

CORD BLOOD COAGULATION STUDIES IN HIGH RISK PREGNANCIES

by

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Introduction

Precise definition of High-Risk Pregnancy is not possible and will continue to change as science of perinatology provides new information. Prematurity, foetal growth retardation, ante-partum haemorrhage, toxæmia, diabetes, Rh isoimmunization are deterrents to the achievement of the goal that all infants not only will be liveborn and survive but will also suffer neither physical nor psychological impairment as the consequence of hostile antepartum, and postpartum environment. Any pregnancy in which there is likelihood that this outcome may not be achieved, must be considered "High Risk".

Sick newborn infants are particularly susceptible to haemorrhagic and thrombotic complications. Disseminated intravascular coagulation has been described after abruptio placentae, pre-eclampsia, dead-twin foetus, idiopathic respiratory distress syndrome. Hypercoagulability of foetal blood has been suggested as an important intermediary pathology of these

frequently seen haemorrhages and thrombotic complications.

Material and Methods

The present study was carried out in Government Medical College Hospital, Nagpur from July, 1976 to December, 1977. The cases studied in this series were grouped under four headings:

Group A: 25 newborns of normal mothers were taken as control group.

Group B: 30 newborns of mother who had pre-eclamptic toxæmia were studied, criteria being B.P. 160/100, + 2 to + 4 proteinuria and oedema.

Group C: 20 premature newborns of normal mother without any complicating illness, criteria being weight below 2000 gms and less than 36 weeks of gestation.

Group D: 10 newborns of mothers who had accidental haemorrhage.

A thorough clinical history and examination of mothers and newborn was carried out. Any bleeding tendency in newborn was noted. Specific investigations to diagnose toxæmia, accidental haemorrhage were done in mother.

Cord blood was collected in three bottles: two with sodium citrate and one with E.P.T.A. fluid as an anticoagulant.

The investigations carried out on the cord blood are as follows:

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- (1) Haemoglobin in grams by Sahli's method.
- (2) Packed cell volume.
- (3) Clotting time by Lee and White method.
- (4) Plasma prothrombin time of quick.
- (5) Platelet count by Rees and Ecker method.
- (6) Platelet adhesiveness by modified Wright's method.
- (7) Fibrinogen estimation by immunodiffusion method.

Observation and Results

Values of different parameters in different Groups are given in Table I.

Mean haemoglobin in gm for normal full term newborns was observed to be 13.03 gm, packed cell volume 43.76%, clotting time 2 min. 54 sec., prothrombin time 19.36 sec. platelet count 3.47 lakh/cu. mm, platelet adhesiveness 14.2%, fibrinogen level 301.2 mg%.

Mean haemoglobin in gm for newborns of toxæmic mothers was found to be 13.34 gm, P.C.V. 44.93%, clotting time 3 min. 25 sec., prothrombin time 21.7 sec., platelet count 2.39 lakhs/cu. mm, platelet adhesiveness 17.34% and fibrinogen level 275.77 mg%. This indicates that there is slight increase in haemoglobin and P.C.V., increase in clotting time, prothrombin time, decrease in platelet count and fibrinogen level and increase in platelet adhesiveness, when compared to normal full term newborns of normal mothers.

In newborns which are premature by weight as well as by gestations, haemoglobin was 12.72 gm, P.C.V. 44%, clotting time 3 min. 50 sec., prothrombin time 21.55 sec., platelet count 2.32 lakh/cu. mm, platelet adhesiveness 18.59% and fibrinogen 256.25 mg%. This indicates that haemoglobin is slightly reduced,

TABLE I

Sr. No.	Group	Hb% in gm. (Mean)	PCV in % (Mean)	Clotting time in min and seconds (Mean)	Prothrombin time seconds (Mean)	Platelet count lakhs (Mean)	Platelet adhesiveness % (Mean)	Fibrinogen mgm% (Mean)
1.	Control	13.03	43.76	2-54	19.36	3.47	14.2	301.2
2.	Newborns of toxæmic mothers	13.34	44.93	3-25	21.7	2.39	17.34	275.77
3.	Premature newborns	12.72	44.00	3-50	21.55	2.32	18.59	256.25
4.	Newborns of accidental age	10.93	43.2	3-53	21.9	2.21	16.46	249.5

packed cell volume show slight change while clotting time and prothrombin time are prolonged. Platelet count and fibrinogen level reduced in premature infants while platelet adhesiveness shows significant increase.

In newborns whose mothers suffered from accidental haemorrhage, haemoglobin was 10.93 gm, packed cell volume 43.2%, clotting time 3 min. 53 sec., prothrombin time 21.9 sec., platelet count 2.21 lakhs/cu. mm., platelet adhesiveness 16.46%, fibrinogen estimation was 249.5 mg%. This shows that haemoglobin is significantly decreased, packed cell volume remains more or less unchanged, clotting time and prothrombin time prolonged, platelet count is decreased significantly, so also the fibrinogen level. Platelet adhesiveness is increased.

No unusual abnormality in coagulation studies was observed except in two premature infants. Clotting time and prothrombin time were significantly prolonged. Platelet count and fibrinogen level were very low. Both of them expired due to prematurity and superceded respiratory tract infection. None of them showed any haemorrhagic diathesis clinically.

newborns. Same thing was seen with premature infants and infants born after accidental haemorrhage. Infants in fourth group were markedly anaemic and hypocoagulated.

These findings clearly showed that marked deficiencies in the function of haemostatic mechanism was seen in infants of toxæmic mothers, premature infants and accidental haemorrhage cases.

The observations of increased clotting time, prothrombin time, decreased platelet count with increased platelet adhesiveness and lower fibrinogen level in the present study in premature infants is in keeping with the result of Hanson (1960), Nielsen (1969), Rapport *et al* (1943). Saito *et al* (1956) reported high values of fibrinogen in premature infants, but Vahlquist (1953), Philips and Skrodellis (1958), Forgacs *et al* (1962), Arustowics (1966) found a lower fibrinogen content in premature infants as in present series.

Hathway *et al* (1975) reported that most of the infants born after accidental haemorrhage are anaemic and platelet count is reduced. Same observations were made in present series.

Villalba Trivinos (1967) reported half

ABLE II
Various values in 2 premature infants

Hb.% gm.	PCV	C. time	Prothom- bin time	Platelet count	Platelet adhesiveness	Fibrinogen
10.6	47	7 min.	26	1.2	26.67	175
11.0	43	6 min.	24	1.00	30.00	150

Discussion

In new borns of toxæmic mothers, clotting time, prothrombin time are prolonged. Platelet count and fibrinogen level is decreased and platelet adhesiveness is increased as compared to normal

value of fibrinogen in infants of toxæmic mothers. Niel Nielsen (1969) also found reduced fibrinogen, prolonged quiet time, platelet count similar to the present series. William Hathway (1975) reported that newborns and pre-eclamptic mothers showed very low abnormalities.

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