MATERIAL AND METHODS
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This prospective study was conducted in the Department of Paediatrics, M.L.B. Medical College, Hospital, Jhansi in active collaboration with the department of Obstetrics and Gynaecology over a period of one year from August, 1993 to August, 1994. The cases included in the study were selected from the newborn and their mothers delivered in the department of Obstetrics and Gynaecology. All newborn babies were divided into three groups:—

1. Full term normal newborns.
2. Premature or preterm babies /37 weeks of gestation.
3. Intrauterine growth retarded symmetrical IUGR babies or small for gestational age (SGA) babies.

SELECTION OF CASES

Cases were selected in different groups according to following criteria:—

1. Full Term Normal Newborns

Thirty full term normal newborns were selected for the present study. The criteria of selection of these cases was:

a. Weight above 2500 gm.
b. Gestational age ranging from 37 to 41 weeks.
c. Apgar score at the time of delivery varying from 7-10.
d. There was no history of infection, toxemia, diabetes, prolonged rupture of membranes in the mother during pregnancy and labour.
None of the newborn was suffering from any infection or congenital malformation. Bloo samples were taken from the umbilical cord in all the cases at the time of birth.

2. **Premature or Preterm Babies**

Ten preterm babies were selected for the present study. The criteria for selection of these cases was:
- All the premature babies had gestation age below 37 weeks.
- The gestational age was assessed by the date of last menstrual period, and by physical characteristic criteria of Robinson et al (1965).
- Premature babies were again classified into AGA (Babies weighing between 10th - 90th percentile for the period of gestation) and SGA (Babies weighing less than 10th percentile for the period of gestation).
- In the present study 8 babies were AGA and two were SGA as assessed by the intrauterine growth chart prepared at A.I.I.M.S., New Delhi (Meharban Singh,).

Bloos samples were obtained from the umbilical cord at birth in each and every case.

3. **Intrauterine growth Retarded(IUGR) or Small for Gestational Age(SGA) Babies**

Ten IUGR babies were selected for the present study. The criteria for selection of IUGR babies was:
- Those babies having weight less than 10th percentile for gestational age. All these babies were showing
feature of intrauterine malnutrition (Symmetrical IUGR) evidenced by features of decreased linearity, loss of subcutaneous fat, loose dry skin and sparse hair (Luebehencan et al, 1983; Naeye, 1966; Drillen, 1970 and Usher, 1970).

OBSTETRICAL HISTORY

A. Antenatal History

A detailed antenatal history was recorded in each and every case. History of TORCH infection/drug/irradiation was excluded in the 1st trimester of pregnancy. History pertaining to disease of respiratory, cardiac and others systems, history of APH, eclampsia, multiple pregnancy, history of ABO or Rh incompatibility, duration of leaking, colour and odour of amniotic fluid was recorded. Number of pervaginal examination and history of vaginal infection was also recorded.

All mothers with anaemia, oedema, hypertension, congestive cardiac failure, acute and chronic infection, prolonged rupture of membrane and metabolic disorder like diabetes was excluded.

B. NATAL HISTORY

The mode of delivery viz. normal, vaginal delivery, breech delivery, forceps or delivery conducted by caesarean section was recorded.
C. POSTNATAL HISTORY

APGAR score at 1 minute and 5 minutes was recorded in each and every case. Life threatening congenital anomalies were also recorded. Subsequently it was our endeavour to see that the vital functions which had been established at birth were maintained or not. Emphasis was given to elicit the history of jaundice, superficial and deep infection and feeding in each and every case.

EXAMINATION OF NEWBORNS

General and systemic examination of baby was recorded in each and every case. The gestational age was assessed by the physical criteria of Robinson et al(1965) as well as by date of last menstrual period. Anthropometric measurement viz. head circumference, weight, length was recorded in each and every case. A complete general and systemic examination was conducted. Special emphasis was given to observe colour, cry, activity, posture, sucking and other neonatal reflexes. Care was taken to assess for evidence of superficial and deep infection.

Babies with haemolytic disease of newborns, congenital anomalies, chromosomal aberration, birth asphyxia, and suspected intrauterine infection were also excluded.
COLLECTION OF SAMPLES

Blood sample for the present study was taken from the umbilical cord at the time of delivery. 5 ml sample of mothers' blood was also taken simultaneously by venepuncture. 5 ml blood was collected from each case in a plain vial and serum was separated by centrifugation and stored at -20°C for determination of complement. Simultaneously the mother's sample was also centrifuged and stored at -20°C for determination of complements.

METHODS

The following complement profile was done in each and every case.

1. Complement C₃ level.
2. Complement C₄ level.

Complement determinations were done by method of single radial diffusion technique of Mancini et al (1965). Solugen (R) SRID Ready to use complement C₃ and C₄ plates supplied by M/S Immunodiagnostic Pvt Ltd. were utilized. The blood sample of mother and baby was centrifuged, sera was separated immediately and kept in deep freezer at -20°C till the time of complement estimation.

PROCEDURE

Each plate has 12 wells. In 4 wells 4 dilution of standard sera viz. 100%, 50%, 25% and 12.5% was taken.
In the remaining wells serum sample was filled with the help of insulin syringe and No. 26 gauge hypodermic needle. The needle tip was rested on well bottom and the serum was slowly released drop by drop while the hole just seemed to disappear. Care was taken not to underfill or overfill the wells.

After filling the wells the lid of plate was replaced and plate was left for development of precipitation ring in inverted position for 24 hours at room temperature. The ring diameter was measured by an immunometer and standard graph for each complement was constructed using the values of reference standard. The diameter was plotted on the ordinate while the quantitative value (Reference standard values) was plotted on the abscissa of the graph. Thereafter the values of the unknown samples were found out directly by interpolation and extrapolation on the standard graph. Results were expressed in mg/100 ml.
Graph between different dilutions of Reference Standard of Complement C₃ and Corresponding precipitation ring diameter.
Graph between different dilutions of Reference Standard of Complement C₄ and Corresponding precipitation ring diameter.

Complement C₄ Value in mg/100 ml