Estimation of Serum Ferritin Level in Preterm Labour

Thesis

Submitted for Partial Fulfillment of Master Degree
in Obstetrics and Gynecology

by

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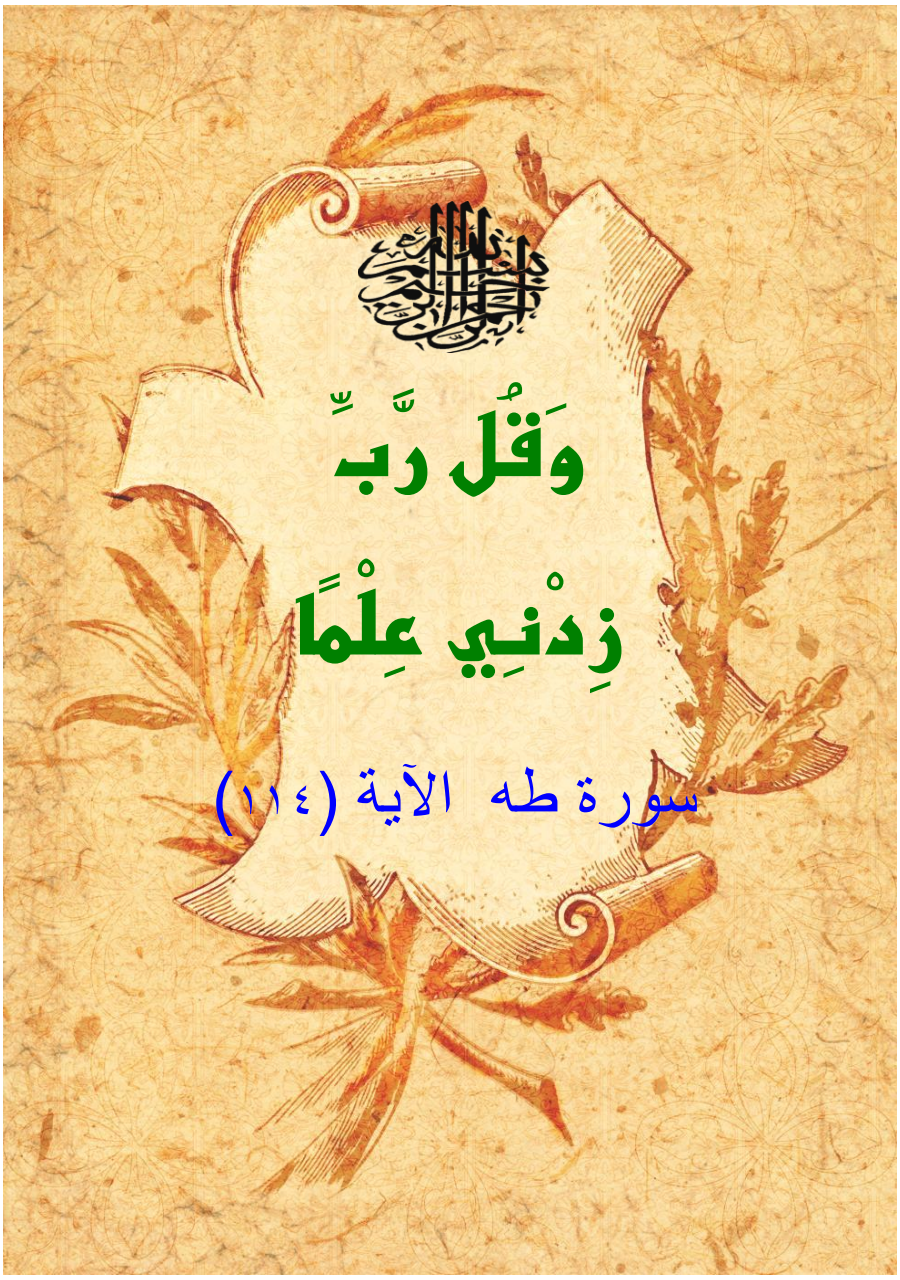
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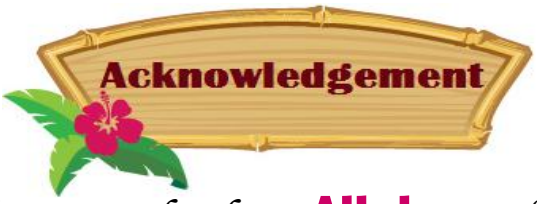

First and foremost, thanks to **Allah**, *to whom I relate any success in achieving any work in my life.*

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Mona Moawad Abd El-Azeem

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List of Abbreviations

Abb.		Full Term
AC	:	Abdominal circumference
ACTH	:	Adrenocorticotropic hormone
AUC	:	Area under the ROC curve
BMI	:	Body mass index
BP	:	Blood pressure
BPD	:	Bronchopulmonary dysplasia
BPD	:	Biparietal diameter
BV	:	Bacterial vaginosis
CKD	:	Chronic kidney disease
CP	:	Cerebral palsy
CRH	:	Corticotropin-releasing hormone
CVF	:	Cervicovaginal fluid
DHEAS	:	Dehydroepiandrosterone sulfate
E1	:	Estrone
E2	:	Estradiol
E3	:	Estriol
EDD	:	Expected date of delivery
ELBW	:	Extremely low birth weight
ELISA	:	Enzyme- linked immunosorbent assay
ER-alpha	:	Estrogen receptor-alpha
fFN	:	Fetal fibronectin
FL	:	Femur length
GA	:	Gestational age
Hb	:	Hemoglobin

List of Abbreviations

Abb.		Full Term
HC	:	Head circumference
hCG	:	Human chorionic gonadotropin
HPA axis	:	Hypothalamic-pituitary-adrenal axis
IL-1b	:	Interleukin-1b
IUFD	:	Intrauterine fetal death
IVH	:	Intraventricular hemorrhage
LBW	:	Low birth weight
LMP	:	Last Menstrual period
LR-	:	Negative likelihood ratio
LR+	:	Positive likelihood ratio
MMPs	:	Matrix metalloproteinases
mRNA	:	Messenger RNA
NEC	:	Necrotizing enterocolitis
NPV	:	Negative predictive values
PAPP-A	:	Pregnancy-associated plasma protein A
PAR	:	Protease-activated receptors
PDA	:	Patent ductus arteriosus
PPROM	:	Preterm premature rupture of membranes
PPV	:	Positive predictive values
PR-A	:	Progesterone receptor -A
PR-B	:	Progesterone receptor-B
PTB :	:	Preterm birth
PTD	:	Preterm delivery
PTL	:	Preterm labour

List of Abbreviations

Abb.		Full Term
RCS	:	Respiratory distress syndrome
ROC curve	:	Receiver-operating characteristic curve
ROM	:	Rupture of membranes
ROP	:	Retinopathy of prematurity
SIDS	:	Sudden infant death syndrome
STIs	:	Sexually transmitted *infections*
TAT	:	Serum thrombin-antithrombin
TLC	:	Total leukocyte count
TNF	:	Tumor necrosis factor
TNF-α	:	Tumor Necrosis Factor (TNF-α).
U/S	:	Ultrasound
VLBW	:	Very low birth weight
WHO	:	World Health Organization

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Abstract

Background: Preterm birth is the leading cause of newborn deaths and also the leading cause of death in children under 5 years of age. There is wide spread suspicion that subclinical infection is a common accompaniment and cause of preterm labour. Ferritin is an acute phase reactant and it increases during inflammation.

Aim: The objective of this study is to measure serum ferritin level in cases of established preterm labour (PTL) as a possible marker of infection.

Study Setting: This study conducted at Ain Shams University Maternity Hospital from March 2015 to November 2015.

Study design: A case-control study.

Materials and Methods: The study involved 2 groups.

Study population: 60 cases divided into two groups:

- **Group (I):** included 30 patients with established (PTL) between 30 to 34 weeks gestational age (GA).
- **Group (II): (Control group)** 30 patients with uncomplicated pregnancies between 30 to 34 weeks GA. Serum ferritin was analysed in the 2 groups.

Statistical analysis: Significance of difference in the means of serum ferritin levels between the two groups were found out. Serum ferritin was assayed by a quantitative test system. This is a solid phase enzyme- linked immunosorbent assay (ELISA) kit.

Results: The results pointed out that There was statistically significant difference between two groups as regarding serum ferritin level as p value was <0.0001 . The median serum ferritin level in preterm labour group and control group was 150 (100 – 150) ng/ml and 20 (15 – 25) ng/ml respectively. The best cut off value of serum ferritin as predictor of preterm labour was >55 ng/ml with a sensitivity of 96.7% and specificity of 96.7 %.

Conclusion: Serum ferittin can be used as a marker of preterm labour.

Keywords: Infection, Preterm labour, Serum Ferritin

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Introduction

Preterm delivery, as the precedent of prematurity, is generally referred to childbirth before 37 weeks of pregnancy. It is considered not only as a main cause of neonatal mortality, but also, as a risk factor of behavioural problems even later through the child's life. About 12.8 % of pregnancies in USA lead to preterm birth, 3.66% being under 34 weeks of gestation. It occurs in 6%-10% of deliveries in developed countries ***(Arpi and Ferrari, 2013).***

Prematurity is a major healthcare problem throughout the globe, constituting 7–8% of total births and contributing to 85% of deaths among premature infants ***(Saha et al., 2000).***

In many countries, the proportion of babies who are born prematurely has risen in the past 20 years. The increased prevalence could be attributed to the change in incidence of twin or multiple pregnancies, improved prenatal care and increased detection of preterm labour due to wider use of ultrasound in estimating the gestational age ***(Broumand et al., 2014).***

Premature birth is the major cause of hospitalisation of the mother before 37 weeks of pregnancy. On the contrary, it is responsible for 75% to 80% of infant mortalities. The lower the gestational age at birth, the incidence and severity

of complications is higher and has a worse prognosis ***(Dammann et al., 2005).***

It has been postulated that infection is a major etiologic agent in the pathogenesis of preterm labour (PTL) and preterm premature rupture of membranes (PROM). Direct sampling of amniotic fluid in these situations has demonstrated the pathogenic microorganisms or markers of infection such as raised total leukocyte count (TLC), cytokines, leukocyte esterase and low glucose level which indicate invasion by microorganisms.

Ferritin provides the primary form of iron storage in the body. Since the first demonstration of a relationship between serum ferritin concentration and the level of iron stores there have been many subsequent studies of this relationship. However, the possible role of ferritin during inflammation has recently been demonstrated. It has been proposed that extracellular ferritin has an important role in host defense against bacteremia by stimulating oxidative metabolism (***Saha et al., 2000***).

A large proportion of early spontaneous preterm deliveries are associated with upper genital tract infections and most patients show little or no sign of infection. This study will be carried out to examine the relationship of preterm delivery and a possible marker of infection, i.e. ferritin. A number of chemical and labouratory biomarkers

have been studied for predicting preterm labour ***(Romero et al., 2010).***

Ferritin as an intracellular iron storage protein has been identified as a diagnostic marker that its high serum levels is associated with a variety of acute phase reactions, including inflammatory conditions ***(Chen et al., 2006).***

According to the main role of inflammation on appearance and progression of preterm delivery, it is hypothesized that the measuring serum ferritin level as a sensitive inflammatory marker can effectively predict this event in the high risk group.

Some investigators have reported a relationship between elevated serum ferritin concentrations and preterm labour ***(Mahmoudian and Khademloo, 2005).*** So the present study will be carried out to examine the relationship of preterm delivery and a possible marker of infection, i.e. ferritin.

Aim of the Work

The objective of this study is to measure serum ferritin level in cases of established preterm labour (PTL) as a possible marker of infection.

Research hypothesis

Serum ferritin may be high in cases of preterm labour.

Research question:

Does serum ferritin have a relation with preterm labour?