

*Effect of maternal administration of vitamin-k  
on umbilical cord prothrombin in preterm  
babies*

*thesis submitted for partial fulfillment of master degree in*

*Obstetrics & Gynecology*

**By**

**Amira Mohammad Zaki Abo Zeid**

M. B. B., Ch. Mansura University (2002)  
Resident of Obstetrics and Gynecology El Galaa teaching hospital  
Supervised by

**Prof. Dr. Maged Ramadan AbouSeeda**

Professor of Obstetrics and Gynecology  
Faculty of Medicine – Ain Shams University

**Prof. Dr. Karim Ahmed Wahba**

Assistant Professor of Obstetrics and Gynecology  
Faculty of Medicine – Ain Shams University

**Faculty of Medicine**

**Ain Shams University**

**2010**

تأثير تعاطي الأم لفيتامين ك علي معامل البروثرومبين

في الحبل السري للأطفال المبتسرين

رسالة توظنة للحصول على درجة الماجستير في أمراض النساء و التوليد  
مقدمة من

الطبيبة / أميرة محمد زكي أبو زيد

بكالوريوس الطب والجراحة (2002) جامعة المنصورة

طبيب مقيم نساء وتوليد مستشفى الجلاء التعليمي

تحت إشراف

**الأستاذ الدكتور / ماجد رمضان أبو سعدة**

أستاذ أمراض النساء و التوليد

كلية الطب - جامعة عين شمس

**الأستاذ المساعد الدكتور / كريم أحمد وهبة**

أستاذ مساعد أمراض النساء و التوليد

كلية الطب - جامعة عين شمس

جامعة عين شمس

كلية الطب

2010

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## *Acknowledgement*

*Words cannot express the depth of my gratitude to my teacher **Prof. Dr. Maged Ramadan AbouSeeda** Professor of Obstetrics and Gynecology Faculty of Medicine – Ain Shams University , for his valuable suggestions, generous assistance, kind support and continuous encouragement throughout this work.*

*My great appreciation and thanks to **Prof. Dr. Karim Ahmed Wahba** Assistant Professor of Obstetrics and Gynecology Faculty of Medicine – Ain Shams University, for his unlimited help, kind support, valuable supervision, guidance and advice.*

*Finally, I would like to express my appreciation to every one who directly or indirectly gave a hand in accomplishment of this work.*

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Amira Mohammad Zaki

MBBCH Mansura university 2002

Supervised by

**PROF. DR . MAGED RAMADAN ABOUSEEDA**

*Professor of Obstetrics and Gynecology*

*Faculty of medicine*

*Ain Shams university*

**ASS. PROF. DR. KARIM AHMED WAHBA**

*Assistant Professor of Obstetrics and Gynecology*

*Faculty of medicine*

*Ain Shams university*

Ain Shams university

(2009)

# Introduction

Preterm labor is the presence of contractions of sufficient strength and frequency to effect progressive effacement and dilation of the cervix between 20 and 37 weeks gestation (1)

There are no accurate recent worldwide data, but estimates of preterm birth rates range from 5% in developed countries to 25% in developing countries. The preterm delivery rate has been relatively stable at 5-10% in developed countries for many years. The main burden of preterm birth exists in developing countries. (2)

Preterm newborn is endangered by many hazards like: respiratory distress syndrome, retinopathy of prematurity, necrotizing enterocolitis, brain disorders & periventricular-intraventricular hemorrhage. (3)

Germinal matrix hemorrhage (GMH) and intraventricular hemorrhage (IVH) are the most common and most important neurologic injuries in preterm neonates. The brain of a premature infant lacks the ability to autoregulate cerebral blood pressure. Fluctuation in cerebral blood pressure and flow can rupture the primitive germinal matrix vessels or lead to infarction of the metabolically active germinal matrix. The damage can extend into the periventricular white matter, resulting in significant neurologic sequelae, including cerebral palsy, mental retardation and seizures. Injury to the germinal matrix has substantial mortality and morbidity rates. Ultrasonography is the primary imaging modality for the screening and diagnosis of GMH\ IVH. (4)

Intraventricular hemorrhage IVH is thought to be associated with coagulation factors at birth in preterm neonates born before 30 weeks gestation. The measured low prothrombin may have been affected by prior bleeding event. Nevertheless, infants with low prothrombin

activity may be susceptible to IVH , or to progression to it ,if left undiagnosed.(5)

Prothrombin (coagulation factor II)is a blood clotting protein. Injury to a blood vessel triggers the conversion of prothrombin to thrombin. vitamin K is essential for synthesis of prothrombin. (6)

Vitamin K is a fat soluble vitamin. The K is derived from the german word "koagulation". Coagulation refers to the process of blood clot formation. Vitamin K is essential for the functioning of several proteins involved in blood clotting (7)

The key vitamin K dependent proteins include: coagulation proteins; factors II,VII,IX and X. , Coagulation inhibitor proteins; proteins C, S and Z. , and others.(8)

Department of Pediatrics,1989, Wayne State University School of Medicine, Detroit, Michigan found that Infants in whom an intraventricular hemorrhage developed were significantly smaller, younger, and more critically ill than infants without intraventricular hemorrhage. Administration of vitamin K1 to pregnant women at less than 35 weeks' gestation does not improve the hemostatic defects nor does it reduce the incidence or severity of intraventricular hemorrhage in their infants.(9)

Department of Obstetrics and Gynecology,1994, Medical University of South Carolina, Charleston suggested that antenatal vitamin K1 therapy to mothers < 32 weeks' gestation has no significant effect on the level of vitamin K-dependent factors in the fetus(10)

Recently, Beijing Obstetrics and Gynecology 2006,Hospital Affiliated to Capital University of Medical Science, Beijing, China found that Administration of vitamin K1 to pregnant women at less than 35 weeks' gestation age may result in improved coagulation and may

reduce the incidence as well as the severity degree of Peri and intraventricular hemorrhage .(11)

The neonatal response to maternal injection of vitamin K is yet to be assessed and compared to preterm babies with no prior maternal injection of vitamin k and to fullterm babies

## Aim of the work :

To determine the effect of maternal administration of Vitamin k on the level of umbilical cord ( prothrombin ).

# Patient and methods

**Type of study :** Randomized prospective double blind study

**Place of the study :**

The study will be conducted in "Ain Shams University hospital of Obstetrics and Gynecology " on 90 patients divided into 2 groups :

**Group A :** 45 threatened preterm deliveries ( 28 - 37 weeks ) who received maternal I.M injections of Vitamin k 10 mg. per day for 2 – 7 days prior to delivery.

**Group B:** 45 preterm deliveries( 28 - 37 weeks ) who received no such treatment

**Inclusion criteria :**

- Maternal age between 18 & 35 years.
- Primigravida or multigravida.
- Pregnancy of a single fetus.
- Living fetus.
- No maternal medical nor obstetric complications.

- No history of ruptured membranes.
- No medications but Vitamin k , tonics , tocolysis & steroids.
- Delivery occurs within 2-7 days of vit k administration.

**Exclusion criteria :**

- Maternal age extremities.
- Multiple pregnancies.
- IUFD
- Preterm premature rupture of membranes.
- Medical & obstetrical compromise.
- Other maternal medications.
- Delivery within the first 48 hours.
- Delivery after more than 7 days.

- Umbilical cord prothrombin level will be assessed in all 90 patients in the 2 groups using Factor II Deficient Plasma.

**Fetal outcome assessment :**

- Gestational age at which delivery occur.
- Fetal weight.

- APGAR score 1-5 minutes after delivery.
- NICU.

**Results will be collected, tabulated and statistically analyzed by the appropriate methods**

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