A COMPARATIVE STUDY OF PLACENTAL TRANSMISSION OF
FOETAL ERYTHROCYTE IN MATERNAL CIRCULATION BETWEEN
SPONTANEOUS ABORTION AND PREGNANCY TERMINATION CASES

by

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Introduction

Kleihauer, et al., (1957) described an acid elution technique for demonstrating
foetal erythrocytes in maternal circulation during pregnancy and after delivery.
Since then other authors have studied foeto-maternal transfusion in normal and
abnormal pregnancy and labour. Ghosh
and Agarwal (1970) studied transpla­
cental haemorrhage in cases of incomplete
abortion and found significant result.
The present study was undertaken to
study placental transmission of foetal cells
in spontaneous abortion and pregnancy
termination cases.

Material and Method

100 cases were studied in Kamala
Nehru Memorial Hospital, Allahabad
and Allahabad Agricultural Institute
Naini, Allahabad.

45 cases of incomplete abortion.
15 cases of complete abortion.
40 cases of pregnancy termination under
12 weeks.

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A complete history including age,
parity, menstrual history and obstetric
history was taken. Any relevant facts of
previous abortions were noted.

Complete physical check-up including
blood pressure record, cardiovascular and
respiratory system examination were
done. Abdominal and vaginal examina­
tions were also done. In pregnancy termi
nation cases dry dot test in urine was
done. Peripheral blood films were made
of pregnant mothers and were repeated
after curettage or after spontaneous
abortion and again after 3 weeks of ter•
mination of pregnancy. Regarding incom­
plete abortion cases the first smear was
taken at the time of admission and then
after curettage. The films were examined
for the presence of foetal red cells by the
Acid Elution Technique.

Controls

Positive and negative controls were
used each time, when the slides were
stained. Positive control smears were pre­
pared from fresh cord blood of new born
babies. Negative control smears were pre­
pared from normal adult males in Kamala
Nehru Memorial Hospital, Allahabad and
Allahabad Agricultural Institute, Naini
Allahabad. These positive and negative
control slides were treated with acid phos­
phate buffer along with the slides of per­
ipheral blood films of pregnant mothers.
Foetal haemoglobin is more resistant than adult haemoglobin to denaturation, not only by alkali, but acid also. Thus at the PH—3.5, adult haemoglobin will be eluted from the R.B.C., but foetal haemoglobin will remain in the red cells and can be stained.

**Procedure**

The peripheral blood films were prepared and fixed in 80% alcohol for 5 minutes. The slides were washed gently with distilled water and air dried. They were immersed in citrate phosphate buffer at PH 3.5 at 37°C for 5-10 minutes. The buffer was made fresh on the day it was to be used. The slides were washed gently with distilled water and stained with acid haematoxylin for 5 minutes after which they were again washed in distilled water gently but completely. They were stained with eosin for 5 minutes, washed in running tapwater for one minute, air dried and mounted under dried cover slip.

Each slide was scanned for 5 minutes, the smears which showed only one foetal cell in 5 minutes scanning were considered as negative (Finn et al., 1961). Adult red blood cells which contained adult haemoglobin appeared only as ghosts cells. The cells containing foetal haemoglobin stood out clearly as pink refractile bodies.

**Dry Dot Test**

Dried anti human chorionic gonadotrophin serum as a dry drop on a paper strip and H.C.G. coated latex suspension dried (yellow coloured) were kept side by side. One drop of water was kept on dried H.C.G. coated latex suspension. One drop of urine was kept on dried anti human chorionic gonadotrophin and mixed well for 30 seconds. Now both drops were mixed properly and paper strip was moved to and fro for 2 minutes. If flocculation was present the test was negative. If clear yellow colour was seen the test was considered to be positive.

**Method of Pregnancy Termination by Weeks of Gestation**

Pregnancy less than 6 weeks were taken under menstrual regulation study, in which uterus is evacuated by suction created by a 50 cc syringe which is known as menstrual regulation syringe. From 6 weeks to 11 weeks pregnancy cases have been terminated by vacuum aspiration (electric machine).

**Observation**

45 cases of incomplete abortion in which curettage was done afterwards and 15 cases of complete abortion were taken in the present study. The results of incomplete abortion and complete abortions (spontaneous) are shown in Table I.

**Table I**

<table>
<thead>
<tr>
<th>Period of gestation in weeks</th>
<th>No. of cases</th>
<th>No. of positive cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>6-8</td>
<td>15</td>
<td>2</td>
<td>13.33</td>
</tr>
<tr>
<td>9-12</td>
<td>20</td>
<td>5</td>
<td>25.00</td>
</tr>
<tr>
<td>13-16</td>
<td>12</td>
<td>3</td>
<td>25.00</td>
</tr>
<tr>
<td>17-20</td>
<td>5</td>
<td>1</td>
<td>20.00</td>
</tr>
<tr>
<td>21-24</td>
<td>6</td>
<td>3</td>
<td>50.00</td>
</tr>
<tr>
<td>25 and more</td>
<td>2</td>
<td>1</td>
<td>50.00</td>
</tr>
</tbody>
</table>

40 cases of pregnancy terminations were also studied in the present series. The results are shown in Table II.

In 30 cases, which were upto 8 weeks, complications were not much and none of the cases required second curettage. In all these cases slides were repeated after
STUDY OF PLACENTAL TRANSMISSION OF FOETAL ERYTHROCYTE

TABLE II

Shows the Incidence of Percentage of Foetal Erythrocytes in Maternal Circulation in Pregnancy Termination Cases

<table>
<thead>
<tr>
<th>Period of gestation</th>
<th>No. of cases</th>
<th>No. of positive cases after curettage</th>
<th>Percentage</th>
<th>So. of cases after three weeks</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 6 weeks</td>
<td>8</td>
<td>0</td>
<td>0.0</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>6–8 weeks</td>
<td>22</td>
<td>2</td>
<td>18.1</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>9-11 weeks</td>
<td>10</td>
<td>3</td>
<td>30.0</td>
<td>2</td>
<td>20.0</td>
</tr>
</tbody>
</table>

3 weeks and none of the cases showed foetal cells.

Out of 10 cases which were between 9-11 weeks, 2 cases bled for more than 15 days and needed second curettage. Both these cases showed foetal cells in slides which were taken just after recurretting.

Discussion

The above study of a total 100 cases, including 60 spontaneous abortions (45 incomplete abortion and 15 complete abortions) and 40 pregnancy termination was undertaken to find out whether pregnancy termination has got any significant effect on the incidence of transplacental haemorrhage in the mother.

The data of present study indicate that the incidence of transplacental haemorrhage is high in cases of incomplete abortion (13.33% to 50%). Similar findings were confirmed by Ghosh and Agarwal, (1970). Freese and Tietel, (1963) noted the presence of foetal cells after 8th week, while Taylor and Kullman (1961), Clayton et al., (1964, 1966) detected it after 16 weeks of ante partum period. The cases which aborted after 20 weeks the percentage of foetal cell positive cases was much higher (50%). The incidence is similar to that of the normal pregnancy (Mukerjee et al., 1972).

Regarding pregnancy termination cases the percentage of foetal cell is more or less same as that of spontaneous abortion group. None of the cases which were terminated before 6 weeks had foetal cells in the maternal circulation. In those cases where duration of pregnancy was more than 8 weeks, 20% cases needed second curettage and in such cases incidence of transplacental haemorrhage was found to be 100%. This observation is of great significance in Rh negative mothers, specially with homozygous Rh positive fathers, as risk of Rh immunisation is very great.

So before doing termination of pregnancy in such cases it is desirable to consider the Rh factor of the mother. As the number of cases in the present series is very small further study is needed to confirm this observation.

Summary and Conclusion

1. A total 100 cases have been studied. Out of which 60 cases were of spontaneous abortion and 40 were of pregnancy termination. The data of present study show that the incidence of transplacental haemorrhage is higher in abortion cases, whether spontaneous or induced, as compared to normal pregnancy and labour.

2. The cases where duration of pregnancy was more than 8 weeks 20% needed second curettage within 15 days of termination.
3. The cases where second curetting was needed incidence of transplacental haemorrhage was found to be 100% which is of significance in Rh negative females.

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References