

Maternal and neonatal outcome in rhesus positive women in a tertiary care center

Abstract

Background: Incidence of Rh negativity in India ranges from 3-5.7%. Rh negative pregnancy not only poses risk to mother but in the fetus, may lead to dreaded complication like hemolysis and intrauterine fetal demise. However, the advance management and early detection of the condition can prevent the complication.

Objective: This study aims to determine the prevalence of Rh negative pregnancy in our population, to study the various maternal and fetal complications.

Materials and methods: A retrospective review from the medical records over a period of 5 years, between January 2012 to December 2016 years, conducted in ESIC medical college and hospital, Bangalore. Maternal geographical data and characteristic were collected like, antibody type, antibody titer. Perinatal and neonatal outcome were also collected like the mean gestation age of birth, birth weight, need of NICU care etc.

Results: A total of 528 number of women were included in the study. The prevalence of the Rh negative pregnancy was found to be 2.9%. The most common blood group among the Rh negative women was O negative. 9(1.7%) of women was found to have a significant antibody titer, whereas Doppler changes indicating fetal anemia was noted in 3(0.5%). The commonest neonatal complication was jaundice 44(8.33%). 2(0.3%) cases had neonatal anemia required a postnatal blood transfusion.

Conclusion: Routine antenatal screening and timely management with intrauterine transfusion are lifesaving method which should be incorporated in daily Obstetrics practice.

Keywords: Rh negative, alloimmunization, erythrocytes, perinatal, transfusion

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Introduction

In the year 1940s Landsteiner and Weiner discovered Rh factor within the blood type it derives its name from the monkey *Macacus rhesus*, of whom 85% is shared by the human red cell antigen.^{1,2} In the year 1953 Chown described the pathogenesis of Rh alloimmunization and explained it to be caused by the passage of Rh-positive red blood cells of the fetus, transplacentally during pregnancy, labour or after delivery which to the mother is antigenic.³ Basques have the highest incidence of the Rh negative blood group constituting to 34%. In India the incidence varies between 3-5.7%.⁴⁻⁶ In the year 1996, a study conducted by the U.S. Center for Disease Control and Prevention, recorded a total of 21 deaths of children caused by hemolytic disease (erythroblastosis fetalis) and jaundice. Antenatal determination of the maternal blood type limits the adverse effect on the mother and the fetus. Erythroblastosis is a serious condition affecting about 4000 babies. In close to 15% of the diagnosed cases the babies die prior to birth, whereas the survivors suffer from conditions like jaundice, which further leads to the speech disturbances, deaf-muteness, mental retardation and cerebral palsy.^{2,3}

Rh antigens is a lipoprotein molecules, which is located on the surface of the erythrocytes. Various types of antigens are identified on the surface of the erythrocytes, of whom the D antigen is the most immunogenic and upto 50 times more often than the C and E antigens.^{7,8} Rh system antibodies are almost always immune, which are predominantly of the IgG class, which due to its size can pass through the umbilical cord and cause hemolytic disease of the newborn (HDN). The antibodies are directed against antigens which are of the paternal origin, which are present in the child's erythrocytes. This

occurs when the fetal red blood cell enter the maternal circulation triggering the immune system.^{7,9} There is a high possibility of the erythrocytes to enter the maternal circulation following amniocentesis, spontaneous or induced abortion, cardiocentesis, chorionic villus sampling, ruptured ectopic pregnancy and a blunt trauma to the abdomen.⁹

Material and methods

Our study was a retrospect study, data was retrieved from the electronic medical records of pregnant women who attended the obstetrics and gynecology department in ESIC medical college and hospital Bangalore, between January 2012 to December 2016. Women blood group, Rh factor and antibody screen done in the routine antenatal checkup was tabulated. The study population included all women with Rh negative blood group who has routine antenatal checkup and delivered with us. Data was collected regarding maternal age, gravidity, parity, previous miscarriage, previous blood transfusions, type of minor RBC antibodies and their titer, obstetric and medical history, gestational age at critical titer, gestational age at first MCA Doppler and gestational age at which MCA Doppler showed evidence of fetal anemia. Blood group (ABO) and the Rh factor to determine the prevalence of Rh-positive blood group among the study population, indirect coombs test, titers if found positive, coombs test on the cord blood etc. was collected and tabulated. The antibody titer of 1:16 or more was considered as critical titer. Women with titers of antibody more than the critical value were followed up by serial MCA Doppler every 1-2 weeks. Patients who showed high MCA Doppler were treated based on the gestation age. Information regarding including the following was also recorded, fetal complications,

gestational age at delivery, and mode of delivery, birth weight, Apgar score, neonatal blood group, hemoglobin, neonatal complications, postnatal blood transfusion and neonatal death was also gathered.

Results

A total of 528 pregnant women were included in our study, which extended for 5 years (between January 2012 to December 2016). We had a total of 17677 numbers of antenatal cases in this duration. Making the prevalence of the Rh negative women 2.98%. Table 1 shows the various maternal demographic characteristics of 9(1.7%) alloimmunized pregnant women. the mean age of the women was 31.2 years, predominantly multiparous 398 (75.3%). Gravidity of these women was between 1 to 7. 42(7.9 %) of the women had history of miscarriage in the past. History of blood transfusion was positive in 37(7%), common indication for which was dietary anemia. 298 (56.4%) were delivered vaginally (spontaneous vaginal delivery [SVD]), while 230(43.5%) had cesarean section, shown in Table 2. A total of 9(1.7%) of cases were diagnosed with significant alloimmunization. These patients were subjected to MCA - PSV Doppler once in every 1-3 weeks. 3(0.5%) had MCA Doppler suggestive of fetal anemia. The perinatal outcomes in tabulated in the table 3, 2(0.3%) showed evidence of fetal anemia, 9(1.7%) women had oligohydramnios, 7(1.32%) polyhydramnios, 26(4.92%) had intrauterine growth retardation, 4(0.75%) has intrauterine fetal demise (Table 3). The commonest neonatal complications were jaundice 44(8.33%)

Table 1 Maternal characteristics

Maternal Characteristics	Number of Women (n=582)	Percentage (%)
Maternal Age		
<20	146	27.6
20-30	321	60.7
>30	61	11.55
Gravidity		
0	130	24.6
1	124	23.4
2	97	18.3
3	77	14.5
4	52	9.8
5	16	3.03
Gestation age (wks)		
<28	2	0.3
28+1 to 32	98	18.5
32+1 to 37	198	37.5
>37	230	43.5
Number of Miscarriages		
0	486	92.04
1	22	4.16
2	9	1.7
3	7	1.32
4	4	0.7
History of Blood Transfusion		
Yes	37	7
No	491	92

Table Continued

Maternal Characteristics	Number of Women (n=582)	Percentage (%)
History of Receiving Anti d Antibody in the Past		
Yes	299	56.6
No	99	18.7
Pregnancy complicated with Hypertension complicating pregnancy		
Polyhydramnios	7	1.3
Oligohydramnios	9	1.7
PROM	32	6.06
Abruption	2	0.3
PPH	29	5.4

Table 2 Mode of delivery

Mode of delivery	Number of women (n=528)	Percentage (%)
Vaginal	298	56.4
Spontaneous	267	50.5
Induced	31	5.87
Vacuum	9	1.7
Forceps	6	1.1
Section	230	43.5
Emergency	132	25
Elective	98	18.5

Table 3 Neonatal outcome

Neonatal Outcome	Number	Percentage
IUFD	4	0.75
Hemoglobin at birth <6 at birth	2	0.3
Need of NICU	39	7.38
Need of phototherapy	42	7.95
Need of post-natal blood transfusion	2	0.3

Discussion

Rh antigens are found on the surface of the red blood cells (RBC) and Rh D antigen is the one which is immunogenic. The red blood cell without the Rh antigen are found to have an abnormal shape and increased osmotic fragility leading to a shorter life span of the cell leading to hemolysis. Even today with tremendous improvement in the medical field in a developing country like India it is still an important reason for hyperbilirubinemia.¹⁰⁻¹² The incidence in our study was found to be 2.98% in comparison to the study performed by Mondal et al.,¹³ where the incidence was found to be 2.4%.¹³ Multigravida in our study was 398(75.3%) and that of the Primigravidas were 130(24.6%) in comparison to a study performed by Bondagji et al.,¹⁴ where the results were similar.¹⁴ O negative was the most common Rh negative blood group in our study which was similar to what found in a study conducted by Okeke et al.¹⁵ Previous history of miscarriage was found

in 42(7.9 %) which was significantly lower than the once found in Bondagji's study 44.8% and Pahuja et al.¹⁶ History of blood transfusion was noted in 37(7%) in our study in comparison to only 4.5% stated in Bondage et al.,¹⁴ whereas the indication for transfusion was found to be the same in both the study, anemia. We noted alloimmunisation rate in the D antigen-negative group was 9(1.7%) which was much lower than in a study conducted by Lurie et al.,¹⁷ (0.9%) but much higher in a study conducted by Al-Ibrahim et al.,¹⁸ (7.1%). This can be attributed to the lack of implementation of standardised and universal anti-D immunoprophylaxis in India.

298(56.4%) of the women delivered vaginally and 230(43.5%) by section the common indication for which was fetal distress. In comparison to a study conducted by Gorle et al., the results obtained were similar 37(7%) cases developed preeclampsia, 26(4.9%) cases developed fetal growth restriction, 2(0.3%) cases associated with abruption.¹⁹ We found that 9(1.70 %) of the women to have a positive indirect Coombs test. They were further investigated and followed with regular Doppler of the MCV. 3(0.5%) of the women had features suggestive of fetal anemia and 2 of these neonates required postnatal transfusion. The neonatal outcome was found to be similar to those found to the study conducted by Gorle et al., 524(99.2%) were live born babies out of whom 3 had a early neonatal deaths. The clinical presentation of the fetus depended on the severity of isoimmunisation, i.e. hydrops fetalis, icterus gravis neonatorum or congenital anemia of the newborn. The apgar score of the neonatal were above 8 in 499(94.5%) of the total children born. 39(7.38%) of the babies needed NICU admission. 2(0.3%) babies needed postnatal blood trsfusion. 42(7.95%) of the babies had early onset of jaundice as they were Rh-positive babies, 4 of whom had a bilirubin levels more than 18mg/dL.

Conclusions

In south India the prevalence of Rh negative pregnancy is lower <5%, Rh isoimmunisation still remains the determining factor for the perinatal morbidity. Hence routine antenatal screening and timely management with intrauterine transfusion are lifesaving method which should be incorporated in daily Obsterstrics practice.

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None.

Conflict of interest

The author declares no conflict of interest.

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