

COMPARATIVE STUDY OF TRANSPLACENTAL PASSAGE OF
FOETAL ERYTHROCYTES IN MATERNAL CIRCULATION IN
CASES OF SPONTANEOUS ABORTIONS AND MEDICAL
TERMINATION OF PREGNANCIES

by

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Introduction

Kleihauer *et al* in 1957 described an acid elution technique for demonstrating foetal erythrocytes in maternal circulation during pregnancy and after delivery. Later a simpler technique devised by Nierhaus *et al* in 1968, has further encouraged study of transplacental haemorrhage in cases of medical termination of pregnancies and spontaneous abortions. Mathew and Mathew (1969), Ketz (1969), Litwik (1970), Ghosh and Agarwal (1970) and Mukerjee (1975) found significant incidence of transplacental haemorrhage in cases of spontaneous abortions and medical termination of pregnancies (M.T.P.).

This study was undertaken to see the rate of foeto-maternal transfusion in cases of M.T.P. and spontaneous abortions. Since, M.T.P. is a common procedure, this may reflect the risk which a woman carries, if she happens to be Rh negative.

Method and Material

This study was carried out on 100 patients admitted in Zenana Hospital, Udaipur

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in year 76-77. Fifty cases of spontaneous abortions varying from 6 to 24 weeks of gestation and 50 cases of M.T.P. upto 12 weeks of gestation were included. Blood was drawn by finger prick method and thin blood film smear was prepared by mixing one drop of blood with one drop of normal saline. Smears were made at the time of admission and after M.T.P. or spontaneous abortions. All post abortal films were made within twelve hours. M.T.P. was done by vacuum aspiration and check curettage was routinely done. In cases of spontaneous abortions evacuation and curettage were done in cases upto 12 weeks.

Positive and negative controls were taken with each case. Positive control was prepared from fresh cord blood and negative control from male student of R.N.T. Medical College, Udaipur.

ABO and Rh grouping was done in every case.

Foetal erythrocytes were detected in smears by acid elution techniques of Nierhaus and Betke (1968).

All smears were scanned under low power field of microscope. The adult red cells looked like ghost cells, due to elution of adult haemoglobin, while the foetal red cells looked like pink refractile cells due to staining of foetal—haemoglobin by

eosin, because foetal haemoglobin resists elution by the acids. In each slide 50 low power fields were examined and foetal cells counted. Presence of single red cell was considered positive. Five foetal cells in 50 low power fields were considered equivalent to 0.25 ml. of foetal blood (1965).

Observations

Study was carried out in cases between age groups of 19 to 42 years irrespective of their gravidity. Study comprised of two groups, Group A of spontaneous abortions and Group B of M.T.P. In both

groups there was reciprocal rise in percentage of positive cases with increase in period of gestation, preoperatively as well as post-operatively (Table I). In group A T.P.H. (Transplacental haemorrhage) was present in 18% of cases preoperatively and 34% post-operatively. Average foetal cell score preoperatively was 3.5 while postoperatively 6.6. But in group B none showed presence of foetal cell preoperatively, while postoperatively 26% showed incidence of foetal cells. Foetal cell score was 3.7 on average (Table II). Incidence of T.P.H. was significantly high in primi than in multigravidas in both groups (Table III).

TABLE I
Relation of Positive Cases and Period of Gestation

Period of gestation in weeks	Spontaneous abortion		M.T.P.	
	Preoperative percentage	Postoperative percentage	Preoperative percentage	Postoperative percentage
6-9	7.14	14.27	0	12.12
10-13	16.00	28.00	0	52.88
14-17	Nil	25.7	—	—
18-21	66.6	100	—	—
22-24	50.0	100	—	—
Total	18%	34%	Nil	26%

TABLE II
Foetal Cell Score per 50 Low Power Field of Microscope

Foetal Cell Score	Spontaneous abortion		M.T.P.	
	Preoperative percentage	Postoperative percentage	Preoperative percentage	Postoperative percentage
0	82.0	66.0	100	74
1-2	10.0	4.0	—	6.0
3-4	4.0	12.0	—	16.0
5-6	2.0	6.0	—	2.0
7-8	—	4.0	—	—
9-10	2.0	2.0	—	—
11-12	—	2.0	—	—
13-14	—	—	—	—
15-16	—	4.0	—	—

TABLE III
Relation of Positive Cases With Gravidity

Gravidity	Spontaneous Abortion percentage	M.T.P. percentage
Primi	44.4	50
Multi	31.7	25

Discussion

Transplacental haemorrhage can occur as early as 8 weeks of gestation* (Freese

and Tital 1963; Galen and Kovacas 1965; Taylor and Kullman 1961).

In Rh negative mother with Rh positive foetus, transfer of foetal cells into maternal circulation can lead to Rh isoimmunization. This will lead to erythroblastosis foetalis in future pregnancies and even in the same pregnancy in rare cases. This can be prevented by timely administration of Anti-D. Recently it has been found that even during spontaneous abortion

TABLE IV

Author	Year	S.P. about		M.T.P.		
		Gestation in wks.	Positive cases	Gestation in wks.	Suction +ve % cases	D & C +ve % cases
1.	2.	3.	4.	5.	6.	7.
Ciallen	1965	—	—	6-8 9-12	—	6.94 20.00
Ciason	1970	7-12 13-16 17-20 21-24	20 20 20 60	—	—	—
Goldman	1970	12 14	5 16	12	9	—
Ketz	1969	Below 16	50	—	—	—
Litwick	1970	8-10 11-13 14-16 17-20	21 37 44 41	—	—	—
Mathew	1968	12	4.8	12	20	—
Mathew	1969	12	15.78	12	—	41.17
Jorgenson	1969	12	13	12	14	20
Murray	1971	—	—	below 14	7.2	—
Mukherjee	1975	6-8 9-12 13-16 17-20 21-24	13.3 25 25 20 50	6-8 9-11	18.1 30	— —
Present study	1977	6-9 10-13 14-17 18-21 22-24	14.27 28 25 100 100	6-9 10-12	12-12 52-88	—

enough amount of foetomaternal haemorrhage occurs, so as to cause Rh isoimmunization. (Ghosh and Agarwal 1970; Litwik and Taswell 1970; Mukherjee 1975). It has also been established by number of workers that M.T.P. is also responsible for foetomaternal haemorrhage and can result in Rh isoimmunization. They are of opinion that chances of foetomaternal haemorrhage are more with conventional curettage than vacuum aspirator. (Kerslake 1967; Mathew and Mathew 1967; Woodrow *et al* 1965).

Relation of foetomaternal haemorrhage with gestational age in group—A revealed that the percentage of positive cases increased as the gestation age increased (Table I). This may be explained on the basis that as the gestational age advances there is thinning of placental barrier and disruption of vessels at choriodecidual junction. Similar pattern was noted by Litwik, 1969; Goldman and Benjamine 1970; Ghosh and Agarwal (1970) and Mukherjee (1975). Similar correlation was found in M.T.P. cases which is similar to findings of Gallen (1965); Voigt and Brett (1969); Mukherjee (1975).

Incidence of positive cases in M.T.P. group was slightly higher than spontaneous abortion group which corresponds to the reports of Jorgenson (1969); Murray and Barron (1970) and Mukherjee (1975), while Mathew and Mathew (1968, 1969) have reported much higher percentage than in spontaneous abortion cases. Foetal cell score definitely increased in postoperative period in both groups when compared with preoperative score (Table II). Foetal cell score was more in spontaneous abortions postoperatively than with M.T.P. cases. This might be because in present study all M.T.P.s were done by vacuum aspirator while in spontaneous abortions cases curettage

were done. It is reported that foetal-maternal haemorrhage occurs more when curettage is done in comparison to vacuum aspirator.

Incidence of foetalmaternal haemorrhage is significantly high in primi gravida than multi gravida in both groups (Table III). Litwik and Taswell (1970) reported similar finding and were of the opinion that probably in primigravida cervical os offers more resistance to uterine action, which may favour entrance of foetal erythrocytes in disrupted vessels at choriodecidual junction.

Thus Rh isoimmunization can occur in Rh negative mother whose husband is Rh positive. To prevent isoimmunization in such patients Rh anti D should be given after spontaneous abortions as well after M.T.P. Therefore Rh grouping of blood should be mandatory for both parents prior to M.T.P.

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