortly before birth, i.e., between 29th and 31st days of intratubal life (40 experiments), the prothrombin time varied from 35 to 15 seconds averaging 28.4 ± 0.8 seconds. In this last group there was observed a definite difference in fetuses at the 29th day of intratubal life and
In the last stages of gestation there was observed the development of heavy thickenings and clumps, while just before term (31st day) a definite clot floating freely in the tube was present. In the female pregnant rabbit, as the blood coagulated, a firm clot filling the entire lumen of the tube and tightly adhering to its walls was formed.

Alterations in prothrombin time in fetuses during the period of transition from intratubal to extratubal life. In this experimental series 35 animals were studied. After tying the cord the fetus was immediately removed from the mother and placed on a cotton pillow; within several seconds there would begin respiration and movement. Within 10-20 minutes after respiration had begun, blood was taken from the heart to determine the prothrombin time. As controls, the fetuses in the other horn of the mother (that had not been separated from the placenta) were used. The results obtained are shown in Table 1.

As can be seen from this table, there were no significant prothrombin alterations as the fetuses entered into the phase of pulmonary respiration.