SOME OBSERVATIONS ON ABO ISOIMMUNISATION IN PREGNANCY

by

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ABO isoimmunisation in pregnancy giving rise to haemolytic disease of the newborn is an interesting and complex condition. In literature there is wide diversity regarding its incidence and observations (Hsia and Gallis, 1954; Rosenfield and Ohno, 1955). A critical appraisal of some of the facets of this condition was undertaken to have an insight to the problem of ABO isoimmunisation.

Material and Methods

1,510 mothers attending the antenatal outpatients were screened at random. Of these 500 were found to be blood group 0. Out of these 500 cases only 125 were taken up as test cases where mothers gave birth to babies of other than group 0 (hetero-specific group). Ninety-nine cases were included in this study as control whose husbands' also were of Blood group 0 (homospecific group).

Standard tube methods were used to determine the ABO and Rh group. Determination of the saline ABO isoagglutinin titre of mother was performed in the standard double dilution tube technique where 2% red cell suspension of blood groups A and B was used and incubated at room temparature for one hour. From cord blood sample, serum bilirubin estimation was done as outlined by Wootton (1964). Secretor status of the babies was ascertained as outlined by Levine (1941).

To ascertain the secretor status, examination of gastric fluid was done. Samples were obtained with the help of sterile catheter. To have a sensitive Direct coombs' test, Rosenfield's (1955) modification test was performed in this study. Detection of foetal erythrocyte in maternal circulation was performed according to the method of Kejihauer *et al* (1957).

Results

One hundred and twenty-five test cases (hetero-specific) and 99 control (homospecific) cases were tested for RhD and the result is given in Table 1.

Only 2 out of 125 mothers in test series were RhD negative which was expected not to interfere with the overall result. All the cases of control series were RhD positive.

The incidence of jaundice was assessed by estimation of bilirubin from cord blood samples and in all the cases the value was above 4.0 mgm%. There was clinical jaundice in all such cases. The result is given in Table II.

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TABLE I
RhD Testing

Group of Mothers	No. of cases	RhD			
		Positive	Per cent	Negative	Percent
Test	125	123	98.3	2	1.7
Control	99	99	100	0	0

TABLE II
Incidence of Jaundice in Newborn

Group	No. of babies	Jaundice		Percentage
Test	125	22	Group A- 4 Group B-18	17.6
Control	99	5		5.05

The incidence of jaundice as shown in Table II was higher in test than the control group.

In both the series it appears that the incidence of jaundice was higher in postmature babies and it also shows that in test series incidence of postmaturity was higher compared to the control group.

Saline anti A and B titre of serum was examined at 24 weeks, 38 weeks and in immediate postpartum period.

TABLE III
Relation of Neonatal Jaundice to Duration of Pregnancy

Group	Duration of Pregnancy	No. of cases	Neonatal Jaundice	Per cent
Test	Upto 38th weeks	30	3	10
	39-41 ,weeks	82	15	18.3
	42 weeks and above	12	4	30.8
	Upto 38 weeks	7	1	14.2
Control	39-41 weeks	88	3	3.4
	42 weeks and above	4	1	25

TABLE IV
Saline Isoagglutinin Titre (anti A and B) in Control Group

Period of gestation	No. of cases	Antibody titre			
		Anti A		Anti B	
		upto 1/64	above 1/64	upto 1/64	above 1/64
24 weeks	85	85	—	85	—
38 weeks	80	78	2 (2.5%)	80	—
Post partum (immediate)	85	82	3 (3.5%)	84	1 (1.1%)

In the control series as shown in Table IV it is evident that there was a standard pattern of isoagglutinin titre during the 3 different periods of gestation.

group. It further shows that there was rise of incidence of immune antibody in immediate postpartum period. Table VI further shows the outcome of immune

TABLE V

Saline Isoagglutinin Titre (anti A and Anti B) in Test Cases

Period of Pregnancy	No. of cases	Antibody titre			
		Anti A		Anti B	
		upto 1/64	above 1/64	upto 1/64	above 1/64
24 weeks	104	99	5 (4.9%)	97	7 (6.7%)
38 weeks	102	97	5 (4.9%)	96	6 (6.7%)
Post partum (immediate)	104	88	16 (15.4%)	77	17 (25.9%)

In test cases (Table V) there was definite increase of titre in immediate postpartum period, the incidence of high titre anti B was more than that of anti A.

Serum of test cases was tested for immune antibody (anti A and anti B) and in Table VI it has been shown that immune anti B was present in test group mothers in 5 cases and in each case the baby developed jaundice. One case that has been shown in 38 weeks group has also been included in the postpartum anti A and anti B over foetus.

For some reasons beyond control, few cases in either group could not be tested. Tables IV and V show the titre in the control and test group respectively. The titre above 1/64 was taken arbitarily as high titre.

Maternal blood samples were tested for the presence of foetal cells. Blood samples were collected from the mothers during the third stage of labour in test and control cases. Table VII shows the incidence of foetal RBC in maternal cir-

TABLE VI

Immune Antibody in Hetero Specific Group and the Foetal Outcome

Period of Pregnancy	No. of cases	Immune antibody		Foetus	
		Present	Absent	Normal	Jaundice
24 weeks	125	—	125	—	—
38 weeks	125	1*	124	—	—
Postpartum (immediate)	125	5	120	0	5

*This figure has been included in 5 cases as has been shown in postpartum group.

TABLE VII

Foetal RBC in Maternal Circulation in Test Cases and the Incidence of Neonatal Jaundice

Group	No. of cases	Foetal RBC Present in No. of Mothers	Baby	
			Normal	Jaundice
Test	80	9	9	—
Control	30	4	4	—

culation and it's effect on the babies. The cases studied were fewer than the total number of test and control cases.

The presence of foetal RBC in maternal circulation had no bearing to the incidence of neonatal jaundice, it did not have any predilection to test and control cases either.

Gastric fluid in the first week of neonatal life was tested for secretor status. Table VIII summarizes the result.

TABLE VIII
Secretor Status of Neonates

Group	No. of cases	Condition of baby	Secretor	Non secretor
Test	69	Normal 53	50	3
		Jaundice 16	15	1
Control	45	Normal 42	40	2
		Jaundice 3	3	—

Here also, the number of cases tested were fewer than the total number of test and control cases. The figures demonstrate that there was no relationship of secretor status and incidence of Jaundice in neonates.

Modified Direct Coomb's tests were negative in all cases of Jaundice.

Discussion

The study was undertaken with 125 test cases and 99 control cases. The test cases are of group 0 mothers having husbands other than group 0 (heterospecific group) and in control group those cases are included where mothers and their husbands are both group 0 (homospecific group). In the study of different parameters, all the test/control cases could not be included for reasons beyond our control. Only 2 out of 125 test cases (Table I) were RhD negative which did not show positive anti D titre. The babies born of these 2 mothers were not jaundiced at the time of birth. So these two cases are not expected to interfere with the result.

The incidence of jaundice on the first day, was higher in the test cases (17.6%) than in the control 5.05% (Table II). The cause of jaundice in control cases is difficult to explain. In 1 in 140 birth Hsia and Gallis (1954) reported incidence of jaundice in neonates due to ABO incompatibility.

Table III shows that the incidence of jaundice on 1st day in the neonates born after 39-41 weeks gestation is higher in test cases compared to babies born prior to 39 weeks of gestation. The smaller number of cases in both test and control series who delivered their babies following 42 weeks or above do not possibly reflect the true incidence of jaundice.

Saline isoagglutinin titre (anti A and anti B) was higher in immediate postpartum period in mothers in test group (Tables IV and V). Titre above 1/64 has been taken as higher titre. The higher saline isoaggultinin titre in mothers bears correlation to the incidence of neonatal jaundice but contrary to the observation of Fisher (1972) where 3.71: 1 is the ratio of affected babies of group A to B. In this series anti B titre is more in number of cases than anti A and affected babies are more of group B (Table II). The incidence of jaundice in this series due to possible ABO incompatibility (as evidenced by saline iso-

agglutinin titre) is higher compared to personal experience of Mollison (1972). In his study of 14,000 consecutive births there were 7 infants who had incidence of jaundice due to ABO incomatibility.

The test of immune anti A and anti B shows little relationship to their presence and the incidence of neonatal jaundice. Though in 5 affected babies the immune antibody was present. It is difficult to explain why in others immune antibody could not be detected. Ames and LLoyd (1964) screened 8,000 women for immune antibody and reported that 3 gave birth to infants with ABO haemolytic disease where such test was positive.

Foetal RBC in maternal circulation could not be taken as a criteria for this disease because in 9 and 4 cases in the test and control group respectively who showed presence of foetal RBC in their circulation, none of the babies showed any jaundice (Table VII).

There is significant finding in Table VIII, where in the secretor status of the neonates have been tabulated and out of the 16 jaundiced babies, 15 are secretors and 1 is non-secretor. Smith (1945) observed rise of alloagglutinin titre when the babies are secretors than non-secretors.

Rosenfield's (1955) modification of direct Coomb's test thought to be a more sensitive method in detecting ABO isoimmunisation could not be proved to be so, in this series, in any case the test is not positive.

Summary

Different parameteres are taken up for study over the problem of ABO isoimmunisation in pregnancy. Saline iso agglutinin titre is higher in immediate postpartum period in mothers of affected babies. The affected babies are more of Group B and they are mostly secretors. Modified direct Coomb's test could not be of help in diagnosing ABO isoimmunisation in pregnancy. The different observations have been discussed.

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