ANEMIA WITH PREGNANCY

Essay

Submitted for Partial Fulfillment of the Master Degree
in Obstetrics & Gynecology

By

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2011

إِنَّ اللَّهَ عِنْدَهُ عِلْمُ السَّاعَةِ وَيُنَزِّلُ

الْغَيْثَ وَيَعْلَمُ مَا فِي الأَرْحَامِ وَمَا

تَدْرِي نَفْسٌ مَاذَا تَكْسِبُ غَداً وَمَا

تَدْرِي نَفْسٌ بِأَيِّ أَرْضٍ تَمُوتُ إِنَّ

اللَّهَ عَلِيمٌ خَبِيرٌ

صدق الله العظيم

(سورة لقمان – الآية : 34)

ACKNOWLEDGEMENT

I am greatly thankful to my supervisors, Professor Ahmed Rashed Mohamed Rashed, Assistant Professor Abdel-Latif Galal El-Kholy and Dr. Wessam Magdy Abuel ghar, whose encouragement, guidance and support from the initial to the final level enabled me to develop an understanding of the study.

Moreover, I offer my regards and blessings to all of those who supported me in any respect during the completion of the study (particularly, my parents, my wife and my family).

Mahmoud Hamed

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List of Abbreviations

- ACE Angiotensin Converting Enzyme
- ACOG American College of Obstetrics and Gynecology
- CBC Complete Blood Count
- CHr Reticulocyte Hemoglobin Content
- CRP C-reactive Protein
- DMT Divalent Metal Transporter
- DNA Deoxyribonucleic Acid
- FAO Food and Agriculture Organization
- FBC Full Blood Count
- G6PD Glucose 6 Phosphate Dehydrogenase
- GI Gastrointestinal
- Hb Hemoglobin
- HbA Adult Hemoglobin
- Hb Bart's Hemoglobin Bart's
- HbF Fetal Hemoglobin
- HbH Hemoglobin H
- Hct Hematocrit
- HCYS Homocysteine
- HELLP Hemolysis Elevated Liver Enzymes Low Platelet Count
- HFE Hemochromatosis gene
- HIV Human Immunodeficiency Virus
- HPL Human Placental Lactogen
- HPLC High performance liquid Chromatography
- ID Iron Deficiency
- IDA Iron Deficiency Anemia
- IF Intrinsic Factor
- IM Intramuscular
- IUGR Intra Uterine Growth Restriction
- IV Intravenous
- LBW Low Birth Weight
- LFTS Liver Function Tests
- LMP Last Menstrual Period
- MCH Mean Corpuscular Hemoglobin
- MCHC Mean Corpuscular Hemoglobin Concentration
- MCV Mean Corpuscular Volume
- MRI Magnetic Resonance Imaging
- N_2O Nitrous Oxide
- NPW Non Pregnant Women

- NSAID Non Steroidal Anti Inflammatory Drug
- NTDs Neural Tube Defects
- PCR Polymerase Chain Reaction
- PCV Packed Cell Volume
- PIH Pregnancy Induced Hypertension
- PROM Premature Rupture Of Membrane
- PV Plasma Volume
- PW Pregnant Women
- RBC Red Blood Cell
- RCT Randomized Control Trials
- R/F Ratio Serum Transferrin to Serum Ferritin Ratio
- RDW Red Cell distribution Width
- SCD Sickle Cell Disease
- SF Serum Ferritin
- STRs Serum TRs
- TBV Total Blood Volume
- TCII Transcobalamin II
- TIBC Total Iron-Binding Capacity
- TRs Transferrin Receptors
- TSH Thyroid Stimulating Hormone
- UK United Kingdom
- USPSTF United States Preventive Services Task Force
- VOC Vaso-Occlusive Crisis
- WBC White Blood Cell
- WHO World Health Organization
- ZPP Zinc Protoporphyrin

Introduction
&
Aim of the work

Introduction

Anemia is a common medical disorder that contributes significantly to maternal morbidity and mortality, intrauterine growth retardation, preterm delivery and prenatal morbidity and mortality **(Diejomaeoh et al., 1999)**.

Maternal mortality continues to be a major health problem in the developing world. In the year 1987, international agencies from 45 countries established the safe motherhood initiative with the goal of reducing maternal deaths. A key component of safe motherhood is the eradication of anemia during pregnancy, and an effective approach to curb the incidence of anemia in pregnancy would be to counter the underlying factors. In that vein, tackling iron deficiency in pregnancy comes first **(Kumar *et al.*, 2005).**

Iron deficiency anemia forms the commonest nutritional pathology in pregnant women. The prevalence of iron deficiency anemia in pregnancy in the developing world is 56% (range 35-75%), versus 18% in the developed world **(Perewusnyk et al., 2002)**.

Anemia during pregnancy is a well known and considerable risk factor for both mother and fetus. Fetal consequences are an increased risk of growth retardation, prematurity, intrauterine death, amnion rupture and infection. Maternal consequences of anemia are also well known and include cardiovascular symptoms, reduced physical and mental performance, reduced immune function, tiredness, reduced peripartal blood reserves and finally increased risk for blood transfusion in the postpartum period. For clinical management, proper diagnosis and therapy are mandatory to reduce maternal and fetal risks and to enable optimal obstetrical outcome of both **(Breymann, 2002).**

Aim of the work

To review the etiological factors, prevalence and impact of anemia on pregnancy and fetus.

Chapter One

Overview of Anemia with Pregnancy

ANEMIA WITH PREGNANCY

Anemia is a reduction in the normal number of circulating red blood cells and in the quantity of hemoglobin in the blood. More than half a million maternal deaths occur each year, approximately 90% of which are in developing countries, making evident a large discrepancy between developed and developing countries **(WHO, 2000).**

The WHO defines anemia in pregnancy as an Hb levels of less that 11 g/dl, although a level of less than 10.5 g/dl is more widely adopted in the second trimester, when physiological hemodilution is at its greatest **(Strong, 2005).**

It also defined by the Centers for Disease Control and Prevention as hemoglobin (Hb) or hematocrit (Hct) value less than the fifth percentile of the distribution of Hb or Hct in a healthy reference population based on the stage of pregnancy. Classification derived from an iron-supplemented population lists the following levels as anemic:

1) In the first trimester Hb (g/dl) and Hct (percentage) levels below 11 g/dl and 33%, respectively,

2) In the second trimester 10.5 g/dl and 32%, respectively,

3) In the third trimester 11 g/dl and 33%, respectively **(ACOG, 2008).**

Grades of anemias

Although anemia is frequently graded as “mild”, “moderate”, or “severe”, the hemoglobin values at which the division into these three categories is made vary and are arbitrary. Standardized cut-off values are difficult to define because populations, geographic settings and needs are different according to specific areas **(WHO, 1999)**.

Some authors suggest that hemoglobin values at sea level should be categorized as follows **(WHO, 1999)**:

(1) Mild anemia (Hb 10 to 10.9 g/dl);
(2) Moderate anemia (Hb 7 to 9.9 g/dl);
(3) Severe anemia (Hb less than 7 g/dl).

However, other criteria have been widely used to define anemia cut-off values:

(1) Mild (Hb 9 to 10.9 g/dl),
(2) Moderate (Hb 7 to 8.9g/dl) and
(3) Severe (Hb below 7 g/dl) **(Adam, 2005)**;

Or

(1) Mild anemia (Hb 7 to 11 g/dl),
(2) Moderate anemia (5 to 7 g/dl) and
(3) Severe anemia (below 5 g/dl) **(Brabin et al., 2001)**.

Table 1: Cutoff Values for Anemia in Pregnant Women **(CDC, 2001)**.

	Hemoglobin (,g/dl)	**Hematocrit (,%)**
Trimester		
First	11.0	33.0
Second	10.5	32.0
Third	11.0	33.0
Adjustment for smoking		
0.5–,1.0 packs/day	10.3	11.0
1.0–,2.0 packs/day	10.5	11.5
.2.0 packs/day	10.7	11.5
Adjustment for altitude (feet)		
3,000–3,999	+0.2	+0.5
4,000–4,999	+0.3	+1.0
5,000–5,999	+0.5	+1.5
6,000–6,999	+0.7	+2.0
7,000–7,999	+1.0	+3.0
8,000–8,999	+1.3	+4.0