Evaluation of the Role of Plasma Procalcitonin in Prediction of Intra-amniotic Infection in Patient with Preterm Premature Rupture of Membrane

A cohort study

Thesis

Submitted for the partial fulfillment of the Master Degree in
Obstetric and Gynecology

Presented by

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Nayra Abdel Sattar Ahmed El Madbouh

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List of Abbreviations

AF	:	Amniotic fluid.
AFI	:	Amniotic fluid index.
AFP	:	α-fetoprotein.
CAPs	:	Contraction-associated proteins.
CAT	:	Catalase.
CRP	:	c-reactive protein.
CTG	:	Cardiotochography.
DHEA-S	:	Dehydroepiandrosterone sulfate.
ELISA	:	Enzyme-linked immune sorbent assay.
FIRS	:	Fetal inflammatory response syndrome.
GPx	:	Glutathione peroxidase.
IUFD	:	Intra-uterine fetal death.
LBP	:	Lipopolysaccharide binding protein
MBPP	:	Modified biophysical profile.
MMP	:	Matrix metalloproteinase.
NICU	:	Neonatal intensive unit admission.
OS	:	Oxidative stress.
PG	:	Prostaglandin.
PON-1	:	Paraoxonase 1.
PPROM	:	Preterm premature of membrane.
ProCT	:	Procalcitonin.
RDS	:	Respiratory distress syndrome.

STDs	:	Sexually transmitted diseases.
TAC	:	Total antioxidant capacity.
TOS	:	Total oxidative status.
WBCs	:	White blood cells.

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Introduction:

Preterm premature rupture of the fetal membranes (PPROM) affects 2–4.5% of all pregnancies and is associated with perinatal morbidity and mortality ***(Laar et al., 2009).*** One of the primary causes of perinatal morbidity is intrauterine infection, which complicates 40–70% of PPROM cases ***(Tita et al., 2010).***

There is significant overlap between clinical and histological chorioamnionitis; however, the latter is more commonly diagnosed based on the pathological findings from microscopic examination of the placenta in cases of subclinical or clinical chorioamnionitis. In addition, subclinical chorioamnionitis may manifest as preterm labor or PPROM ***(HK et al., 2008).***

Chorioamnionitis causes a spectrum of complications for the mother and fetus. Septic shock, disseminated intravascular coagulation and maternal death are serious, but extremely rare, for the mother ***(HK et al., 2008).***

Complications for the fetus include direct fetal infection, sepsis and death. The fetal response to infection, termed fetal inflammatory response syndrome (FIRS), may induce cerebral white matter injury and result in cerebral palsy and other short- and long-term neurological deficits ***(Shatrov et al., 2010).*** Therefore, early and appropriate management of chorioamnionitis is important to reduce fetal and maternal complications ***(Oludag et al., 2013).***

Procalcitonin (ProCT) is a 116-amino-acid peptide precursor of calcitonin **(Rossum et al., 2004).** Microbial infections induce a ubiquitous increase in CALC1 gene expression and a subsequent release of calcitonin precursors from all of the tissues and cell types throughout the body ***(Muller et al, 2001).*** The increase in ProCT in bacterial infections often correlates with disease severity and mortality ***(Rossum et al., 2004).***

Furthermore, increases in ProCT occur more rapidly than increases in CRP ***(Dandona et al., 1998).*** ProCT can be detected in the plasma 2 h after injection of endotoxins, rising within 6–8 h and reaching a plateau after 20–72 h. ProCT and CRP decrease to their normal values after 2–3 days and 3–7 days, respectively ***(Gabay et al., 1999).***The use of ProCT as an early marker of bacterial infection in neonates and infants results in better sensitivity and specificity than CRP ***(Rossum et al., 2004).***

ProCT has a higher predictive value than CRP and IL-6 in predicting chorioamnionitis and newborn infection ***(Kopyra et al., 2010).*** ProCT may be more beneficial than CRP in the decision to clinically observe preterm PROM patients because of its higher specificity for predicting histological chorioamnionitis. In addition, the kinetics of ProCT are more rapid than CRP, which makes it a better option for treatment monitoring ***(Oludag et al., 2013).***

Research Hypothesis

Research Question:

In patient with preterm premature rupture of membrane (PPROM) is the procalcitonin can be used to predict subclinical intra-amniotic infection?

Research Hypothesis:

It is hypothesized that the procalcitonin has a role to play in prediction of subclinical intra-amniotic infection.

Objective:

To detect the cutt-off values of procalcitonin for predicting subclinical intra-amniotic infection, which facilitate safe observation of PPROM.

Study design

-Prospective cohort study.

Study population

This study will be conducted at the department of Obstetrics and Gynecology recruiting pregnant women selected from the attendees of antenatal clinic, emergency department and from inpatient wards of Ain Shams University Maternity Hospital starting from June 2014.

This study will include 50 pregnant women with preterm premature rupture of membrane.

Inclusion criteria:

- Patients are with singleton pregnancies.
- Rupture of membranes will be diagnosed by history, sterile speculum examination to confirm fluid leakage from the cervical canal and ultrasound to confirm oligohydraminos.
- Subclinical infection will be detected by laboratory indices (WBC count of ≥15, 000 c/mm3, CRP of ≥1 mg/dL) without any clinical symptoms and signs of infection elsewhere such as urinary tract infection or chest infection.