

Perinatal Outcome in Cases with Bleeding during First and Early Second Trimester

S. Chhabra, C. Tickoo, P. Kalra

Abstract—*Background:* Bleeding during first half of pregnancy mostly originates from placenta, some abort, others are at risk of complications. *Objective:* Study was done to know perinatal outcome with bleeding up to 20 weeks in singleton pregnancy. *Material Methods:* Subjects were 1020, equal controls managed over 2 years, 435 had viable pregnancy at admission, 135 excluded, 300 followed for perinatal outcome, 99 (19.52% up to 10 weeks), 201 (39.18% of 11-20 weeks). *Results:* Hypertensive disorders occurred in 24% cases of bleeding within 10 weeks, 22% 11-20 weeks 14.79% controls, placenta previa 4% in 10 weeks, 0.9% 11-20 weeks, 0.97% controls, prelabor rupture of membranes in 16%, 7.45% controls. 20% up to 10 weeks, 35% 11-20 weeks, 18% controls had fetal growth restriction, 34.34% up to 10 weeks 30.35% of 11-20 weeks 17.17% controls had preterm births, perinatal mortality rate in study was 118.62, in controls 68.16 (Uneventful pregnancy in 13.52% study, 46.11% controls). *Conclusion:* Once bleeding occurs, one third continue pregnancy, maternal neonatal outcome gets affected with variations in cases of bleeding within first 10 weeks & 11-20 weeks.

Keywords—First, Second trimester, bleeding, Disorders, Perinatal Outcome.

I. BACKGROUND

BLEEDING during first half of pregnancy could have varying effects on pregnancy and perinatal outcome. So it constitutes a source of anxiety for the mother, family as well as the care providers. As bleeding originates from the placental area in most of the cases, quite a few women abort and in left out pregnancy could be at increased risk for complications like pregnancy loss, placenta previa, fetal growth restriction (FGR), pregnancy induced hypertension (PIH), pre-eclampsia, preterm birth, prelabour rupture of membranes (PLROM), placental abruption, and cesarean birth [1]-[9]. Outcome is likely to be affected by the gestation at bleeding, cause of bleeding, severity of bleeding and may be other factors.

II. OBJECTIVE

The objective of the present study was to know the pregnancy outcome in women who presented with vaginal bleeding in first trimester or early second trimester (up to 20 weeks of pregnancy) for possibilities of getting some insight

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S. Chhabra is with Department of Obstetrics Gynaecology, Mahatma Gandhi Institute of Medical Sciences, Sevagram, Wardha - 442102, Maharashtra, India (e-mail: chhabra_s@rediffmail.com).

C. Tickoo and P. Kalra were with Department of Obstetrics Gynaecology, Mahatma Gandhi Institute of Medical Sciences, Sevagram, Wardha - 442102, Maharashtra, India.

into better management strategies for improving outcome in limited resource settings.

III. MATERIAL METHODS

Present prospective study was carried out in women presenting with vaginal bleeding, in first trimester and early second trimester (up to 20 weeks of pregnancy) after approval of ethical committee. Informed written consent was taken. Women with multiple pregnancy, any medical / surgical illness, known bleeding disorder, lower genital tract disease like cervical polyp, cervical erosion which could cause bleeding were excluded. Primigravida as well as multigravida with gestation up to 20 weeks of pregnancy, with vaginal bleeding, with ultrasonographically confirmed singleton intrauterine pregnancy and willing to be part of the study were the study subjects and equal numbers with similar exclusion criteria but no vaginal bleeding were the controls. Ultrasonologist did sonography of study subjects as well as controls. Overall, the study cases were divided into 2 groups as per the gestation, gestation up to 10 weeks and 11 to 20 weeks and then further sub grouped; up to 6 weeks, >6-10 weeks >10-16 weeks and > 16-20 weeks.

IV. RESULTS

During the study period 7040 pregnant women were registered and 1020 (14.48%) of them had presented with bleeding in first half of pregnancy, 507 (49.7%) were up to 10 weeks gestation and 513(50.3%) between 11-20 weeks gestation, almost equal. Of the 507 cases of vaginal bleeding up to 10 weeks gestation, only 174(34%) had viable pregnancy at admission. Excluding 7 with multiple pregnancy, 167 (33%) became study subjects. Of 513 cases between 11-20 weeks gestation, 251(49%) had viable pregnancy, (significantly more viable pregnancies than those with bleeding up to 10 weeks pregnancy), seven with multiple pregnancy were excluded, 244 (47.5%) became study subjects. So a total of 411 were the study subjects (167 up to 10 wks, 244 beyond) for perinatal outcome.

Of the 167 study subjects with gestation up to 10 weeks and singleton viable pregnancy, 65% (110 of 167) had normal scan, and 100 of 110 (91%) continued with pregnancy beyond 28 weeks and 10 (9%) aborted, 16% (26 of 167) had subchorionic hematoma, 73% (19 of 26) of them continued with pregnancy, 27% (7 of 26) aborted, 9.2% (28 of 167) had low lying placenta, 61% (17 of 28) of them continued with pregnancy and 39% (11 of 28) aborted, and 1.8% (3 of 167) with low lying placenta as well as subchorionic hematoma continued with pregnancy. Thus of the total 500 women with

singleton pregnancies up to 10 weeks and bleeding, only 167 (33.4%) had singleton viable pregnancy at admission, 139 of them (79.8%) continued with pregnancy, 25 of these 139 decided to deliver at other centers and 15 were lost to follow up, so finally 99 study subjects with viable pregnancy and gestation up to 10 wks could be followed for final maternal neonatal outcome.

Of 244 women between 11-20 weeks gestation, with viable singleton pregnancy, 78% (191 of 244) had normal scan, 84% (160 of 191) of them continued with pregnancy beyond 28 weeks, 16% (31 of 191) aborted, 9% (22 of 244) had subchorionic hematoma, 86% (19 of 22) of them continued and 14% (3 of 22) aborted, 12% (28 of 244) had low-lying placenta, 73% (19 of 28) of them continued pregnancy beyond 28 weeks, 27% (9 of 28) aborted, 1.22% (3 of 244) had low-lying placenta as well as subchorionic hematoma and all continued pregnancy beyond 28 weeks. Thus, of 506 cases of 11-20 weeks gestation with singleton pregnancy, 39.72% (201 of 506), 82.37% (201 of 244 with viable pregnancy between 11 to 20 wks) at admission continued with pregnancy.

Of the total 1020 controls, 439 were up to 10 weeks gestation, 6 (1.18%) had nonviable pregnancy on USG, though they had no bleeding and eight had multiple pregnancy, so were excluded. Of 425 controls up to 10 weeks with singleton viable pregnancy with no complaints, 96% (408 of 425) had normal USG, 2 (0.47%) had subchorionic hematoma, 15 (3.53%) had low-lying placenta. Of 581 controls between 11-20 weeks also, 6 (1.03%) had nonviable pregnancy and 6 had multiple pregnancy so were excluded, of remaining 569, 96.66% (550 of 569) had normal scan, 0.7% (4 of 569) had subchorionic hematoma and 2.64% (15 of 569) had low lying placenta. Of the controls also, 68 were lost to follow up, so 926 could be followed for outcome (Table I).

Pregnancy induced hypertension/preeclampsia occurred in 24% (24 of 99 study subjects) with pregnancy of 10 weeks, 22% (44 of 201) women of bleeding between 11-20 weeks and 14.79% (137 of 926) controls, significantly more study subjects than controls, (p value 0.014) had hypertensive disorders. Of 99 study cases up to 10 weeks, 18 (18.18%) and of 201 women with 11-20 weeks gestation, 44 (21.89%), had preterm pains, insignificant difference between the two (p value 0.455), but highly significantly more (p value <0.001) in comparison to 5.51%, controls (51 of 926) with preterm pains. PLROM occurred in 16.16% (16 of 99) cases up to 10 wks and 16% (32 of 201) of 11-20, weeks gestation, both significantly more (p value <0.0001), than controls 7.45% (69 of 926). Twenty of 99 study cases up to 10 weeks (20%), 70 (35%) of 201 cases between 11-20 weeks and 167 of 926 (18.03%) controls were diagnosed to be having fetal growth restriction(FGR), significantly more study cases with bleeding between 11-20 weeks.

Placenta previa at delivery was present in 4 (4%) study cases of bleeding up to 10 weeks, 0.9% (2 of 201 of 11-20 weeks gestation) and 0.97% (9 of 926) controls, significantly more (p value 0.033) in cases up to 10 weeks. Placental

abruption occurred in two study cases (0.6%), one out of 99 cases (up to 10 weeks) and one of 201 (beyond 10 weeks) and 6 (0.65%) controls also.

Of the fifteen cases of less than 10 weeks with subchorionic hematoma, 6.66% (one of 15) had preterm pains, 20% (3 of 15) had PLROM, 13.33% (2 of 15) had FGR, 26.66% (4 of 15) had PIH/pre-eclampsia and only 33.33% (5 of 15) had no disorder. Of the twenty three women of 11-20 weeks gestation with sub chorionic hematoma also one had preterm pains, 13.04% (3 of 23) had PLROM, 26.08% (6 of 23) had FGR, 26.08% (6 of 23) had PIH/pre eclampsia, 4.34% (1 of 23) had placenta previa and rest (17% of 23) had no disorder, but the difference was insignificant between the two groups. Of all 38 study cases with sub chorionic hematoma, 13% (5 of 38) had hematoma of less than 10 ml, 26% (10 of 38) of 10-30 ml and 61% (23 of 38) greater than 30 ml. Of the 23 women with hematoma greater than 30 ml, 43% (10 of 23) had preterm labour, 31% (7 of 23) had PLROM, 26% (6 of 23) had FGR and 30.43% (7 of 23) delivered term SGA infants (Table II).

Of 99 women with bleeding in first 10 weeks, finally 34.34% had preterm births and of the 201 with bleeding between 11-20 weeks also, 30.35% had preterm births (p value <0.939).

Amongst 45 study subjects, up to 10 weeks gestation, and mild bleeding, 40% (18 of 45) had preterm births, and of the 99 cases between 11-20 weeks with mild bleeding, 26% (26 of 99) had preterm births. Of 34 women up to 10 weeks gestation with moderate bleeding, 38% (13 of 34) and of 87 cases of more than 10 weeks with moderate bleeding, 25% (22 of 87) had preterm births. Of the six women up to 10 weeks gestation with severe bleeding, 50% (3 of 6) had preterm births and of 29 cases of more than 10 weeks with severe bleeding, 45% (13 of 29), had preterm births, significantly more preterm births in those who had severe bleeding and also in cases with mild and moderate bleeding up to 10 weeks than 11-20 weeks. Of study subjects only 4% (4 of 99) up to 10 weeks gestation and 7% (14 of 201) of 11-20 weeks gestation had no disorder. Pregnancy was uneventful in 46.11% (427 of 926) controls (Table III).

Of 300 study subjects (99 up to 10 weeks and 201 between 11-20 weeks), 265 (88%) had spontaneous onset of labor, 69% (183 of 265) of them had normal and 31% (82 of 265) had cesarean births (CB), (56% (46 of 82) for fetal distress, 26% (21 of 82) for cephalopelvic disproportion(CPD), 11% (9 of 82) for malpresentations and 7% (6 of 82) for antepartum haemorrhage (APH)). Of the 16% (35 of 300) women who had labor induced also, 57.1% (20 of 35) delivered normally and 42.8% (15 of 35) had CS, [80% (11 of 15) for fetal distress and 20% (4 of 15) for APH]. Of 926 controls, 71.16% (659 of 926) had spontaneous labor, of whom 69.0% (454 of 659) had normal delivery and 31% (205 of 659) had CS. Of 28.8% (267 of 926) controls who had induced labor, 50.94% (136 of 267) had normal delivery, and 49.06% (131 of 267) had CS, no difference in mode of delivery in study and controls.

TABLE I
AGE, GRAVIDITY WITH ASSOCIATED DISORDERS IN STUDY AND CONTROLS

| Age | Gravidity | Associated Disorders | | | | | | | | | | | | | | | | | |
|--------------------|-----------|----------------------|--------------|--------------|-------------|-------------|--------------|--------------|--------------|--------------|--------------|-------------|-------------|--------------|---------------|--------------|--------------|--------------|-------------|
| | | Study | | | | | | Total | | Controls | | | | | | Total | | | |
| | | 1 | 2 | 3 | 4 | 5 | 6 | 1 | 2 | 3 | 4 | 5 | 6 | 1 | 2 | 3 | 4 | 5 | 6 |
| <19 | Primi | 0 | 0 | 2 | 0 | 1 | 0 | 3 | 3 | 0 | 6 | 0 | 3 | 0 | 0 | 6 | 3 | 0 | 12 |
| | Multi | 1 | 2 | 0 | 1 | 0 | 2 | 4 | 6 | 6 | 3 | 0 | 0 | 6 | 6 | 3 | 0 | 0 | 9 |
| | Total | 1 | 2 | 2 | 1 | 1 | 2 | 7 | 9 | 6 | 6 | 3 | 0 | 12 | 12 | 9 | 3 | 0 | 21 |
| | % | 0.29 | 0.59 | 0.59 | 0.29 | 0.29 | 0.59 | 2.05 | 0.32 | 0.65 | 0.65 | 0.32 | 0.32 | 0 | 0 | 0.65 | 0.32 | 0.32 | 0 |
| 20-29 | Primi | 7 | 3 | 3 | | 3 | 2 | 18 | 9 | 6 | 3 | 0 | 0 | 18 | 9 | 3 | 0 | 18 | 36 |
| | Multi | 75 | 80 | 43 | 4 | 11 | 32 | 245 | 81 | 137 | 113 | 9 | 51 | 298 | 689 | 113 | 9 | 51 | 689 |
| | Total | 82 | 83 | 46 | 4 | 14 | 34 | 263 | 90 | 143 | 116 | 9 | 51 | 316 | 725 | 226 | 9 | 51 | 725 |
| | % | 24.11 | 24.41 | 10.88 | 0.58 | 4.12 | 10.00 | 77.35 | 9.71 | 14.45 | 12.53 | 0.64 | 5.50 | 34.12 | 78.29 | 22.6 | 0.9 | 5.1 | 78.29 |
| >30 | Primi | 3 | 0 | 1 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 3 | 3 |
| | Multi | 24 | 5 | 19 | 3 | 3 | 10 | 64 | 27 | 18 | 15 | 3 | 6 | 108 | 177 | 15 | 3 | 6 | 177 |
| | Total | 27 | 5 | 20 | 3 | 3 | 10 | 68 | 27 | 18 | 15 | 3 | 6 | 111 | 180 | 20 | 3 | 6 | 180 |
| | % | 7.94 | 1.47 | 5.88 | 0.88 | 0.88 | 2.94 | 20 | 2.91 | 1.95 | 1.62 | 0.32 | 0.65 | 11.99 | 19.43 | 7.94 | 1.47 | 5.88 | 19.43 |
| Grand Total | | 110 | 90 | 68.00 | 8.00 | 18 | 46 | 340* | 120 | 167 | 137 | 15 | 60 | 427 | 926 | 110 | 90 | 68.00 | 8.00 |
| % | | 32.36 | 26.47 | 20.00 | 2.35 | 5.29 | 13.53 | 100.0 | 12.96 | 18.03 | 14.79 | 1.62 | 6.48 | 46.11 | 100.00 | 32.36 | 26.47 | 20.00 | 2.35 |

- 1-Preterm labour and Pre labour rupture of membranes
- 2-Fetal growth restriction
- 3-Pregnancy induced hypertension/Pre eclampsia
- 4-Placenta Previa & Placental Abruption
- 5- Others
- 6-Normal

* Of 500 singleton pregnancies with bleeding up to 10 weeks, 139 finally continued but 25 decided to deliver at other centres and 15 lost to follow-up, of 201 of 506 bleeding with 11-20 weeks continued. Analysis was of 99+201=300.

Of the study cases of gestation up to 10 weeks, 25.25% (25 of 99) and of 11-20 weeks gestation 24% (48 of 201) had preterm, appropriate for gestation age infants, compared to 12.96% (120 of 926) controls, (p value <0.001), 9% (9 of 99) cases of less than 10 weeks, 6.5% (13 of 201) of more than 10 weeks had preterm small for gestation age infants compared to 4.21% (39 of 926) controls, significant difference (p value < 0.05). Thirty nine (39%) women of less than 10 weeks, 60% (120 of 201) of 11-20 weeks compared to 306 (33.05%) controls had term SGA babies, highly significantly, more women with bleeding between 11-20 weeks had term SGA (p value <0.001). Only twelve (12%) women of less than 10 weeks, 34 (17%) of 11-20 weeks delivered term AGA infants, compared to 461 (49.78%) controls, (p value <0.001).

Overall 8 (2.67%) babies had minor congenital anomalies in the study subjects, 15 (1.61%) controls, (p value >0.05), however neither in the study nor in controls, any baby had major congenital anomaly.

Thirty four (10.0%) neonatal deaths (NND) occurred in study cases, 47.06% (16 of 34), due to prematurity, 5.88% (2 of 34) due to severe birth asphyxia, 11.76% (4 of 34) had meconium aspiration syndrome (MAS), 11.76% (4 of 34) extreme low birth weight and 23.53% (8 of 34) due to septicemia and 6.04% (56 of 926) controls had NND, (p value <0.05). Total perinatal deaths in study subjects were 42 (PMR of 118.62), 65 in controls PMR of 68.16, (p value < 0.05).

TABLE II
PREGNANCY OUTCOME IN RELATION TO GESTATION AT BLEEDING AND VOLUME OF HEMATOMA ON ULTRASOUND

| Pregnancy Outcome | Gestation at bleeding (wks) | | | | | | | | | | | | | | | Total |
|-------------------|-----------------------------|-------|-------|-------------|-------|-------|-------------|-------|-------|-------------|-------|-------|-------------|-------|-------|--------|
| | < 6 | | | 7-10 | | | 11-13 | | | 14-16 | | | 17-20 | | | |
| | Volume (ml) | | | Volume (ml) | | | Volume (ml) | | | Volume (ml) | | | Volume (ml) | | | |
| | <10 | 10-30 | >30 | <10 | 10-30 | >30 | <10 | 10-30 | >30 | <10 | 10-30 | >30 | <10 | 10-30 | >30 | |
| Preterm AGA | 0 | 1 | 2 | 0 | 1 | 2 | 1 | 0 | 2 | 0 | 1 | 1 | 0 | 1 | 2 | 14 |
| % | 0 | 12.5 | 7.14 | 0 | 12.5 | 7.14 | 14.28 | 0 | 7.14 | 0 | 12.5 | 3.57 | 0 | 14.28 | 7.14 | 36.84 |
| Preterm SGA | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 1 | 1 | 0 | 3 | 2 | 0 | 1 | 1 | 12 |
| % | 0 | 0 | 3.57 | 0 | 0 | 7.14 | 0 | 12.5 | 3.57 | 0 | 37.5 | 7.14 | 0 | 14.28 | 3.57 | 31.58 |
| Term SGA | 1 | 1 | 2 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 0 | 2 | 12 |
| % | 14.28 | 12.5 | 7.14 | 14.28 | 0 | 3.57 | 0 | 0 | 3.57 | 0 | 12.5 | 3.57 | 2.63 | 0 | 7.14 | 31.58 |
| Total | 1 | 2 | 6 | 1 | 1 | 6 | 1 | 1 | 4 | 0 | 5 | 4 | 1 | 2 | 6 | 38 |
| % | 14.28 | 28 | 17.86 | 14.28 | 12.6 | 17.86 | 14.28 | 12.6 | 14.28 | 0 | 62.6 | 14.28 | 5.26 | 28.56 | 17.85 | 100.00 |

AGA = Appropriate for gestational age
SGA = Small for gestational age

V. DISCUSSION

The frequency of uterine bleeding in first half of pregnancy, 5-20% [1], [2], [4], [6], [10]-[13] makes it an important factor affecting perinatal outcome. Present prospective observational study was done to know the pregnancy outcome of women who presented with bleeding in first half of pregnancy.

In women who presented with pregnancy up to 10 weeks and bleeding, 34% had viable pregnancy and of viable pregnancy cases who had normal USG, 91%, of those with sub chorionic hematoma on USG 73% and with a low lying placenta 61% had continued pregnancy beyond 28 weeks, similar findings have been reported by other researchers also [4], [5], [14], [15]. In study subjects of more than 10 weeks gestation 49% had viable baby, of them, 84% with normal scan, 86% with subchorionic hematoma and 73% with low lying placenta continued pregnancy beyond 28 weeks. Though women who had bleeding after 10 weeks and subchorionic hematoma and low lying placenta also continued pregnancy beyond 28 weeks, if the scan was normal more women continued with pregnancy.

Bhattacharya [4] and Verma [16] have reported no significant association between vaginal bleeding and the

occurrence of placental abruption, but Agrawal [3], Mitra [6], Weiss [7], Alexander et al. [8], Malik [17] have reported placental abruption more often. Ball [18] has reported that the presence of subchorionic hemorrhage increases the risk of placental abruption eleven folds and the risk of stillbirth two to four fold. One would think that chances of placental abruption increase. It was not so in the present study, two cases of placental abruption, frequency similar to controls, one was a case with subchorionic hematoma of large size. More studies are needed to understand the risk of placental abruption in women who have bleeding in first half of pregnancy.

Association of low lying placenta and bleeding in first half of pregnancy has been reported [2], [19], [20]. Placenta previa at delivery was present in 4 (4%) study cases of up to 10 weeks gestation, 2 (0.9%) of 11-20 weeks gestation and 9 (0.97%) controls, significant difference (p value 0.033) between cases up to 10 weeks and controls and bleeding between 11-20 weeks. Placenta near the os causing bleeding is easy to understand and pregnancy may not continue but in quite a few cases pregnancy grows well.

TABLE III
GESTATION SEVERITY OF BLEEDING WITH PERINATAL OUTCOME IN STUDY SUBJECTS

| Gestation (wks) | Severity of bleeding | Perinatal outcome | | | | | | | | Total | |
|-----------------|----------------------|-------------------|-------|--------------|------|----------|------|----------|-------|-------|--------|
| | | Pre-term AGA | | Pre-term SGA | | Term SGA | | Term AGA | | | |
| | | No. | % | No. | % | No. | % | No. | % | No. | % |
| <6 | Mild | 6 | 1.76 | 2 | 0.59 | 10 | 2.94 | 2 | 0.59 | 20 | 5.88 |
| | Moderate | 4 | 1.18 | 2 | 0.59 | 5 | 1.76 | 1 | 0.29 | 12 | 3.82 |
| | Severe | 1 | 0.29 | 0 | 0.00 | 1 | 0.29 | 0 | 0.00 | 2 | 0.59 |
| | Total | 11 | | 4 | | 16 | | 3 | | 34 | |
| 7-10 | Mild | 7 | 2.06 | 3 | 0.88 | 11 | 4.41 | 4 | 1.47 | 25 | 8.82 |
| | Moderate | 5 | 1.47 | 2 | 0.59 | 10 | 4.41 | 5 | 1.47 | 22 | 7.94 |
| | Severe | 2 | 0.59 | 0 | 0.00 | 2 | 0.59 | 0 | 0.00 | 4 | 1.18 |
| | Total | 14 | | 5 | | 23 | | 9 | | 51 | |
| 11-13 | Mild | 7 | 2.35 | 4 | 1.18 | 24 | 9.41 | 8 | 2.35 | 43 | 15.29 |
| | Moderate | 8 | 2.94 | 2 | 0.59 | 20 | 7.06 | 7 | 2.06 | 37 | 12.65 |
| | Severe | 5 | 1.47 | 2 | 0.59 | 7 | 2.06 | 0 | 0.00 | 14 | 4.12 |
| | Total | 20 | | 8 | | 51 | | 15 | | 94 | |
| 14-16 | Mild | 8 | 3.53 | 1 | 0.29 | 20 | 5.88 | 10 | 2.94 | 39 | 12.65 |
| | Moderate | 7 | 3.24 | 1 | 0.29 | 26 | 8.82 | 8 | 2.35 | 42 | 14.71 |
| | Severe | 6 | 1.76 | | 0.00 | 9 | 2.65 | 0 | 0.00 | 15 | 4.41 |
| | Total | 21 | | 2 | | 55 | | 18 | | 96 | |
| 17-20 | Mild | 4 | 1.76 | 2 | 0.59 | 10 | 2.94 | 1 | 0.29 | 17 | 5.59 |
| | Moderate | 3 | 0.88 | 1 | 0.29 | 4 | 1.18 | 0 | 0.00 | 8 | 2.35 |
| | Severe | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Total | 7 | | 3 | | 14 | | 1 | | 25 | |
| Grant Total | | 73 | 24.33 | 22 | 6.47 | 159 | 53 | 46 | 13.82 | 300 | 100.00 |

AGA - Appropriate for gestational age;SGA - Small for gestational age

Irrespective of gestation at bleeding significantly more study cases had preterm pains compared to controls, similar to reports by other researchers [6], [21]-[24], possibly bleeding leads to utero-placental dysfunction, which predisposes these women to shorter gestational periods [7]. PLROM occurred in 16.16% (16 out of 99) study cases of gestation up to 10 wks and 16% (32 of 201) of 11-20 weeks gestation, significantly more (p value <0.0001), compared to 7.45% (69 of 926)

controls, similar to other studies [10], [16], [23], [25], [26]. Although the reasons are unclear, it is hypothesized that disruption of the chorio-amniotic plate by adjacent hemorrhage may make the membranes more susceptible to rupture [3], [4], [6].

Twenty percent (20 of 99) study cases up to 10 weeks, 35% (70 of 201) of 11-20 weeks and 18.03%(167 of 926) controls had fetal growth restriction (FGR), significantly more study

DECLARATION OF INTEREST

There is no conflict of interest associated with any of the author. No grant or research support has been accepted/obtained for this research and no organization or society is directly or indirectly associated with this research. We have no financial or personal relationship to disclose.

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