Thrombocytosis in low birthweight infants

A physiological phenomenon in infancy

ULLA LUNDSTRÖM

Children's Hospital, University of Helsinki, Finland

SUMMARY Prematurity has traditionally been connected with thrombocytopenia, although this is unlikely to be associated with prematurity itself but rather with serious illnesses in such infants. Platelet counts were measured in 117 healthy preterm infants with birthweights <2 000 g, who were followed up from 2 weeks to 6 months. In this series the platelet counts were high compared with those in previous reports, and also compared with what is considered normal for term infants. The 95% range was between 160 and 675 x 10^9/1, with a median value of 375 x 10^9/1. The data suggest that thrombocytosis is a phenomenon related to prematurity.

There have been conflicting reports on platelet counts in preterm infants during the first weeks of life and little information about platelet counts after 2 months. Medoff (1964) found low values in infants with birthweights <1700 g, as did Kaplan and Klein (1962). Aballi et al. (1968) reported considerably higher values with a mean value >200 x 10^9/1 at 1-2 days and >300 x 10^9/1 at 2 weeks and at one month in a large series of 300 premature infants. They excluded 10% of the infants because they were ill or subsequently died, and concluded that the abnormally low values in earlier reports might be associated with serious illnesses which result in thrombocytopenia. Evidence of illness was also found in many premature infants who had low platelet values (Oztalay and Beard, 1963). Abnormally high values have been reported in connection with haemolytic anaemia due to vitamin E deficiency (Ritchie et al., 1968). Melhorn and Gross (1971) found platelet counts of between 400 and 450 x 10^9/1 in 10 infants with anaemia, reticulocytosis, and low levels of serum vitamin E concentration who were aged 6-8 weeks. The platelet count subsequently decreased when the infants were treated with oral vitamin E.

The purpose of this study was to establish the platelet counts in preterm infants who were followed longitudinally and for a sufficiently long time to exclude any sick infant; iron and vitamin E deficiency was prevented by giving daily supplements.

Subjects and methods

At age 2 weeks a group of 125 healthy preterm infants with birthweights between 1050 and 2000 g was studied (Lundström et al., 1977). None then had had exchange transfusion, but 7 had transfusions later and so were excluded. One infant with hereditary spheroctytosis was also excluded. Thus the study group comprised 117 infants who were tested at 2 weeks and then each month until aged 6 months, on average five times per infant. Gestational age according to amenorrhoea ranged from 27 to 40 weeks (mean 32 weeks); the average birthweight was 1650 g.
During the follow-up period the infants received either breast milk, proprietary infant milk formula, or home-prepared cows' milk dilution. In addition to vitamins A, D, and C, and folic acid, each infant was given a daily dose of 5 IU vitamin E as alphatocopherol acetate beginning at age 2 weeks. Thus the ratio of vitamin E to polyunsaturated fatty acids in the three milk diets ranged from 1·6 to 5·0, and exceeded the amount normally considered sufficient to prevent vitamin E deficiency (Horwitt et al., 1963). The infants with uneven birth dates received 2 mg/kg elemental iron each day starting at 2 weeks, while babies born on even dates were not given additional iron before 6 months unless there were signs of iron depletion in their haemoglobin (Lundström et al., 1977).

Hb concentration and reticulocyte and platelet counts were determined from capillary samples during the initial period in hospital and from venous blood at subsequent outpatient visits. Hb was measured by a Model S Coulter Counter. Reticulocytes were determined microscopically. Platelet counts were performed by a direct chamber count method (Wright and Kinnicutt, 1911).

Results

There was evidence of thrombocytosis in preterm infants aged between 2 weeks and 6 months. However, there was a wide range of values at each age and a great variation within single infants at different times (Figure). The 95% range of all the babies with their ages combined was between 160 and 675 x 10⁹/1, with a median of 375 x 10⁹/1. Only a few infants had transient low values <200 x 10⁹/1.

There was no difference in platelet counts between infants who were given iron and those who were not (Figure). At each age the groups of infants with platelet counts above or below 400 x 10⁹/1 had similar values for Hb and reticulocyte counts, except at 2 weeks of age when the group with the high count had a lower concentration of Hb (P<0.05). In order to test the correlation between gestational age and platelet count the two extreme groups, those with gestational age <31 weeks and those with gestational age >34 weeks were compared. No difference was found, nor was there any correlation between birthweight and platelet count.

Discussion

In this series of premature infants the platelet counts were high compared with other reports (Kaplan and Klein, 1962; Medoff, 1964), and also compared with what is considered normal for term infants. In
infancy and childhood, thrombocytosis is seen in connection with various rare diseases (Addiego et al., 1974) of which iron deficiency and vitamin E deficiency are likely to be the most common causes in preterm babies. These results show that there were relatively high values at 2 weeks in the presence of ample iron stores. No difference was found between iron-supplemented and nonsupplemented infants. Nor were high platelet values associated with low Hb levels, except at 2 weeks. Accordingly there is no reason to suspect that a lack of iron in these infants individually, or as a group, would have resulted in thrombocytosis. Vitamin E deficiency as a cause is also unlikely as the infants were supplemented with vitamin E, and Hb levels and reticulocyte counts were similar whether their platelet counts were high or low.

The data suggest that thrombocytosis is a physiological phenomenon in preterm infants during the first 6 months of life. The increase in number might be compensatory to a decreased functional capacity shown in term infants (Corby and Schulman, 1971) and further suggests that values \(<160 \times 10^9/1\) are evidence of thrombocytopenia.

This study was supported by grants from the Foundation for Paediatric Research in Finland, and by National Institutes of Health Grant No. AM HD 13897 and National Foundation, March of Dimes Grant No. 6–81.

**References**


Correspondence to Dr U. Lundström, Children's Hospital, University of Helsinki, Stenbäckinkatu 11, SF-00290 Helsinki 29, Finland.

---

**Aortography in infantile coarctation**

A simple and effective technique

BRIAN DENHAM, O. C. WARD, PATRICK McCANN, AND NOEL BLAKE

Cardiac Department, Our Lady's Hospital for Sick Children, Dublin

**SUMMARY** A new and simple technique is described which clearly defines the aortic anatomy in infantile coarctation. The technique greatly helps to select those neonates whose lives can be salvaged by early surgery. There have been no serious adverse effects.

Coarctation in the neonate when associated with an interventricular septal defect or patent ductus arteriosus is a disorder which carries an extremely high mortality, in the region of 80 to 90% in the first year of life. It is usually associated with hypoplasia of the distal aortic arch and may be regarded as the mildest expression of the hypoplastic left heart syndrome.

In some cases surgery in the first months of life to relieve the coarctation and close a patent ductus arteriosus can reduce the left ventricular pressure...