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Study of Fetal Blood With Maternal Vaginal Bleeding

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ABSTRACT

Present study was done to know the extent of fetal bleed in cases of maternal vaginal bleed in third trimester. Study subjects were one hundred primigravida as well as multigravida with singleton pregnancy, above 28 weeks, admitted with vaginal bleeding in third trimester of pregnancy. Twenty three of placenta previa, 42 placental abruption and 35 unclassified hemorrhage and investigated for presence of foetal blood in maternal vaginal bleeding. All three tests APT, Ogita and Kleihauer-Betke were performed, positive Kleihauer test was taken as positive for fetal bleed, irrespective whether other two tests were negative or positive. Fetal blood was present in 14% cases. Perinatal deaths in cases of fetal blood in vaginal bleeding were significantly higher than those without fetal blood in vaginal bleeding. Neonatal anemia was detected in 80% cases of placental abruption, 80% placenta previa and 66.6% of unclassified hemorrhage in cases fetal blood with compared to 13.5, 6.5 and 6.5% in cases with no fetal blood in vaginal bleeding. If fetal blood is present in vaginal bleed, chances of neonatal anemia, perinatal death and neonatal morbidity are more. All the cases of third trimester vaginal bleeding need to be investigated for fetal bleed in vaginal blood.

Key words: Third trimester, vaginal bleeding, tests for fetal blood, perinatal death, conservative management

INTRODUCTION

Third trimester vaginal bleeding is almost always maternal but could also be mixed with fetal blood. Massive fetal bleeding could occur in 1:1,000 births. It occurs more often after traumatic diagnostic amniocentesis, external cephalic version, placental abruption and maternal trauma, however in most cases, the cause is unexplained (De Almeida and Bowman, 1994; Giacoia, 1997). If disruption of the villi occurs, when substance of the placenta is traumatized, fetal component could be significant, leading to perinatal morbidity and mortality (Neilson, 1999; Arias, 2000; Claydon and Pernoll, 2003). Fetal blood can be checked by identification and counting of nucleated erythrocytes (Benedetti, 1996) and also by checking for fetal hemoglobin by elution or electrophoresis technique. Timely identification of fetal blood and expedited delivery could prevent perinatal loss (Jennings and Clauss, 1978; Benedetti, 1996; Schellpfeffer, 1995; Odunsi *et al*., 1996; Neilson, 1999).

Over the years a number of methods have been used to detect fetal blood in maternal blood. The acid elution test has been the landmark (Kleihauer *et al*., 1957), many others, including alkaline denaturation APT test (Apt and Downey Jr, 1955) and Ogita Test (Ogita *et al*., 1976) have

also been tried. Newer tests like Enzyme-Linked Antiglobulin Test (ELAT) and gel agglutination are more sensitive and specific but are expensive, require sophisticated machinery and specially skilled persons. The present study was done for detection of fetal blood with vaginal bleeding in cases of third trimester hemorrhage and to find out it's relation to the perinatal outcome for improvisation of the outcome in cases of third trimester hemorrhage.

MATERIALS AND METHODS

Study was done in the year 2003, however was not sent for publication as the research assistant (first co-author) had left the place and the research needed in depth analysis. Study subjects were primigravida as well as multigravida with singleton pregnancy, Rh positive blood type admitted with vaginal bleeding after 28 weeks of gestation and who gave consent for inclusion in study. Out of the 170 such cases admitted over a period of 26 months, 100 were randomly investigated as per the availability of the person who was responsible for collecting vaginal blood for the special tests for detection of fetal blood in maternal vaginal bleeding.

Tests were done as per the procedure of Apt and Downey (1955) and Odunsi *et al.* (1996), Ogita *et al.* (1976) and Nierhaus and Betke (1968) and volume calculated (Kleihauer *et al.*, 1957). All three tests APT, Ogita and Kleihauer-Betke were performed, however positive Kleihauer test was taken as positive for fetal bleed, irrespective whether other two tests were negative or positive. Cord blood was collected immediately after delivery in all cases for estimation of fetal hemoglobin. Neonatal anaemia meant cord blood hemoglobin less than 14 g dL^{-1} classified into mild, moderate and severe anaemia (Edwards and Yaden, 2005) (Table 1).

Apt and Ogita tests are based on detection of fetal hemoglobin by denaturation technique. Chances of false positive results are minimal but false negative results may be obtained if fetal hemoglobin concentration in vaginal blood is low. Kleihauer-Brauer-Betke test is the simplest method for the detection of fetal cells. This test is based on fetal hemoglobin F which resists elution from the cell in an acid medium. But false positive results can occur because of faulty technique or subjective error. We believe that no gold standard has been made by researchers to compare the tests results, so it is difficult to comment on the specificity and sensitivity.

Table 1: Age, parity, type of haemorrhage with various tests in vaginal blood

		Placenta previa						Abruptio placenta						Unclassified H'ge					
		KB		APT		OGITA		KB		APT		OGITA		KB		APT		OGITA	
Age	Parity	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-
≤ 19	Primi	0							1		1		1						
	Multi																		
20-29	Primi		3		10		10	2	14	1	14	2	13	2	14	1	17	1	17
	Multi	2	13	1	8	1	8	2	14	1	17	1	17	1	15	0	14	0	14
>30	Primi	0	1	0	1	0	1	0	1	0	1	0	1	1	0	1	0	1	0
	Multi	3	0	1	2	1	2	0	7	0	7	0	7	0	2	0	2	0	2
Total		5	17	2	21	2	21	5	36	2	40	3	39	4	31	2	33	2	33

KB: Kleihauer-Betke test, H'ge: Hemorrhage, P: Parity

RESULTS

Of the 100 study subjects with third trimester hemorrhage investigated for presence of fetal blood with vaginal bleeding, 23 were of placenta previa, 42 placental abruption and 35 unclassified hemorrhage. Fetal blood was detected, at least by one test in 5 (21.7%) out of 23 cases of placenta previa, 5 (11.9%) out of 42 cases of placental abruption and 4 (11.4%) out of 35 cases of unclassified hemorrhage. All the APT positive (6) or Ogita positive (7) tests were also Kleihauer-Betke test positive, Kleihauer test was positive in 14 cases but in 7 cases other two tests were negative. Of the 23 cases of placenta previa, 11 were primigravida none had fetal bleeding, 8 were second gravida of which 3 (37.5%) had fetal blood, 4 were third gravida of which 2 (50%) had fetal blood. Of 42 cases of placental abruption, overall 5 had fetal blood, 4(23.5 %) of 17 primigravida, 1 (7.1%) of 14 second gravida and of 11 third gravida onwards, none had fetal blood. Out of 35 cases of unclassified hemorrhage 19 were primigravida, of which 3 (15.7 %), none of 9 second gravida had fetal blood and 1 (14.2%) of the 7 third gravida onwards had fetal blood in vaginal blood (Table 2).

Of 100 study cases, 16 (36.3%) out of 44 cases of 20-24 years, 15 (37.5%) out of 40 cases of 25-29 years, 7 (50%) of 14 cases of 30-34 years and 1 case each of 18 years and 36 years had fetal blood in vaginal blood at admission.

There was no relation between presence of fetal blood in vaginal blood and severity of vaginal bleeding.

Fetal anemia was detected in 80% cases of placental abruption as well as, placenta previa 66.6% cases of unclassified hemorrhage with fetal blood in vaginal bleeding. In cases of no fetal blood in vaginal blood, fetal anemia was detected in 13.5% of placental abruption, 6.5% cases of placenta previa and 6.5 % of unclassified hemorrhage (Table 3).

Table 2: Foetal bleed in vaginal blood with various types of APH parity, type of hemorrhage

	Placenta previa		Placental abruption		Unclassified hemorrhage		
	KB		KB		KB		
Parity	+	-	+	-	+	-	Grand total
Primi gravida	-	11	4	13	3	16	47
Second gravida	3	5	1	13	_	9	31
Third gravida onwards	2	2	-	11	1	6	22
Total	5	18	5	37	4	31	100

KB: Kleihauer-Betke test

Table 3: Types of APH, fetal bleed, vaginal bleed and cord hemoglobin levels

	Type of tests		Haemoglobin in g dL^{-1}				
Type of APH	FB	test	<8	8-10.9	11-13.9	>14	Total
PAb	FB	+	1	1	2	1	5
	tests	-	1	1	3	32	37
PP	FB	+	-	3	1	1	5
	test	-	-	-	-	18	18
UH	FB	+	-	-	2	1	3
	test	-	-	1	2	29	32
Total			2	6	10	82	100

AP: Abruptio placenta, PP: Placenta previa, UH: Unclassified hemorrhage, FB: Fetal blood, Severe anaemia = Hb<8 g dL^{-1}, Moderate anaemia = 8-10.9 g dL^{-1}, Mild anaemia =11-13.9 g dL^{-1}

Table 4: Positivity of different tests and perinatal outcome

		Abruptio placenta				Praevia placenta				Unclassified H'ge				
Tests		L	SB	ND	T	L	SB	ND	T	L	SB	ND	T	Total
OGITA	+ve	-	2	1	3	-	1	1	2	2	-	-	2	
	-ve	22	14	3	39	19	-	2	21	25	7	1	33	100
APT	+ve	-	1	1	2	-	1	1	2	2	-	-	2	
	-ve	22	15	3	40	19	-	2	21	25	7	1	33	100
KB	+ve	1	3	1	5	2	1	2	5	2	2	-	4	
	-ve	21	12	3	36	17	-	2	19	25	5	1	31	100
		66	47	12	125	57	3	10	70	81	21	3	105	300

KB: Kleihauer Betke test, L: Live birth, SB: Still birth, ND: Neonatal death, H'ge: Hemorrhage, T: Total

Of 5 cases of placental abruption who had fetal blood with vaginal bleeding, 1 had live birth, 3 stillbirths, later 1 neonatal death (NND) occurred. Of the 5 cases of placenta previa who had fetal blood, 2 had live births, 1 stillbirth and 2 NND occurred and of 4 cases of unclassified hemorrhage with fetal blood, 2 were hive births and 2 stillbirths. Perinatal deaths in cases with fetal blood with vaginal bleeding was significantly higher than those without fetal blood, 64.2 vs. 25.5% (statistically significant difference $p<0.05$). placental abruption (80 vs. 40.5%, $p<0.05$), unclassified hemorrhage (64.2 vs. 19.3%, $p<0.05$) and placenta previa (60 vs. 5.5%, $p<0.05$) (Table 4).

DISCUSSION

In the present prospective pilot study, fetal blood in vaginal bleeding was detected in 14 study subjects complicated by third trimester bleeding, in more cases of placenta previa (21.7%) compared to placental abruption (11.9%) and unclassified hemorrhage(11.4%), statistically significant difference ($p<0.05$). Researchers do advocate checking for fetal blood in all cases of third trimester vaginal bleeding in day to day life (Scott *et al*., 1982; Oyelese *et al*., 1999; Neilson, 1999; Edwards and Yaden, 2005) but it is not done specially in low resource settings, Occurrence of fetal blood in vaginal blood is more often in cases above 30 years (Van De Putte *et al*., 1972; Paterson, 1979; Scott *et al*., 1982; Odunsi *et al*., 1996). In the present pilot study in cases of placenta previa, it was multiparous women and in placental abruption, nulliparous women who had fetal blood, whereas unclassified hemorrhage had no relation with parity. This aspect needs to be investigated further, as mechanism of separation of placenta might have something to do with fetal blood in vaginal blood.

The clinical manifestations and prognosis depends on the amount of fetal blood and the rapidity with which it occurs. If the bleeding has been prolonged or repeated during the course, it gives the fetus an opportunity to develop hemodynamic compensation with increased hemopoietic activity. If it is sudden and heavy the effects could be serious, the diagnosis is postnatal and these infants may manifest only pallor at birth. Rapid blood loss is followed by perinatal hypoxia and intrauterine death or severe anaemia and hypoxia at birth. A decrease in the fetal movements associated with abnormal cardiotocographic findings, such as a sinusoidal pattern of the fetal heart rate, may be a warning sign of a massive bleed especially observed in low-risk pregnancy (Renaer *et al*., 1976). Management of massive hemorrhage requires immediate delivery by caesarian section, if the gestational age is suitable. Alternatively for very preterm fetuses, serial fetal transfusions could be used, if necessary facilities and experienced personnel are available.

Fetal anemia was detected in 80% cases of placental abruption, 80% of placenta previa and 75% of unclassified hemorrhage with fetal blood, in cases without any fetal blood, in 13.5% of placental abruption and 6.5% of unclassified hemorrhage and 6.5% cases of placenta previa. Anaemia is likely cause still birth and neonatal death. Further fetal blood was not related to the severity of overall vaginal bleeding. Perinatal deaths in cases of fetal bleed in vaginal blood were significantly higher than those without fetal blood in vaginal bleeding (64.2 vs. 25.5%) in cases of third trimester bleeding.

Present study has limitations as it involves all type of antepartum hemorrhage and of all parity but it does indicate that all cases of third trimester vaginal bleeding need to be investigated for fetal bleed in vaginal blood especially in cases when conservative treatment is planned. If fetal blood is present in vaginal blood chances of fetal anemia, neonatal morbidity and perinatal death increase. If required, expedition of delivery can be considered to improve perinatal outcome. Further research needs to be done with larger numbers with different types of third trimester bleeding in primigravida and multigravida.

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