Original Research Article

Comparative Study of TAS & TVS in Diagnosis of Bleeding in Early Pregnancy: A Cross Sectional Study in A Tertiary Care Hospital of North East India

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Conflict of interest: Nil

Abstract:

Introduction: Transvaginal sonography (TVS) & transabdominal sonography (TAS) both are used to identify the different uterine structural abnormalities & various causes of bleeding during the first trimester. The causes of bleeding in early pregnancy are broadly divided into two groups as follows: i) those related to the pregnant state: abortion, ectopic pregnancy, hydatidiform mole, implantation bleeding. ii) those associated with the pregnant state: uterine anomalies, cervical lesions such as vascular erosion, polyp, etc. TAS is usually the first investigation performed for assessment of the causes of first trimester bleeding. This delay is crucial in emergency situations. Hence, if it is proved that TVS is distinctively superior to TAS is assessment of first trimester bleeding.

Objectives: Estimation of proportion of the different causes of bleeding in early pregnancy diagnosed by TAS & TVS in patients attending a tertiary care teaching hospital.

Material and Methods: The study was conducted in the department of Radio-Diagnosis, Agartala Government Medical College & G.B. Pant Hospital, duration was 2 years and the sample size was taken as 100. A detailed clinical examination was performed to arrive at a provisional clinical diagnosis. After that patients were subjected to ultrasound examinations. All patients subjected to transabdominal sonography were further subjected to transvaginal sonography. Data was collected in a preformed proforma. Clinical and ultrasound findings were correlated.

Results And Observations: Majority of the patients studied (35%) belonged to the age group of 20-24 years followed by 25-29 years (33%), 30 years and above (19%), and less than 20 years (14%). Duration of amenorrhoea was between 2.0 to 3.9 months for 98 per cent of the patients. Half of the patients (50%) were primi gravidae while the rest were multi gravidae. Among 100 cases of bleeding in first trimester were evaluated to understand the importance of sonographic evaluation over clinical examination with special emphasis on TVS. By mere clinical diagnosis, it was not possible to diagnose many of the cases correctly, with 65% misdiagnosed cases. Different types of abortion were identified as the major cause of bleeding in the first trimester. Out of the 44 clinically diagnosed cases of threatened abortion, 27 were falsely diagnosed, giving a fallacy rate of 61.36% whereas, TVS was 100% accurate in diagnosis. In case of incomplete abortion, clinical diagnosis was found to have 77.77% fallacy rate while TVS had a 100% accuracy rate. Out of the 13 cases clinically diagnosed as missed abortion, 9 were incorrectly diagnosed, giving a fallacy rate of 69.23%. TVS again had a 100% accuracy rate in diagnosis. Clinical examination identified 11 cases of suspected ectopic pregnancy of which, 6 were incorrectly diagnosed giving a fallacy rate of 54.54%. TVS was used to correctly diagnose all the cases with 100% accuracy. Out of the nine cases clinically diagnosed as RPOC, 6 were false diagnosis giving a fallacy rate of 66.66%. As in previous cases, TVS was 100% accurate in successfully diagnosing the causes of bleeding. Tubo-ovular mass was diagnosed clinically in 3 cases which were all misdiagnosed giving a fallacy rate of 100%. One case each of ruptured ectopic pregnancy and tubal pregnancy were diagnosed clinically which were found to be accurate in follow-up with TVS and final diagnosis, thus making a fallacy rate of 0.00%. For identification of molar pregnancy, clinical examination was unable to correctly diagnose the five cases which were identified as threatened abortion (3) and incomplete abortion (2), but later on follow up by TVS were confirmed as molar pregnancy, thus giving clinical diagnosis a 100% fallacy rate in diagnosis of structural abnormalities.

Keywords: First Trimester Bleeding, TAS, TVS, Ectopic Pregnancy.

Introduction

Transvaginal sonography (TVS) & transabdominal sonography (TAS) both are used to identify the different uterine structural abnormalities & various causes of bleeding during the first trimester. The causes of bleeding in early pregnancy are broadly divided into two groups as follows: i) those related to the pregnant state: abortion, ectopic pregnancy, hydatidiform mole, and implantation bleeding. ii) Those associated with the pregnant state: uterine anomalies, cervical lesions such as vascular erosion, polyp, etc.

TAS is usually the first investigation performed for assessment of the causes of first trimester bleeding. TVS is usually performed after TAS, if the cause of bleeding is not identified properly. This delay is crucial in emergency situations. Hence, if it is proved that TVS is distinctively superior to TAS is assessment of first trimester bleeding, TVS can be performed as the first line investigation, instead of TAS, thus saving time and starting active treatment at the earliest, which will reduce mortality & morbidity. So, this study is intended to examine the usefulness of TVS compared to TAS in assessment of first trimester bleeding.

Objectives

Estimation of proportion of the different causes of bleeding in early pregnancy diagnosed by TAS & TVS in patients attending a tertiary care teaching hospital.

Determination of sensitivity, specificity, positive & negative predictive value of TAS & TVS leading to abortion among the above mentioned study subjects.

Material and Methods

The study was conducted in the department of Radio-Diagnosis, Agartala Government Medical College & G.B. Pant Hospital, duration was 2 years (December 2014 to September, 2016), and the sample size was taken as 100.

Inclusion criteria

1. Pregnancy confirmed by urine pregnancy test
2. Stable patients
3. Patients in first trimester of pregnancy with bleeding per vaginum.

Exclusion criteria

1. Patients with negative urine pregnancy test
2. Patients to whom early intervention after admission were done
3. Patients with period of gestation more than 12 weeks
4. Patients unwilling to take part in the study.
5. Systemic diseases and haematological diseases should be excluded.

Method

A detailed clinical examination including complete general physical examination and pelvic examination was performed to arrive at a provisional clinical diagnosis.

After that patients were subjected to ultrasound examinations. All patients subjected to transabdominal sonography were further subjected to transvaginal sonography if transabdominal sonography was inconclusive or equivocal.

For bringing more clarity in diagnosis transvaginal sonography was applied additionally during the study period. All the studied cases were subjected to transvaginal sonography.

Data was collected in a preformed proforma. Clinical and ultrasound findings were correlated.

Ethical approval

Ethical approval for this study was obtained from Institutional Ethical Committee, AGMC & GBP Hospital, and Agartala. The study was conducted after due approval from the committee.

Results and Observations

Table 1: Age of the cases studied

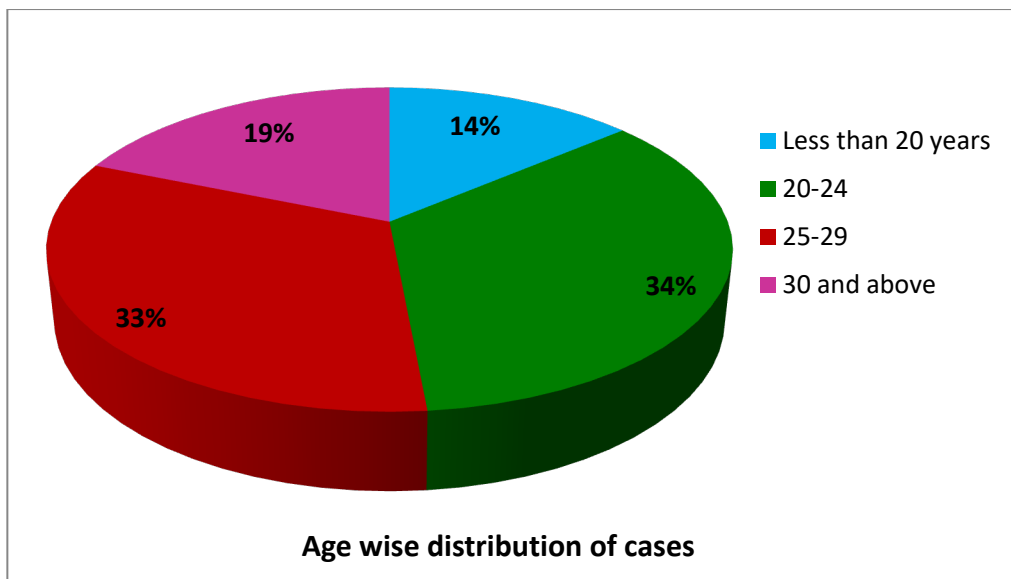| Age group	Frequency	Percentage (%)
Less than 20 years	14	14
20 years – 24 years	35	35
25 years – 29 years	33	33
30 years and above	19	19

(N=100)

Age wise distribution of cases

Figure 1: Age wise distribution of cases

Table 2: Duration of amenorrhoea

Duration of amenorrhoea	Frequency	Percentage (%)
Less than 1 month	0	0
1.0 month – 1.9 months	2	2
2.0 months – 2.9 months	43	43
3.0 months – 3.9 months	55	55

(N=100)

Duration of amenorrhoea
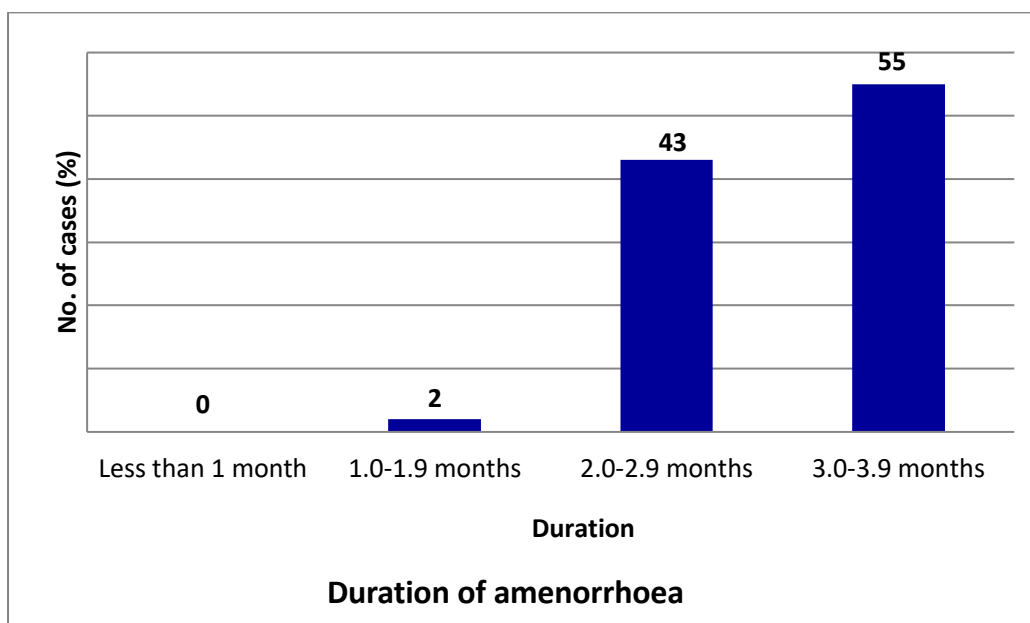
Figure 2: Duration of amenorrhoea

Table 3: Parity distribution

Parity	Frequency	Percentage (%)
Primi	50	50
Multi	50	50

(N=100)
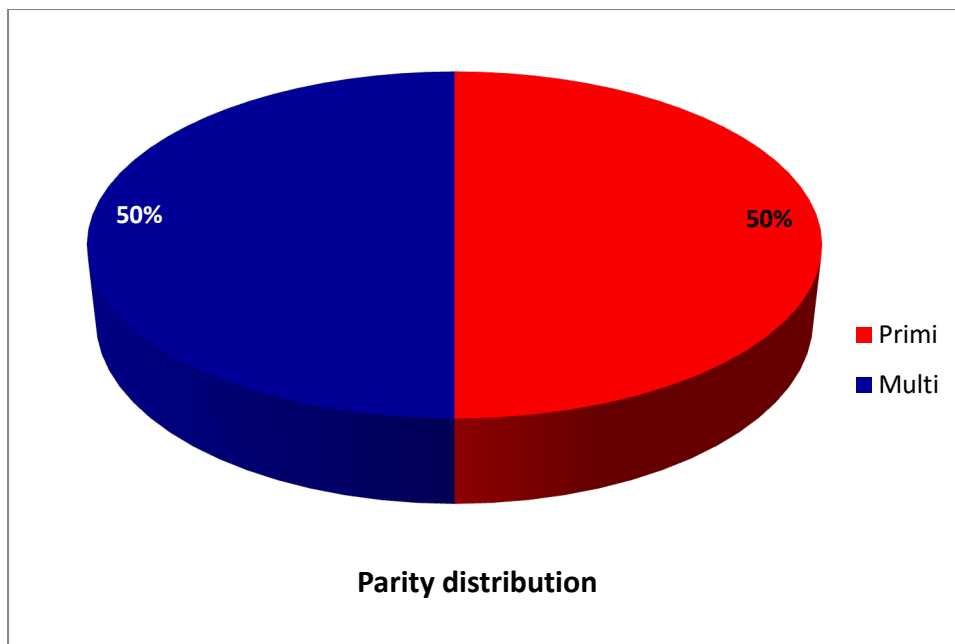
Figure 3: Parity distribution

Table 4: Size of uterus

Size of uterus	Frequency	Precentage (%)
Less than 8 weeks	46	46
8 weeks and above	64	64

(N=100)
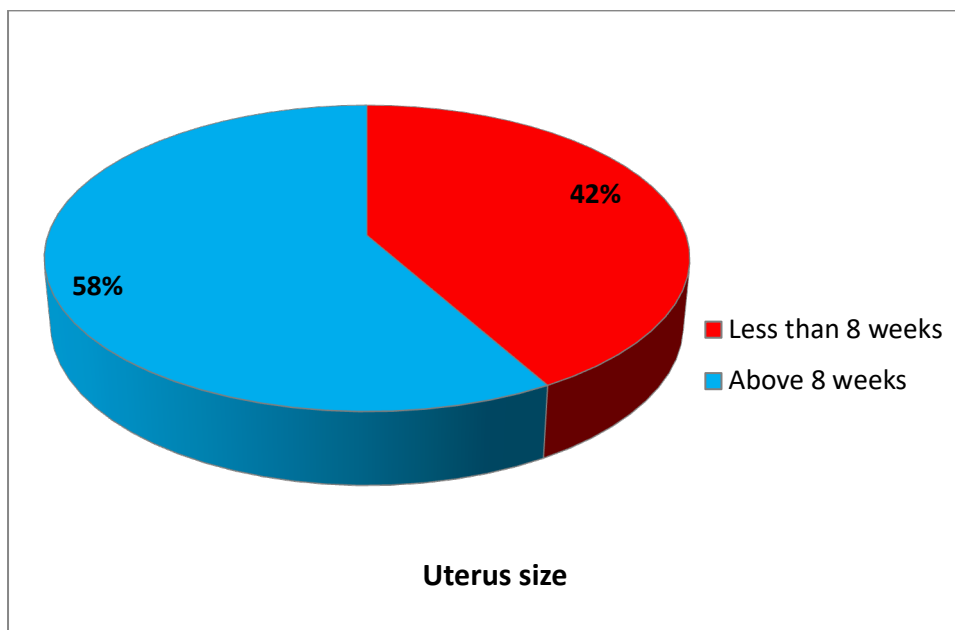
Figure 4: Uterus size

Table 5: Type of formices

Formices	Frequency	Percentage (%)
Free formices (FF)	93	93
With mass	7	7

(N=100)
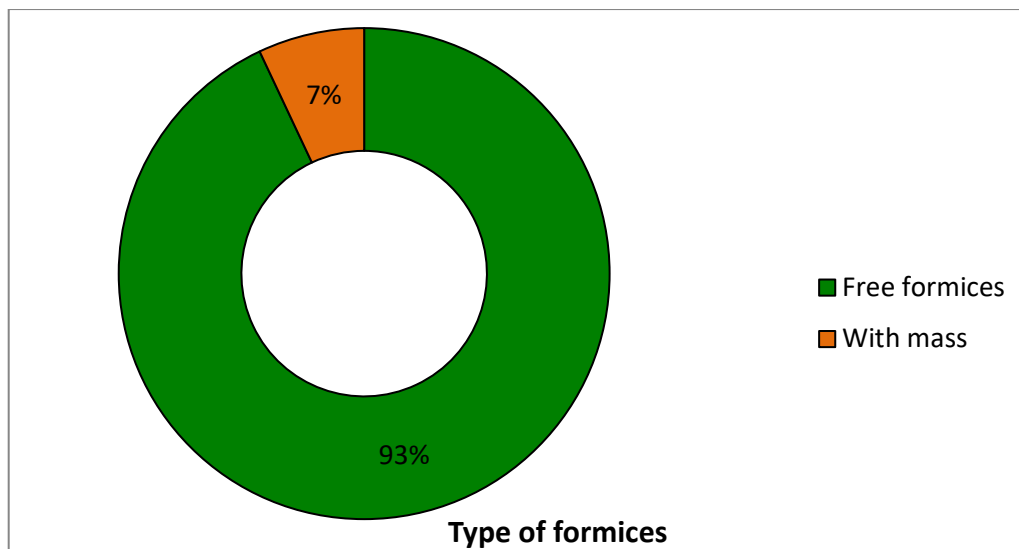
Figure 5: Type of formices

Table 6: State of cervix

State of cervix	Frequency	Percentage (%)
Closed	98	98
Open	2	2

(N=100)
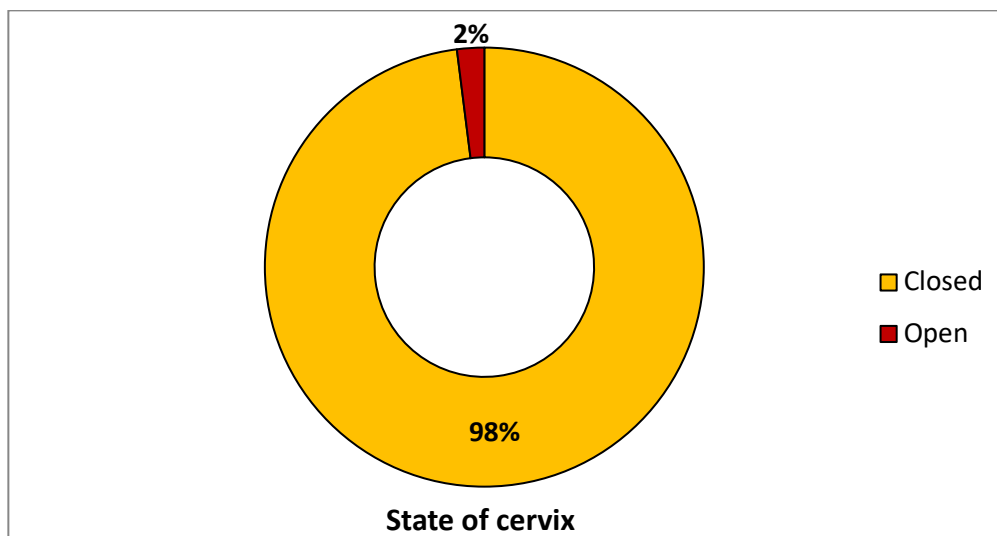
Figure 6: State of cervix

Table 7: Distribution of cases based on clinical diagnosis

Cases	Frequency	Percentage (%)
Ruptured EP	1	1
Tubal pregnancy	1	1
CA	1	1
TO mass	3	3
EP	7	7
RPOC	9	9
MA	13	13
IA	18	18
TA	43	43

(N=100)
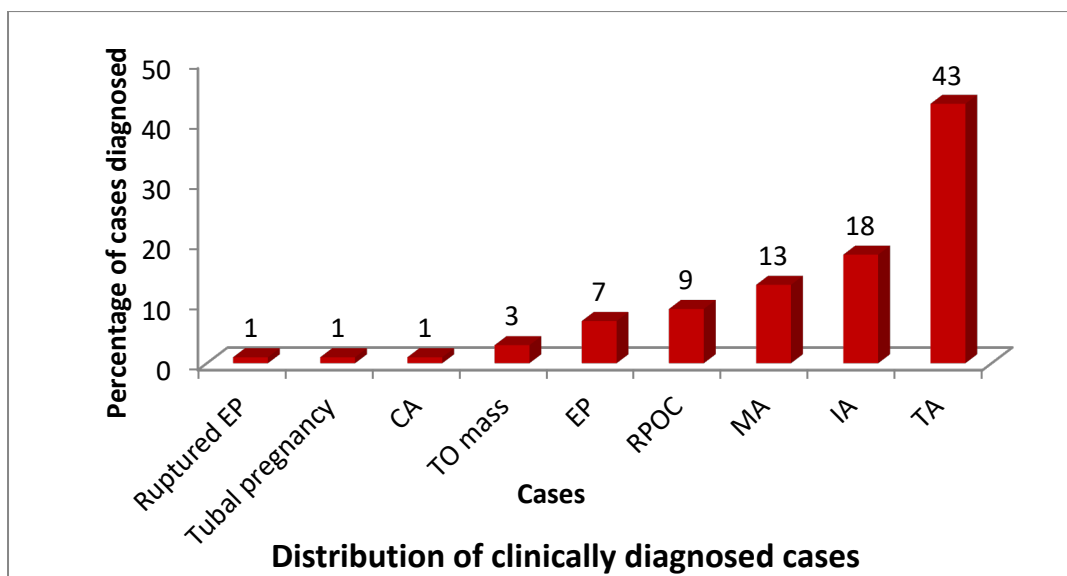
Figure 7: Distribution of clinically diagnosed cases

Table 8: Distribution of cases based on TVS diagnosis

TVS diagnosis	Frequency	Percentage (%)
Aneubryonic gestation	1	1
Molar pregnancy	1	1
Normal	1	1
Complete molar gestation	2	2
Vesicular mole	2	2
Complete abortion	5	5
Ruptured ectopic pregnancy	6	6
Ectopic pregnancy	8	8
Blighted ovum	8	8
Missed abortion	13	13
RPOC	14	14
Threatened abortion	19	19
Incomplete abortion	20	20

(N=100)

Figure 8: Distribution of cases based on TVS diagnosis

Table 9: Types of abortion and diagnosis method (p = 0.02)

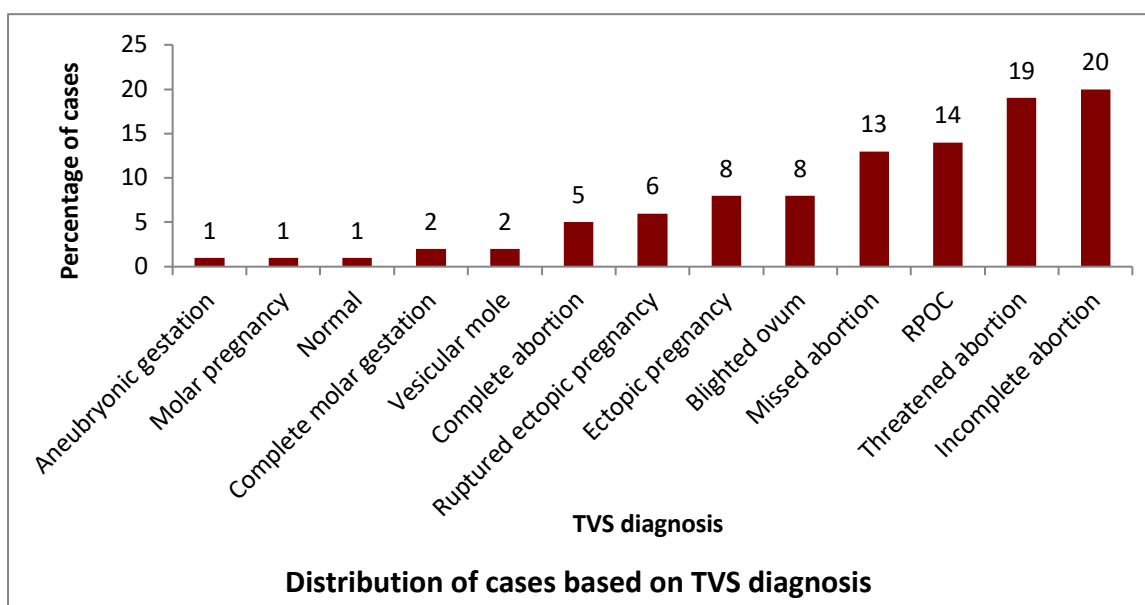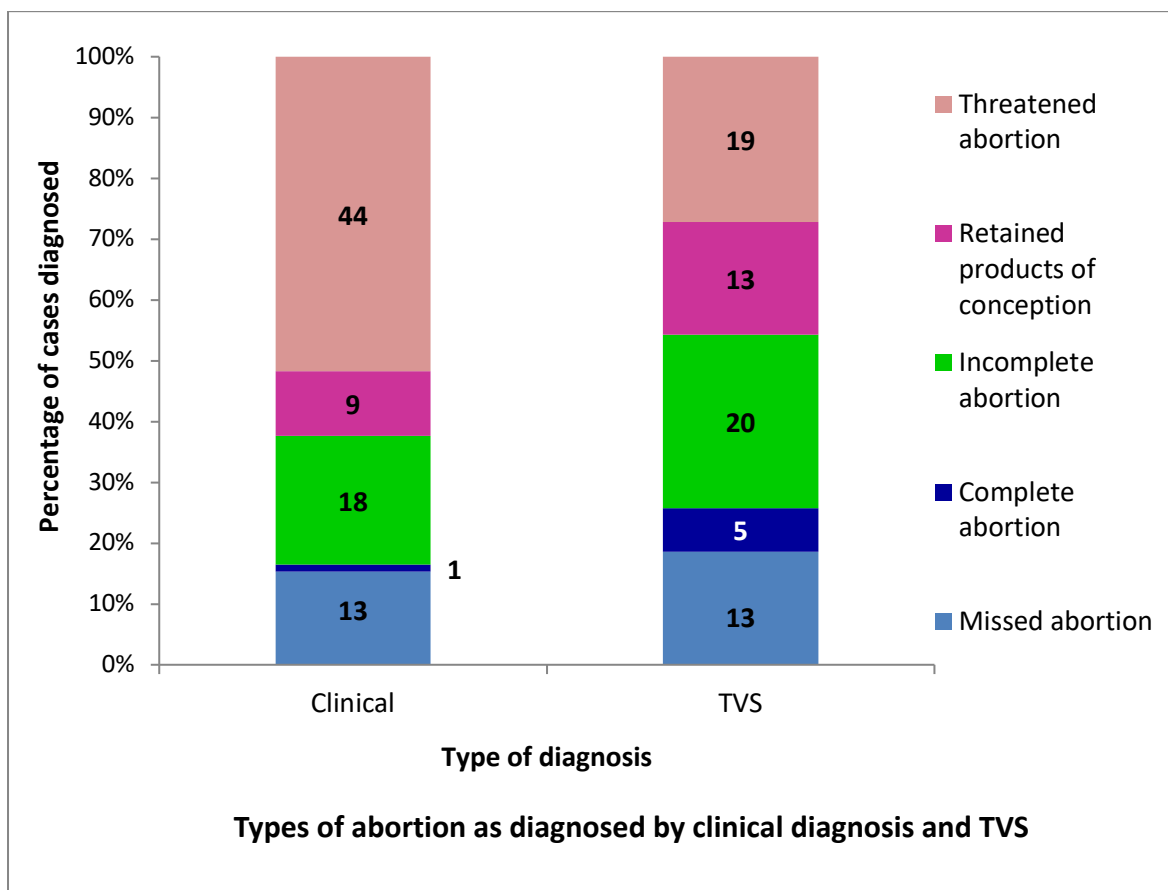| Types of abortion	Clinical diagnosis		Transvaginal sonography (TVS)	
	Frequency	Percentage (%)	Frequency	Percentage (%)
Missed abortion	13	13	13	13
Complete abortion	1	1	5	5
Incomplete abortion	18	18	20	20
Retained products of conception	9	9	13	13
Threatened abortion	43	43	19	19

(N=100)

Figure 9: Types of abortion as diagnosed by clinical diagnosis and TVS

Table 10: Fallacy rate of clinical diagnosis

Clinical diagnosis	No. of false diagnosis	Fallacy rate (%)
Threatened abortion (44)	27	61.36
Incomplete abortion (18)	14	77.77
Missed abortion (13)	9	69.23
Suspected ectopic pregnancy (11)	6	54.54
Retained product of conception (9)	6	66.66
TO mass (3)	3	100.00
Ruptured ectopic (1)	0	0.00
Tubal pregnancy (1)	0	0.00
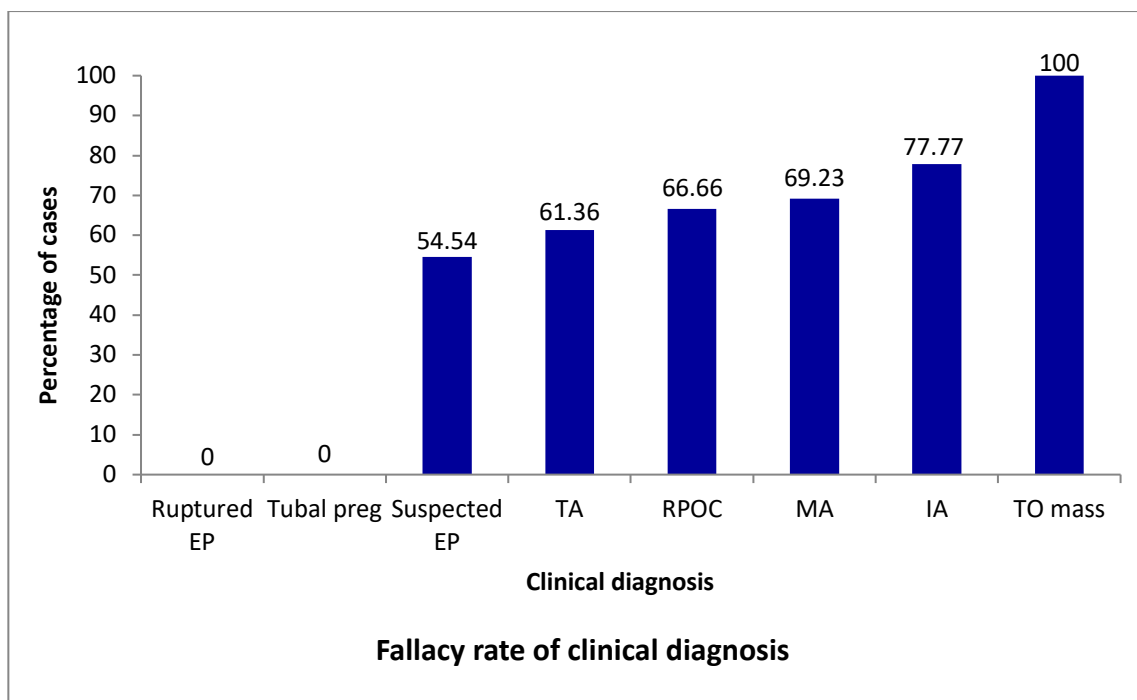
Figure 10: Fallacy rate of clinical diagnosis

Table 11: Causes of bleeding

Causes of bleeding	Frequency	Percentage (%)
Normal pregnancy	1	1
Anembryonic gestation	1	1
Molar pregnancy	5	5
Blighted ovum	8	8
Ectopic pregnancy	13	13
Retained products of conception	14	14
Different types of abortion	60	60

(N=100)

Figure 11: Causes of bleeding based on final diagnosis

Table 12: Follow up of the cases ultrasonologically diagnosed (N=100)

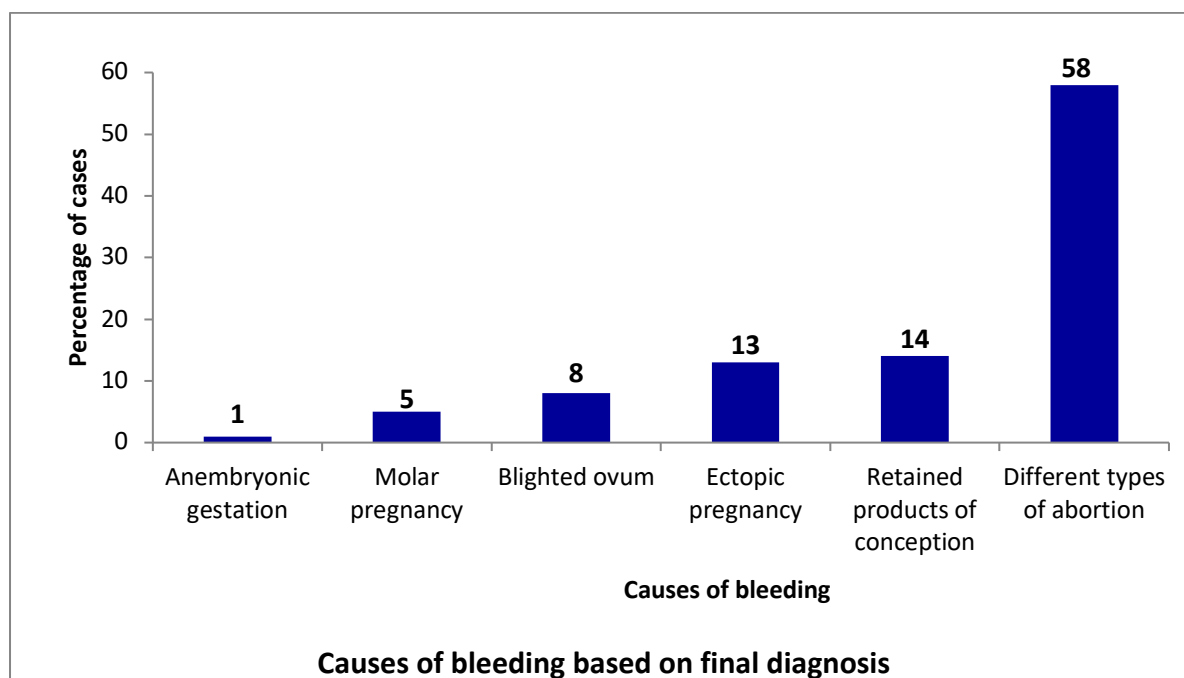| TVS diagnosis	No. of cases	Percentage (%)	Follow up result
Aneubryonic gestation	1	1	Dilation and evacuation (D&E)
Blighted ovum	8	8	Dilation and evacuation (D&E)
Complete abortion	5	5	No procedure was followed
Complete molar gestation	2	2	Suction and evacuation (S&E)
Ectopic pregnancy	8	8	Laparotomy salpingo oophorectomy
Extrauterine pregnancy	1	1	Laparotomy salpingo oophorectomy
Incomplete abortion	20	20	Dilation and evacuation (D&E)
Missed abortion	14	14	Dilation and evacuation (D&E)
Molar pregnancy	3	3	Suction and evacuation (S&E)
Retained products of conception	14	14	Dilation and evacuation (D&E) was done in 12 cases and MTP+Tube was done in one case
Ruptured ectopic pregnancy	6	6	Laparotomy salpingo oophorectomy
Threatened abortion	19	19	For 13 cases, FTND was done; MTP+Tube was done in 2 cases; MTP, TND, D&E, and emergency LSCS was done in one case each
Vesicular mole	2	2	Suction and evacuation (S&E)
Normal pregnancy	1	1	No procedure followed

Table 13: Outcome of the cases studied

| Outcome	Frequency	Percentage (%)
Emergency LSCS	1	1
TND	1	1
MTP	1	1
MTP + Tube	3	3
S&E	5	5
No procedure needed	6	6
FTND	13	13
Lap. & Sal.	14	14
D&E	56	56
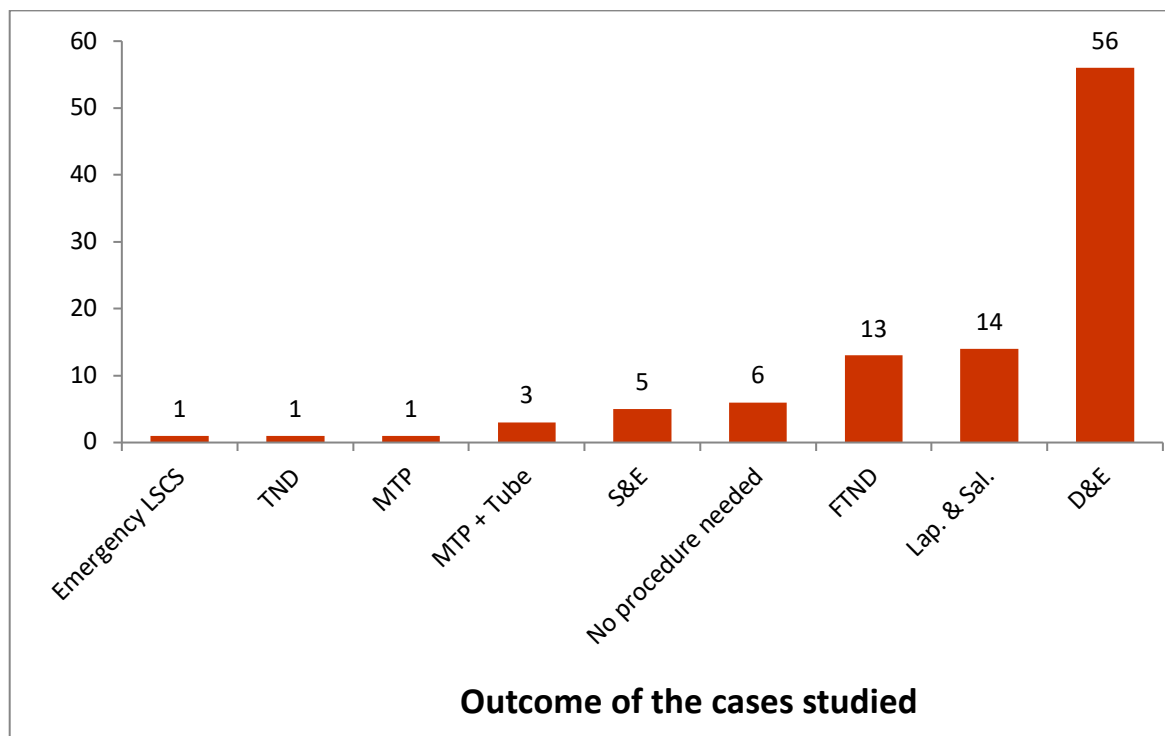
Figure 12: Outcome of the cases studied

Table 14: Correlation of clinical examination and TVS in diagnosing molar pregnancy

Structural abnormality (Final diagnosis)	Clinical diagnosis		TVS	
	Frequency	Percentage (%)	Frequency	Percentage (%)
Molar pregnancy	0	0	5	5

Table 15: Comparative study between Clinical, Trans abdominal Sonography (TAS) and Trans vaginal sonography (TVS)

		Clinically	TAS	TVS	Final Diagnosis
1	Aneubryonic gestation	0	1	1	1
		0%	100%	100%	
2	Blighted ovum	0	5	6	6
		0%	83%	100%	
3	Complete abortion	01	4	5	5
		20%	80%	100%	
4	Molar	0	6	7	7
		0%	86%	100%	
5	Ectopic pregnancy	15	7	8	8
		187%	87%	100%	
6	Extrauterine pregnancy	0	1	1	1
		0%	100%	100%	
7	Incomplete abortion	18	16	20	20
		90%	80%	100%	
8	Missed abortion	13	13	13	13
		93%	100%	100%	
9	Retained products of conception	9	22	13	13
		64%	169%	100%	
10	Ruptured ectopic pregnancy	1	6	6	6
		17%	100%	100%	
11	Threatened abortion	43	18	19	19
		226%	95%	100%	
12	Normal pregnancy	0	1	1	1
		0%	100%	100%	
Total cases		100	100	100	100
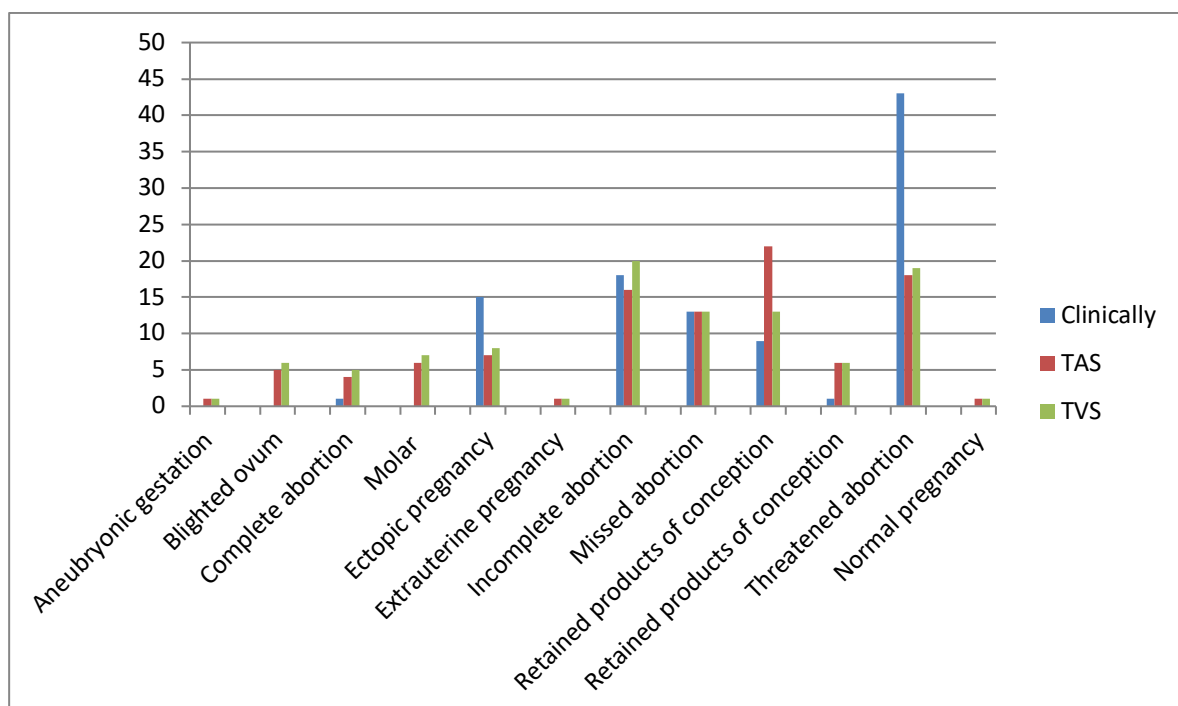
Figure 13:

Discussion

1. Age wise distribution: In the present study, majority (35%) of the patients were from the age group of 20-24 years, 33% were from the age group 25-29 years, 19% were 30 years and above, and 14% were less than 20 years (Table 1, Figure 1).

2. Duration of amenorrhea: In the present study, 55% of the cases with 3.0-3.9 months of amenorrhea complained of bleeding. The least problematic period was 1.0 – 1.9 months, during which period of pregnancy, only 2% had bleeding. 43% of the cases in 2.0 – 2.9 months of amenorrhoea complained of bleeding. So the most vulnerable period of pregnancy for bleeding to occur according to this study was 3.0 – 3.9 months followed by 2.0 – 2.9 months in the first trimester (Table 2, Figure 2).

3. Parity distribution: In this study, 50% of the cases were primi gravid and the rest 50% were multi gravida. In the study conducted by Sujatha and Sujatha (2016), 39.33% cases with first trimester bleeding per vaginum were primi gravid, whereas 66.66% cases were multi gravida (Table 3, Figure 3).

4. Uterus size: In this study, 46% of the cases had uterus size less than 8 weeks, while the rest 64% of the cases had uterus size of 8 weeks and above (Table 4, Figure 4).

5. Type of formices: In the present study, in a large majority of the cases (93%), type of formices was free, while in case of the rest 7% cases, masses were observed in the formice (Table 5, Figure 5).

6. State of cervix: The state of cervix in 98% of the cases were found to be closed, while only 2% of the cases were found in open state in the present study (Table 6, Figure 6).

7. Distribution of cases based on clinical diagnosis: In the present study, ruptured ectopic pregnancy, tubal pregnancy, and complete abortion were clinically diagnosed as 1% each.

3% cases of tubo-ovarian mass, 7% cases of ectopic pregnancy, 9% cases of retained products of conception, 13% cases of missed abortion, 18% cases of incomplete abortion, and 43% cases of threatened abortion were clinically diagnosed (Table 7, Figure 7).

8. Distribution of cases based on TVS: In the present study, through TVS, one case (1% each) each of anembryonic gestation, molar pregnancy and normal pregnancy were identified; 2% of the cases were complete molar gestation and vesicular mole each; 5% cases were diagnosed to be complete abortion; 6% of the cases were ruptured ectopic pregnancy; 8% cases each were diagnosed to be extopic pregnancy and blighted ovum; missed abortion was diagnosed in 13% cases; 14% of the cases were diagnosed as retained products of conception; threatened abortion was diagnosed in 19% cases; and 20% of the cases were diagnosed as incomplete abortion (Table 8, Figure 8).

9. Types of abortion and diagnosis method: In the present study, clinical diagnosis of threatened abortion was made in 43% of the patients, 18% were diagnosed as incomplete abortion, 13% were diagnosed as missed abortion, 9% as retained products of abortion, and 1% as complete abortion. Bit in case of TVS diagnosis, incomplete abortion were 20%, 19% were diagnosed as threatened abortion, 13% were diagnosed as RPOC, 13% as missed abortion, and 5% were complete abortion (Table 9, Figure 9).

10. Fallacy rate of clinical diagnosis: Table 10 and Figure 10 give the fallacy rate of clinical diagnosis. In total there were 65 wrong clinical diagnoses giving a fallacy rate of 65%. Threatened abortion was diagnosed by clinical methods in 44 cases where 27 cases of first trimester bleeding were wrongly diagnosed clinically as threatened abortion to be other causes giving a fallacy rate of 61.36%.

In case of incomplete abortion, 18 patients were diagnosed by clinical methods where 14 cases were misdiagnosed giving a fallacy rate of 77.77%. 13 cases of missed abortion were diagnosed by clinical method, of which 9 were misdiagnosed giving a fallacy rate of 69.23%. 11 cases of suspected ectopic pregnancy was diagnosed clinically, of which 6 were misdiagnosed giving a fallacy rate of 54.54%. Retained products of conception were diagnosed clinically in 9 cases, of which 6 were misdiagnosis, giving a fallacy rate of 66.66%.

Tubo-ovarian mass was clinically diagnosed in 3 cases which turned out to be misdiagnosis in entirety giving a fallacy rate of 100%. In case of ruptured ectopic pregnancy and tubal pregnancy, 1 case each were diagnosed clinically and was confirmed by TVS and final diagnosis to be the same, giving a fallacy rate of 0.00%.

From this discussion of Table 9 and Figure 9, we can conclude that TVS is of utmost importance in accurate diagnosis of causes relating to first trimester bleeding per vaginum.

11. Causes of bleeding based on final diagnosis: Different types of abortion (58%) were the major causes of bleeding per vaginum in the first trimester followed by retained products of conception (14%), ectopic pregnancy (13%), blighted ovum (8%), molar pregnancy (5%), and anembryonic gestation (1%) (Table 11, Figure 11).

12. Outcome of the cases studied: The diagnosed cases were followed up for finding out the course of action taken on diagnosis. Dilation and evacuation procedure was adopted in case of

anembryonic gestation (1%), blighted ovum (8%), incomplete abortion (20%), missed abortion (13%); laparotomy salpingo – oophorectomy was conducted when the diagnosis was ectopic pregnancy (8%), extrauterine pregnancy (1%), and ruptured ectopic pregnancy (6%); suction and evacuation was done in cases of complete molar gestation (2%), molar pregnancy (1%), and vesicular mole (1%); 13% cases of threatened abortion were followed up with FTND; MTP+Tube was done in 1% case of retained products of conception and 2% cases of threatened abortion; 1% cases MTP, TND, D&E and emergency LSCS were also conducted in case of threatened abortion depending on the condition of the patient. No further procedure was followed up in 5% cases of complete abortion and 1% case of normal pregnancy (Table 12).

Overall, in 56% cases dilition and evacuation was followed, laparotomy salpingo oophorectomy was followed in 14% cases, FTND was undertaken in 13% of the cases, suction and evacuation was conducted in 5% of the cases, in 3% cases MTP+Tube was conducted, and the follow up procedure was MTP, TND, and emergency LSCS in 1% cases for each. No further procedure was followed in 6% of the cases diagnosed with complete abortion and normal pregnancy (Table 13 and Figure 12).

13. Structural abnormalities: Molar pregnancy was the only form of structural abnormality leading to bleeding per vaginum in first trimester encountered during the study period. While clinical diagnosis misdiagnosed all the cases (3% as threatened abortion and 2% as incomplete abortion), TVS conclusively diagnosed all of them as molar pregnancy.

Thus, fallacy rate of clinical diagnosis in identification of molar pregnancy was 100%, further emphasising on the importance of ultrasonography, specifically TVS, to correctly diagnose molar pregnancy.

Summary

In the present study, 100 cases of bleeding in first trimester were evaluated to understand the importance of sonographic evaluation over clinical examination with special emphasis on TVS. By mere clinical diagnosis, it was not possible to diagnose many of the cases correctly, with 65% misdiagnosed cases. Majority of the patients studied (35%) belonged to the age group of 20-24 years followed by 25-29 years (33%), 30 years and above (19%), and less than 20 years (14%). Duration of amenorrhoea was between 2.0 to 3.9 months for 98 per cent of the patients. Half of the patients (50%) were primi gravidae while the rest were multi gravidae. Different types of abortion were identified as the major cause of bleeding in

the first trimester. Out of the 44 clinically diagnosed cases of threatened abortion, 27 were falsely diagnosed, giving a fallacy rate of 61.36% whereas, TVS was 100% accurate in diagnosis.

In case of incomplete abortion, clinical diagnosis was found to have 77.77% fallacy rate while TVS had a 100% accuracy rate. Out of the 13 cases clinically diagnosed as missed abortion, 9 were incorrectly diagnosed, giving a fallacy rate of 69.23%. TVS again had a 100% accuracy rate in diagnosis.

Clinical examination identified 11 cases of suspected ectopic pregnancy of which, 6 were incorrectly diagnosed giving a fallacy rate of 54.54%. TVS was used to correctly diagnose all the cases with 100% accuracy.

Out of the nine cases clinically diagnosed as RPOC, 6 were false diagnosis giving a fallacy rate of 66.66%. As in previous cases, TVS was 100% accurate in successfully diagnosing the causes of bleeding. Tubo-ovular mass was diagnosed clinically in 3 cases which were all misdiagnosed giving a fallacy rate of 100%. One case each of ruptured ectopic pregnancy and tubal pregnancy were diagnosed clinically which were found to be accurate in follow-up with TVS and final diagnosis, thus making a fallacy rate of 0.00%.

For identification of molar pregnancy, clinical examination was unable to correctly diagnose the five cases which were identified as threatened abortion (3) and incomplete abortion (2), but later on follow up by TVS were confirmed as molar pregnancy, thus giving clinical diagnosis a 100% fallacy rate in diagnosis of structural abnormalities.

Conclusion

Ultrasound is an invaluable diagnostic tool in obstetrics, specifically for correct diagnosis of patients presented with vaginal bleeding in the first trimester of pregnancy. Though such patients are subjected to various examinations like pelvic and laboratory examinations, but disorders still remain obscure which can only be properly identified through ultrasonography. Specifically for tranvaginal sonography, the accuracy is more or less 100% as has been observed in numerous studies worldwide, thus making it a very reliable tool in determining the causes of first trimester bleeding per vaginum.

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