



Journal Homepage: - www.journalijar.com
**INTERNATIONAL JOURNAL OF
 ADVANCED RESEARCH (IJAR)**

Article DOI: 10.21474/IJAR01/6421
 DOI URL: <http://dx.doi.org/10.21474/IJAR01/6421>



RESEARCH ARTICLE

QUANTITATIVE MEASUREMENT OF BETA SUBUNIT OF HUMAN CHORIONIC GONADOTRPHIN IN VAGINAL WASHING AND ITS ROLE IN DIAGNOSIS OF PREMATURE RUPTURE OF MEMBRANES

Wafaa Aboulenein¹, Abir Elhadidy², Nashwan Farrag¹ and Ziad S. Abouzeid¹.

1. Department of Obstetrics and Gynecology, Faculty of Medicine, Alexandria University, Alexandria, Egypt.
2. Department of Clinical Pathology, Faculty of Medicine, Alexandria University, Alexandria, Egypt.

Manuscript Info

Manuscript History

Received: 02 December 2017
 Final Accepted: 04 January 2018
 Published: February 2018

Key words:-

Premature rupture of membranes;
 PROM; Human chorionic
 gonadotrophin; β -HCG.

Abstract

Background: Premature rupture of membranes (PROM) is defined as spontaneous rupture of the fetal membranes before the onset of labor. The exact pathophysiology of PROM is not well defined, but the currently accepted postulation is that of reduced fetal membrane strength.

Diagnosis of PROM has instituted a clinical dilemma due to the lack of a diagnostic test with accepted accuracy. Vaginal washing β -HCG may be helpful in diagnosis of PROM.

Materials and methods: The current study assessed the role of quantitative measurement of β -HCG in vaginal washing for diagnosis of PROM. Fifty pregnant females 28-40 weeks of gestation were recruited from Elshatby Maternity University Hospital, allocated into two groups; the first group included twenty five pregnant females complaining of evident passage of liquor before the onset of uterine contractions, while the other included twenty five pregnant females without passage of liquor. All cases were subjected to complete examination and laboratory assessment of vaginal washing β -HCG.

Results: β -HCG ranged between 74.9 - 1338.0 mIU/L with mean value 394.2 ± 284.8 in PROM group, and 4.6 - 79.3 mIU/L with mean value 35.8 ± 23.8 in non PROM group, with a statistical significant difference. A cut-off value of 75.1 mIU/L has been recommended with a sensitivity of 96.5%, specificity of 92% and accuracy of 94%.

Conclusion: Vaginal washing concentrations of β -HCG significantly increases among patients with PROM, with cut-off value > 75.1 mIU/ml.

Copy Right, IJAR, 2018., All rights reserved.

Introduction:-

Premature rupture of the membranes (PROM) is defined as spontaneous rupture of the fetal membranes before full cervical dilatation (Cunningham et al., 2010).

The overall incidence of PROM is 2.7% to 17% of all pregnancies, whether term or preterm. This wide range in the incidence rates reflects differences in defining premature rupture of the membranes, as well as true prevalence

Corresponding Author:- Ziad Abouzeid.

Address:- Department of Obstetrics and Gynecology, Faculty of Medicine, Alexandria University, Alexandria, Egypt.

differences. It affects about 8% of term pregnancies, and is concomitant with about 30% of preterm deliveries (ACOG, 2007).

PROM has been the issue of many studies trying to find out the mechanism of its development. The accepted postulation is that of reduced fetal membrane strength, which will eventually lead to its rupture (El Khwad, 2006).

PROM has a considerable incidence rate, and is responsible for serious morbidities and mortalities to both the mother and her fetus. Based on these findings, premature rupture of membranes has been the scope of many studies, but its diagnosis remains a dilemma (Ramsauer et al., 2013).

Human chorionic gonadotrophin (HCG) is a glycoprotein hormone produced during pregnancy that is made by the syncytiotrophoblast. It is present in maternal blood, urine, and amniotic fluid. The beta subunit of HCG (β -HCG) has been evaluated as a possible predictor of preterm labour and a marker for PROM (Esim et al., 2003).

The objective of this study was to assess the role of quantitative measurement of β -HCG in vaginal washing for the diagnosis of PROM.

Materials and methods:-

This study was designed as a case control study conducted on fifty pregnant females, 28 - 40 weeks of gestation recruited from Elshatby Maternity University Hospital, allocated into two groups; the first group (Group A) included twenty five pregnant females having evident passage of liquor, diagnosed by speculum examination and Nitrazine paper test, before the onset of uterine contractions, while the other group (Group B) included twenty five pregnant females without passage of liquor.

Any case presenting with vaginal bleeding, fetal anomalies, multifetal pregnancy and/or coitus within the previous 48 hours was excluded from the study.

After approval of Ethical Committee of the Faculty of Medicine all patients were informed about the nature of the study and an informed written consent was signed by each patient prior to participation in the study.

All cases were subjected to vaginal washing β -HCG sampling which was obtained by injecting 5 ml of sterile saline into the posterior vaginal fornix and 3 ml of it was collected with the same syringe and sent for laboratory assessment. After 3 minutes centrifugation, supernatant part of the vaginal washing was assessed for β -HCG by quantitative measurement.

Statistical analysis:-

Data were analyzed using IBM SPSS software package version 20.0. Qualitative data were described using number and percent. Quantitative data were described using range (minimum and maximum), mean \pm standard deviation and median. Arithmetic mean, standard deviation, for comparison between two groups t-test was used. The level of significance was 0.05.

The prognostic value of the tests determined by:

- 1) *Sensitivity of the test*: the percent of the positives by the test and the true positives.
- 2) *Specificity of the test*: the percent of the negatives by the test and the true negatives.
- 3) *Accuracy*: the percent of agreement between the two tests.

Results:-

Regarding the level of β -HCG, in group A it ranged between 74.9 - 1338.0 mIU/L with a mean value of 394.2 ± 284.8 , while in group B, it ranged between 4.6 - 79.3 mIU/L with a mean value of 35.8 ± 23.8 . There was a statistically significant difference between the two studied groups regarding the level of β -HCG ($P < 0.05$). Table (1), and Fig. (1)

Table 1:- Comparison between the two studied groups regarding β -HCG.

β -HCG (mIU/L)	Group A "n=25"	Group B "n=25"
Range	74.9 - 1338.0	4.6 - 79.3
Mean \pm S.D.	394.2 \pm 284.8	35.8 \pm 23.8
T	6.25	
p	0.001*	

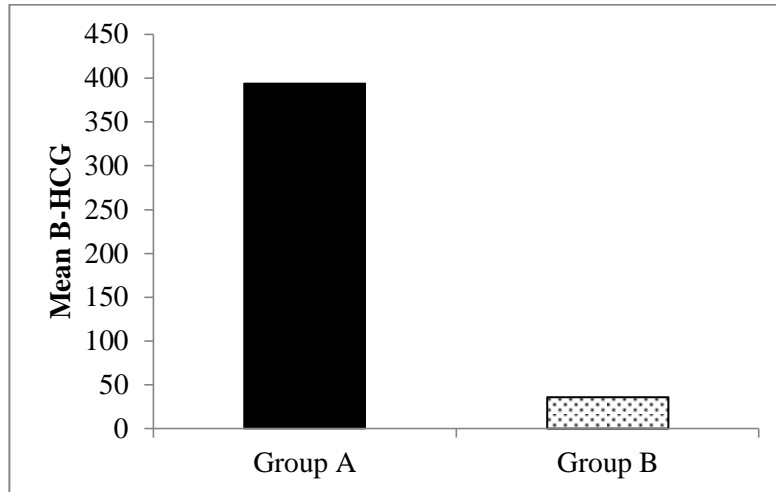


Fig. 1:- Comparison between the two studied groups regarding β -HCG.

Table (2), and Fig. (2), show the receiver operating characteristic (ROC) Curve to determine the cut off value of β -HCG in diagnosis of the premature rupture of membranes. From this ROC curve it was found that the cut off value of β -HCG in vaginal washing was 75.1, at this point the sensitivity was 96.5%, specificity was 92.0% and the accuracy was 94.0%.

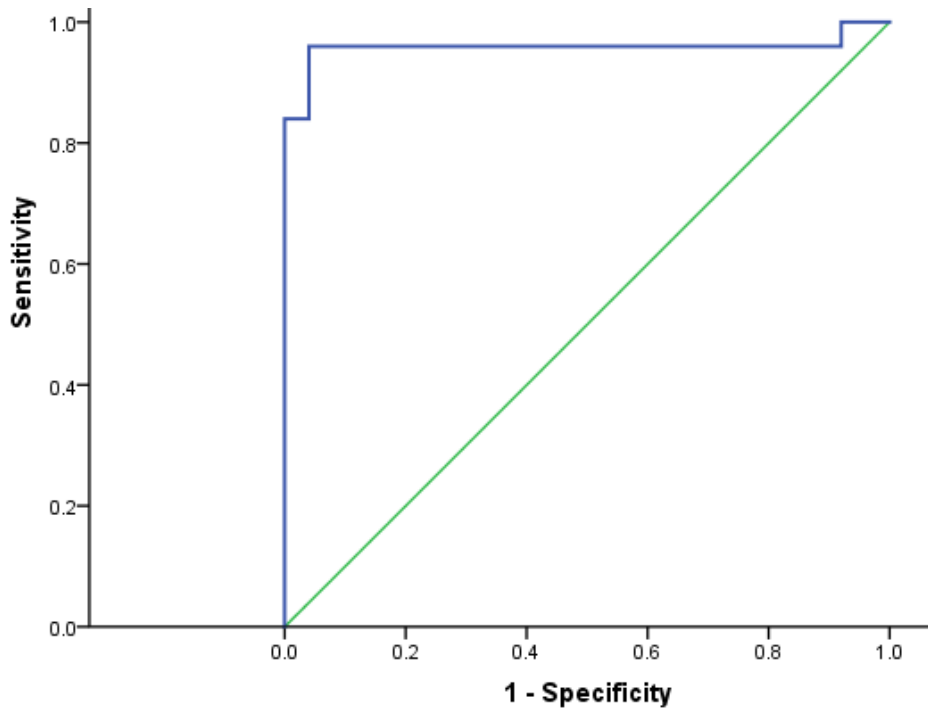


Fig. 2:- ROC curve to detect the sensitivity, specificity and accuracy of β -HCG.

Table 2:- The area under the curve, cut off value of β -HCG, sensitivity, specificity and accuracy of this cut off value.

Area under the curve	Cut off value	Sensitivity	Specificity	Accuracy
0.958	75.1	96.5	92.0	94.0

Discussion:-

Correct diagnosis of PROM has great importance because failure of diagnosis can lead to unwanted obstetric complications; on the other hand over diagnosis can lead to unnecessary interventions (Mercer, 2003).

Diagnosis of PROM has always been a debatable issue. Direct visualization of liquor passage through the external cervical os during speculum examination is definitive, but this is not possible in every case. Thus, many tests has been advised for diagnosis of PROM, however, each one has its own limitations, making the diagnosis of PROM difficult (Ramsauer et al., 2013).

The relation between quantitative β -HCG and PROM had been studied several times with different results for cut-off point. In this study we included 50 women in whom we checked the level of β -HCG in vaginal washing.

Our results showed nine fold increase in vaginal washing β -HCG concentration among patient with PROM versus pregnant women with intact membranes. ROC curve analysis was used to establish the cut-off values of vaginal washing β -HCG for diagnosis of PROM, which recommended 75.1 mIU/ml. A single vaginal washing β -HCG > 75.1 mIU/ml had a sensitivity of 96.5%, a specificity of 92%, and accuracy of 94%.

The mean concentration of β -HCG in vaginal washing in our study was 394.2 ± 284.8 mIU/ml and 35.8 ± 23.8 mIU/ml for PROM and intact membranes groups respectively. The appearance of HCG in vaginal samplings is probably the result of direct HCG diffusion from the placenta and amniotic fluid.

This agrees with a study done by Bahasadri et al in 2013, performed on 123 pregnant women between 28 - 37 weeks of gestation. β -HCG in the PROM group was 468.06 ± 366.34 mIU/mL with cut-off value of 79.5 mIU/mL (Bahasadri et al., 2013).

Esim E et al. reported higher β -HCG levels in vaginal washing of patients with PROM. They proposed that there had been an escape of β -HCG from the amniotic fluid after rupture of the fetal membranes. However, in Esim's study, β -HCG mean concentration in patients with PROM was 95 mIU/ml and in women with intact membranes, it was 10.47mIU/ml. An explanation for this wide gap between the mean β -HCG concentration in our study and Esim's study could be attributed to the difference in the gestational age of recruited patients. Their test had a sensitivity and specificity of 90% and 95% respectively in detecting PROM by evaluation of vaginal washings β -HCG concentration with a cut-off value of 65 mIU/ml (Esim et al.,2003).

Conclusions:-

1. Patients with PROM have increased level of β -HCG concentration in vaginal washing.
2. Measurement of vaginal washing β -HCG for the diagnosis of PROM is a reliable, simple and rapid test.
3. A single value of vaginal washing β -HCG > 75.1 mIU/ml, between 28-40 weeks of gestation is diagnostic for PROM.
4. Pregnant women complaining of passage of liquor per vagina or having low amniotic fluid index should be subjected to assessment of quantitative β -HCG in vaginal washing to rule out PROM.

References:-

1. **Cunningham FG, Mac Donld PC, Gant NF, Leveno KJ, Gilstrap LC, Hankins GD, Clark SL (2010):** Placenta and fetal membranes In: Williams Obstetrics 23rd edition, 110-45.
2. **Ramsauer B, Vidaeff AC, Hösli I, et al (2013):** The diagnosis of rupture of fetal membranes (ROM): a meta-analysis. J Perinat Med, 41:233.
3. **Esim E, Turan C, Unal O, Dansuk R, Cengizglu B (2003):** Diagnosis of premature rupture of membranes by identification of beta-HCG in vaginal washing fluid. Eur J Obstet Gynecol Reprod Biol, 107:37-40.
4. **Mercer BM (2003):** Preterm premature rupture of the membranes. Obstet Gynecol, 101:178-93.
5. **Bahasadri S, Kashanian M, Khalili S (2013):** Evaluation of vaginal fluid β -human chorionic gonadotrophin for the diagnosis of preterm premature rupture of membranes. J Obstet Gynaecol Res, 39(4):777-82.
6. **ACOG Committee on Practice Bulletins-Obstetrics, authors (2007):** Clinical management guidelines for obstetrician-gynecologists. (ACOG Practice Bulletin No. 80:premature rupture of membranes). Obstet Gynecol, 109:1007-19.
7. **El Khwad M, Pandey V, Stetzer B, Moore RM, Kumar D, Mercer B, et al (2006):** Fetal membranes from term vaginal deliveries have a zone of weakness exhibiting characteristics of apoptosis and remodeling. J Soc Gynecol Investig, 13:191-5.