

ORIGINAL RESEARCH

Role of ultrasonography in first trimester bleeding

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ABSTRACT

Introduction: Vaginal bleeding in the first trimester is a common obstetric situation ranging from an insignificant episode to life threatening emergency. The major causes include abortion, ectopic pregnancy and molar pregnancy. In determining the causes of first trimester bleeding, ultrasound (both abdominal and TVS) plays an important role in prognosticating and predicting the status of abnormal pregnancies. This study was taken up to evaluate its utility vis-à-vis clinical examination findings. **Aims and objectives:** a) Sonological evaluation of clinically first trimester bleeding. b) To prognosticate and predict the status of abnormal pregnancies. c) To evaluate the uterine structural defects which leads to repeated abortions. **Materials and methods:** After obtaining written informed consent, 100 patients referred to the Department of Radiodiagnosis and Imaging, Government Medical College and Guru Nanak Dev Hospital, Amritsar with history of the first trimester bleeding for the sonographic evaluation were examined by ultrasound (TAS/TVS). **Results:** Among these 100 cases, incomplete abortion (IA) was the most common cause of bleeding. This was observed in 73 cases (73%). There were 11 (11%) cases of ectopic gestation in the present study. Missed abortion in 4 (4%) and threatened abortion in 2 (2%) cases respectively. There were 5 (5%) cases of early pregnancy failure, 3 (3%) cases of hydatidiform mole and 2 (2%) case of AVM. There was significant correlation between duration of amenorrhea, pain abdomen and duration of bleeding with sonographic and final clinical diagnosis. **Conclusion:** Ultrasound is a valuable tool in the differentiation of causes of first trimester vaginal bleeding. Ultrasound is helpful in the decision-making algorithm about the safe continuation of the pregnancy and timely intervention for abnormal pregnancy.

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INTRODUCTION

Bleeding per vagina in the first trimester is one of the most common obstetric problems and the commonest cause for the majority of the emergency admission to the obstetrics department¹. The occurrence of first trimester bleeding per vaginum is estimated to be as high as 7% to 24% in early pregnancies. About 50% cases of first trimester bleeding lead to miscarriage. The primary causes of first trimester bleeding are spontaneous abortions, ectopic pregnancies, and gestational trophoblastic diseases.² Sub chorionic hemorrhage and sub chorionic hematoma are the most common cause of vaginal bleeding in patients of 10 to 20 weeks gestational age³. In determining the causes of first trimester bleeding, ultrasound (both abdominal and TVS) plays an important role in prognosticating and predicting the status of abnormal pregnancies. Real-time sonography

is a non-invasive and readily accessible approach that is highly beneficial for sonographic diagnosis to be achieved.

Endovaginal ultrasonography represented a significant advancement of this technology, decreasing maternal morbidity and mortality. Now it is possible to detect an intrauterine gestational sac as early as five weeks. Clinical history and pelvic examination are often inadequate in assessing the cause and the prognosis. When ultrasonography reveals the nature of the pregnancy (viable/non-viable), unnecessary complications and misdiagnosis in first trimester bleeding can be avoided.⁴

AIMS AND OBJECTIVES

1. Sonological evaluation of first trimester bleeding.
2. To prognosticate and predict the status of abnormal pregnancies.

3. To evaluate the uterine structural defects which leads to repeated abortions

MATERIALS AND METHOD

The study was a prospective observational study on patients referred to the Department of Radio diagnosis and Imaging, Government Medical College and Guru Nanak Dev Hospital, Amritsar for the sonographic evaluation of the first trimester bleeding. The study included a group of 100 cases. Written informed consent was obtained from every patient in the vernacular language. The protocol was approved by the Ethics Committee of the institute.

TECHNIQUE

Ultrasound examination was performed using SAMSUNG RS80A, Philips CLEAR VIEW 350 and Mind ray DC-8, machine with curvilinear transducer of frequency of 2.5- 5 MHz and linear transducer frequency of 7.5-10 MHz and TVS transducer of frequency 2-10 MHz

INCLUSION CRITERIA

- All patients presenting clinically with first trimester bleeding and less than <12 completed weeks.

EXCLUSION CRITERIA

- Patients with more than 12 completed weeks of gestation.

STATISTICAL ANALYSIS

The findings were tabulated, subjected to the statistical analysis and inferences were drawn.

OBSERVATIONS

The present prospective observational study was conducted on 100 patients referred to the Department of Radio diagnosis and Imaging, Government Medical College and Guru Nanak Dev Hospital, Amritsar for the sonographic evaluation of the first trimester bleeding. The following observations were seen.

TABLE I: AGE WISE DISTRIBUTION OF THE CASES (n=100)

Age (Years)	Frequency	Percent
18-20	7	7.00
21-25	33	33.00
26-30	34	34.00
31-35	17	17.00
>35	9	9.00
Total	100	100.00
Minimum Age	19	
Maximum Age	46	
Mean±S.D.	27.77±5.03	

Table 1 depicts the age wise distribution of the subjects. In our study group age ranged from 18 to 35 years. Majority of patients were from the age group of 26-30 years, totaling 34 (34%). 33 patients (33%) were between 21-25 years, 17 patients (17%) were between 31-35 years and the least common age group was between 18-20 years constituting only 7%. The Mean age of the study group was 27.77±5.03.

Table 2: Distribution of cases on basis of USG diagnosis and clinical diagnosis

Diagnosis	Total no of cases	Clinical diagnosis	Percent
Ectopic Gestation	11	11	11.0
Early Pregnancy Failure	5	5	5.0
Hydatidiform Mole	3	3	3.0
Incomplete Abortion	73	73	73.00
Missed Abortion	4	4	4.0
Threatened Abortion	2	2	2.0
AVM	2	2	2.00
Total	100	100	100.0

BAR CHART 2: SHOWING DISTRIBUTION OF CASES ON BASIS OF USG DIAGNOSIS

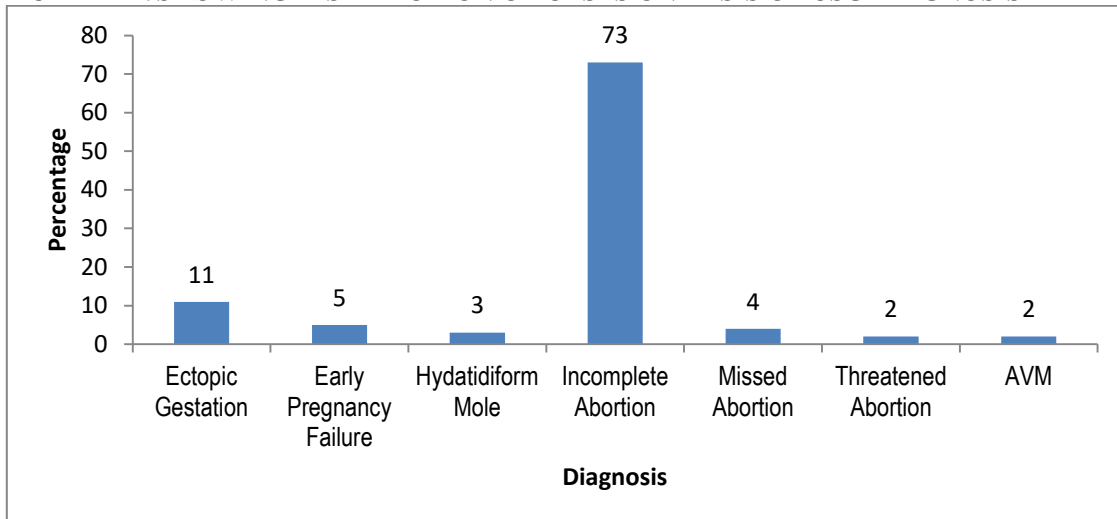


Table 2 depicts distribution of cases on basis of USG diagnosis and final clinical diagnosis. Majority of subjects had incomplete abortion in: 73 (73%) cases followed by ectopic gestation in 11 (11%) cases. Early pregnancy failure was seen in 5 (5%) cases, missed abortion was present in 4 (4%) cases and 3 (3%) cases were of hydatiform mole pregnancy. Two (2%) cases were present each of threatened abortion and AVM.

Table 3: Comparison of USG diagnosis and symptom (pain abdomen)

Ultrasound Diagnosis	No. of cases (n=100)	Percentage
Arteriovenous Malformation (AVM)	0	0.00
Ectopic Gestation (EG)	11	100.00
Early Pregnancy Failure (EPF)	0	0.00
Hydatidiform Mole (HM)	3	100.00
Incomplete Abortion (IA)	15	20.00
Missed Abortion (MA)	0	0.00
Threatened Abortion (TA)	1	50.00

Pain abdomen was found to be highly significant symptom (P=0.000) in the cause of bleeding.

In present study only 30% of patients presented with pain abdomen before, during or after bleeding while 70% of patients didn't have abdominal pain.

Table 3 depicts the comparison of USG diagnosis and symptom of pain. Majority of cases presenting with pain in first trimester had incomplete abortion that is 15 (15%) cases followed by ectopic gestation in 11(11%) cases. Only three (3%) case of hydatiform mole and one (1%) cases of threatened abortion had the symptom of pain.

GRAPH 3: BAR CHART SHOWING COMPARISON OF USG DIAGNOSIS AND SYMPTOM (PAIN ABDOMEN)

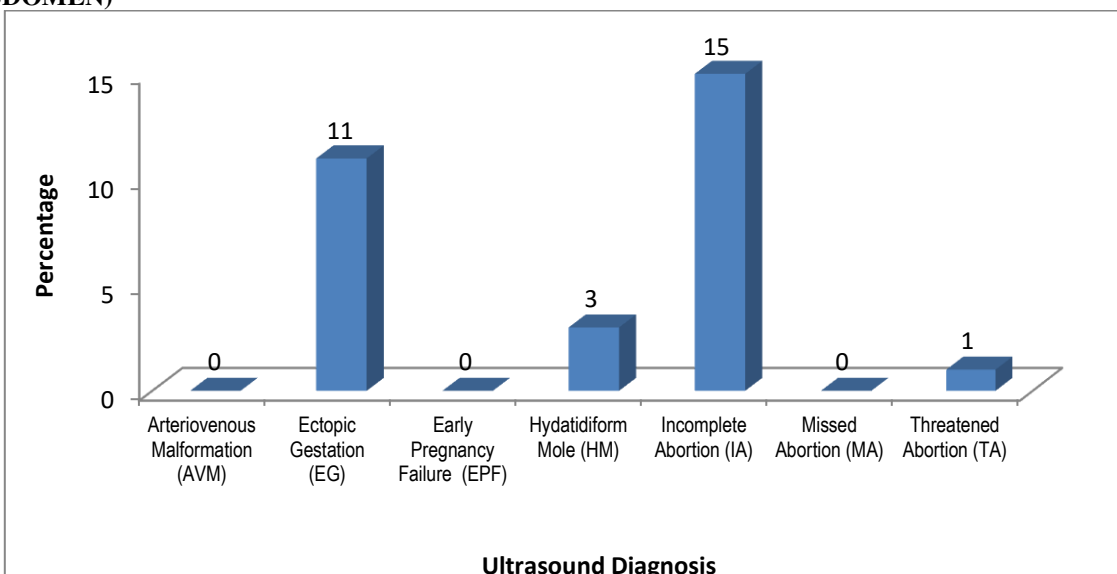


TABLE 4: AGEWISE COMPARISON OF THE DIAGNOSIS OF VAGINAL BLEEDING ON ULTRASONOGRAPHY

Ultrasound Diagnosis	Age (Years)					Total
	18-20	21-25	26-30	31-35	>35	
Arteriovenous Malformation (AVM)	-	-	2	-	-	2
Ectopic Gestation (EG)	1	3	4	2	1	11
Early Pregnancy Failure (EPF)	1	1	1	2	-	5
Hydatidiform Mole (HM)	-	-	2	-	1	3
Incomplete Abortion (IA)	5	25	24	12	7	73
Missed Abortion (MA)	-	3	1	-	-	4
Threatened Abortion (TA)	-	1	-	1	-	2
Total	7	33	34	17	9	100

Table 4 depicts age wise comparison of the diagnosis of vaginal bleeding on ultrasonography. In the age group of 26 to 30 years, majority of cases 24(24%) were incomplete abortion followed by ectopic gestation in 4(4%) cases. Two (2%) cases of AVM and Hydatiform mole each were present and one (1%) of early pregnancy failure in the age group of 26 to 30 years. In the age group of 21 to 25 years, there were 25 (25%) cases of incomplete abortion, three (3%) cases of Ectopic gestation and missed abortion each followed by one (1%) cases each of Threatened Abortion and Early Pregnancy Failure. In the age group of 31 to 35 years, majority of cases 12(12%) were Incomplete abortion followed by two (2%) cases each of Ectopic Gestation and Early Pregnancy Failure and one (1%) case of threatened abortion was present. In the age group of >35 years seven (7%) cases were Incomplete abortion and one (1%) case each was of Ectopic gestation and Early Pregnancy Failure.

PATIENT PROFILE AND SYMPTOMATOLOGY

In the current study of 100 patients, 84%ofthepatients were multigravida while 16%were primigravida. Majority of patients were para 2 (38 %) followed by para 1 (35 %) and para 0 in 16 (16%) cases. Six (6%) cases were para 3 and three (3%) cases were para 5. The least common observed were para 2 (2%) cases. Patients presented with amenorrhea in the range of 6 weeks to 12completed weeks of pregnancy. Majority of patients presented between 8 -10weeks of pregnancy constituting 79% followed by 12 (12%)c ases less than 8weeks, and 9((9%)cases were more than 10weeks. **Duration of amenorrhea was found to be highly significant (0.001) with ultrasound diagnosis in cause of bleeding and with final ultrasound diagnosis.**

The duration of bleeding ranged from 1 day to 8 days withmajority presenting with history of bleeding for 3 to 4 days (54%). Only 2(2%) patients presented with bleeding between 7 to8 days. 44 patients (44%) presented with 1-2 days of bleeding while 54 (54%)patientshad bleeding for3-4 days. **Duration of bleeding was found to be highly significant (0.000) along with cause of bleeding clinically and on ultrasound diagnosis (P=0.05).**

ULTRASOUND FEATURES

In present study only 22% of patients had gestational sac during ultrasonographywhile 78% of patients revealed no gestational sac.Only 13% of patients showed fetal node during ultrasonography and 17% of patients had yolk sac. 4% of patients had fetal cardiac activity during ultrasonography and amniotic fluid was present only in 2% cases (diagnosed as threatened abortion).

Among patients of threatened abortion, both cases had sub chorionic bleed. On ultrasonography, 74 % of patients showed open cervical os, suggestive of inevitable abortion during ultrasonography.

DISCUSSION

The present prospective observational study was conducted on 100 patients referred to the Department of Radio diagnosis and Imaging, Government Medical College and Guru Nanak Dev Hospital, Amritsar for the sonographic evaluation of the first trimester bleeding.

AGE GROUP

In our study group age ranged from 18 to 35 years. Amajorityofpatientswerefromtheagegroupof26-30years, totaling34 (34%).33patients (33%) were between 21-25 years, 17 patients(17%) were between 31-35 years and the leastcommonage groupwasbetween18-20yearsconstituting only7%. The mean age of the study group was 27.77±5.03. The present study can be compared with the study conducted by Bagoria et al (2016)⁵ Majority of patients in their study belonged to 26 – 30 years of age, totaling 37%, and 35% were from the age group 20 – 25 years, 19% were less than 20 years and 9% were more than 30 years. Gawade S et al (2015)⁶observed in their study that maximum number of patients who presenting with first trimester vaginal bleeding belonged to age group 18 – 27 years (70.67%). In another study conducted by Thobbi et al (2016)⁷ age group ranged from 16-35 yrswith majority of study subjects belonging to 21-25 years, constituting percentage of 46%. Orakzai ZJ et al (2022)⁸observed a similar finding to the present study that the women of age ranging between 23-27 years are more prone to suffer from first trimester bleeding. Similar results were observed by the study conducted by Shah K et al (2017)⁹ who observed the incidence of

first trimester vaginal bleeding more in in age group of 24-28 years and 29-33 years (47.2 % and 32.8%) and Dogra et al (2006)¹⁰ where 33% of patients were in age group of 17-24 years and 61% in 25-34 years of age.

The probable reason for the most common age group of 21 to 30 years is because this is the peak years of pregnancy in the female population.

Obstetric history:

In the present study, out of 100 patients, 84% of the patients were multigravida while 16% of primigravida. Similar study conducted by Thobbi et al (2016)⁷ found 60% primigravida and 40% multigravida. Amir Khan Z et al (2013)¹¹ found majority of cases were primigravida 30% and 13% multigravida. Koti Mythri DS, et al (2021)¹² also had majority of multipara (70%) compared to 30% of primipara.

ULTRASOUND DIAGNOSIS

In the present study, majority of subjects had incomplete abortion 73 (73%) cases followed by ectopic gestation in 11 (11%) cases. Early pregnancy failure was seen in 5 (5%) cases, missed abortion was present in 4 (4%) cases and 3 (3%) cases were of hydatiform mole pregnancy. Two (2%) cases were present each of threatened abortion and AVM. Gawade S et al (2014)⁶ observed threatened abortion as the most common clinical diagnosis (86.67%) in patients presenting with first trimester bleeding per vaginum. Other cases were diagnosed as missed abortion (5.33%), incomplete abortion (4.0%), ectopic pregnancy (2.0%), hydatiform mole (0.67%), threatened abortion with cervical polyp (0.67%) and complete abortion (0.67%). The present study shows comparable results to studies conducted by Tiparse A et al (2015)¹³, Joseph et al (2019)¹⁴, Orakzai et al (2022)⁸, Pilli S et al (2022)¹⁵ and Singh K et al (2016)¹⁶

In the study conducted by Thobbi et al (2016)⁸, all cases of threatened abortion, missed abortion, incomplete abortion, complete abortion, anembryonic gestation and molar pregnancy were diagnosed accurately on ultrasound with accuracy of 100%. The results of present study are also comparable with Sofat R et al (1987)¹⁷ and Bhardwaj N et al (1987)¹⁸ in diagnosing, missed abortion, incomplete abortion, an embryonic gestation and hydatidiform mole with 100% accuracy.

GESTATIONAL AGE

The present study constituted of patients presenting with amenorrhea in the range of 6 weeks to 12 completed weeks of pregnancy. Majority of patients presented between 8-10 weeks of pregnancy constituting 79% followed by 12 (12%), and least common 9 (9%) presentation was more than 10 weeks. The present study was similar to study by Koti Mythri DS et al (2021)¹² where the majority of patients presented between 8-10 weeks of pregnancy, constituting 52%, and the least common

presentation was less than eight weeks.

In a similar study done by Bhardwaj N et al (1988)¹⁸ majority of patients were in gestational age of 8-10 weeks constituting 35 cases, 6-10 weeks 30 cases and 10-12 weeks 22 cases.

BLEEDING

In the present study, the duration of bleeding ranges from 1 day to 8 days with majority presenting with 3 to 4 days (54%) of bleeding. Least commonly, patients presented with bleeding for 7 to 8 days constituted 2%. 44 patients (44%) presented with 1-2 days of bleeding, 54 (54%) patients presented with 3-4 days of bleeding.

In the study conducted by Koti Mythri DS, et al (2021)¹² the duration of bleeding ranged from 1 day to 8 days, with the majority presenting with 3 to 4 days (32%) of bleeding. The least common was between 7 to 8 days, constituting 4%. 28% patients presented with 1-2 days of bleeding, (16%) patients presented with 5-6 days of bleeding. (40%) patients were presented with pain abdomen before, during, or after bleeding.

FETAL NODE

In present study only 13% of patients had fetal node during ultrasonography which is comparable to study by Koti Mythri DS, S et al (2021)¹² who visualized fetal node in 42% cases.

SUB CHORIONIC BLEED

In present study only 2% of patients had sub chorionic bleed, during ultrasonography. Both were cases of threatened abortion. Joseph A et al (2019)¹⁴ found sub chorionic hemorrhage in 10.9% of the participants. In another study by Shivangappa et al (2015)¹⁹ where sub chorionic bleed was noted in 33 cases which constitutes 71%, when compared to Goldstein et al (1994)²⁰ 20% and 18% in Pederson et al (1990)²¹.

YOLK SAC

In present study 74 % of patients with gestational sac had yolk sac, during ultrasonography. In study conducted by Joseph A et al (2022)¹⁴ yolk sac was present in 51.3% cases and absent in 48.7 % cases which is almost similar from the present study. In the study conducted by Koti Mythri DS, et al (2021)¹² the yolk sac was visualized in 24 cases by USG.

FETAL CARDIAC ACTIVITY

In present study only 4% of patients had fetal cardiac activity (Two had ectopic and two had threatened abortion, during ultrasonography and 96% of patients had no fetal cardiac activity. In the study conducted by Koti Mythri DS, et al (2021)¹² 36% cases showed fetal cardiac activity by USG and 4% cases with absent fetal cardiac activity.

CONCLUSION

Ultrasound is a valuable tool in the differentiation of causes of first trimester vaginal bleeding. Ultrasound is helpful in the decision-making algorithm about the safe continuation of the pregnancy or timely intervention for abnormal pregnancy. Judicious utilization of ultrasonography and a close liaison with the sonologist is necessary. Prompt treatment based on the ultrasound findings, not only reduces the maternal morbidity and mortality but also helps in less hospital stay and alleviates anxiety among the couples. However, it should be remembered that ultrasound is only an extension of the pelvic examination and cannot replace obstetric history and clinical examination.

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