

EFFECT OF THREATENED ABORTION ON FETAL GROWTH AND PREMATURE RUPTURE OF MEMBRANES

By

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ABSTRACT

Background: Threatened abortion is the incidence of first trimester bleeding from the uterus, characterized by closed os cervix and a viable fetus. As many cases of threatened abortion pregnancy continue until term, therefore it is crucial to determine the complications of threatened abortion.

Objective: To evaluate the effect of threatened abortion on fetal growth, preterm premature rupture of membrane (PPROM), and adverse pregnancy outcomes as preterm labor, placenta previa, pregnancy-induced hypertension (PIH), intrauterine growth restriction (IUGR) and cesarean section.

Patients and methods: One hundred ongoing pregnant cases who experienced first trimester threatened abortion and an age matched control group who had no threatened abortion signs until delivery were recruited in this prospective case-control study, and assessed for eligibility at the Outpatient Clinic and Causalities of the Obstetrics and Gynecology Department, Al-Monira General Hospital from October 2018 till September 2019 .

Results: Adverse fetal outcomes were significantly higher among threatened abortion group in comparison with control group including the incidences of neonatal admission to NICU, preterm birth and low birth weight ($p < 0.001$), and IUGR ($p = 0.01$). There were no significant differences between both groups regarding PPRM, PIH and placenta previa ($p > 0.05$).

Conclusion: The incidences of low birth weight, PROM, PIH, placental previa and IUGR rates increased in threatened abortion group in comparison with control group.

Key words: Threatened abortion, bleeding, complications, PROM, IUGR.

INTRODUCTION

Approximately, 25% of pregnant women have some degree of vaginal bleeding during the first two trimesters, and about 50% of these ended up with either complete or incomplete spontaneous abortion (*Turgal et al., 2017*).

The main reasons for early pregnancy bleeding are subchorionic hemorrhage, subchorionic hematoma or rupture of a marginal placental sinus. Early diagnosis of a poor pregnancy outcome could aid in management of that group of patients (*Karataşlı et al., 2019*).

Controversies are present regarding whether the threatened abortion is a high

risk pregnancy or not, and the maternal and neonatal outcomes of threatened abortion. Some studies indicated that threatened abortion is associated with increased incidence of antepartum hemorrhage, preterm labor, intra uterine growth restriction (IUGR), placental abruption, pregnancy induced hypertension (PIH) and premature rupture of membranes (PROM) (*Sarmalkar et al., 2016*). Other studies indicated that pregnancies complicated by threatened abortion which treated with progesterone increase the incidence of live birth and reduce the risk of miscarriage (*Li et al., 2020*).

The aim of this study was to evaluate the effect of threatened abortion on fetal growth, premature rupture of membrane, and adverse pregnancy outcomes as preterm labor, placenta previa, IUGR and cesarean section.

PATIENTS AND METHODS

The primary outcome was occurrence of intrauterine growth restriction (IUGR) or premature rupture of membranes (PROM).

The secondary outcomes were occurrence of placental abruption, preterm labor, neonatal sepsis and neonatal intensive care unit admission.

The study was performed at the outpatient clinic and causalities of the Obstetrics and Gynecology Department, Al-Monira General Hospital. In our study, two groups were included: Threatened abortion group (n=100), and age matched control group (n=100).

Inclusion criteria:

1. Age: between 18-40 years old.

2. BMI between 18.5-30 kg/m².
3. Single intrauterine pregnancy with gestational age determined by sure last menstrual period and confirmed by first-trimester ultrasound.
4. Threatened abortion group: Experienced threatened abortion was diagnosed by vaginal spotting and minimal pain with closed cervix on examination and viable fetus by ultrasound.

Exclusion criteria:

1. Pregnant females with chronic systemic disease (i.e. chronic hypertension, diabetes mellitus, and thrombophilia).
2. History of trauma or surgery during the current pregnancy.
3. Smoker.
4. Multiple pregnancies.
5. History of recurrent abortion.
6. Congenital uterine anomalies.
7. Large leiomyomata distorting uterine cavity.
8. Cervical incompetence or local cervical pathology as cervical polyp.

All cases in both groups underwent routine investigations including blood typing and antibody testing, complete blood count (CBC), urine analysis, and ultrasound assessment using Volsuon-730 pro (General Electric Health Care, Austria) with a 3.5 MHz probe.

Sonographic parameters evaluated were size of gestational sac and crown-rump length (CRL) if gestational age was less than 12 weeks, fetal cardiac activity, sub-chorionic hematoma, fetal biometry:

BPD, FL, AC if the gestational age was more than 12 weeks, placental site and amniotic fluid index.

Patients of the first trimester threatened abortion group had been given 200mg progesterone supplementation twice daily in the form of rectal suppositories till one week after stoppage of bleeding. Both threatened abortion and control groups were appointed to be examined every two weeks to determine any pregnancy adverse outcomes.

Both groups were compared regarding different criteria including:

1. Demographic characteristics.
2. The incidence of PPRM.
3. The incidence of IUGR.
4. The incidence of placenta previa.
5. The incidence of PIH.
6. The mode of delivery.

7. The incidence of pre-term births.
8. The incidence of fetal admission to the NICU.

Statistical Analysis of Data:

Data were analyzed with SPSS 21.0. Quantitative data were presented as means \pm standard deviation (SD). The statistical analysis of the differences between the patient and control groups for the parameters showing normal distribution was done with a parametric test "independent-samples Student's t-test." Used as a non-parametric test, the "Mann-Whitney U" was used to make comparisons among the parameters that did not demonstrate normal distribution. Pearson chi-square tests (non-parametric) were performed to test statistical significance of the differences in proportions. A value of $P < 0.05$ was considered to be statistically significant.

RESULTS

Regarding the maternal age, BMI, gravidity, parity and gestational age recorded at the beginning of the study,

there were no significant difference between the threatened abortion group and control group ($p > 0.05$) (Table 1).

Table (1): Comparison between demographic characteristics of the threatened abortion group and control group (Mean \pm SD)

Parameters	Threatened abortion group (n=100)	Control group (n=100)	P
Maternal age (years)	27 \pm 6.5	27.6 \pm 6.1	0.5
Maternal BMI ⁽¹⁾ (Kg/M ²)	23.1 \pm 3.3	23.3 \pm 2.8	0.5
Gravidity	3.6 \pm 1.2	3.9 \pm 1.4	0.1
Parity	2.4 \pm 1.1	2.5 \pm 1.1	0.5
Gestational age * (weeks)	15.8 \pm 2.4	16.3 \pm 2.2	0.1

(1)BMI: Body Mass Index. *Gestational age at time of the beginning of the study.

IUGR was significantly higher in threatened abortion group in comparison with control group ($p = 0.01$), while the incidences of PPRM, PIH and placental

previa were not significantly different between the threatened abortion and control groups (**Table 2**).

Table (2): Comparison between both groups regarding maternal outcome measures

Parameters	Threatened abortion group (n=100)	Control group (n=100)	P
PPROM ⁽¹⁾	7 (7%)	2 (2%)	0.088
PIH ⁽²⁾	6 (6%)	2 (2%)	0.149
Placenta praevia	4 (4%)	0 (0%)	0.121
IUGR ⁽³⁾	11 (11%)	2 (2%)	0.01

(1) PPRM; Preterm Premature Rupture of Membranes. (2) PIH: Pregnancy-induced hypertension. IUGR: Intra-Uterine Growth Restriction.

The incidence of neonatal admission to NICU was significantly higher among the threatened abortion group in comparison with control group. Fetal birth weight was significantly lower among threatened

abortion group than control group. The incidences of preterm birth and low birth weight were significantly higher among the threatened abortion group than control group ($p \leq 0.05$) (**Table 3**).

Table (3): Comparison between both groups regarding neonatal outcome measures

Parameters	Threatened abortion group (n=100)	Control group (n=100)	P
Preterm birth	14(14%)	1 (1%)	<0.001
Admission to NICU ⁽¹⁾	28 (28%)	7 (7 %)	<0.001
Fetal birth weight (kg)	2.4 ± 0.139	3.1± 0.367	<0.001
Low birth weight (LBW)	34 (34%)	12 (12%)	<0.001

(1)NICU: neonatal intensive care unit.

The prevalence of pre-term delivery was significantly higher among the threatened abortion group in comparison with control group ($p \leq 0.05$). There were

no significant differences between both groups regarding the mode of delivery ($p > 0.05$) (**Table 4**).

Table (4): Comparison between two groups regarding outcome and type of delivery

Parameters	Threatened abortion group (n=100)	Control group (n=100)	P
Outcome of delivery			
Term delivery	84(84%)	98(98%)	<0.001
Preterm birth	16(16%)	2 (2%)	
Type of delivery			
Cesarean section	39 (39%)	35 (35%)	0.6
Vaginal delivery	61(61%)	65(65%)	

DISCUSSION

Our study showed that first trimester threatened abortion patients were at great risk of pregnancy complications, especially PPROM, IUGR and preterm labor. Such findings could propose the theory that first-trimester vaginal bleeding in some patients could be related to placental dysfunction which causes adverse pregnancy outcomes in later pregnancy (*Petriglia et al., 2015*).

In the current study, we have identified 4 different maternal and neonatal outcomes which were significantly associated with first trimester threatened abortion. Neonatal outcomes included low birth weight (birth weight less than 2500 g), intrauterine fetal growth restriction (IUGR), and admission to NICU were significantly associated with threatened abortion group in comparison with the control group. Moreover, the prevalence of low birth weight among threatened abortion group was 34% in comparison with 12% in the control group. That led to the assumption that low birth weight is greatly related as a neonatal outcome to the first trimester threatened abortion.

Such results were in agreement with *Ahmed et al. (2012)* and *Kanmaz et al. (2019)* that reported increased incidence of preterm birth and low birth weight as an outcome with pregnancy with first trimester threatened abortion.

Contrarily, other studies revealed that pregnancies complicated by threatened abortion which proceed beyond 28 weeks' gestation and managed properly have no significant increase in the incidence of prematurity or low birth weight (*Newnham et al., 2014*).

Our results revealed the increase in the incidence of IUGR among the threatened abortion group (11%) than the control group (2%). Regarding the relationship between the first trimester bleeding and the incidence of IUGR, there were controversial findings. Our results were in agreement with *Safaa and Ahmed (2018)* who reported that vaginal bleeding during the first trimester pregnancy has increased risks of IUGR. On contrary, *Petriglia et al. (2015)* assumed that threatened abortion and the incidence of IUGR are not related.

In the current study, the rate of admission to neonatal intensive care unit (NICU) was higher among threatened abortion group (28%) when compared with control group (7%). NICU admission for low birth weight fetuses increased because of prematurity complications such as respiratory distress.

Hashem and Sarsam (2019) revealed that threatened abortion patients with sub chorionic or retroplacental hematoma have greater incidence for their neonates to be admitted to the NICU.

On contrary, *Perera et al. (2010)* demonstrated that no difference in rate of admission to the neonatal intensive care unit between threatened abortion group and non-threatened abortion group.

Placenta previa is a common cause of obstetrical vaginal bleeding. Our results revealed no significant difference of the incidence of placenta previa between the threatened abortion group and control group.

Our results were in agreement with *Ozdemirci et al. (2015)* whose results suggested no significant difference

between the incidence of placenta previa in patients who experienced first trimester bleeding and control group. On the other hand, our results were in disagreement with *Kanmaz et al. (2019)* who indicated that placenta previa rates were statistically significantly and more frequent in the pregnancies with the threatened abortion group than in the control group.

Our study showed no significant difference in the incidence of PIH among the threatened abortion group in comparison with control group. Such results were in agreement with *Hashem and Sarsam (2019)* whose results indicated suboptimal maternal outcomes related to threatened abortion including PIH which was statistically not significant between the studied threatened and control groups.

In the present study, we compared the mode of delivery between the threatened abortion group and control group and found that there was no significant difference between both groups. Our results were in agreement with *Ozdemirci et al. (2015)* whose study revealed that mode of delivery and instrumental delivery did not differ between threatened miscarriage and control groups.

CONCLUSION

The incidences of low birth weight, IUGR, admission to NICU and preterm birth rates increased in threatened abortion patients.

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تأثير الإجهاض المنذر على نمو الجنين والإنفجار المبكر لجيب المياه

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خلفية البحث: الإجهاض المنذر هو حدوث نزيف مهبلى قبل الأسبوع العشرين من الحمل، ويحدث ذلك بنسبة عشرين بالمائة من حالات الحمل، ويتم تشخيص الإجهاض المنذر من خلال شكوى المريضة من حدوث نزيف مهبلى، ويتم التأكد من وجود عنق رحم مغلق باستخدام الفحص المهبلى ثم التأكد من وجود نبض القلب للجنين داخل الرحم وذلك باستخدام الموجات فوق الصوتية.

الهدف من البحث: تقييم العلاقة بين حدوث حالات الإجهاض المنذر ومدى تأثيرها على الانفجار المبكر لجيب المياه ونمو الجنين.

المريضات وطريقة البحث: تمت هذه الدراسة على مائتى سيدة حامل مقسمين إلى مجموعتين: المجموعة الأولى (مجموعة الإجهاض المنذر): مائة سيدة حامل تعانين من إجهاض منذر و المجموعة الثانية (المجموعة المرجعية): مائة سيدة حامل لا تعانين من إجهاض منذر. وتم تجميع الحالات من العيادات الخارجية والطوارئ بمستشفى المنيرة العام في الفترة من أكتوبر 2018 الى سبتمبر 2019، ثم إعطاء السيدات بالمجموعة الأولى مائتى ميليجرام بروجسترون لبوس شرجى مرتين يومياً حتى أسبوع بعد توقف النزيف.

نتائج البحث: كشفت نتائج البحث عن زيادة نسبة حدوث تأخر النمو داخل الرحم بين المجموعة المهدة بالإجهاض (11%) بالمقارنة مع المجموعة المرجعية (2%)، فضلاً عن ذلك، كان معدل حدوث تمزق الأغشية السابق للمخاض أعلى بشكل ملحوظ بين مجموعة الإجهاض المهدة مقارنةً بالمجموعة المرجعية. وأظهرت النتائج أن 7% من الحالات في المجموعة المهدة بالإجهاض و 3% في المجموعة المرجعية مصابة بتمزق الأغشية المبترس.

وقد كشفت نتائج البحث أن الحالات في مجموعة الإجهاض المنذر كانت أكثر عرضة للولادة المبكرة مقارنةً بالمجموعة المرجعية. و سجلت نتائجننا 16% من الحالات في المجموعة المهدة بالإجهاض مقارنة مع 2% من المجموعة المرجعية. وكان معدل الاوزان المنخفضة لحديثي الولادة بين مجموعة الإجهاض المنذر في دراستنا 34% مقارنة بـ 12% في المجموعة المرجعية.

الاستنتاج: على الرغم من أن نوبة نزييف الثلث الأول من الحمل (الإجهاض المنذر) قد توقفت في الحوامل المهدة بالإجهاض ، إلا أن تأثيرها مستمر. و يجب متابعة الحوامل اللاتي تعرضن للنزف في الثلث الأول من الحمل باعتباره حالات حمل عالية الخطورة، مع إمكانية حدوث إنخفاض وزن المواليد وزيادة معدلات تأخر النمو داخل الرحم في حالات الإجهاض المنذر.