

## TRANSPLACENTAL HEMORRHAGE DURING SPONTANEOUS AND INDUCED ABORTIONS

by

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Transplacental foetomaternal haemorrhage is a well known phenomenon responsible for iso-immunization. The prevention of Rh iso-immunization is possible today by administering anti-D immunoglobulin to Rh negative mothers following delivery. But the production and availability of such immunoglobulin is still limited. Therefore, it is of utmost importance to determine whether the risk of foetomaternal transfusion in spontaneous and induced abortion is real. With the increasing incidence of induced abortions following legalisation of abortions, it is imperative to study the role of abortions and surgical intervention in the causation of transplacental passage of foetal erythrocytes. With this view the present study was undertaken to determine the incidence and magnitude of foetomaternal haemorrhage after abortion.

### Material and Methods

Blood smears were examined for the presence of foetal cells in 122 women, who had spontaneous or induced abortions. These included:

18 women in whom pregnancy ended in spontaneous abortions in 1st trimester.

34 women in whom artificial therapeutic abortion was performed during the first trimester.

22 women who had a late spontaneous abortion, i.e. in second trimester of pregnancy.

48 women who underwent a late artificial therapeutic abortion during second trimester.

Smears from cord blood of new born babies served as positive control smears.

In each of these, 2 blood smears were examined for the foetal cell score, before and after spontaneous or induced abortion, when bleeding or other signs of imminent abortion appeared, immediately after curettage or other intervention for the termination of pregnancy and finally 8 hours after the termination.

The period of gestation varied from 6-24 weeks. Induced abortions in first trimester were done by curettage or by vacuum suction. Out of 18 spontaneous abortions, 11 needed curettage as the abortion process was incomplete. In second trimester, induction of abortion was done either by intrauterine hypertonic saline instillation or by hysterotomy. Both in spontaneous and induced abortions intravenous oxytocin infusion was used when uterine contractions started

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and sometimes digital curettage was needed for completion.

The foetal cells were detected by acid elution technique described by Kleihauer *et al* (1957); venous blood was collected in double oxalate. Blood smears were made, dried and fixed in 80% ethyl alcohol for 5 minutes and washed in sodium citric phosphate buffer PH 3.2 for 5 minutes at 50°C. Slides were washed again with water, dried and stained with hemato-

xylin eosin. Foetal cells with this technique appear as pink stained refractile cells in the field of adult erythrocyte ghosts. Each slide was scanned for 5 minutes and foetal cell score was determined under high power by counting the number of cells per 1000 adult ghost cells.

#### Results

Table I shows the preabortal, and Table II shows the post-abortal foetal cell

TABLE I  
Preabortal Findings in First Trimester

Foetal cell Score (Per 1000)	Upto 6 weeks	6-12 weeks	Induced upto 6 weeks	6-12 weeks
0	5	11	13	20
1- 2	1	1	—	1
3- 4	—	—	—	—
5-10	—	—	—	—
Above 10	—	—	—	—
Total abortions	—	—	Total Induced	— 34
Spontaneous	— 18	—	—	—
Positive for Foetal Cells	— 2	—	—	— 01
Percentage of positive cases	— 11.1%	—	—	— 2.9%

TABLE II  
Postabortal Findings in First Trimester

Foetal Cell Score	Spontaneous				Induced upto 6 weeks	6-12 weeks
	Upto 6 weeks		6-12 weeks			
	Complete	Incomplete	Complete	Incomplete		
0	2	3	4	5	13	17
1- 2	—	1	1	2	—	3
3- 4	—	—	—	—	—	1
5-10	—	—	—	—	—	—
above 10	—	—	—	—	—	—
Total spontaneous abortions—curetting	18	11	7	7	Total induced	34
Positive for foetal cells	4	3	1	1		4
Percentage of positive cases	22.2%	27.2%	14.2%	14.2%		11.7%

scores, due to transplacental bleeding before and after spontaneous and induced first trimester abortions and curettage. Table III shows the preabortal and Table IV shows the postabortal foetal cell score after the transplacental hemorrhage due to spontaneous and induced second trimester abortions. In both the postabortal scores in Table II and IV the split up of spontaneous abortions as curretted and non-curretted is shown below the Tables.

The preabortal score percentage was higher for spontaneous abortions than for induced abortions (11.1% and 2.9% respectively). This probably could be explained by the fact that most of 18 spontaneous abortion cases had presented as vaginal bleeding which varied from minimal to moderate. The extent of foeto-maternal haemorrhage was not more than 1-2 cells per thousand in all the types. The foetal cell score did not increase post-

TABLE III  
Preabortal Finding in Second Trimester

Foetal cell score	Spontaneous		Induced	
	12-18 weeks	18-24 weeks	12-18 weeks	18-24 weeks
0	7	10	24	21
1- 2	2	3	2	1
3- 4	—	—	—	—
5-10	—	—	—	—
Above 10	—	—	—	—
Total spontaneous	— 22		Total induced:	48
Positive for foetal cells	— 5		Positive	3
Percentage of positive cases	— 22.7%			6.2%

TABLE IV  
Postabortal Finding in Second Trimester

Foetal cell score	Spontaneous				Induced	
	12-18 weeks		18-24 weeks		12-18 weeks	18-24 weeks
	Com-plete	Incom-plete	Com-plete	Incom-plete		
0	3	4	7	2	22	16
1- 2	—	1	1	2	2	4
3- 4	—	1	1	—	1	1
5-10	—	—	—	—	1	1
Above 10	—	—	—	—	—	—
	Total spontaneous		Curretted		Non-curretted	
	22		10		12	
Total positive for foetal cells	6		4		2	
Percentage of positive cases	27.2%		40%		16.6%	
					Total induced	
					48	
					10	
					20.8%	

abortionally in spontaneous complete abortions. It was higher in those cases of spontaneous abortions where curettage was done (27.2%).

In the induced variety the incidence rose from preabortal level of 2.9% to 11.7% postabortionally. Significantly this increase was mainly confined to later half of first trimester. In all cases of first trimester, the foetomaternal hemorrhage was minimal as it did not exceed 1-2 per thousand except in 1 case. There was no change seen in the smears made immediately after the abortion and 8 hours later.

In the second trimester abortions, as shown in Table III, the preabortal score percentage was higher in both spontaneous and induced abortions (22.7% and 6.2% respectively). Again the incidence was seen higher in spontaneous abortions as invariably they were accompanied by signs of placental disruption of varying degree. Following spontaneous abortion or surgical intervention like digital curettage, the percentages of foetal cell scores were increased over the preabortal level (22.7% before as compared to 27.2% after). This increase was more marked in patients who underwent digital curettage (40% as compared to 16.6% in non-intervention group). Following operation for induced abortion, the foetal cell score percentage increased steeply from 6.2% preoperative to 20.8% postoperative. Considering the distribution according to gestational period, the magnitude of foetomaternal haemorrhage increased 18 weeks onwards and in 2 cases it was seen upto 5-10 cells per thousand. The score remained same even after 8 hours postoperatively.

#### Discussion

The occurrence of transplacental passage of foetal cells in the maternal circula-

tion has been demonstrated not only during labour but also during the entire pregnancy. Moreover, it has been shown that a proportionate increase in the number of foetal cells does occur from the early months of pregnancy to delivery (Zipursky *et al* 1963).

Gellen *et al* (1965) stated that the number of foetal cells doubled after vaginal operation for the interruption of pregnancy during second trimester. Mathews and Mathews (1969) found an incidence of transplacental hemorrhage as 6% in spontaneous abortions as compared to 25% in induced abortions by abdominal or vaginal route.

The transplacental foetomaternal hemorrhage is accepted as occurring even in early normal pregnancies. Walsh and Lewis (1970) has found an incidence of 4%.

In the present study the incidence in the first trimester was 2.9% and was found as high as 11.1% in those cases who showed signs of choriodecidual disruption as in threatened abortions. The incidence was slightly higher in second trimester as 6.2% in symptomless cases, while it was seen significantly higher (22.7%) in cases presenting with vaginal bleeding.

Following abortion in first trimester, out of 6 spontaneous abortions, foetal cell transfusion occurred in only 1 and that too minimal (1 per thousand). The rise in foetal cell score percentage was seen upto 27.2% in patients nearing end of first trimester and who had undergone curettage.

In second trimester abortions, the incidence of transplacental bleeding increased only slightly over its preabortal level i.e. from 22.7 to 27.2%. However, in the split-up study, the incidence was more in patients who had undergone surgical in-

tervention. In the induced abortions too, the cells score percentage was higher following operation, though it was less as compared to spontaneous ones. This could probably be due to a larger series of induced abortions. (48 as compared to 22) and most of them were less than 20 weeks. Nevertheless, the extent of foeto-maternal haemorrhage seen was more in induced abortions (upto 10 cells per thousand).

In order to evaluate the risk of sensitization of Rh negative mothers following abortion, the amount of foetal blood constituting a large enough stimulus for the production of Rh antibodies should be known. There appears to be an increase in the risk of anti-D developing, in general, as the foetal cell score rises, as stated by Woodraw and Donohoe (1968). Most authors believe that anti-D may appear after a stimulus of less than 0.1 ml of Rh +ve blood.

In the present study, in most of the cases the number of foetal cells entering the maternal circulation was rather minimal, 1-2 cells per 1000, in 5 cases 3-4 cells per 1000, while in 2 it was upto 10 cells per 1000.

The postoperative cell score after 8 hours was same as the one seen immediately after the abortion suggesting thereby that the cells did not disappear from the circulation. Neither was there any increase, thus probably there was no delayed passage of foetal cells in the maternal circulation.

#### Conclusion

The risk of foetomaternal hemorrhage and subsequent sensitization following early and late spontaneous and induced abortions is rather limited in view of the small quantities of transfusion of foetal cells in maternal circulation. However,

the possibility of sensitization must be considered more so in second trimester abortions and where there has been artificial interference.

#### Abstract

The incidence and magnitude of foeto-maternal hemorrhage after abortions was determined in 122 women. The amount of foetal blood that had crossed the placental barrier was determined before and after, spontaneous and induced abortions in first and second trimester of pregnancy. Small quantity of foetal blood was seen in most subjects, however, the incidence of transplacental bleeding was noted higher in late abortions and in those subjects where surgical intervention was carried out.

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