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## Research Article

### PREGNANCY OUTCOME IN THREATENED MISCARRIAGE AND CORRELATION WITH USG PARAMETERS

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#### ABSTRACT

Objective of the study was to analyze effect of threatened miscarriage on pregnancy outcome and correlation with ultrasound parameters. It was a prospective study conducted over a period of 3 years, including 284 pregnant women with bleeding per vaginum during first 12 trimester of pregnancy. A structured proforma was used to collect information and followed till their pregnancy terminated. Out of the 284 women, majority were primigravida (65.1%), 19.7% had history of previous abortion & 32.4% were associated with medical disorders. 38.7% presented with bleeding at <8 weeks. 30.6% of women had sub chorionic hematoma in USG. Incidence of spontaneous miscarriage was 22.2%, 80.5% had vaginal delivery. PROM/PPROM (9.51%) was most common maternal complication after 24 weeks. Among perinatal outcome, preterm birth seen in (13.1%), perinatal mortality 2.71%. To conclude, pregnancies complicated by threatened miscarriage are associated with higher risk for adverse pregnancy outcome. Knowledge of these risks help obstetricians provide proper antenatal care and do timely intervention.

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## INTRODUCTION

Threatened miscarriage is one of the most common complication of pregnancy which affects 16 – 25% of all pregnancies (Farrell et al, 1996). The diagnosis of threatened miscarriage is based on documented fetal cardiac activity on ultrasound with a history of vaginal bleeding in the presence of a closed cervix (Park et al, 2006). In general, the incidence of spontaneous abortion after first trimester bleeding is quoted to be 50% before sonographic evaluation for fetal viability (Farrell et al, 1996; Chung et al, 1999). If a viable fetus is noted at ultrasound examination after first trimester vaginal bleeding, 95 – 98% of such pregnancies will still continue beyond 20 weeks of gestation (Farrell et al, 1996; Uerpaiojkit et al, 2001). Several studies have reported an association between first trimester bleeding and abnormal pregnancy outcome, including preterm deliveries, fetal growth restriction and low birth weight but the majority of these reports were retrospective (Weiss et al, 2004; Batzofin et al, 1984; Mulik et al, 2004; Hertz et al, 1985). The largest prospective study was conducted by Weiss et al which concluded that first trimester bleeding was an independent risk factor for adverse obstetrics outcome (Weiss et al, 2004). Knowledge about the outcome of ongoing pregnancies

following first trimester bleeding is relevant to both women and other obstetricians in order to plan antenatal care and consider clinical interventions in pregnancy.

The objective of this study was to analyze the causes, maternal as well as perinatal outcome in patients with threatened miscarriage and their correlation with ultrasound findings so that they can be managed in the best possible way with reduction in morbidity and mortality.

## MATERIALS AND METHODS

### Location and duration of study

This was a prospective observational study conducted in the Department Obstetrics and Gynaecology, GSVM Medical College, Kanpur over a period of three years from January 2014 to December 2016 after institutional ethical approval. After taking written informed consent a cohort of 284 pregnant women with bleeding per vaginum during the first 12 weeks of pregnancy were included.

### Selection Criteria

The inclusion criteria were singleton pregnancies complicated with vaginal bleeding at less than 12 weeks gestation in the presence of closed cervix with positive fetal cardiac activity

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detected on ultra sound. Multiple pregnancies, congenital uterine anomalies, uterine fibroids or local cervical pathology, cervical incompetence, history of recurrent miscarriages, history of trauma or surgery during the present pregnancy were excluded from study.

The gestational age was estimated from last menstrual period and the first trimester ultrasound. Pregnant women were registered, had a complete physical and gynaecological examination at booking and followed up prospectively at antenatal clinic and delivered at same hospital and repeat ultrasound scans were done as required. In women with subchorionic hematoma, scans were repeated weekly until resolution of hematoma. The assessment of all cases included maternal disease; thrombophilia, chronic hypertension and diabetes mellitus, hypothyroidism, history of infertility treatment, PCOS. The patients were admitted and closely monitored along with supportive therapy in the form of progesterone. Once their symptoms subsided, they were discharged and called in the OPD as per scheduled antenatal visits.

**Outcome measured**

We categorized outcome broadly into maternal and perinatal outcomes. The maternal outcome included spontaneous miscarriage, Hypertensive disorders of pregnancy (HDP), Antepartum haemorrhage (placenta preavia, abruption placentae), PPRM/PROM, postdatism, postpartum haemorrhage (PPH) and retained placenta, mode of delivery. The perinatal outcome evaluated were birth asphyxia, RDS(Respiratory distress syndrome), low birth weight, IUGR, Apgar score at 1& 5 minute, perinatal mortality, indicators of perinatal morbidity (Apgar Score and neonatal unit admission). Data were analyzed using simple tabulations.

**RESULTS**

The total number of obstetric admissions were 6370, out of which 284 had bleeding per vagina in the first trimester constituting a percentage of 4.5%. Age group between 21-30 years constituted the largest number 192 (67.6%), 36(12.7%) were >30 years of age. Most of the women were from lower middle class 154 (54.2%).Majority had BMI between 21 – 25 174(61.3%). Out of 284 women 107(38.7%) presented with bleeding was <8 weeks gestation. Primigravida 185 (65.1%) and nullipara 193(67.9%) constituted the maximum number,56 (19.7%) presented with history of previous abortion. 92(32.4%) of women were associated with medical disorders like diabetes mellitus, chronic hypertension, hypothyroidism, thrombophilia, infertility treatment & PCOD (Table1).

Low implantation of gestation sac was seen in 43 ( 15.14%) cases, out of which 27 (62.8%) continued pregnancy beyond 20 weeks and 16(37.2%) aborted.87(30.6%) had subchorionic hematoma in USG, Size of hematoma was <3cm<sup>2</sup> in 54(19.01%) and >3 cm<sup>2</sup> in 33(11.6%) women. In women with hematoma size <3 cm<sup>2</sup>, 44(81.4%) continued pregnancy successfully till term, while in cases with hematoma size >3 cm<sup>2</sup>, spontaneous miscarriage was seen in as high as 21(63.6%) cases. Placenta was seen located in lower segment in 39 (13.7%). Poor decidual reaction seen in 31(10.9%), out of which 26(83.8%) aborted.

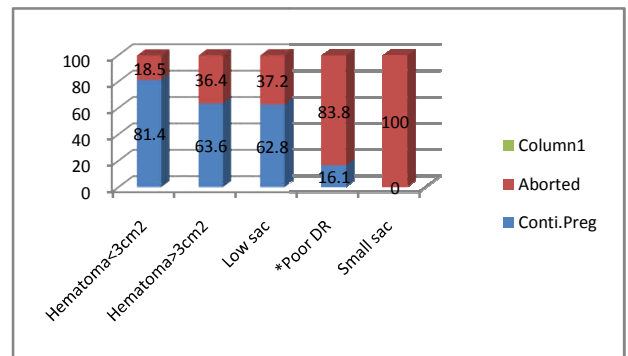
**Table 1** Baseline & obstetric characteristics of study population (n=284)

Age(in years)	No.(%)
<20	56(19.7)
21-30	192(67.6)
>30	36(12.7)
<b>Socioeconomic status</b>	No.(%)
Upper	0(0)
Upper middle	24(8.45)
Lower middle	154(54.2)
Lower	106(37.3)
<b>BMI(kg/m<sup>2</sup>)</b>	No.(%)
<20	78(27.5)
21-25	174(61.3)
>25	32(11.3)
<b>Gestational age at bleeding(in weeks)</b>	No.(%)
<8	107(37.7)
8-10	96(33.8)
11-12	81(28.5)
<b>Gravida</b>	<b>No.(%)</b>
Primigravida	185(65.1)
Gravida 2	58(20.4)
Gravida 3 or more	41(14.4)
<b>Parity</b>	<b>No.(%)</b>
Nullipara	193 (67.9)
Para2	48(16.9)
Para3 or more	43(15.1)
Previous abortion history	56(19.7)
<b>*Associated medical disorders</b>	92 (32.4)
Diabetes Mellitus	12(4.23)
Chronic hypertension	07(2.46)
Hypothyroidism	51(17.9)
Thrombophilia	09(3.17)
Infertility Treatment	22(7.75)
PCOD	26(9.15)

Mean sac size (MSS) was determined and a small sac was diagnosed when the difference between the MSS and crown-rump length (MSS-CR) was less than 5 mm. An MSS-CR of 5 mm or greater was considered normal. Small sac was an USG finding in 9(3.17%) and all of them aborted within 10 weeks (Table2) & (Figure 1).

**Table 2** USG Parameters

Location of sac	No.(%)
Upper segment	241(84.6)
Lower segment	43(15.14)
Size of hematoma	No.(%)
<3 cm <sup>2</sup>	54(19.01)
>3cm <sup>2</sup>	33(11.6)
Location of placenta	No.(%)
Upper segment	145(51.06)
Lower segment	39(13.7)
Poor decidual reaction	31(10.9)
Small sac	09(3.17)



**Figure 1** Correlation of USG parameters with pregnancy outcome

\*Poor decidual reaction

Among 284 women, 63 (22.2%) had spontaneous miscarriage out of which 44 (15.5%) aborted in first and 19 (6.69%) in second trimester. Rest 221 (77.8%) women continued pregnancy beyond 20 weeks. Among these 178 (80.5%) had vaginal delivery. Out of these 138 (62.4%) had term, 29 (13.1%) had preterm & 11 (4.98%) had instrumental delivery. 43 (19.5%) women underwent caesarean section (Table 3).

**Table 3** Outcome of pregnancy (n=284)

Outcome of pregnancy	No. (%)
Spontaneous miscarriage	63 (22.2)
Vaginal delivery	178 (80.5)
Term	138 (62.4)
Preterm	29 (13.1)
Instrumental delivery	11 (4.98%)
Caesarean delivery	43 (19.5%)

Among maternal outcome, low lying placenta before 20 weeks was present in 39 (13.7%) cases, placenta praevia in 21 (7.39%), 17 (5.99%) of cases presented as abruptio placentae, PROM & PPRM seen in 27 (9.51%), hypertensive disorders of pregnancy (HDP) in 19 (6.69%), PPH 16 (5.63%), postdated in 5 (1.76%), 4 (1.41%) needed manual removal of placenta, mean gestational age at delivery was 36.12. Among 221 babies born, birth asphyxia was present in 12 (5.43%) neonates, 15 (6.79%) developed with RDS, Apgar score < 5 at 5 minute was seen in 22 (9.95%) babies, 29 (13.1%) had preterm birth, IUGR seen in 19 (8.59%), low birth weight (< 2.5 kg) were 28 (12.7%). Perinatal mortality was 6 (2.71%). 29 (13.1%) babies required NICU admission. Mean birth weight at the time of delivery was 2.51 kg (Table 4).

**Table 4** Maternal & Perinatal Outcome

Maternal Outcome	No. (%) (n=284)
Low Lying placenta	39 (13.7)
Placenta Praevia	21 (7.39)
Abruptio Placentae	17 (5.99)
PPROM+PROM	27 (9.51)
Hypertensive disorders of pregnancy (HPD)	19 (6.69)
Postdated	05 (1.76)
PPH	16 (5.63)
Manual removal of placenta	04 (1.41)
Mean gestational age at delivery	36.12
Perinatal outcome	*No. (%) (n=221)
Birth Asphyxia	12 (5.43)
Respiratory distress syndrome (RDS)	15 (6.79)
Preterm	29 (13.1)
IUGR	19 (8.59)
LBW (< 2.5 Kg)	28 (12.7)
Apgar score at < 5 at 5 min	22 (9.95)
Perinatal mortality	06 (2.71)
NICU admission	29 (13.1)
Mean birth weight	2.51 Kg

(\*Total no. of cases were 284 but out of them 63 aborted, so for all outcome after 20 weeks total no. of cases (n) were reduced to 221).

## DISCUSSION

Threatened miscarriage is not only associated with increased miscarriage rate but also with a higher rate of pregnancy complications. The present study was conducted with an aim to find out effect of threatened miscarriage in the current pregnancy on the subsequent maternal and perinatal outcome.

Majority were in the age group of 21 – 30 years (67.6%), only (12.7%) were above 30 years, although pregnancy complications were seen more among them. A study by Bennett et al (1996), also showed that spontaneous abortion rate was approximately twice as high for women aged 35 years

or older versus younger women (13.8% and 7.3%) respectively. Most of the women were from lower middle class (54.2%). A few previous studies have reported an association between socioeconomic position and spontaneous abortion (Carlson et al, 1999; Osborn et al, 2000) while others have found no such association (Maconochie et al, 2007). Out of 284 women, only 11.3% had BMI > 25. According to the literature review, there is evidence that an increase in BMI raises the risk of spontaneous abortion in the general population, as well as in women who have undergone infertility treatment (Metwally et al, 2008). 13.8% of women presented with bleeding at less than 8 weeks of gestation which is comparable to the study by Bharadwaj et al (1988) of 30%. 33.8% of cases had bleeding between 8 – 10 weeks and 28.5% between 11 – 12 weeks compared to 35% and 22% respectively in the Bharadwaj study.

In our study previous abortion history was present in 19.7% of cases, while William et al (1991), observed 43.5% of women with previous abortion history. 53.2% of women were having associated medical illness, among them hypothyroidism (17.9%) was the most commonly encountered disorder. It is known that systemic disease such as diabetes mellitus, hypothyroidism, infertility treatment, thrombophilia, maternal weight and uterine structural anomalies increase the risk of abortus imminens (Gitau et al, 2009; Dadkhah et al, 2010). Obese women undergoing infertility treatment were at increased risk of spontaneous miscarriage (Wang et al, 2000). In USG sac was implanted in lower segment in (15.14%) cases, out of which 37.2% aborted. Several investigators have reported an increased incidence of abortion with low implantation (Elson et al, 2003). Numerous sonographic signs of predictors of poor outcome have been described by various authors, including an excessively small, or irregular shape gestational sac, low implantation site, a weak decidual reaction (Nyberg et al, 1986; Ball et al, 2000). In our study, 83.8% of women with weak decidual reaction had miscarriage. Small sac size was seen in (3.17%). All of them aborted within 10 weeks of gestation. In a study by Bromley et al (1991), fifteen of the 16 patients (94%) with first – trimester small sacs had spontaneous abortions despite normal sonographic cardiac activity. The low placenta on USG at the initial scanning before 20 weeks was seen in 13.7 % of cases. Our findings concur with previous studies by Weiss et al (2004), and Das et al (1996). Thus it seems that low lying placenta plays a major role in causation of bleeding in early pregnancy. The volume of hematoma influences the progress. 30.6 % of patients had subchorionic haemorrhage in early USG. In women with hematoma size < 3 cm<sup>2</sup>, 81.4% continued pregnancy successfully till term, while in cases with hematoma size > 3 cm<sup>2</sup>, spontaneous miscarriage was seen in as high as 63.6% patients. This result confirmed the findings of Bennett et al (1996). Subchorionic hematoma can result in a nidus which may become infected and cause preterm rupture of membranes. Incidence of subchorionic bleed was 10 (20%) & 62 (18%) resp. in the study of Goldstein et al (1983), Pederson et al (1990). The overall spontaneous abortion rate for the patients after a viable pregnancy diagnosed on ultrasonography was 22.2%. A previous study done by Agarwal et al (2014), found an incidence of 21% in 62 patients with a history of threatened abortion in first twenty weeks of pregnancy. Davari Tanha et al (2008), quoted a



figure as high as 42.7% spontaneous pregnancy loss in first trimester. 27 77.8% of women continued pregnancy beyond 20 weeks, out of which 62.4% had term, 13.1% had preterm, 4.98% had instrumental delivery mainly for prolonged second stage and fetal distress. The risk of instrumental delivery was not significantly altered in our study. A study done by [Mulik et al \(2004\)](#), revealed incidence to be 21.1% which could be due to large sample size taken for the study and use of instrument for the delivery of a distressed fetus. 719.5% had caesarean section, fetal distress being the most common indication. [Ben Haroush et al \(2003\)](#), found the incidence of term delivery in threatened abortion to be 86.5%. 28 [Dongal et al \(2011\)](#), in their study found the incidence of term delivery to be upto 75.8% which is closer to our study. 29 Data linking caesarean delivery to threatened miscarriage are very limited. Our study showed an incidence of 19.5%, mostly done for emergency indications. This is similar to the findings of [Weiss et al \(2004\)](#) which showed no evidence of an association with emergency caesarean. 5

A low lying placenta on USG at the initial screening before 20 weeks was seen in 13.7% of women, but when the incidence was compared at 36 weeks only 7.39% presented as placenta praevia. Our findings concur with previous studies by [Weiss et al \(2004\)](#), and [Das et al \(1996\)](#) 5, 22. [Davari-Tanha et al \(2008\)](#), revealed an incidence of 0.66%, at the same time, [Konje et al \(1992\)](#), reported an incidence of 4.1%. 27, 30 The location of the chorion frondosum within the uterine cavity in early pregnancy may explain this association, with an inferior position more likely to cause first trimester bleeding, as well as a higher risk of placenta praevia later on in pregnancy. Placental haemorrhage may recur later in pregnancy, which result in placental abruption. In our study, the risk of abruption was 5.99%. [Davari-Tanha et al \(2008\)](#) quoted incidence as 5.7%. 27 [Ananth et al \(1994\)](#) also concluded that vaginal bleeding early in pregnancy is associated with increased risk of placental abruption in later pregnancy. 31 In our study, PROM & PPRM was found (9.51%) cases, while in a study by [Davari-Tanha et al \(2008\)](#), 16% of patients had PPRM. 27 Our finding corroborate other studies that suggested an association between threatened abortion and PPRM ([Farrell et al, 1996](#); [Batsofin et al, 1984](#)). 1, 6 Although the cause is unclear, it is hypothesized that disruption of the chorionic-amniotic plane by adjacent haemorrhage may make the membranes more susceptible to rupture ([Batsofin et al, 1984](#)). 6HPD was seen in 6.69% of cases, [Davari Tanha et al \(2008\)](#), reported PIH in 4.6%. 27 The increased occurrence of preeclampsia among mothers with first trimester vaginal bleeding had been demonstrated by previous study done by [Verma et al \(1994\)](#). 32 1.76% of women had postterm delivery, whereas in a study done by [Agrawal et al \(2014\)](#), 6.12% of cases ended into postdatism. 26 Postpartum haemorrhage seen in 5.63% of patients in study group, whereas in the study of [Wijesiriwardana et al \(2006\)](#), incidence of PPH was 9.7%. 33 [Hertz et al \(1985\)](#) reported that retention of placenta was associated with threatened miscarriage, and the rate of manual removal was 14% in contrast to our study in which MROP was done in 1.41% of cases. 8 While [Bimsara et al \(2009\)](#) in their study, quoted incidence of MROP as 1.8%. 34 They postulated that adhesive scarring between the uterine wall and placenta at the site of bleeding might be responsible

for the increased incidence of retention of placenta in women with threatened miscarriage. Mean gestational age at delivery was 36.12, while [Agrawal et al \(2014\)](#), reported mean gestation age as 35.29. 26 Among 221 neonates, 5.43% had birth asphyxia & 6.79% presented with RDS. A study done by [Samalkar MS et al \(2016\)](#), among 92 neonates reported incidence of birth asphyxia & RDS in 5.4% & 13.0% cases respectively. 35 Apgar score < 5 at 5 min was seen in 9.95% of babies, [Dadhkah et al \(2010\)](#), also reported lower Apgar scores with poor previous obstetrics history. 17 Incidence of preterm birth in our study was 13.1% while in a study done by [Arafa et al \(2000\)](#), showed an incidence of 26.19%, which is higher than our study. 36 The occurrence of preterm delivery in mothers with threatened miscarriage had been a consistent finding most of the previous studies ([Farrell et al, 1996](#); [Weiss et al, 2004](#); [Dadhkah et al, 2010](#)).

1, 5, 17. The difference in mean birth weight seemed to be related to PPRM & preterm delivery. The risk of low birth weight in our group of patients was 12.7% while in a similar study by [Batsofin et al \(1984\)](#), the incidence of LBW was 15.48%. 6 [Davari-Tanha et al](#) also found risk of Low Birth Weight (14.9%) in their study. 27 There were varying reports as regards intrauterine growth restriction is concerned among various groups. [Arafa et al \(2000\)](#), reported an incidence of 48.5% while another study done by [Davari-Tanha et al \(2008\)](#), revealed incidence as 2%. 27, 36 In our study, the incidence of IUGR was found to be 8.59%. Perinatal mortality was seen in 2.71%, among which we had 2 cases of IUFD one was complicated with severe preeclampsia and other was unexplained, 1 intrapartum death due to difficult breech delivery came in second stage of labour and 3 early neonatal death (expired within 24 hour), 2 due to severe birth asphyxia and one was very low birth weight (1.25 kg). [Dongol et al \(2011\)](#), reported 3 cases of IUFD out of 70 in their study. 29 [Agrawal et al \(2014\)](#) in their study reported perinatal loss in 8.16% of cases. 26 13.1% of babies required NICU admission out of which 19 recovered and 6 expired within 7 days. [Bimsara et al \(2009\)](#), in their study reported incidence of NICU admission as 19.1% among 110 study cases. 34 Neonatal intensive care unit admission for low birth weight fetuses were increased because of prematurity complications as a respiratory distress. Mean birth weight at delivery was 2.51 kg which is similar to that reported by [Agrawal et al \(2014\)](#) as 2.47 kg. 26

## CONCLUSION

Current study validate previous studies which support the school of thinking that first trimester bleeding is associated with variety of adverse fetomaternal outcomes. It is therefore acceptable to consider these pregnancies as high risk group for which antenatal care should be performed carefully. As it was a prospective study, it enabled us to detect the complications at the earliest and intervene appropriately. Investigations that determine the diagnostic and prognostic parameters are of value and more careful surveillance should be performed for them.

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