

# A STUDY OF BLOOD SUGAR LEVELS IN THE NEONATES BORN OF NORMAL PREGNANT MOTHERS AND TOXAEMIC MOTHERS

by

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## SUMMARY

Blood sugar estimations were done in 101 neonates which included neonates born to normal pregnant women and neonates born to toxæmic women. It was observed that as the severity of toxæmia increased blood sugar of neonates decreased considerably.

### Introduction

Toxaemia of pregnancy results into many still births and prematurity in neonates. The actual cause for this is still to be found. However, several workers have tried to co-relate the values of different parameters of blood in the toxæmic mothers with that in the neonates born of them. Cornblath *et al* 1959 concluded that some of the neonatal mortality in the toxæmic cases may be due to unrecognised attacks of hypoglycaemia. Before birth the foetus receives a continuous supply of glucose from its mother and its principal metabolic fuel is carbohydrate (Sarkar *et al* (1977). The foetus receives its supply of glucose by continuous transfusion across the placenta. Glucose crosses the placenta by facilitated diffusion i.e. direction of transfer is in accordance with the glucose concentration gradient between maternal and foetal blood. Mac Donald (1971) has observed that normally foetal and maternal glucose concentrations are

closely co-related, with the maternal level higher than the foetal. Changes in the maternal blood glucose are reflected in the foetal blood levels and the foetal blood glucose level at delivery is very strongly dependent upon the maternal level.

In the normal full term new born hypoglycaemic symptoms are not seen unless the blood glucose concentration fall below 40 mg/100 ml. Jhelly and Neleghan (1966) in their literature on "Neonatal hypoglycaemia" has mentioned that neonatal hypoglycaemia resulting into neonatal syndromes like apnoea, cyanosis, limpness, convulsions, cerebral palsy and behaviour disorders, is more common in toxæmic cases. He narrated the mechanism to be due to placental insufficiency, resulting into intrauterine malnutrition and a baby which is small for date, a common occurrence in pre-eclampsia. Hypoglycaemia, both symptomatic and asymptomatic, is certainly more common in these babies than in babies of normal birth weight. Philipp *et al* (1970) has mentioned that transient severe hypoglycaemia in the new born may be associated with maternal toxæmia.

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Accepted for publication on 22-8-83.

*Material and Methods*

Blood sugar estimations were done in a total of 101 neonates which includes both the neonates born to normal pregnant women and neonates born to toxæmic women. The total cases were divided in the following order:

*Group I:* Neonates born of normal pregnant women—35.

*Group II:* Neonates born of mild pre-eclamptic women—35.

*Group III:* Neonates born of severe pre-eclamptic women—19.

*Group IV:* Neonates born of eclamptic women—12.

Total—101.

Blood samples were taken from the severed umbilical cord of the neonates within 5 minutes of birth. The following cases were not included in our programme of work:

(i) The patients receiving glucose transfusion during labour.

(ii) Patients dying during labour.

(iii) Patients having still births. In this case both the mother and still born babies were excluded.

Criteria for grouping the individual:

*Group I:* The patient of this group was

clinically healthy, taking normal diet containing not less than 200 gms. of carbohydrate a day throughout the pregnancy not having diabetes or hypertension. Labour occurred at 38-40 weeks of gestation. Throughout labour there were no evidence of maternal or foetal distress. The cases were of different ages and parity.

*Group II:* The patient had oedema and or albuminuria and blood pressure varying between 140/90 to 160/100 mm of Hg.

*Group III:* Patients in this group had oedema albuminuria and blood pressure 160/100 mm of Hg and above.

*Group IV:* The patients were having convulsions, hypertension, albuminuria or oedema and had history of pre-eclampsia before the patient had fits.

The clinical state of the neonates were assessed and Apgar scoring was done in all the cases at one minute of birth. A score of 5 to 7 indicates neonatal asphyxia.

*Observations*

The findings were tabulised as follows:

TABLE I

*Comparison of Neonatal Blood Sugar Level in Normal Pregnancy and Mild Pre-eclampsia*

Neonatal blood sugar level in mg/100 ml of blood in normal pregnancy			Neonatal blood sugar level in mg/100 ml of blood in mild pre-eclampsia			't' df.	Remark
Range	Mean	S.D.	Range	Mean	S.D.		
54-89	67.171	8.28	53.76	63.60	6.35	2 68	Significant

The mean blood sugar level in the neonates of mild pre-eclampsia was low as compared with the neonates of the normal pregnant women. The difference is statistically significant.

TABLE II  
Comparison of Neonatal Blood Sugar Level in Normal Pregnancy and Severe Pre-eclampsia

Neonatal blood sugar level in sugar level in mg/100 ml of blood in normal pregnancy			Neonatal blood sugar level in mg/100 ml of blood in severe pre-eclampsia			t df.	Remarks
Range	Mean	S.D.	Range	Mean	S.D.		
54-89	67.171	8.28	47.61	51.05	3.341	7.98 52	Significant

The mean blood sugar level in the neonates of severe pre-eclampsia is low as compared with the neonates of normal pregnant women. The difference is statistically significant.

Apgar Scoring of the baby in all cases were done.

Normal neonates—8 to 10.

Toxaemic neonates—5 to 7.

#### Discussion

The levels of blood sugar in normal neonates vary widely. This might be due to the variety of methods developed by various workers, the source of blood samples, the length of the fasting period as well as to the age of the infants.

As the severity of toxæmia in the mother increases the neonatal blood sugar decreases. Moreover, when the neonatal blood sugar levels in the toxæmic cases are compared with the normal neonatal blood sugar level they are found to be considerably lower than the normal (Tables 1, 2 and 3). The "t" value and "df" indicates that the difference is statistically significant.

The reasons for the marked lowered level of blood sugar in the neonates born of toxæmic mothers are not fully clear but there are several speculations.

Brown and Patricia (1963) mentioned that the factor responsible for the neonatal hypoglycaemia in toxæmia of pregnancy was by virtue of its tendency to cause dysmaturity and asphyxia.

Jhelly *et al* (1966) has stated that pre-disposing factor is more likely to be the placental insufficiency, resulting in the intrauterine malnutrition and a baby which is small for date and having low birth weight, a common occurrence in toxæmia of pregnancy.

According to Lula and Bard (1971) the foetus receives its supply of nutrients from maternal sources during gestation and builds up stress of glycogen and fat late in pregnancy which will tide over the period from birth until he can establish oral nutrition. An important source of glucose in the immediate postnatal period is liver glycogen. If in utero, anoxia or birth asphyxia occurs, the source of carbohydrate is partially depleted. If in addition the stores are inadequate as in preterm and under nourished term infants, then glucose level would be expected to fall. Further more, liver function is altered in neonates born of toxæmic mother.

Long *et al* (1977) observed that there was a higher than expected incidence of hypoglycaemia in women destined to become pre-eclamptic. They further observed a positive correlation between hypoglycaemia and foetal growth retardation. Maternal hypoglycaemia in pre-eclampsia leads in turn to neonatal hypoglycaemia. This would fit the clinical observation that the foetal growth retardation often precedes the appearance of signs of pre-eclampsia. Thus he concluded

that pre-eclampsia in association with hypoglycaemia had an ominous significance with regard to foetal outcome.

Blood sugar level should be estimated in all the neonates born of toxemic mothers. This is an important step to avoid the risk of damaging effects of low blood sugar level on the various organs of the body and the blood sugar level should be rectified as early as possible.

References

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