PREMATURITY & BIRTH WEIGHTS IN TOXAEMIA OF PREGNANCY

by

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The association of premature births and under-weight babies in toxaemia of pregnancy is stressed in all the text books of Obstetrics. However, several workers who have studied this aspect of the problem Brasch 1933, Baird *et al* 1957, Pierre *et al* 1960 and Basu & Puri 1962) have not been able to confirm this association. Further, since weight for weight, maturity is an important factor which determines survival, it would be worth-while to note which is more affected by the toxaemic process and its severity, the maturity of the foetus or the rate of intra-uterine growth. Paukamaa *et al* (1957) observed that rise in blood pressure and increase in protein in urine result in retarded weight and early termination of pregnancy but changes in birth weights are more marked than the rate of premature births.

We have attempted in this paper to study the effect of toxaemia of pregnancy and its severity on the time of spontaneous termination of pregnancy and on birth weights at different periods of gestation. A further correlation has been sought between the foetal prognosis and the birth weights at different periods of gestation.

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Material & Methods

One hundred and fifty cases were studied in the antenatal wards of Safdarjang Hospital from 1st August 1964 to 30th March 1965, and compared with 2871 non-toxaemic cases delivered in the same period.

All the toxaemic cases had blood pressure at or over 140/90 mm. of Hg. and either albuminuria or oedema or both. These cases were divided into mild (BP below 160/110), severe (BP over 160/110) and eclamptic groups.

In this study, prematurity was taken on the basis of gestational age with the demarcation at 36th week of gestation. At or before the 36th week the births were considered premature. No inductions were carried out in this series. The prematurity ratio was expressed as the ratio of premature to mature births.

Observation : Prematurity rate

The prematurity rate was significantly higher in the toxaemic group, the prematurity rotio being 1:8 in non-toxaemic and 1: 3.6 in toxaemic cases.

TABLE I
Prematurity ratios according to severity of toxaemia

Mild	Severe	Eclamptic
1 : 5	1 : 2.2	1 : 0.6

TABLE II
Prematurity ratio according to systolic and diastolic blood pressure

Systolic blood pressure		Diastolic blood pressure	
Below 160 mm.	Above 160 mm.	Below 110 mm.	Above 110 mm.
1 : 5	1 : 3.3	1 : 4	1 : 3

TABLE III
Prematurity ratio according to severity of albuminuria

Below 5 gms./24 hrs.	Above 5 gms./24 hrs.
1 : 6	1 : 0.7

The ratio of premature births (1 : 3.6) in toxaemia of pregnancy is twice as high as in non-toxaemic cases (1 : 8). Further it was observed that there was a greater tendency to early spontaneous termination of pregnancy; 4% of toxaemic women delivered at or before the 28th week as compared with 1.6% in non-toxaemic mothers. The ratio of premature births increased with severity of the total toxaemic process, systolic blood pressure above 160 mm of Hg. diastolic blood pressure above 110 mm of Hg. and albuminuria over 5 gms.

Births Weights:

Average birth weights were studied at various period of gestation from 28th week to 40th week.

Comparison of birth weights in toxaemic and non-toxaemic cases (Fig. I)

The average birth weights were almost the same in toxaemic and non-toxaemic groups between the 36th and 40th weeks. Before 36th week the babies of non-toxaemic mothers were slightly heavier than those of toxaemic mothers.

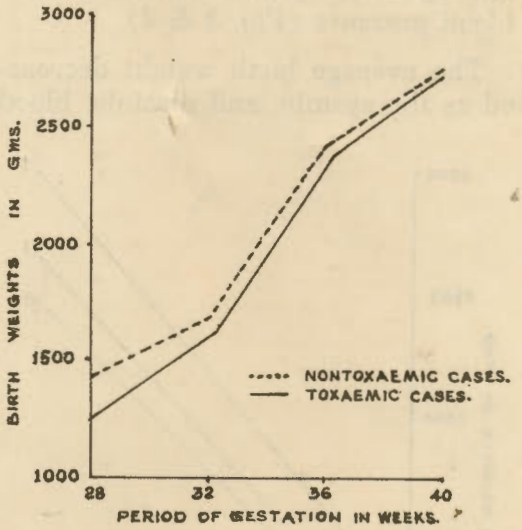

FIG 1 - A COMPARISON OF AVERAGE BIRTH WEIGHTS IN NONTOXAEMIC AND TOXAEMIC CASES.

The effect of the toxaemic process as a whole: (Fig. 2).

When the toxaemic process was mild the birth weights were higher than the birth weights in severe and eclamptic groups.

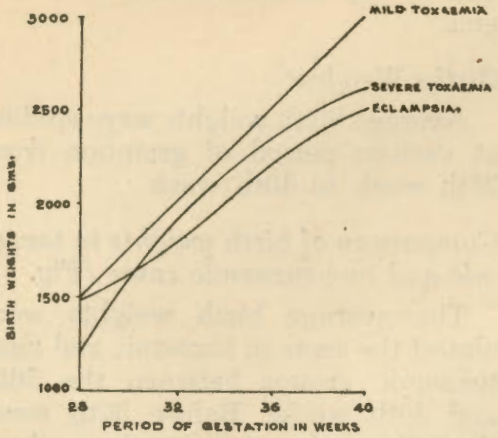

FIG 2 - AVERAGE BIRTH WEIGHTS ACCORDING TO SEVERITY OF TOXAEMIA.

The effect of systolic and diastolic blood pressure (Fig. 3 & 4).

The average birth weight decreased as the systolic and diastolic blood pressure rose above 160 mm and 110 mm of Hg. respectively.

The effect of albuminuria: (Fig. 5).

The birth weights decreased with the appearance of albuminuria especially when albuminuria rose above 5 gm/24 hrs.

The correlation of birth weights and foetal prognosis: (Fig. 6).

The birth weights were highest in the group of survivals. There was reduction in birth weights in the neonatal death group, while the lowest birth weights were found in the group of still-births.

Discussion

Prematurity: While in this study the spontaneous premature termination of pregnancy in toxaemic cases

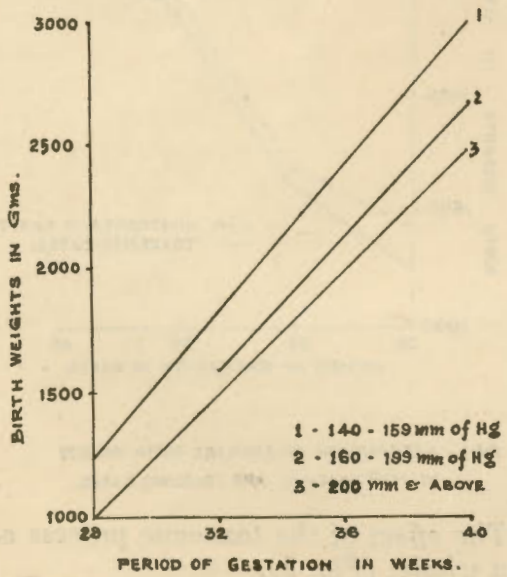

FIG 3 - AVERAGE BIRTH WEIGHTS ACCORDING TO SEVERITY OF SYSTOLIC BLOOD PRESSURE.

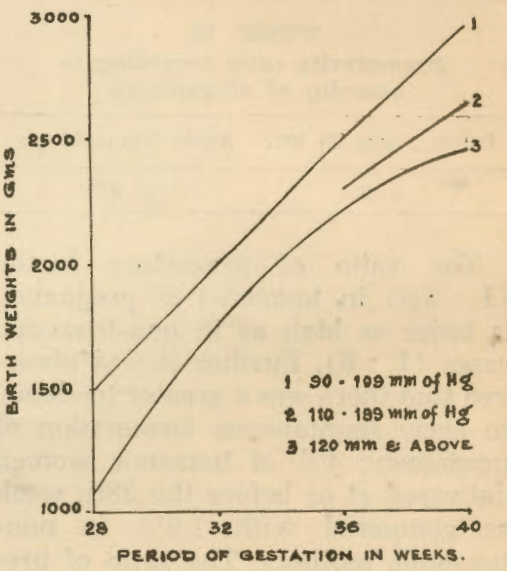

FIG 4 - AVERAGE BIRTH WEIGHTS ACCORDING TO SEVERITY OF DIASTOLIC BLOOD PRESSURE

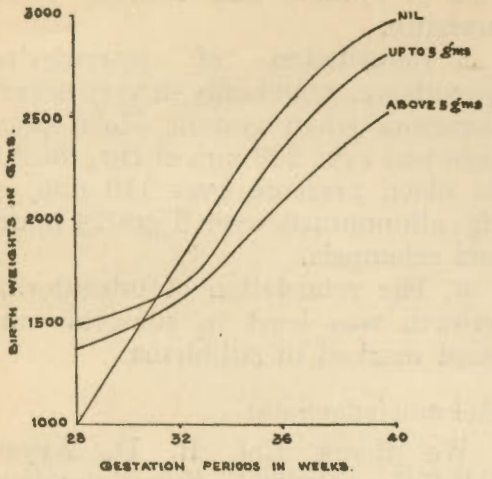

FIG 5 - AVERAGE BIRTH WEIGHTS ACCORDING TO SEVERITY OF ALBUMINURIA

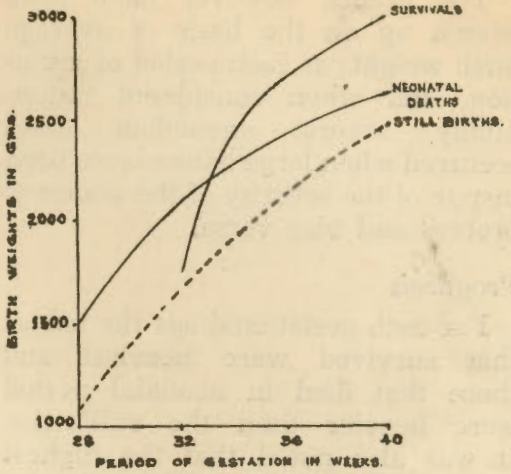

FIG 6 - AVERAGE BIRTH WEIGHTS ACCORDING TO ULTIMATE PROGNOSIS OF THE TOXAEMIC BABIES.

was more marked than the retardation of intra-uterine growth when compared to non-toxaemic cases, Paukamaa (1957) found exactly the opposite. Further, prematurity is affected more by the complete picture of toxaemia and the severity of albuminuria, than by the rise of blood pressure level alone.

Retardation of intra-uterine growth: There is definite retardation of intra-uterine growth in toxaemic cases as the severity increases but it is less marked than the prematurity rate. A study of the variations revealed some points worth stressing.

(I) *Effect of toxaemia:* When compared with an offspring of non-toxaemic mother, a very small deviation towards lower birth weights was noted in the babies of toxaemic mothers before the 36th week of gestation, while between the 36th and 40th week there was no apparent difference. This is a very significant finding which suggests, that those cases who delivered between the 36th and 40th week did so, because they had a good placental function. Premature termination of pregnancy before the 36th week may have been due to placental insufficiency which also causes retarded growth. These lower birth weights in pre term babies as compared to term babies were noted by Mac-Gillivray (1958) and Baird & Thomson (1957).

(II) *Influence of severity:* The retardation of intrauterine growth was observed in relation to each of the variable components of the toxaemic process, namely, severity of blood pressure and albuminuria. The degree of retardation, however, was not particularly marked except in the groups which manifested with systolic blood pressure above 200 mm, diastolic blood pressure above 110 mm of Hg, albuminuria above 5 gm%, impending eclamptics and eclamptics.

The graphs however have been drawn up on the basis of average birth weights at each period of gestation, and when considered individually, several anomalous cases occurred when large babies were born inspite of the severity of the toxaemic process and vice versa.

Prognosis

For each gestational age the babies that survived were heaviest and those that died in neonatal period were heavier than the stillbirths. It was also noted that the highest percentage of small infarcted placentae was in the group of stillbirths (17 out of 21 stillbirths had severe degree of infarction). This indicates greater incidence of placental insufficiency and retardation of intrauterine development in stillbirths as compared to live births.

From this study it may, therefore, be concluded that pre-eclamptic toxaemia has a definite adverse effect on the growth and maturity of the foetus. Except for Paukamaa's report on this subject, however, we could find no other report giving statistical data.

Summary & Conclusion

1. Prematurity ratios and birth weights were studied in 150 cases of toxaemia of pregnancy, and compared with 2871 non-toxaemic cases.

2. Premature termination of pregnancy was more marked than the retardation of intra-uterine growth. The prematurity rate was affected more by the total toxaemic cases and severity of albuminuria than by the rise of systolic and diastolic blood pressure.

3. Retardation of intrauterine growth was noted only in very severe toxaemia when systolic blood pressure was over 200 mm of Hg., diastolic blood pressure over 110 mm, of Hg. albuminuria over 5 gm/24 hours and eclampsia.

4. The retardation of intrauterine growth was least in survivals and most marked in stillbirths.

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