

# ROLE OF ULTRASOUND IN PREDICTION OF PREGNANCY OUT COME IN THREATENED ABORTION

By

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## ABSTRACT

**Background:** Threatened miscarriage constitutes 15–20% of pregnancies and is one of the commonest gynecological emergencies. Previously, the volume of an intrauterine hematoma (IUH) or on the presence of vaginal bleeding was considered but not the location of the hemorrhage.

**Objective:** To predicted pregnancy outcome through sonographic finding in women presenting with symptoms of threatened abortion.

**Subjects and methods:** This was a prospective study held on 300 patients who attended the out-patient clinic or the causality department of Obstetrics &Gynecology, in Tahta general hospital. Patients were with clinical diagnosis of threatened abortion in their 1st trimester of pregnancy, attended to outpatient clinic or causality department, giving a history of bloody vaginal discharge or vaginal bleeding.

**Results:** there were statistically significant difference of mean values of sub trophoblastic arteries RI for the continued group and aborted group in all gestational age. There were statistically significant difference of mean values of sub trophoblastic arteries PI for the continued group and aborted group in all gestational age.

**Conclusion:** CRL and FHR are good sonographic indicators for the prediction of outcome in women with threatened miscarriage. Color Doppler of subtrophoblastic arteries is useful in prediction of pregnancy outcome in threatened abortion .The incidence of maternal and fetal complications increased in cases with threatened miscarriage that completed the pregnancy.

**Keywords:** Threatened, Miscarriage, Sonographic, Pregnancy.

## INTRODUCTION

Loss of pregnancy is a distressing problem for both the patient and the physician (Ayaty *et al.*, 2010).

The clinical features of threatened abortion are vaginal bleeding before 20 weeks of gestation, accompanied by cramping pain, and sometimes without changes of the cervix (Sotiriadis *et al.*, 2010). Other than clinical symptoms, ultrasound examination is an important

auxiliary procedure for diagnosis of abortion.

The sonographic findings using conventional ultrasound have been assessed and are considered to have a prognostic value that interacts with other clinical and maternal factors analyzed Bae *et al.* (2011). Some parameters obtained using conventional ultrasound considered as prognostic factors are: the morphological characteristics of the yolk

sac, adequate visualization of the embryo by transvaginal technique, changes in fetal heart rate, and macroscopic lesions of the placenta (*Papaioannou et al., 2011*).

*El-Mashad et al. (2011)* reported that the abnormal resistance of uterine artery may be useful to predict recurrent fetal loss. However, *Pellizzari et al. (2009)* did not find differences in Doppler velocimetry of the uterine arteries in women with normal and pathological pregnancy. There remains controversy as to whether Doppler ultra-sound assessment is useful in predicting outcomes of women with threatened abortion.

The aim of this study was to predict pregnancy outcome through sonographic finding, mean sac diameter, crown rumb length, embryonal heart, yolk sac diameter, intervillious circulation (sub trophoblastic arteries) in women presenting with symptoms of threatened abortion.

## PATIENTS AND METHODS

This was a prospective study .This study was held on 300 patients who attended the out-patient clinic or the causality department of Obstetrics & Gynecology, in Tahta general hospital with clinical diagnosis of threatened abortion in their 1<sup>st</sup> trimester of pregnancy, giving a history of bloody vaginal discharge or vaginal bleeding. This study contained 2 groups, i.e. continued group and aborted groups.

**Inclusion criteria:** Patients in their 1<sup>st</sup> trimester of a singleton pregnancy presenting with vaginal bleeding or spotting, A visible gestational sac or a living embryo, verified by cardiac activity

visualized on real time ultrasound. Maternal age ranged between 20-40 years, gestational age was 8-12 weeks calculated from the 1st day of the last menstrual period, preceded by 3 regular menstrual cycles, and correlating with ultrasound measurements, together with positive pregnancy test and spontaneous pregnancy, i.e. no history of induction of ovulation.

**Exclusion criteria:** History of medical disease e.g diabetes or thyroid disease, Presence of local gynecological diseases as fibroid, presence of uterine malformation as spectate uterus orhyoplastic uterus, and patient with history of recurrent abortion.

**All groups were subjected to the following:**

1. Informed written consents were obtained from the participants.
2. Detailed clinical history.

All participants were undergone for physical examination, routine laboratory investigation, sonographic examination, and color Doppler studies.

**Statistical analysis:**

Recorded data were analyzed using the statistical package for social sciences, version 20.0 (SPSS Inc., Chicago, Illinois, USA). Quantitative data were expressed as mean± standard deviation (SD). Qualitative data were expressed as frequency and percentage.

**The following tests were done:**

- Independent-samples t-test of significance was used when comparing between two means.

- Chi-square (x2) test of significance was used in order to compare proportions between two qualitative parameters.
- The confidence interval was set to 95% and the margin of error accepted was set to 5%. The p-value was considered significant as the following:
- P-value <0.05 was considered significant.

**RESULTS**

This prospective study was conducted to investigate the relationship between sonographic finding (Gestational sac, yolk sac, crown rumb length, fetal heart rate and sub trophoblastic arteries Doppler) and the occurrence of abortion in pregnancies complicated by first trimester bleeding.

A total of 300 pregnant patients with bleeding between 8-12 weeks gestation in which a singleton embryo with cardiac activity were initially documented completed study .50 patients(18%) ended in abortion and 244 patients (82%) continued till 20 weeks of gestation.

The study group was subdivided into; group of patients who aborted (50

patients) and anther group who continued their pregnancy and proceeded into second trimester (244).

However, 6 patients did not complete their follow up program with us , and hence were considered as a drop of our cases leaving 294 patients who were eligible for analysis(50 patients in the group who aborted , and 244 patients in the group that continued).

There was statistically significant difference between continued and aborted group as regard Gestational sac diameter, and shape, Crown rump length and fetal heart rate, but there was no significant difference as regard maternal age (**Table 1**).

**Table (1): Comparison between continued and aborted group as regard GS, CRL, FHR and maternal age**

Variables		Groups		Continued (N=244)		Miscarriage (N=50)		P
		Mean±SD	Range					
Age (years)	Mean±SD	26.98±3.94		29.44±4.87				0.001
	Range	19.0–33.0		20.0–37.0				
GS (mm)	Mean±SD	37.776±12.943		30.035±15.400				0.023
	Range	28.60–65.000		12.000–35.900				
GS shapes	Regular	233	95.49%	13	26%			
	Irregular	11	4.05%	37	74%			
CRL	Mean±SD	41±4.83		36.2±4.3				<0.001
	Range	15.0–57.0		16.5–53.0				
FHR (beat/min)	Normal	232	95.1%	3	6.0%			0.001
	Bradycardia	12	4.9%	47	94.0%			

There was statistically significant difference between continued and aborted group as regard Subtrophoblastic arteries

Doppler (vascularity, PI, and RI) (Table 2u3).

**Table (2): Doppler vascularity between continued and aborted groups**

Doppler vascularity	Outcome				P-value
	Continued		Miscarriage		
	No.	%	No.	%	
Normal	208	85.2	10	20.0	<0.001*
High vascular	36	14.8	40	80.0	

**Table (3): Subtrophoblastic artery RI ,PI in each group in different gestational age**

RI Gestational age (weeks)	Normal	Miscarriage	P-value
	Mean ± SD	Mean ± SD	
8 - < 9	0.60 ± 0.08	0.64 ± 0.10	<0.05
9 - < 10	0.56 ± 0.11	0.60 ± 0.15	<0.05
10 – 12	0.51 ± 0.03	0.54 ± 0.02	<0.05
PI Gestational age (weeks)			
8 - < 9	0.86 ± 0.31	1.10 ± 0.19	<0.05
9 - < 10	0.80 ± 0.28	0.90 ± 0.24	<0.05
10 – 12	0.76 ± 0.06	0.80 ± 0.09	<0.05

**Table (4): Show sensitivity, specificity, +ve predictive value, -ve predictive value and overall diagnosis accuracy for predicting the occurrence of abortion among patients with 1st trimester threatened abortion.**

Variables	Sensitivity	Specificity	+PV	-PV	Accuracy	AUC
GS	48.00	63.93	21.4	85.7	61.22	0.511
FHR	94.08	95.08	79.7	98.7	94.90	0.945
Doppler vascularity	80.00	85.25	52.6	95.4	84.35	0.826

## DISCUSSION

Threatened miscarriage constitutes 15–20% of pregnancies and is one of the commonest gynecological emergencies. Previously, the volume of an intrauterine hematoma (IUH) or on the presence of vaginal bleeding was considered but not the location of the hemorrhage. It is likely if the bleeding occurs at the level of the definitive placenta it may result in

placental separation and subsequent abortion (Hanchate, 2017).

Our results were supported by findings reported by Hanchate, V (2017) as they reported that 18.34% ended in threatened abortion. They showed that group I had 80 patients with threatened abortion, Group II had 22 patients with abortion and group II had 58 patients without abortion. The difference was significant (P – 0.02).

In the present study the group of patients who continued pregnancy had a significantly high parity than the group of patients who aborted. There was no statically difference between both groups as regard history of abortion.

Ultrasound examination has become the “golden standard” in follow-up of the development and complications of early pregnancy. Application of color Doppler ultrasound has enabled functional hemodynamic presentation and evaluation soon after implantation (*Cooley et al., 2011*).

Our results were in good agreement with that reported by *Hanchate, V. (2017)* as which showed that the mean gestational sac diameter was lower in group that aborted compared to the group who continued.

According to *Ibrahim and Farag (2018)*, the study of sonographic markers showed a statistically significant difference between Group I and the other two groups regarding FHR and CRL; which is in line with our study.

*Bamniya et al. (2017)* found that the incidence of pregnancy loss with large YSD and smaller GSD was 78.57% and 14.28% respectively. Moreover, *Tan et al., (2014)*, established that the pregnancies with YSD > 5 mm had a significantly higher risk of Miscarriage ( $p=0.005$ ).

In the present study, there was a statistically significant difference between the aborted and continued group regarding fetal heart rate and regard Doppler vascularity.

Our results are in contrary of findings reported by *Shehata et al. (2018)* as they

reported sonography examination revealed no significant difference in the mean fetal heart rate between the two groups The Doppler indices were also not significantly different between the groups. However, intrauterine blood pooling was more common in the spontaneous abortion group.

Our results show that there were statistically significant difference of mean values of sub trophoblastic arteries RI for the continued group and aborted group in all gestational age. There were statistically significant difference of mean values of sub trophoblastic arteries PI for the continued group and aborted group in all gestational age.

Our results are in agreement with findings reported by *Shehata et al. (2018)* as they reported that the Doppler indices were not significantly different between the groups, but calculation of the uterine artery resistance index as a percentage of the normal standard value at a given pregnancy duration revealed significant differences between the two group.

Our results show that the cut off point for the gestational sac diameter of  $\leq 39$ mm had a sensitivity of 48.00%, specificity of 63.93%, +ve predictive value 21.4%, -ve predictive value and overall diagnostic accuracy of 61.22% for predicting the occurrence of abortion among patients with 1st trimester threatened abortion.

Our findings are supported by findings reported by *Ibrahim and Farag, (2018)*, as they reported that the CRL cutoff value of 22 mm was obtained with a sensitivity of and specificity of 46.9% and 42.3%, respectively.

In the present study fetal heart rate had sensitivity 94.00%, specificity of 95.08%, +ve predictive value of 79.7%, -ve predictive value of 98.7% and overall diagnostic accuracy of 94.90% for predicting the occurrence of abortion among patients with 1<sup>st</sup> trimester threatened abortion. subtrochoblastic artery Doppler vascularity had a sensitivity of 80.00%, specificity of 85.25% , +ve predictive value of 52.6% , -ve predictive value of 95.4 and over all diagnostic accuracy of 84.35 % for predicting the occurrence of abortion among patients with 1st trimester threatened abortion.

Our results are supported by findings reported by *Ibrahim and Farag (2018)*, as they reported that the sensitivity and specificity of FHR and CRL especially FHR with a cutoff value of 115 bpm can help us to decide which women with threatened miscarriage are likely to continue their pregnancy and which ones will abort. Thus, helping to modify management given to both groups of patients.

However, some other previous studies had higher cutoff values: *Datta and Raut, (2017)*, showed the best cutoff value of FHR for the continuation of pregnancy was 128 bpm. *Dede et al. (2010)*, found that an FHR value below 130 bpm had 81.4% sensitivity and 85.1% specificity for predicting abortion.

Being an easily available, quick, safe, reliable, and reproducible non-invasive investigation, USG plays an important role in differentiating normal from abnormal pregnancies and therefore in predicting its wellness accurately. The chronological development and growth of

GS, timely appearance of YS, CRL, its cardiac activity and heart rate can be very well assessed by USG during the period of organogenesis and any later adverse outcome can therefore be very well predicted. It also stresses importance of obstetricians to get trained in obstetric sonology.

## CONCLUSION

The CRL and FHR are good sonographic indicators for the prediction of outcome in women with threatened miscarriage. The incidence of maternal and fetal complications increased in cases with threatened miscarriage that completed the pregnancy. Ultrasonography is useful in detection of pregnancy complication. The use of color Doppler is beneficial in assessing abnormalities and prediction of pregnancy outcome in threatened abortion. Ultra sonographic findings such as irregular wall of gestational sac, low fetal heart rate (embryonic bradycardia), perigestational hemorrhage etc. are suggestive of threatened abortion. It has helped in managing the patients

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## دور الموجات فوق الصوتية في التنبؤ بنتائج الحمل في الأجهاض المنذر

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**خلفية البحث:** يشكل الإجهاض المنذر نسبة ١٥ إلى ٢٠٪ من حالات الحمل وهو أحد أكثر حالات الطوارئ النسائية شيوعاً. سابقاً، تم النظر في حجم ورم دموي داخل الرحم أو على وجود نزيف مهبلي ولكن ليس موقع النزف.

**الهدف من البحث:** التنبؤ بنتيجة الحمل من خلال الكشف بالموجات فوق الصوتية (متوسط قطر الكيس، وطول تاج الجنين، ومعدل النبض الجنيني، وقطر الكيس الأصفر، وفحص الدوبلر الملون للشرابين الرحم وشرابين مهاد المشيمه عند النساء اللاتي يعانين من أعراض الإجهاض المنذر.

**المريضات وطرق البحث:** تمت هذه الدراسة علي ٣٠٠ حالة من السيدات اللاتي يأتين الي قسم النساء والتوليد بمستشفى طهطا العام يعانين من اعراض الاجهاض المنذر في الثلث الاول من الحمل وذلك بعد حدوث حمل تلقائي يتم تأكيد حدوثه بالموجات فوق الصوتية ووجود هرمون الحمل بالبول تتراوح اعمارهن ما بين العشرين والاربعين عاماً بعد عرض طبيعة البحث علي المشاركات واخذ اقرارات مكتوبه منهن.

**نتائج البحث:** كان هناك فروق ذات دلالة إحصائية في القيم المتوسطة للشرابين تحت الأوعية الدموية، مؤشر المقاومة الشريانية للمجموعة المستمرة والمجموعة المجهضة في كل عمر الحمل، كان هناك فروقا ذات دلالة إحصائية بين المجموعة المجهضة والمتممه للحمل فيما يتعلق بمعدل ضربات القلب الجنينية والأوعية الدموية دوبلر.

**الاستنتاج:** طول تاج الجنين و نبضات قلب الجنين هي مؤشرات جيدة بالموجات فوق الصوتية للتنبؤ بالنتائج في النساء مع الإجهاض المنذر. وزادت نسبة حدوث

مضاعفات الأم والجنين في حالات الإجهاض المنذر الذي أكمل الحمل. كما أن استخدام الدوبلر الملون مفيد في تقييم نتائج الإجهاض المنذر.