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Dr. Poonam Gupta

Associate Professor, Department
of Physiology, MLN Medical
College, Allahabad, India.

Kumar Aniket

Student, MLN Medical College,
Allahabad, India.

Study of association of neonatal birth weight and maturity with maternal blood group

Dr. Poonam Gupta and Kumar Aniket

Abstract

LBW has been defined by WHO as birth weight of less than 2.5 Kg, while the measurements being taken preferably within the first hour of life. Preterms have greater risk of developing Respiratory Distress, Intracranial haemorrhage, sepsis, retrolental fibroplasia and other conditions related to physiological immaturity. Neonatal maturity in turn affected by multiple maternal factors. So, the aim of the study is to determine the relationship between maternal ABO blood group & risk of pregnancy outcomes as LBW & SGA babies. The study was conducted in obstetric wing of LLRM Medical College. The patients that attended antenatal clinic and booked cases delivered retrospectively are included in the study book (100 singleton pregnancies).

Patients suffering from chronic diseases as malnutrition, maternal infections, hypertensive disorders, multiple pregnancies and diabetes were excluded in the study. All the observations in the study were evaluated statistically by Chi-Square test.

Maternal blood group has been found to have significant association with the maturity of the new born. Prevalence of LBW was found to be statistically insignificant in both ABO and Rh blood group of mothers.

Keywords: LBW- Low Birth Weight NBW- Normal Birth Weight AGA- Appropriate Gestational Age SGA- Small for Gestation Age LMP- Last Menstrual Period.

1. Introduction

It's now a well-defined fact that birth weight is not only a critical determinant of child survival, growth and development but also valuable indicator of overall maternal health, nutrition and Quality of life Roy S, Motghare DD *et al.* (2009)^[1].

Fedrick *et al.* (1978)^[4] in a study in Scotland and Wales observed no significant co-relation with blood group (A, B,O) and incidence of LBW. However they observed a negative co-relation with AB blood group and LBW suggestive of least rise or Low Birth Weight in mothers having AB group.

2. Materials and Method

The study was conducted in obstetric wing of LLRM Medical College. The patients that attended antenatal clinic and booked cases randomly delivered retrospectively are included in the study book (100 singleton pregnancies). The study cases were

- Mothers who came for delivery to SVBP hospital(Singleton pregnancies)
 - Their baby's (Live born babies) birth weight
 - Maternal parameters
- a) Blood grouping of the mother: standard open- slide technique was adopted by mixing self-suspension of RBC's and known serum directly on a glass slide. The upper surface of the slide was divided in two parts by drawing a line across the middle of it. The left hand compartment was always marked as 'A' and right hand as 'B'. a drop of anti -A serum was placed on the left of glass slide and a similar drop of anti-B serum on the right hand side. An equal quantity of red cell suspension to be tested is added to each of these serum drops. This was then mixed with separate sticks. The slide as then kept undisturbed for few minutes. After this period naked eye examination is made to look for agglutination. After observing the results and noting it down, all the slides were further examined for microscopic confirmation.
- b) Gestation period was calculated by Naegele's rule, means adding one week to the first Day of the LMP and then adding 9 calendar months. The gestation period was recorded in weeks.

Corresponding Author

Dr. Poonam Gupta

Associate Professor, Department
of Physiology, MLN Medical
College, Allahabad, India.

2.1 Neonatal Parameters

- a) Weight of the new born was measured to the nearest of 20 gm on a standard weighing machine 10 kg calibration, the accuracy of which was checked from time to time
- b) Duration of Gestation by asking the first date of LMP. It provides the most accurate mean of computing the gestational age of the new born, but it has its short comings like improper records of LMP due to illiteracy, ignorance, irregularity of the period, modification by contraceptives and maternal diseases.

All the observation in the study were evaluated statistically by Chi-Square test (χ^2 test) to test the difference of the two proportions.

3. Result

Or study showed 30% incidence of LBW and 13% incidence of SGA's babies. Maternal blood group has been found to have significant association with the maturity of the new born. Prevalence of LBW was found to be statistically insignificant in both ABO and Rh blood group of mothers. The results are shown in the following observation table.

Table 1: Association of Maternal Blood Group with Neonatal Birth Weight

| Maternal blood group (ABO) | LBW No% | | NBW No% | | Total no of cases | LBW% | NBW% |
|----------------------------|---------|-------|---------|-------|-------------------|-------|-------|
| A | 7 | 23.33 | 17 | 24.44 | 24 | 29.17 | 70.83 |
| B | 6 | 20 | 22 | 31.44 | 28 | 21.43 | 78.57 |
| AB | 0 | 0 | 8 | 11.45 | 8 | 0 | 100 |
| O | 17 | 56.67 | 23 | 32.78 | 40 | 42.5 | 57.5 |
| TOTAL | 30 | | 70 | | 100 | | |
| Rhesus | | | | | | | |
| Rh + | 25 | 83.5 | 63 | 90 | 88 | 28.41 | 71.59 |
| Rh - | 5 | 16.67 | 7 | 10 | 12 | 41.67 | 58.33 |
| TOTAL | 30 | | 70 | | 100 | | |

ABO- $X^2 (2) = 1.66$ Rh- $X^2 (2) = 0.37$

$p > 0.05$ $p > 0.05$

Note: AB and O blood groups have pooled.

3.1 Statistically Insignificant

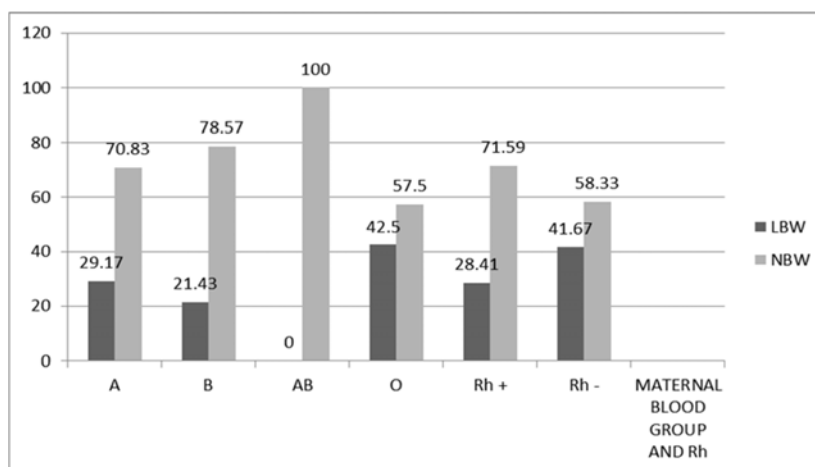


Chart 1: Association of Maternal Blood Group with Neonatal Birth weight

Table 2: Association of Maternal Blood Group with Neonatal Maturity

| Maternal blood group (ABO) | SGA(Premature) | Mature and AGA | Total No of cases | SGA% Premature | Mature and AGA% | | |
|----------------------------|----------------|----------------|-------------------|----------------|-----------------|-------|-------|
| A | 1 | 7.69 | 23 | 26.44 | 24 | 4.17 | 95.83 |
| B | 3 | 23.08 | 25 | 28.74 | 28 | 10.71 | 89.29 |
| AB | 0 | 0 | 8 | 9.20 | 8 | 0 | 100 |
| O | 9 | 69.23 | 31 | 35.63 | 40 | 22.5 | 77.5 |
| TOTAL | 13 | | 87 | | 100 | | |
| RHESUS | | | | | | | |
| Rh+ | 8 | 61.54 | 80 | 91.95 | 88 | 9.09 | 90.91 |
| Rh- | 5 | 38.46 | 7 | 8.05 | 12 | 41.67 | 58.33 |
| TOTAL | 13 | | 87 | | 100 | | |

ABO- $X^2 (1) = 4.01$ Rh- $X^2 (1) = 7.24$

$P < 0.05$ $p < 0.05$

3.2 Statistically Significant

It's evident from the table that prevalence of prematurity (SGA's) is maximum (22.5%) in mothers having blood group

O and almost nil in mothers having AB blood group. Mothers having Rh -ve blood group gave birth to maximum premature (41.67%).

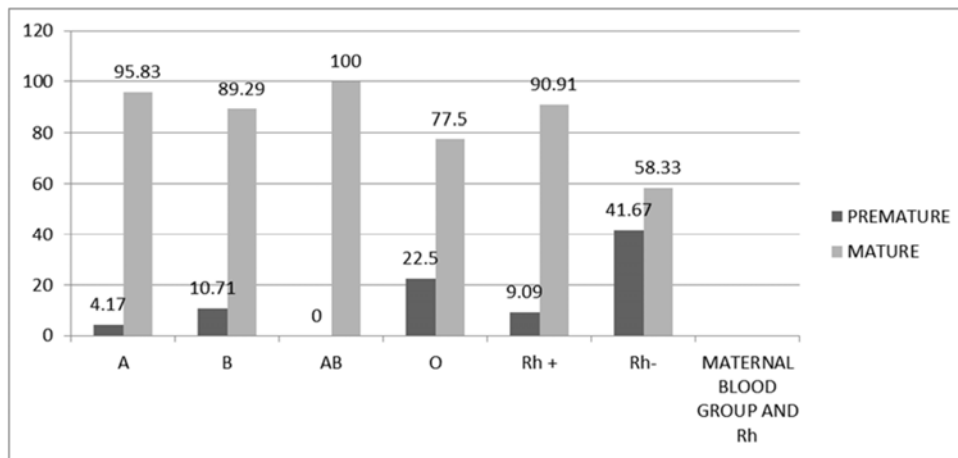


Chart 2: Association of Maternal Blood Group with Neonatal Maturity

4. Discussion

The study revealed a variable trend about the incidence of LBW with ABO group. Such incidence with respect to Rh factor was found to be doubled in Rh -ve mothers. However mothers with AB blood group delivered NBW as well as mature AGA babies ($p < 0.05$) as shown in Table 1 & 2.

Fedrick *et al.* (1978) showed a negative co-relation with AB group and LBW suggestive of least possibility in mothers having AB group. In our study we observed higher incidence of LBW in O^{ve} blood group. Though the cause of such a relationship between LBW and maternal blood group cannot be explained due to paucity of literature.

The study showed a low but variable pattern of prematurity in different ABO groups. However it was statistically significant in babies born to mother's with O^{-ve} blood group ($p < 0.05$).

The literature here is silent about any relationship in blood group and prematurity.

5. Conclusion

It is suggested to conduct more comprehensive studies to assess maternal blood groups and different diseases during pregnancy and associated risk factors for LBW babies.

6. References

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