

SECRETION OF BLOOD GROUP SPECIFIC SUBSTANCES IN AMNIOTIC FLUID

by

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Most of the studies regarding the secretion of blood group specific substances have been done in saliva (Grewal and Mukherjee, 1950; Buchie, 1953; Dube and Sehgal, 1967; Tyagi *et al* 1968; Dutta *et al* 1969 and Pradhan *et al* 1970). The frequency of secretors i.e. those individuals who secrete blood group specific substances in saliva, varied from 66.9 per cent (Buchia, 1953) to 83.6 per cent (Sanghvi *et al* 1954) in our country. Studies in amniotic fluid were generally carried out by workers in association with other body fluids (Roy and Chatterjea 1965 and Tyagi and Hameed 1970).

While studying the secretion of blood group specific substances A, B and H in body fluids the pattern of secretion of these substances was quite different in the amniotic fluid from that in the saliva and the gastric fluid; hence the problem of secretion of substances in amniotic fluid was further carried out.

Material and Methods

A random collection of mid-stream

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samples of liquor amnii after spontaneous rupture of membranes in cases of normal deliveries conducted at the Dufferin Hospital, Tikaram Nursing Home and Medical College Hospitals, Aligarh, was done. In total 205 samples were obtained. Care was taken to avoid any mixing of blood with the fluid. Mixed samples were discarded. The patients were in the age group of 20 to 40 years.

Secretion of blood group specific substances was carried out by the haemagglutination inhibition method of Wiener (1943) and modified by Roy and Chatterjea (1965). The whole technique employed in the present work was the same as reported earlier (Tyagi *et al*, 1968). The secretors samples belonging to women of groups A, B and AB were further tested to find out the titre of secretion of the blood group specific substances, whereas in cases of group O females only 25 samples out of 34 were tested due to scarcity of anti —H serum. In the present series anti —A (human), anti —B (human) and anti —H (lectin) sera were used. These were obtained from the Haffkine Institute, Bombay.

Results were recorded as follows:

1. Nonsecretors: where the haemagglutination was present.
2. Secretors: where the haemagglutination was inhibited. This group also

included the 'aberrant secretors' in group AB females, where either of the two substances was secreted in appreciable amount.

Results

Out of 205 samples, secretion of blood group specific substances was noted in 142 samples (69.27%), whereas 63 (30.73%) were nonsecretors. The frequency of secretors in relation to different blood groups is shown in the Table I. Maximum incidence of secretors was found in group AB individuals (72.41%) as compared to that in group B (71.23%), group A (67.31%) and group O (66.67%). Amongst 21 secretors of group AB 'aberrant secretors' were 13 in whom the group substances A was absent in eight and group substance B in five.

The above frequencies were calculated by the method of Race and Sanger (1962).

Secretors titre

Table II shows the range of inhibiting titre of secretion of blood group specific substances in different blood group individuals. In females of groups A, B and O the average secretors titre was 2⁰.

Discussion

In the present series the incidence of secretors in relation to amniotic fluid was found to be 69.27% which was more or less identical to those of Roy and Chatterjea (1965) and Tyagi and Hameed (1970). Roy and Chatterjea (1965) while studying the secretion of blood group substances in 98 samples of amniotic fluid reported the secretors frequency to

TABLE I

Showing the Frequency of Secretors in Individuals of Different Blood Groups

Blood groups	Number of cases	Secretors	Nonsecretors
A	52	35 (67.31%)	17 (32.69%)
B	73	52 (71.23%)	21 (28.77%)
O	51	34 (66.67%)	17 (33.33%)
AB	29	21* (72.41%)	8 (27.59%)
Total	205	142 (69.27%)	63 (27.59%)

* Including 13 aberrant secretors'.

Gene frequency

Using the figures in Table I the gene frequencies were as follows:

$$\begin{aligned}
 se &= 0.3073 &= 0.5544 \\
 Se &= 1-0.5544 &= 0.4456
 \end{aligned}$$

and the genotype frequencies were:

$$\begin{aligned}
 Se \times Se &= Se^2 &= 0.1985 & \text{or } 28.66\% \\
 Se \times se &= 2 \times Se \times se &= 0.4941 & \text{or } 71.34\% \\
 se \times se &= se^2 &= 0.3073 &
 \end{aligned}
 \left. \begin{array}{l} \\ \\ \end{array} \right\} \text{ of all secretors}$$

be 68.58%. Though the secretors frequency in individuals of different blood groups varied from 66.67% in group O to 72.41% in group AB but statistically

TABLE II
Showing the Secretors Titre for Different Blood Group Substances in Amniotic Fluid

Blood groups	Total samples tested	Secretors Titre										Average titre	
		2 ⁶	2 ⁷	2 ⁸	2 ⁹	2 ¹⁰	2 ¹¹	2 ¹²	2 ¹³	2 ¹⁴	2 ¹⁵		2 ¹⁶
A	35	6	5	5	7	4	3	2	2	—	—	1	2 ⁹
B	52	8	8	6	10	5	4	4	3	1	1	2	2 ⁹
O	25*	6	4	—	5	3	3	2	1	1	—	—	2 ⁹
AB	21**	4	1	1	2	3	1	1	—	—	—	—	2 ⁶
	B	3	—	4	2	3	2	—	2	—	—	—	2 ⁷

* Quantitative estimation of substances H was done in 25 samples only.

** In 13 aberrant secretors substance A was absent in eight and substance B in five.

TABLE III
Statistical Evaluation of the Secretors Frequencies in Different Blood Groups

Blood Groups	Value of χ^2	Inference
A and B	0.222	Not significant
A and O	0.004	Not significant
A and AB	0.227	Not significant
B and O	0.172	Not significant
B and AB	0.014	Not significant
O and AB	0.284	Not significant

Corresponding to 1 d.f.

value of χ^2 0.05 = 3.84

value of χ^2 0.01 = 6.64

this variation was found to be insignificant (Table III). Higher percentage of secretors as reported by Sanghvi *et al* (1954) is probably due to the fact that they have limited their study to one particular community.

While studying the end titre of blood group specific substances A, B and H, it was observed that the average secretor titre was 2^9 for all the three substances. Thus, no difference was noted in the secretor titre for different blood group substances. Tyagi and Hameed (1970), however, have reported secretion of blood group substance B in high titre as compared to group substances A and H in saliva and gastric fluid. Roy and Chatterjea (1965) reported the range of inhibiting titre varying from 2^6 to 2^{12} in amniotic fluid and the mean titre 2^{10} . They did not assess the inhibiting titre for different blood group substances individually.

In individuals of group AB, 'aberrant secretors' were 13 out of 21. Group substance A was found to be absent in eight as compared to group substance B in five samples. Further the end titre for group substance B was 2^7 as compared to that of group substance (2^8).

Summary

1. Two hundred and five samples of amniotic fluid obtained from cases of normal deliveries were tested for the secretion of blood group substances A, B and H.

2. The frequency of secretors was 69.27%, whereas non-secretors were 30.73%.

3. No statistical significant variation was observed in the frequencies of the secretion of blood groups.

4. The secretors titre for all the three substances was 2^9 .

5. Out of 21 samples of secretors in group AB females, 13 were 'aberrant secretors.'

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