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Original Research Article

Role of clinical examination, ultrasound findings and serum beta-hCG in first trimester vaginal bleeding

Hemapriya Lalchand*, Praharshita Doddapaneni

Department of Obstetrics and Gyenecology, JSS Medical College, JSS AHER, Mysore, Karnataka, India

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***Correspondence:**
Dr. Hemapriya Lalchand,
E-mail: drpriya_911@hotmail.com

ABSTRACT

Background: The significance of bleeding in first trimester of pregnancy may vary from an inconsequential episode to a life-threatening emergency. USG is safe and non-invasive and widely used for diagnosis various problems in pregnancy. Beta hCG can be detected in the plasma of a pregnant woman as early as eight days after ovulation, and its quantitative estimation can provide useful information regarding early pregnancy. Aim was to determine the role of clinical examination, ultrasonographic parameters and serum beta-hCG in predicting the outcome of pregnancy in first trimester vaginal bleeding.
Methods: It was a prospective observational study conducted in the department of OBG at JSS medical college, Mysuru for a duration of 18 months where in, serum beta-hCG levels, ultrasound examination was done in 120 patients presenting with first trimester of vaginal bleeding with gestational age less than 13 weeks.
Results: Out of 120 patients in our study, 39 patients had miscarriage and 81 patients had viable pregnancy at 28 weeks of gestation. Among those who had pregnancy loss, higher beta-hCG levels were found at 6-8 weeks of gestation. Higher incidence of miscarriage was found in association with subchorionic haemorrhage and smaller gestational sac. No statistically significant association between the pregnancy loss and ultrasound parameters was noted in our study.
Conclusions: The incidence of miscarriage in our study was 32.5%. No statistically significant association between the biochemical and ultrasonography parameters with pregnancy loss in patients presenting with threatened abortion could be established in our study.

Keywords: Threatened abortion, Beta human chorionic gonadotropin, Subchorionic haemorrhage, Miscarriage

INTRODUCTION

One of the most common complications in the first trimester of pregnancy is vaginal bleeding seen in around 20% of pregnant women, which may or may not be associated with other symptoms like pain abdomen.[1] In patients presenting with bleeding per vagina, around 30% will eventually have miscarriage, 10-15% will be diagnosed as ectopic pregnancy, 5% will need termination of pregnancy, 0.2% will present with hydatidiform mole, and the rest will have successful pregnancies beyond 20 weeks of gestation.[2] Abortion is defined as the spontaneous or induced termination of pregnancy before the viability of the fetus i.e., 20 weeks of gestation.[3]

Threatened abortion is defined as vaginal bleeding less than 20 weeks of gestation in patients with positive urinary or serum pregnancy test without any evidence of fetal demise or passage of fetal products.[4] Patients with threatened abortion usually present with mild to moderate vaginal bleeding along with presence of abdominal pain.[5] Although the exact etiology of threatened abortion cannot always be determined, majority of spontaneous abortions are due to chromosomal abnormalities and hence the outcome can neither be modified nor prevented. [6]

The risk factors for threatened abortion are advanced age of parents, infections, history of pregnancy loss, uncontrolled diabetes mellitus, hypertension, obesity, thyroid disorders, pre conceptional use of teratogenic drugs, history of trauma or stressors.[7] Patients diagnosed with threatened abortion should undergo evaluation with detailed history taking, physical and clinical examinations, and serum beta-hCG measurements and transvaginal ultrasonography examination.[8]

Primary objective

Primary objective was to determine the role of clinical examination, USG parameters and serum beta-hCG in first trimester vaginal bleeding.

Secondary objective

Secondary objective was to assess the accuracy of ultrasound parameters like CRL, YSD, MSD in diagnosis of first trimester vaginal bleeding and to determine the association between single serum beta-hCG value and early pregnancy loss in patients presenting with vaginal bleeding in 1st trimester of pregnancy.

METHODS

A total of 120 pregnant women presenting with vaginal bleeding in first trimester of pregnancy to the department of OBG at JSS medical college and hospital from June 2020 to September 2021 were included in the study. A detailed history was collected along with clinical examination following with serum beta-hCG and transvaginal ultrasonography was performed on the patients. Documentation was done using a pre-constructed profomas and analysed using statistical methods.

Inclusion criteria

Patients with singleton pregnancy up to 13 weeks of gestation and age 18-35 years were included.

Exclusion criteria

Patients with multiple pregnancies, other non-obstetrical causes of vaginal bleeding and renal and thrombophilic disorders were excluded.

RESULTS

In the study 120 patients were included to form the study group. The patients were distributed according the age, parity, amount of vaginal bleeding, medical comorbidities, and clinical examination and ultrasonography findings.

The study population was divided into two group based on the viability of pregnancy and the ultrasound parameters and serum beta-hCG levels were studied in individual groups with the respect to the particular period of gestation as well in comparison to each other.

Table 1: Demographic distribution of study population.

Age (in years)	<25 years, 43.3%	26-30 years, 27.5%	31-35 years, 29.2%	
Parity	Primi 48.3%	Prev 1 abortion 45%	Prev ≥2 abortions 6.7%	
BMI (kg/m^2)	Normal 41.7%	Overweight 27.5%	Pre-obese 21.7%	Obese 9.2%
Type of conception	Spontaneous 86%	Ovulation induction 12%	IUI 2%	
Occupation	House wife 65%	Working 35%		
Presenting symptoms	Backache 50.8%	Pain abdomen 49.2%		
Clinical exam	OS closed 67.5%	16% heavy bleeding	14% minimal bleed	2.5% POC's expelled spontaneously
Associated conditions	7% thyroid disorder	10% anaemia	2.5% type 2 diabetes	
Viable pregnancy	67.5% viable	32.5% abortion		

Table 2: Comparison of beta hCG and ultrasound parameters between viable and non-viable pregnancies.

Gestation in weeks		6-8 weeks		8-10 weeks		10-12 weeks		≥12 weeks	
Viable at 28 weeks		**No**	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**
N	BHCG	8	2	15	24	8	32	8	23
Mean		17917.25	9171.5	42789.13	45686.00	54873.37	214690.50	124382.00	65044.17
SD		24829.94	7254.21	50860.06	41080.7	46212.31	264372.09	165921.74	1775162.74
P value		0.649		0.846		0.100		0.527	
Mean	MSD	21.75	21.50	26.93	31.00	46.87	38.22	43.00	53.52
SD		6.61	2.12	4.68	4.85	9.31	8.89	17.63	16.13
P value		0.931		0.014		0.513		0.936	

Continued.

Gestation in weeks		6-8 weeks		8-10 weeks		10-12 weeks		≥12 weeks	
Mean	CRL	11.37	17.00	28.00	25.83	39.87	49.56	53.50	69.26
SD		4.24	8.45	6.37	8.87	11.83	6.88	13.44	10.13
P value		0.190		0.417		0.922		0.213	
Mean	YSD	4.25	4.50	5.533	4.42	6.500	6.09	7.12	6.35
SD		2.19	2.12	2.77	1.72	3.07	2.07	1.81	1.90
P value		0.888		0.128		0.656		0.321	

In the study group who had miscarriage, higher b-hCG values were noted as compared with viable pregnancy group at 6-8 weeks of gestation, although the values are within the normal reference range. In miscarriage group with gestation age >12 weeks higher levels of b-hCG above the normal reference range were seen. At 8-12 weeks of gestation the b-hCG values were within the normal reference range.

When the beta-hCG levels in the viable and miscarriage were compared, higher levels of the hormone was found in those who presented with threatened abortion at 6-8 weeks who had subsequent miscarriage. Although the b-hCG levels were higher in the miscarriage group, no statistical significance was established; as indicated by the p>0.005. In patients presenting at 8-12 weeks of gestation with threatened abortion the hormone levels were in the normal range in both groups and no statistical significance were noted among both the groups. In those with threatened abortion with more than 12 weeks of gestation, higher b-hCG values were noted in those who had subsequent miscarriage when compared those with viable pregnancy but statistically significant difference could not be established among both groups at that particular period of gestation.

The CRL measurements in the study population presenting with vaginal bleeding at 6-12 weeks of gestation who had subsequent miscarriage were with the normal reference range corresponding to the period of gestation. In those patients with threatened abortion presenting after 12 weeks of gestation who had pregnancy loss had lower than normal CRL values were noted.

On comparing CRL measurements among both the groups, higher CRL values were noted in patients at 6-8 weeks and 10-12 weeks of gestation who had eventual pregnancy loss as compared to those with viable pregnancy but the values are within the normal reference range in both the groups. In patients at 8-10 weeks and more than 12 weeks of gestation, the CRL measurements are higher in the group with viable pregnancy as compared those had abortion but no statistically significant difference with regard to CRL between both the groups was established.

Among viable and miscarried groups of the study population, YSD measurements obtained from ultrasound when compared showed no statistically significant difference, indicated by the p>0.005 in the all-gestational age groups.

When the gestational sac diameter was compared in both the viable pregnancy and miscarriage groups, sac was smaller in miscarriage group presenting at 8-12 weeks of gestation as compared to the viable pregnancy group but the difference in the sac diameter was not statistically significant. The diameter of the sac in patients at 6-8 weeks and more than 12 weeks of gestation were approximately the same size and normal sac diameter was noted in these patients.

DISCUSSION

First trimester vaginal bleeding is considered as a risk factor for adverse pregnancy outcome but there are very limited markers or predictors available for predicting the outcome of pregnancy in such scenarios. The incidence of first trimester vaginal bleeding varies between 18-25% and sub chorionic hematoma is one of the common findings in the ultrasonography of patients with complaints of vaginal bleeding or pain abdomen during the first trimester of pregnancy.

In our study a total of 120 patients were taken of which 81 (67.5%) women had viable pregnancy at 28 weeks and 39 (32.5%) had miscarriage. Forty eight percent were primigravida and 52% multigravida and incidence of miscarriage in primigravida was 46.5% and 24.1% in multiparous women of study population. Higher incidence of pregnancy loss in primigravida as compared to multiparous women with threatened abortion reported.

Our study showed that advanced maternal age >30 years is associated with fetal loss in the study population which is supported by the results reported in the study conducted by Mbugua et al.[9] A study reported by Dakhah et al shows no significant effect of maternal age on the outcome of pregnancy in patients with 1st trimester vaginal bleeding.[10]

A majority of our patients (41.7%) were normal weight. However, 27.5% were overweight, 21.7% were pre-obese and 9.2% were obese. Out of the 39 women who had miscarriage, 14 were overweight and 6 were pre-obese. There was a statistical significance between the weight of the patient and miscarriage of the study population which is in accordance with the study conducted by Metwally et al which reported significant association between body weight and early pregnancy loss in women with threatened abortion.[11] Studies conducted by Hornberger et al reported no significant association between the maternal weight and miscarriage in threatened abortion.[12]

In our study there was no statistical significance between the ultrasonography parameters and serum beta-hCG values in predicting the outcome of pregnancy in the study population who presented with threatened abortion.

A study conducted by Maged et al in obstetrics and gynaecology department, Cairo university in 2013 concluded that hormonal measurements and ultrasonographic parameters are complementary in predicting the outcome of threatened abortion and they are only high values of percentages for prognostic indications for pregnancy outcome.[13]

Limitations

In our study, estimation of a single value of serum beta-hCG value was considered. A serial estimation of serum beta-hCG values would have yielded a better result and in estimating the predictive value of the test in relation with pregnancy outcome in women with threatened abortion.

Other factors affecting the pregnancy outcome especially genetic and chromosomal disorders in first trimester of pregnancy have not been included in the study.

CONCLUSION

Presence of irregular gestational sac, subchorionic hematoma, smaller gestational sac is highly suggestive of poor pregnancy outcome. Extensive studies are required for further understanding regarding the association of biochemical markers and ultrasonographic parameters in predicting the outcome of pregnancy in threatened abortion. Although in our study no association between the biochemical markers and ultrasonographic parameters in predicting the pregnancy loss has been reported, with further studies in larger study groups will be helpful to further evaluate the association between the parameters.

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