FETOMATERNAL HAEMORRHAGE IN ANTEPARTUM AND POSTPARTUM CASES

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SUMMARY

In the present study, a low incidence of fetomaternal haemorrhage was found in antepartum cases i.e. 7% as compared to 28.8% in the postpartum period. Induction of labour with pitocin, manual removal of placenta and traumatic deliveries like forceps and caesarean section increased the incidence of fetomaternal haemorrhage. In the antepartum period, only APH appeared to a affect fetomaternal haemorrhage.. Other factors that were studied and had no significant co-relation with the extent of transplacental fetomaternal bleeding were age, gravidity, parity, gestation and fetal weight.

The obstetrician faced with the delivery of Rh negative patient should aim for spontaneous normal vaginal delivery with minimum of traumatic manipulation. This should decrease chances of fetomaternal haemorrhage and thus ensure that her obstetric career is not endangered.

Introduction

Nature created the placental barrier for the safety of the foetus and mother. Any breach in this barrier creates problems for both of them.

With recognition of the formation of antibodies by the mother against antigens of baby in cases of Rh. incompatibility and the ever increasing importance of erythoblastosis fetalis, many investigators searched for a mechanism by which the interaction could be explained. The most likely explanation was that fetal bleeds occurred across the placenta.

The incidence of transplacental haemorrhage during antenatal period was studied by various workers following the introduction of acid elution technique by Kleihauer and Betke 1957. A steady increase in incidence towards term was observed by Cohen and Zuelzer (1964). Cohen and Zuelzer (1964) found foetal cells more often immediately post partum (50.3%) than in the last trimester of pregnancy. Woodrow *et al* (1965) found foetal cells in 59 out of 200 women im-

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mediately after delivery and thought that in 40 of these, haemorrhage occured during delivery.

Several workers including Woodrow *et al* 1965 Parikh *et al* (1971), Mukerji *et al* (1973), Deshpande and Sharma (1975) have studied transplacental haemorrhage in normal pregnancy and normal deliveries and also in those women whose deliveries were assisted by use of obstetric procedures. Acid elution method of demonstrating foetal erythrocytes in maternal blood smears is the best available technique. The principle is the differential elution of adult and fetal haemoglobin in blood smears treated with citric acid—phosphate buffer; adult haemoglobin is washed away, and thus the adult cells appear as ghosts while fetal haemoglobin being resistant to denaturation with acid remains in the fetal RBC's and these are stained with eosin (appear pink and refractile) so that differentiation is possible.

The present study was carried out on 100 pregnant women in the Government Hospital for Women, Amritsar in the antepartum and postpartum periods to calculate the incidence of fetomaternal haemorrhage and also to study the effect of factors like APH, toxaemia of pregnancy, effect of induction of labour with pitocin, mode of delivery and method of placental delivery on fetomaternal haemorrahage.

Material and Methods

One hundred cases were taken at random and were unselected for gravidity, parity or blood groups. Each case was asked for a detailed history of her menstrual cycles, obstetrical career and any complaints during the present pregnancy as vaginal bleeding, headaches, visual disturbances, oedema, pain in epigastrium and urinary complaints. She was then subjected to a thorough general physical examination and obstetrical examination. Routine investigations (Hb, complete urine examination and ABo, Rh grouping were done).

To detect the fetomaternal bleeding, 2 samples of maternal blood were taken in each case (1) in the antepartum period (2) within 24 hours of delivery.

Note was made of mode of delivery, (normal vaginal; forceps or LSCS) whether labour ensued spontaneously or was induced with pitocin I/V drip; delivery of placenta (spontaneous expulsion or manual removal) fetal outcome and weight of the baby. After delivery, baby's blood grouping was done (ABo, Rh).

Kleihauer's method of detecting fetal cells in maternal circulation was used, with the modification that eosin instead of May-Gruenwald stain was used (Freese and Title 1963).

2 c.c. maternal blood was collected by venepuncture in a glass vial containing double oxalate anticoagulant and diluted 1:3 with 0.9% sodium chloride solution. Thin smears were made on a glass slide, air dried and fixed in 80% ethanol. Slides were then dipped in a citric acid—phosphate buffer ph 3.5 at 37°c and after 5 minutes, dried and stained with eosin for further 5 minutes.

Slides were screened under high power magnification and any slide with one or more fetal was counted as positive. No attempt was made to calculate the amount of fetal blood in maternal circulation as the presence of even a single fetal cell is significant in terms of its potential sensitization effects.

Twenty-five non-pregnant gynaecological patients acted as controls and slides were prepared in a like manner. Cord

blood was also treated similarly to check on the sensitivity of the technique.

Results

Out of 100 women studied by making 2 smears from each patient i.e. 197 slides in all, 35 (17.7%) were positive for fetal cells at one time or the other. No fetal cells were seen in any of the controls (Table I).

TABLE I
Incidence of Transplacental Bleeding

	Negative cases	Positive cases	Total
Study Group	162 (82.3%)	35 (17.7%)	197
Control Group	25 (100%)	0 (0.0%)	25

In the antepartum period, 7 (7.0%) were positive for fetomaternal haemorrhage, while after delivery, 28 (28.8%) had fetal cells in circulation.

On analysing the complications in the antenatal period it was seen that 11% cases had antepartum haemorrhage and 10% had toxaemia of pregnancy. The percentage incidence of positive smears in cases with APH, pre-eclamptic toxaemia and uncomplicaed cases was 18.1%, 10% and 5.1% respectively in antepartum cases (Table II). While in the same cases (postpartum period) the incidence was 36.3%, 22.2% and 20.0% respectively (Table III).

Grouping the cases according to their mode of delivery there were 49 normal vaginal deliveries, 23 forceps deliveries, 25 caesarean sections, 1 caesarean hysterectomy and 1 craniotomy (Table IV).

The relationship between the mode of delivery and Fetomaternal haemorrhage is depicted in Table V.

TABLE II
Incidence of Positive Cases in APH and Toxaemias of Pregnancy in the Antepartum Period

Complications	Negative cases	Positive cases	Total
A.P.H.	9 (81.9%)	2 (18.1%)	11
Pre-eclampsia and eclampsia	9 (90%)	1 (10%)	10
No complications	75 (94.9%)	4 (5.1%)	79

TABLE III
Incidence of Positive Cases in APH and Toxaemias in Postpartum Period

Complications	Negative cases	Positive cases	Total
A.P.H.	7 (63.7%)	4 (36.3%)	11
Pre-eclampsia and eclampsia	7 (77.8%)	2 (22.2%)	9
Normal vaginal delivery	32 (80%)	8 (20%)	40
			37*

*Cases that had other complications were not included

TABLE IV
Fetomaternal Bleeding in Relation to Mode of Delivery

Before Delivery:

Mode of delivery	Negative cases	Positive cases	Total
Normal vaginal delivery	40 (81.6%)	9 (18.4%)	49
Forceps	14 (60.9%)	9 (39.1%)	23
LSCS	15 (60.9%)	10 (40.0%)	25
C. Hysterectomy	1(100.0%)	—	1
Craniotomy	1(100%)	—	1
Absconded before deliver	—	—	1

TABLE V
Mode of Delivery

Mode of delivery	No. of cases
Normal vaginal delivery	49 (49%)
Forceps	23 (23%)
CSCS	25 (25%)
Cases arean hystractomy	1 (1%)
Craniotomy	1 (1%)
1 case absconded before delivery	1 (1%)

Positive smears in normal vaginal delivery, forceps and Caesarean section were 18.4%, 39.1% and 40% respectively.

Out of the 59 cases in which Labour ensued spontaneously, only 20.3% had fetal cells in circulation as compared to 43.3% where labour was induced with pitocin (23 cases).

Seventy-two cases had spontaneous expulsion of the placenta and in them 23.6% had fetomaternal haemorrhage as compared to the 24 cases of manual removal of placenta out of which 45.8% had fetomaternal haemorrhage.

On checking the blood groups of mother and fetus, out of 27 positive cases, 23 (5.2%) were ABO compatible and only 4 (14%) were ABO incompatible.

Grouping the cases into normal or abnormal cases, it was seen that in the former 6.5% cases had fetomaternal haemorrhage while in contrast, 39.3% had fetomaternal haemorrhage in abnormal cases.

Discussion

Fetal cells have been identified in the maternal circulation in the antepartum as early as 8 weeks of gestation (Zipursky, 1963). Such transplacental bleeding in cases of incompatibility between the mother and fetus increases the risk of maternal isoimmunisation and immunoserologial reactions. Massive bleeding also places the fetus in sudden jeopardy. Smaller leaks are difficult to detect clinically as they do not affect the fetus, but can be detected by the Kleihauer method of staining fetal cells.

The incidence of transplacental cross over of cells in the antepartum period has been reported to be ranging from 4% (Clayton *et al*, 1962) to 43.8% (Freese *et al*, 1963). The findings of the present study i.e. 7% are in agreement with those of Harold and Keenan (1963) and Jorgensen (1977) who found the incidence to be 7% and 9% respectively.

In the antenatal period, only APH appeared to facilitate the passage of fetal cells; may be because of the break in the choriodecidual junction. These results compare favourably with those of Ghosh (1970) and Mukherji *et al* (1974).

High incidence of foetomaternal haemorrhage was found in cases induced with pitocin i.e. 43.3% as compared to 20.3% where labour ensued spontaneously. This may be explained on the basis

that pitocin induced contractions though physiological are stronger and may cause passage of fetal cells across the placental barrier. But Ghosh and Agarwal (1970) found that there was no effect of induction of labour with pitocin as compared to normal labour.

Mode of delivery was found to influence the extent of foetomaternal haemorrhage i.e. there was a much higher incidence in case who had caesarean section 40% as compared to 18.4% in cases with uncomplicated vaginal delivery. These results are in conformity with those of Zipursky *et al*, 1963, Krishana *et al* (1973), Ghosh and Aggarwal (1970). But findings of Cohen and Associates (1964) are at variance. They failed to find any positive correlation with various modes of delivery and foetamaternal bleeding. In cases where forceps application was done, the incidence of foetomaternal haemorrhage was 39.1% as compared to 18.4% in cases with uncomplicated delivery. This is in close agreement with the results of Deshpande and Sharma (1975). Mukerji *et al* (1974) were not able to detect any alteration in the incidence of foetal cells in forceps delivery compared to that seen in normal delivery.

Manual removal of placenta caused a very high incidence of foetomaternal haemorrhage i.e. 45.8%. Similar findings were reported by Papagordiades (1977). Manual removal of placenta causes a traumatic separation of the placenta and may significantly increase the entrance of fetal cells into the open maternal sinuses.

Generally higher incidence has been reported in post partum cases ranging from 11.7% (Finn *et al*, 1961) to 56.9% (Freese *et al*, 1963). The latter comment "Our results suggest that a number of bleeds occur in the antepartum period, but the fact that the incidence is higher in post partum mothers indicates that the traumas of labour and delivery facilitate transplacental bleeding".

The incidence of 28.8% in the present study is significantly higher than 7% in the antepartum period and is consistent with that reported by Woodrow *et al* (1965) 29.5%.

This method is of obvious value in detecting fetomaternal haemorrhage in ABO normospecific pregnancies as ABO incompatibility renders the incidence of RH incompatibility low, due to the prompt destruction of incompatible fetal cells which reach the maternal circulation.

It was found that there was a 6 times increase in fetomaternal haemorrhage in abnormal cases as compared to normal cases in the present study. Similar results were reported by Papageordiades (1976).

Thus it is important to know the various factors that can affect the extent and magnitude of fetal bleeding, causing various problems for both mother and fetus.

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