# COMPARATIVE STUDY BETWEEN PROLACTIN, ALPHA-FETOPROTEIN AND B-SUBUNIT HUMAN CHORIONIC GONADOTROPIN IN CERVICOVAGINAL FLUID FOR DIAGNOSIS OF PREMATURE RUPTURE OF MEMBRANE

***Thesis***

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***Presented by***


***Rania Abd El Moniem Abd El Tawab***
*M.B.,B.Ch, 2002*
*Resident of Obstetrics & Gynecology*
*Banha Teaching Hospital*


***Under Supervision of***


**Prof. Hassan Tawfik Khairy**
*Professor of Obstetrics and Gynecology*
*Faculty of Medicine*
*Ain Shams University*

**Dr. Sherif Fekry Hendawy**
*Assistant Professor of Obstetrics & Gynecology*
*Faculty of Medicine*
*Ain Shams University*



Faculty of Medicine - Ain Shams University
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***Rania Abd El Moniem***

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# List of Abbreviations

| | |
|---|---|
| ACOG | American College of Obstetricians and Gynecologists |
| AF | Amniotic fluid |
| AFI | Amniotic Fluid Index |
| AFP | Alpha feto protein |
| BPP | Biophysical profile |
| B-hCG | Beta-subunite human chorionic gonadotropin |
| DA | Dopamine |
| DAO | Diamine-oxidase |
| ELISA | Enzyme-Linked Immunosorbent Assay |
| FFN | Fetal fibronectin |
| GH | Growth hormone |
| HAFP | Human alpha-fetoprotein |
| IGFBPs | Insulin-like growth factor binding proteins |
| IGFs | Insulin-like growth factors |
| IUGR | Intrauterine growth retardation |
| LEEP | Loop electrosurgical excision procedure |
| LLETZ | Large-loop excision of the transformation zone |
| MIAC | Microbial invasion of the amniotic cavity ' |
| MMPs | Matrix metalloproteinases |
| MSAFP | Maternal serum alpha-fetoprotein |
| MVP | Maximum Vertical Pocket |
| NST | Non-stress test |
| PBEF | Pre-B-cell colony enhancing factor |
| PL | Placenta lactogen |
| PPROM | Preterm premature rupture of membrane |

| | |
|---|---|
| **PRL** | Prolactin |
| **PROM** | Premature Rupture of Membrane |
| **PTB** | Preterm birth |
| **PTL** | Preterm labour |
| **RDS** | Respiratory distress syndrome |
| **REM** | Rapid-eye-movement |
| **STD** | Sexually transmitted diseases |
| **VFs** | Vaginal fluids |
| **VIP** | Vasoactive intestinal peptide |

# INTRODUCTION

Premature rupture of membranes (PROM) is a condition which occurs in pregnancy when the amniotic sac ruptures before the onset of lobor. Preterm prelabor rupture of membranes (PPROM) is a condition where the amniotic sac leaks fluid before 37 weeks of gestation **(Deering et al., 2007)**.

Premature rupture of the membranes (PROM) is another most common problem in obstetrics, complicating approximately 5–10% of term pregnancies and up to 30% of preterm deliveries (**Scott, 2008).**

Intact fetal membranes with normal amniotic fluid are necessary for normal fetal growth and development. Membranes also serve as a barrier that separates the sterile fetal environment from the bacteria colonized in vagina. PPROM is the leading cause of the preterm birth and perinatal morbidity with tremendous socioeconomic impact in society **(Sadaf et al., 2011).**

Like many obstetric diseases, the etiology of PROM appears to be multifactorial; recently, subclinical intrauterine infection has been implicated as the major etiologic factor contributing to the pathogenesis of PROM.

Infection leads to recruitment of activated neutrophils and macrophages. These cells are capable of killing bacteria by

releasing reactive oxygen species (ROS) that destroy the bacterial cell wall. The primary ROS released hypochlorous acid, is also capable of damaging the fetal membrane directly and acts as a signal for the up-regulation of MMPs ***(Mingione et al., 2006).***

Risk factors include a history of cervical insufficiency, antepartum bleeding, multiple gestations, previous PROM or preterm labor, tobacco use, cervical cerclage, and amniocentesis ***(Waters and Mercer, 2009).***

The major cause of perinatal morbidity and mortality associated with PROM is prematurity . Morbidities related to prematurity include respiratory distress syndrome, necrotizing enterocolitis, interventricular hemorrhage, cerebral palsy, and sepsis. Other complications include in utero umbilical cord compression, cord prolapse and fetal distress, fetal malpresentation, placental abruption, chorioamnionitis with subsequent endometritis, and risk of operative delivery from this multitude of factors. Maternal sepsis is a rare but life-threatening complication reported in nearly 1% of cases ***(El-Messidi and Cameron, 2010).***

Early and accurate diagnosis of ROM would allow for gestational age specific Obstetric interventions designed to optimize perinatal outcome and minimize serious complications

such as cord prolapse and infectious morbidity (chorioamnionitis, neonatal sepsis). Conversely, a false positive diagnosis of ROM may lead to unnecessary obstetric interventions, including hospitalization, administration of antibiotics and corticosteroids, and even induction of labor ***(Shin Park et al., 2007).***

It is therefore important to achieve accurate diagnosis by identifying the presence of specific amniotic fluid markers in vaginal environment. These tests include measurement of vaginal pH, prolactin, α-fetoprotein, di-amine oxydase, insulin-like growth factor binding protein-1 (IGFBP-1), human chorionic gonadotropin and fetal fibronectin ***(Esim et al., 2003).***

***Esim et al (2003) and Kim et al (2005)*** demonstrated that the measurement of β-hCG may be a reliable, simple and rapid test for the diagnosis of PROM in the absence of vaginal bleeding because high levels of β-hCG in blood can interfere with the results of β-hCG levels in vaginal washing fluid.

***Shahin and Raslan (2007)*** evaluated the clinical practicability of using AFP, β-hCG and prolactin in the diagnosis of PROM. Their statistical information clearly indicated that of the three markers, AFP was the best for diagnosing PROM.

***Beesley et al (2008)*** found that qualitative and quantitative β-hCG assay of vaginal secretions are not useful for detecting ROM in term pregnancies.

All these tests have advantages and drawbacks. Up to now there is no gold standard test for PROM ***(Kafali and Oksuzler, 2007).***

# AIM OF THE WORK

This study was conducted to compare the reliability of the vaginal washing – fluid Prolactin, AFP and B-HCG assay and qualitative B-Human Chorionic Gonadotropin for the diagnosis of premature rupture of membranes (PROM) .

**Chapter (1)**

# THE FETAL MEMBRANES

The membranous structure that surrounds the developing fetus and forms the amniotic cavity is derived from fetal tissue and is composed of two layers: the amnion (inner layer) and the chorion (outer layer).

The amnion is a translusent structure adjacent to the amniotic fluid, which provides necessary nutrients to the amnion cells. The chorion is a more opaque membrane that is attached to the decidua (the materna tissue that lines the uterus during pregnancy). The amnion and the chorion are separated by the exocelomic cavity untile approximatly three months gestation, when they become fused. Intact healthy fetal membrane is required for an optimal pregnancy outcome **(Steth Guller, 2011**).

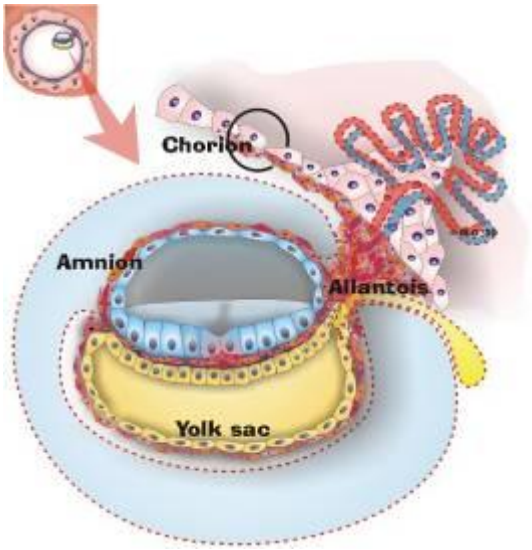
Inspection of the fetal membranes following delivery reveals amnion that is mildly adherent to the fetal side of the chorion. Small amounts of maternal decidual tissue can be observed attached to the outer, maternal side of the chorion ***(Cunningham et al., 2005).***

Amnion and chorion fuse at about 12 weeks′ gestation, via an intermediate layer of tissue, the spongy layer. The resulting amniochorion fuses intimately to the maternal decidua

parietalis at 20-25 weeks′ gestation ***(McParland and Taylor, 2005).***

The amnion and chorion laeve, although slightly adherent, are never intimately connected and usually can be separated easily, even at term ***(Cunningham et al., 2005a).***

## Anatomy of the amnion & chorion:




**(1)** Amnion **(2)** Chorion

**(3)** Umbilical Vesicle **(4)** Allantois.

**Fig (1):** Fetal membranes: Anatomy ***(Keith* L. Moore 2007*).***