

## EFFECT OF MANAGEMENT OF THIRD STAGE OF LABOUR ON FETOMATERNAL TRANSFUSION

by

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and

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The presence of Rh positive fetal erythrocytes in maternal circulation of Rh negative women is generally accepted as the sensitizing agent in erythroblastosis foetalis. Although fetomaternal transfusion during pregnancy and labour is a physiological phenomenon, its incidence and magnitude are influenced by iatrogenic factors. Rh immunization is most likely to occur with transplacental haemorrhage of more than one ml and this occurs more commonly during delivery (Clarke, 1963). The present study was undertaken to see the effect of different modes of placental delivery on fetomaternal transfusion.

### Material and Method

The cases for this study were taken from labour room of Department of Obstetrics and Gynaecology, Patna Medical College Hospital.

Following groups of full time normal delivery cases were taken:

- i. Placenta was allowed to drain.
- ii. Placenta was delivered spontaneously.
- iii. Placenta delivered by controlled cord traction.

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iv. Ergometrine was given with delivery of shoulder of baby.

v. Oxytocin was given with delivery of shoulder of baby.

vi. Manual removal of placenta was done.

Each group consisted of 30 cases except the last in which 5 cases were studied. Two samples of blood were taken by venipuncture during second and third stage of labour. Blood samples in the third stage were taken one hour postpartum. In sixth group samples of blood were taken before manual removal and one hour after manual removal of placenta.

Modification of Kleihauer and Betke acid elution technique was used for staining blood smears. One hundred high power fields of microscope were searched for fetal red cells.

### Observations and Discussion

In group one, one clamp was applied to the cord on the fetal side and cord on placental side was allowed to drain. Maternal peripheral blood showed fetal cells in second stage of labour in 10% cases. Incidence of positive cases one hour postpartum was 13.3% showing a rise of 3.3%. Range of fetal cells in positive cases was 0.001-0.004% and 0.001-0.005% during second stage and one hour postpartum respectively.

In group 2 positive cases during the second stage and postpartum period were 13.3% and 20 per cent with fetal cells percentage range in positive cases 0.001-0.012 and 0.002-0.120 respectively. There was rise of 6.7% in positive cases in postpartum group when compared to the second stage of labour.

In group 3 incidence of positive cases for fetal erythrocytes was 10% in the second stage of labour and 26.6% one hour postpartum. Range of fetal cells in maternal circulation was 0.002-0.006% in second stage and 0.001-0.017% one hour postpartum. There was a rise of 16.6% in positive cases in postpartum period as compared to the second stage of labour.

In fourth group ergometrine 0.25 mg was given I.V. at the time of delivery of the shoulder of the baby. Placenta was expelled spontaneously. Incidence of positive cases for fetal erythrocytes in the second stage of labour was 10%. It became 23.3% one hour postpartum showing the rise of 13.3% when compared to the second stage. Range of fetal erythrocytes in positive cases was 0.002-0.012% in the second stage one hour postpartum.

In fifth group 10 I.U. of oxytocin I.M. was given with the delivery of the shoulder of the baby. Incidence of positive cases was 13.3% in the second stage of labour and 46.6% one hour postpartum showing increase by 33.3%. Range of fetal cells in positive cases was 0.002-0.020% in the second stage and 0.001-0.120% one hour postpartum.

In sixth group placenta was removed manually. Controlled cord traction was employed in all cases after giving ergometrine before doing manual removal. Incidence of positive cases was 20% before manual removal and it became 60% afterwards, showing rise of 40%. Range

of fetal cells in positive cases was 0.008% (only one case was positive) before manual removal and 0.010-0.300% after manual removal of placenta.

#### Discussion

This study shows that when placenta is delivered by controlled cord traction incidence of positive cases increased by 16.6% in postpartum group as compared to 6.7% increase when placenta is expelled spontaneously and 3.3% increase when placenta is allowed to drain. Queenan *et al* (1964) stated that excessive traction on cord might be an inciting factor in disruption of feto-maternal barrier. There is increase of 13.3% in positive cases for fetal erythrocytes during postpartum period when ergometrine is used although there is no rise in percentage of fetal cells. Incidence of positive cases is greater when compared to cases of spontaneous delivery of placenta without use of ergometrine. Evidently the present study indicates that ergometrine causes sudden spasm of uterus and that perhaps tears placental cotyledons and causes rise in placental intravascular pressure because cord is clamped when uterus relaxes this fetal blood under tension is forced into the maternal uterine sinuses. Cohen *et al* (1964) did not notice increased incidence with use of ergometrine. This varied observations may be due to the fact that ergot does not produce similar effect in all cases. One can recall this from every day observations.

There is marked increase in incidence of transplacental haemorrhage when oxytocin is given as compared to cases of spontaneous delivery of placenta when no oxytocin is used. Reilly (1960) and Doolittle (1963) made similar observations. According to Reilly use of

oxytocics in third stage of labour enhances the entry of fetal cells into maternal blood by quick separation of placenta. Manual removal of placenta shows increase by 40% in incidence of positive cases for fetal cells. According to Queenan (1964) manual removal involves interruption of the integrity of circulatory vessels of the placenta. Doolitte (1963) stated that manual removal of placenta gave range of values.

**Summary**

There is increase in incidence of positive cases for fetal cells in maternal circulation during postpartum period as compared to second stage of labour. This indicates that feto-maternal transfusion can be influenced by different methods of management of third stage of labour.

Maternal sensitization of Rh negative mothers can be minimised by:

- (i) Draining the placenta and allowing it to be expelled spontaneously.
- (ii) By not using other methods of placental delivery.
- (iii) By not using ergometrine or any other oxytocin.

**References**

1. Clarke, C. A.: Brit. Med. J. 1: 979, 1963.
2. Cohen, F., Zuelzen, W. W., Gustafson, D. C. and Evans, M. M.: Blood, 23: 621, 1964.
3. Doolitte, J. E.: Obst. & Gynec. 22: 468, 1963.
4. Queenan, J. T. and Nakamoto, M.: Obst. & Gynec. 23: 392, 1964.
5. Reilly, C. T.: Amer. J. Obst. Gynec. 80: 391, 1960.