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Original Research Article

Incidence of Rh alloimmunisation and its effects on pregnancy outcome in a tertiary care hospital

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ABSTRACT

Background: Red cell alloimmunization results from transplacental passage of maternal antibodies that destroy fetal red cells. The aim of the study is to determine incidence, maternal and perinatal outcome in Rh negative pregnancy.
Methods: A retrospective observational study was conducted in the Department of Obstetrics and Gynaecology, Shri Lal Bahadur Shastri Medical College, Mandi, Himachal Pradesh for period of one year from 01 January 2024 to 31 December 2024. All the pregnant women admitted in labour ward with Rh negative pregnancy were included in the study.
Results: The incidence of Rh negative pregnancy was 6.1% in one-year study period. Most common age group was 26-30 years comprising 42.8% cases. Majority of the patients were multipara (53.57%). Only 1.78% Rh negative pregnant women had positive indirect Coombs test. One patient was delivered at 34 weeks of gestation, 3 (1.33%) at 36 weeks and 220 (98.21%) at term (37-40) weeks of gestation. About 10.71% neonates had neonatal jaundice, 87.05% neonates had uneventful neonatal outcome.
Conclusions: Early detection, timely intervention and motivation of the Rh negative patients can prevent maternal, fetal and neonatal complications.

Keywords: Red cell alloimmunisation, Anti D immunoglobulin, Hemolytic disease of newborn

INTRODUCTION

Landsteiner and Weiner in the year 1940,discovered specific unknown antigen in the human red cells.[1] The individual having the antigen is called Rh positive and in whom it is not present is called Rh negative.[1] Red cell alloimmunization results from transplacental passage of maternal antibodies that destroy fetal red cells.[2] Importantly, alloimmunization is uncommon for the following reasons: low prevalence of incompatible erythrocyte antigens; insufficient transplacental passage of fetal antigens and maternal antibodies; maternal-fetal ABO incompatibility, which leads to rapid clearance of fetal erythrocytes before they elicit an immune response; variable antigenicity; and variable maternal immune response to the antigen.[2] This usually has minimal effect on the first such pregnancy; but, in a second such pregnancy, pre-existing maternal antibodies to RhD antigens on fetal red blood cells often leads to erythroblastosis fetalis, a condition which can be fatal to the fetus.[3] The term hemolytic disease of the fetus and newborn (HDFN) would appear more appropriate to describe this disorder.[4]

The critical titer is the level at which significant fetal anemia may develop.[2] It may vary according to antibody and laboratory but is usually between 1:8 and 1:32. If the laboratory's critical titer threshold for anti-D antibodies is 1:16, a titer ≥1:16 indicates the possibility of severe hemolytic disease.[2] The CDE group was formerly termed Rh or rhesus, due to a misconception that red cells from rhesus monkeys expressed these human antigens. In

transfusion medicine, "rhesus" is no longer used.[2] Fetal blood sampling is generally performed if the MCA peak systolic velocity exceeds the threshold for severe anemia, with plan for concurrent intrauterine transfusion as needed.[2] Immunoprophylaxis with Rhesus immune-globulin can be given at 28 weeks of gestation and within 72 hours of delivery or termination of pregnancy.[5-7] Intrauterine transfusion and postnatal exchange transfusion may reduce perinatal mortality.[8,9]

The aim of the study was to determine incidence, maternal and perinatal outcome of Rh negative pregnancy.

METHODS

A retrospective observational study was conducted in the Department of Obstetrics and Gynaecology, Shri Lal Bahadur Shastri Medical College Mandi, Himachal Pradesh for period of one year from 01 January 2024 to 31 December 2024.

All the pregnant women admitted in labour ward with Rh negative pregnancy were included in the study. The exclusion criteria were the patients who had miscarriage, ectopic pregnancy or molar pregnancy and those who refused to give consent.

The detailed records of clinical history, gestational age, maternal and perinatal outcomes were collected from hospital delivery register and case files. The parity, previous history of stillbirth or abortion, history of anti D immunoglobulin administration in previous pregnancy, history of threatened abortion or APH in present pregnancy were recorded on performa. Blood group of the husband was recorded. Indirect Coombs test reports and titres were analysed Ultrasound growth parameters, MCA Doppler PSV, treatment, and mode of delivery were analysed. Cord blood for baby blood grouping and Rh typing, Hemoglobin concentration, Hematocrit, serum total and indirect bilirubin values and Direct Coombs test reports were recorded. APGAR score, birth weight of babies, complications resulting in the admission in NICU were also recorded. The fetal outcome included incidence of hydrops fetalis, antepartum IUD, fresh still birth, neonatal jaundice, admission in neonatal intensive care units and neonatal deaths.

Statistical analysis

Data was entered in excel and analysed by using software statistical package for the social sciences (SPSS) version 17.

RESULTS

A total 3628 women delivered in the tertiary care hospital during the study period of one year. The incidence of Rh negative pregnancy was 224 (6.1%). Most common age group was 26-30 years consisting of 96 (42.8%) cases followed by 31-35 years affecting 47 (20.98%) pregnancies (Table 1).

Table 1: Age distribution (n=224).

Age group (years)	N	Percentage
<20	4	1.78
20-25	40	17.8
26-30	96	42.8
31-35	47	20.98
36-40	30	13.39
>40	7	3.13

Majority of the patients were multipara (53.57%) (Table 2).

Table 2: Parity (n=224).

Parity	N	Percentage
Primigravida	104	46.43
Multipara	120	53.57

Among 104 multipara, 96 (92.30%) patients received anti D immunoglobulin in previous pregnancy and 4 did not receive (Table 3).

Table 3: Anti D immunoglobulin in previous pregnancy (n=104).

Parameters	N	Percentage
Anti D received in previous pregnancy	96	92.30
Not received	4	3.84
Unknown	4	3.84

About 86 (38.39%) Rh negative pregnant women received prophylactic anti D immunoglobulin at 28 weeks in present pregnancy (Table 4).

Table 4: Anti D prophylaxis at 28 weeks in present pregnancy (n=224).

Parameters	N	Percentage
Anti D prophylaxis in present pregnancy	86	38.39
Not received	138	61.61

Only 4 (1.78%) among 224 Rh negative pregnant women had positive indirect coomb test (Table 5).

Only one (0.44%) patient was delivered at 34 weeks of gestation, 3 (1.33%) at 36 weeks and 220 (98.21%) at term gestation (Table 6).

200 (89.28%) neonates were Rh positive and 24 (10.72%) neonates were Rh negative (Table 7).

About 10.71% neonates had neonatal jaundice, 87.05% neonates had uneventful neonatal outcome (Table 8).

Table 5: Maternal alloimmunisation (n=224).

Parameters	N	Percentage
ICT positive	4	1.78
ICT negative	220	98.22

Table 6: Gestational age at the time of delivery (n=224).

Gestational age (weeks) at the time of delivery	N	Percentage
28-34	1	0.44
34-37	3	1.33
37-40	220	98.23

Table 7: Blood group of neonates (n=224).

Parameters	N	Percentage
Rh positive neonates	200	89.28
Rh negative neonates	24	10.72

Table 8: Perinatal outcome (n=224).

Parameters	N	Percentage
Neonatal jaundice	24	10.72
Neonatal anemia	1	0.44
Respiratory distress	4	1.78
Uneventful neonatal outcome	195	87.05

Hydrops fetalis, antepartum IUD, fresh still birth, and neonatal deaths were not observed.

DISCUSSION

In present study, the incidence was 6.1% which is higher than the studies by Sharma et al (2.9%) and Preethi et al 3.5%.[10,11] The prevalence was more in age group 26-30 years as many couples plan pregnancy in this age group after completing their education. In present study 53.57% patients were multipara which is similar to Shradha et al.[12]

In our study, anti D immunoprophylaxis in present pregnancy at 28 weeks of gestation was 38.39% which is similar to 37% in the study by Alakananda et al.[13] According to study by Bowman, provision of anti-D immune globulin at 28 weeks' gestation reduces the third-trimester alloimmunization rate from approximately 2 percent to 0.1 percent.[14]

Indirect coombs test was positive in 1.78% which is comparable to 2.07% in the study by Preethi et al.[11] In present study 98.2% Rh negative women had delivery at 37 to 40 weeks of gestation while it was 86% in study by Chintada et al.[15]

About 10.71% neonates were Rh negative and 89.28% were Rh positive. 10.71% neonates had neonatal jaundice and 87.05% had uneventful neonatal course. Hydrops fetalis, antepartum IUD, fresh still birth, and neonatal deaths were not observed in our study as all the patients were booked. In our state of Himachal Pradesh especially in our Mandi district, the patients are well motivated by ASHA workers and the patients come to government hospitals for routine anenatal checkups and institutional deliveries.

Limitations

The limitations of the study are that the study population did not analyse the Rh negative cases who had miscarriage, ectopic pregnancy or molar pregnancy. There is no comparison group.

CONCLUSION

Early detection, timely intervention and motivation of the Rh negative pregnant women can prevent maternal, fetal and neonatal complications. Awareness among medical professionals, undergraduates and postgraduates for anti D immunoglobulin prophylaxis after MTP, APH, abortion, ectopic pregnancy and molar pregnancy should be increased. Routine antenatal screening and timely intervention is of utmost importance in daily obstetrics practice.

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