



Research Article

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Sonographic findings in first trimester vaginal bleeding at Moi teaching and referral hospital

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Abstract

Background: First trimester per vaginal bleeding may be an indication of early pregnancy failure. Clinical management relies on sonography with delay or inadequate diagnosis leading to pregnancy loss or maternal mortality. **Objective:** To describe the ultrasound findings in patients referred with first trimester bleeding in relation to their clinical characteristics. **Methods:** This was a cross-sectional study. A total of 201 women who had first trimester vaginal bleeding were recruited. Study was done at Moi Teaching and Referral hospital (MTRH), between November 2015 and October 2016. Associations were assessed using Fisher's exact test and results were presented in tables and graphs. **Results:** Median age was 27.0 years. The most common Ultrasound findings were incomplete abortion (22.9%), Uterine Fibroids in Pregnancy was diagnosed in (15.4%) and Extra uterine Pregnancy (14.4%). Significant clinical association were; Complete and incomplete abortion was associated with prolonged and heavy bleeding ($p = 0.003$ and <0.001 respectively). Majority diagnosed with incomplete abortion had no history of contraceptive use ($p = 0.003$). Anembryonic pregnancy was associated with spotting ($p = 0.008$). Diagnosis of extra uterine pregnancy was associated with spotting. **Conclusion:** Incomplete abortion, uterine fibroids in pregnancy and ectopic pregnancy were common sonographic findings. Ectopic pregnancy was associated with previous history of contraceptive use.

Keywords: First trimester, vaginal bleeding, Sonographic findings.

INTRODUCTION

First trimester is a period of rapid change that spans fertilization, formation of blastocyst, implantation, gastrulation, neurulation, embryonic period (week 6-10) and early fetal life. The last normal menstrual period (LNMP) is used as a land mark for pregnancy dating. First trimester is defined as 12 weeks after LMP [1]. It is however fraught with a high complication rate [2].

Vaginal bleeding is a common occurrence and it occurs in 25% of all recognized pregnancy [3]. Incidence of first trimester bleeding is 25-30%, miscarriages occur in 50% of bleeding cases and even if viable, have a risk of complications [3].

Ultrasound evaluation is the mainstay evaluation since it is the safest and fastest way of evaluating patients. First reports of ultrasonography being used to evaluate early pregnancy were published in 1980 [4]. First trimester ultrasonography aims to visualize location, establish viability, pregnancy dating, detect multiple pregnancy, observe uterine adnexal structures, measure nuchal translucency, evaluate fetal gross anomaly and detect other special indications [5].

A study done in Niger showed poor correlation between clinical impression and ultrasound findings in first trimester vaginal bleeding [6]. In a study in Kenyatta National Hospital (KNH), there were several significant clinical associations between first trimester bleeding and sonographic findings in first trimester bleeding [7].

First trimester vaginal bleeding is a common occurrence in an acute gynecological setting. It can be a sign of complication such as threatened abortion, ectopic pregnancy, gestational trophoblastic disease and others. About 20-25% of women experience some degree of vaginal bleeding in the first trimester [8].

In Africa, a study done in Niger to determine clinical pattern of gynecological and early pregnancy complaints as well as evaluate the correlation between clinical and sonographic diagnosis,

found that Cases of Bleeding per vagina (BPV), with or without pain, were the highest, 149 cases (61.6%), followed by threatened abortion, 45 cases (18.6%), and non-viable or incomplete abortions, 13 cases (5.4%). Dysfunctional uterine bleedings (DUB) ranked the highest among the ultrasound results, with 62 cases (25.6%), incomplete abortion cases were 44 (18.2%), while the non-viable pregnancies (missed abortions, blighted ovum, and early intrauterine fetal deaths (IUFD) cases contributed to 26 cases (10.7%). They concluded that there was poor correlation between clinical impressions and ultrasound diagnosis ^[6].

In a study done in Kenya to determine sonographic findings in first trimester bleeding at Kenyatta National Hospital, it was found that all 231 patients had abnormal findings on ultrasound. However, six of them had more than one finding, giving 237 findings. The commonest finding was incomplete abortion accounting for 38.7% of cases, followed by ectopic pregnancy accounting for 28.1%, while the least common finding was uterine fibroids in pregnancy accounting for 0.4%. First trimester bleeding was associated with a high rate of pregnancy loss with 206 of the patients (89.2%) having pregnancy loss ^[7].

MATERIALS AND METHODS

This was a cross - sectional study done from November 2015 to October 2016.

The study was conducted at the Radiology and Imaging department, Moi Teaching and Referral Hospital. The hospital is located in Eldoret town, which is 350 Kilometers northwest of the capital Nairobi. MTRH is a tertiary (level 6) health facility serving as a teaching hospital for Moi University School of Medicine.

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Ultrasound findings

Intrauterine Ultrasound Findings

Table 2: Intra-Uterine Gestational Sac Characteristics

Variable	N	Median (IQR) or n (%)	
Gestational sac present	201	Yes	117 (58.5%)
		No	83 (41.5%)
Gestational sac appearance	117	Normal	97 (82.9%)
		Abnormal	20 (17.1%)
Shape if appearance is abnormal	20	Deformed	14 (70.0%)
		Collapsed/Disrupted wall	6(30.0%)
Gestational sac location	117	Normal	112 (95.7%)
		Low lying	5 (4.3%)
Number of gestational sacs	117	1	112(95.7%)
		2	5 (4.3%)
CRL (weeks)	117	8.0 (6.9, 9.5)	
Mean sac diameter (mm)	117	34.0 (27.2, 40.0)	

Intra-uterine gestational sac was present in 117 (58.5%) of the participants. Of this number, 20 (17.1%) had abnormal appearance. For those who had abnormal appearance of the gestational sac, 14 (70.0%) were deformed and 6% was collapsed or had disrupted walls.

Consecutive sampling was used in this study and a total of 201 patients were recruited.

The machines used were Aloka's Prosound Alpha 7 (Tokyo, Japan) and Philips HD 11xe (Eindhoven, Netherlands) as per our hospitals protocol. Data was obtained through a structured questionnaire. Ethical considerations were taken care of.

RESULTS

Table 1: History of Contraceptive Use

Variable	N	n (%)
Contraceptive use	201	130 (64.7%)
Duration (Before conception)		
<3 months ago	130	45 (34.6%)
>3 months ago		85 (65.4%)
Types of contraceptives		
OCPS	130	11 (8.5%)
Norplant/Jadel	130	19 (14.6%)
IUCD	130	23 (17.7%)
BTL	130	2 (1.5%)
Depo-Provera	130	52 (40.0%)
Emergency contraceptives	130	23 (17.7%)

More than half of the participants had history of use of contraceptives 130 (64.7%). Of this number, one third had been using it in the past three months. The types of contraceptives that the participants were using include OCPS 11 (8.5%), Norplant/Jadel 19 (14.6%), IUCD 23 (17.7%), BTL 2 (1.5%), Depo-Provera 52 (40.0%), and emergency contraceptives 23 (17.7%).

The median diameter of the gestational sac was 34.0 (IQR: 27.2, 40.0) mm, and CRL was 8.0 (IQR: 6.9, 9.5) weeks.

Table 3: Intra-uterine Yolk Sac and Fetal Cardiac Activity Characteristics

Variable	N		Median (IQR) or n (%)
Yolk sac present	117	Yes	60 (51.3%)
		No	57 (48.7%)
Shape of the yolk sac	60	Normal	58 (97.7%)
		Abnormal	2 (3.3%)
Appearance of the yolk sac	60	Normal	55 (91.7%)
		Abnormal	5 (8.3%)
Mean yolk sac diameter (mm)	60		6.0 (5.0, 6.0)
Fetal pole present	117	Yes	89 (76.1%)
		No	28 (23.9%)
Fetal cardiac activity present	88	Yes	55 (62.5%)
		No	33 (37.5%)
Nature of heart rate	55	Regular	52(94.5%)
		Irregular	3 (5.5%)

Yolk sac was present for 60 (51.3%) participants. Of these, 2 (3.3%) had abnormal shape, and 5 (8.3%) had abnormal appearance. The median diameter of the yolk sac was 6.0 (IQR: 5.0, 6.0) mm.

Fetal pole was present in 89 (76.1%) of the participants who had a gestational sac with 55 (62.5%) of them having a fetal heart rate. The fetal cardiac activity was irregular in 3 (5.5%) of them.

Extra uterine ultrasound Findings

Table 4: Extra-uterine characteristics including ectopic pregnancy

Variable	N		Mean (SD) or n (%)
Gestational sac present	31	Yes	4 (12.9%)
		No	27 (87.1%)
Appearance	4	Normal	3 (75.0%)
		Abnormal	1 (25.0%)
CRL (weeks)	4		9.7 (1.5)
Definitive yolk sac present	4	Yes	1 (25%)
		No	3 (75%)
Complex adnexal mass present	31	Yes	14 (45.2%)
		No	17 (54.8%)
Hemoperitoneum present	31	Yes	15 (48.4%)
		No	16 (51.6%)
Presence of fluid in the cul de sac	31	Yes	9 (29.0%)
		No	22 (71.0%)

Extra uterine gestational sac was present in 4 (12.9%) of the participants diagnosed with extra uterine pregnancy. With only 1 having abnormal appearance.

Definitive yolk sac was present for one of the participants who had gestational sac. Complex adnexal mass, hemoperitoneum, and fluid of the

cul de sac was present in 14 (45.2%), 15 (48.4%), and 9 (29.0%) respectively. Co-existent intra- and extra- uterine pregnancy was established in two participants who had heterotopic pregnancy. All the above Patients diagnosed with ectopic and Heterotopic pregnancies were confirmed surgically.

Table 5: Final Ultrasound Diagnosis

Diagnosis	n (%)
Incomplete abortion	46 (22.9%)
Complete abortion	8 (4.0%)
Normal pregnancy	22 (10.9%)
Missed abortion	26 (12.9%)
Anembryonic pregnancy	20 (10.0%)
Inevitable abortion	20 (10.0%)
Ectopic pregnancy	29 (14.4%)
Sub chorionic hemorrhage	22 (10.9%)
Heterotopic pregnancy	2 (1.0%)
Uterine / cervical anomalies	6 (3.0%)
Hydatidiform mole/GTDs	9(4.5%)
Uterine fibroids in pregnancy	31 (15.4%)

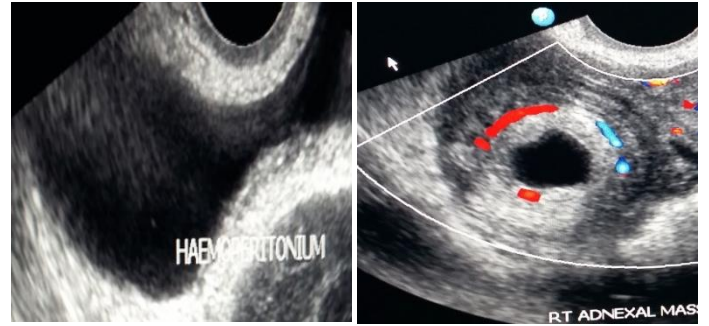


Figure 3: TVS of a patient diagnosed with ruptured ectopic pregnancy showing ring of fire sign and Haemoperitoneum

DISCUSSION

Ultrasound findings

Ultrasound is a cardinal adjuvant to clinical examination in the evaluation of first trimester bleeding since it helps in differentiating non-viable gestation from potentially normal gestation [9]. Sonography is instrumental in confirming the diagnosis of abnormal pregnancy based on a variety of ultrasound findings and the examination of the various ultrasound parameters like gestational sac, yolk sac, fetal pole and fetal cardiac activity and mean sac diameter is crucial in determining the ultrasound diagnosis.

Intra-uterine gestational sac was present in 58.5% of the participants. The mean sac diameter was then calculated for the above cases. The median mean sac diameter of the gestational sac was 34 millimeters and CRL was 8 weeks for those cases whereby embryo was present. The median age of 8 weeks explains that earliest pregnancy complications occur during the first 10 weeks. This was reported by a study carried out in UK which found out that abortion at less than 10 weeks is 3 times greater than a gestation more than 10 weeks [10]. Similar findings were also found in a study done on ultrasonic assessment of first trimester complication in that threatened abortion present at 7-10 weeks [11].

Majority of the gestational sac had an embryo (76.1%) with less than half being viable. From this we can see that first trimester bleeding is an indicator of pregnancy loss. A similar study in Thailand also demonstrated that first trimester bleeding is a strong indicator of non-viable pregnancy whereby only 14% of the gestational sac were viable [12]. In a study which was assessing fetal cardiac activity in first trimester bleeding found that all the 48.8% of women who had no fetal heart rate miscarried after being subsequently followed up [13].

There were a number of the gestational sacs (17.1%) with abnormal appearance. A study on sonographic distinction of normal and abnormal gestational sac showed that deformed gestational sac is 100% specific for non-viable outcome [9].

Sub chorionic hemorrhage was present in 10.9% of the participants with a median volume was 50cc and median percentage coverage of 25%. According to Bennett *et al.*, classification it would be classified as medium coverage whereby small is characterized as (less than 20%), medium (20 –50%), or large (greater than 50%) [14].

According to Bennett *et al.*, Large volumes of subchorionic bleed (cover more than 2/3 of gestational sac volume) increases risk of spontaneous abortion by 2.4-fold. Though several other studies have failed to demonstrate this association between volume of bleed and adverse outcome but have shown that its presence is associated with increased risk of pregnancy loss [15, 16]. Therefore, presence of sub chorionic bleed could be postulated to be because of impaired placentation, which could be a risk factor to pregnancy loss regardless of its volume.



Figure 1: A TVS of a 19 year old with history of spotting showing viable G.S with a subchorionic hemorrhage.



Figure 2: TVS of a 34 year old showing a right adnexal mass and endometrial fluid. Diagnosis of ruptured ectopic was made.

Incomplete abortion was the most common ultrasound diagnosis followed by uterine fibroids in pregnancy and ectopic pregnancy. Diagnosis of incomplete abortion was made by presence of intrauterine retained products of conception of which most had an open cervix. The findings of this study is similar to a similar study carried out in KNH whereby the most common ultrasound finding was incomplete abortion (37.6%) [7]. This findings are incomparable to a similar study done in Niger whereby dysfunctional uterine bleeding (17.45%) was found to be the commonest among women presenting with first trimester bleeding [6]. A study done in Finland found normal pregnancy (50%) as the commonest ultrasound diagnosis followed by blighted ovum (26%) and incomplete abortion being 8% [17].

Uterine fibroids among women presenting with first trimester bleeding, was the second most common ultrasound finding (15.4%). The incidence of uterine fibroids in pregnancy in our setting is high compared with similar studies done in Africa i.e. In KNH it had (0.4%) [7] and in Illoin, Niger (6.1%) [6]. This could be an indicator that may be uterine fibroids are on a rise in our setting thus increasing risk of pregnancy loss. This has been shown by several other studies that women with leiomyoma have an increased risk of pregnancy loss in the first trimester as compared with women without [18, 19, 20].

In our study 14.4% of patients had surgically confirmed ectopic pregnancy. A similar study done at KNH found an incidence of 27.4% [7]. In a study in Pakistan prevalence of ectopic pregnancy was found to be 1.87% of the patients presenting with first trimester bleeding [21].

Common ultrasound presentation of ectopic pregnancy were presence of hemoperitoneum and presence of complex adnexal mass. This finding is similar to several studies which found that majority of confirmed ectopic pregnancy were seen as complex adnexal mass [22, 23]. Most of the patients seen had features of ruptured ectopic pregnancy and this could be explained by the fact that MTRH is a referral hospital thus the late presentation of the patients.

Relationship between Ultrasound Findings and Clinical Characteristics.

A number of studies have validated sonography in the evaluation of patients presenting with first trimester bleeding. A few studies have demonstrated significant association between clinical history and the ultrasound findings. A Study done in Iran demonstrated the usefulness of combining clinical history with ultrasound findings in the management of patients with first trimester bleeding [24]. A study which was comparing sonographic findings and clinical findings in the diagnosis of RPOCs recommended combination of both before any surgical intervention [25].

Both complete and incomplete abortion were significantly associated with a heavy and a longer duration of vaginal bleeding. A similar study in KNH found out that incomplete abortion was associated with heavy vaginal bleeding [7]. This finding also compares with previous studies which showed that heavy bleeding in first trimester was associated with miscarriage and that spotting or light bleeding had a less risk of miscarriage [26, 27].

There was also significant association between use of contraceptive and incomplete abortion whereby majority of the patients had no history of contraceptive use. A study done in South Africa on the epidemiology of incomplete abortion showed unsafe abortion as one of the leading cause and was due to inadequate access to contraception and health services [28].

Inevitable abortion was associated with a shorter duration of amenorrhea. This means most of them occur in the early gestation. Several studies have demonstrated that most spontaneous abortion present in the early gestation (less than 10 weeks) and this has been demonstrated by several studies [10, 29].

Presence of gestational sac, yolk sac, and fetal heart rate were associated with the diagnosis of sub chorionic bleed. This could mean that the presence of medium coverage subchorionic bleed could indicate a good prognosis. This was described by Bennett *et al.*, who described that large subchorionic hemorrhage (cover more than 2/3 of gestational sac volume)

increases risk of spontaneous abortion and that small and medium coverage subchorionic bleed had less risks [14].

Spot bleeding was associated with ectopic pregnancy. Similar findings were also found in KNH whereby most of the patients diagnosed with ectopic pregnancy had presented with vaginal spotting [7]. A higher proportion of patients diagnosed with ectopic pregnancy had a history of contraceptive use. A number of studies have shown that there are some contraceptives which predispose to ectopic pregnancy. A Study done in Netherlands demonstrated that Intrauterine contraceptive device was a strong risk factor for ectopic pregnancy [30]. Emergency contraceptive has also been shown to increase chances of getting ectopic pregnancy [31, 32].

CONCLUSION

Most common sonographic finding of first trimester bleeding among patients referred for pelvic ultrasound in our setting was incomplete abortion (22.9%), whereby most of them had intrauterine POCs with an open cervix on ultrasound. Proportions of other common sonographic findings were uterine fibroids in pregnancy (15.4%), ectopic pregnancy (14.4%) and missed abortion (12.9%).

Both incomplete and complete abortion were associated with heavy bleeding and prolonged bleeding whereas anembryonic pregnancy and ectopic was associated with spotting. Presence of vaginal spotting increased the chances of having a normal pregnancy.

A higher proportion of patients diagnosed with ectopic pregnancy had a history of contraceptive use.

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