بسم الله الرحمن الرحيم

MONA MAGHRABY

شبكة المعلومات الجامعية

التوثيق الالكتروني والميكروفيلم

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شبكة المعلومات الجامعية

التوثيق الإلكتروني والميكروفيلم

جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

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MONA MAGHRABY

Role of Ultrasonographic Measurement of Fetal Kidney Length in Determination of Gestational Age during Third Trimester of Pregnancy

Thesis

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

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List of Abbreviations

AC	:	Abdominal circumference
ANC	:	Antenatal care
AP	:	Anteroposterior
bHCG	:	Beta-human chorionic gonadotropin
BPD	:	bi-parietal diameter
CA	:	Conceptional age
CI	:	Cephalic index
CRL	:	Crown–rump length
DNA	:	Deoxyribonucleic acid
EDD	:	Expected date of delivery
FKL	:	Fetal kidney length
FL	:	Femur length
FW	:	Fetal weight
GA	:	Gestational age
GDM	:	Gestational Diabetes Mellitus
HC	:	Head circumference
hCG	:	Human Chorionic Gonadotropin
IUGR	:	Intrauterine growth restriction
KL	:	Kidney length
LGA	:	Large for gestational age
LMP	:	Last menstrual period
SD	:	Standard deviation
SGA	:	Small for gestational age

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Introduction

An accurate age of fetus plays a pivotal role in obstetric care. Uncertain dates and no assigned ultrasound date in early trimester poses a dilemma in management decision leading to iatrogenic pre or post maturities. In high risk pregnancies like pre-eclampsia, IUGR, GDM, planning termination of pregnancy due to complications or to plan for fetal investigations or therapy requires an accurate gestational age **(Shivalingaiah et al., 2014)**.

Even if menstrual history is correct, the exact time of ovulation, fertilization, and implantation cannot be known. Women may undergo several "waves" of follicular development during a normal menstrual cycle, which may mean ovulatory inconsistency during any given cycle. Sperm may survive for 5 to 7 days in the female reproductive tract, a "known" conception date is therefore not completely reliable. Recent studies suggest the ovulation-to-implantation duration can vary by as much as 11 days, and this may affect fetal size and growth **(Butt et al., 2014).**

In routine ultrasonography the Sonographer measures the bi-parietal diameter (BPD), head circumference (HC), abdominal circumference (AC) and femur length (FL) in estimating the gestational age (GA) and estimated date of delivery **(Gupta et al., 2013).** However as the pregnancy advances these parameters become increasingly unreliable in prediction of GA. Therefore accurate estimation of GA in late

second and third trimester still remains problem **(Kaul et al., 2012).**

Fetal kidney has been shown a steady growth of 1.7 mm fortnightly (every 2 weeks) throughout pregnancy and is unaffected by growth abnormalities. Various studies have reported that fetal kidney length (FKL) strongly correlates with the gestational age in late trimester. Fetal kidney is easy to identify and measure but has not been studied extensively as a biometric index for gestational age estimation, although ultrasound textbooks often have tables of different dimensions **(Goyal et al., 2016)**.

Aim of the Study

The aim of this study is to asses the accuracy of the gestational age estimated by mean fetal kidney length compared to multiple growth parameters like BPD, HC, AC & FL in addition to the actual gestational age derived from the reliable last menstrual period.

Study Question:

In normal singleton pregnancies, is fetal kidney length more accurate in estimation of gestational age in the third trimester than the other parameters?

Study Hypothesis:

In normal singleton pregnancies, fetal kidney length may be more accurate than bi-parietal diameter, head circumference, femur length & abdominal circumference in estimation of gestational age in the third trimester.

Chapter 1

The Significance and Importance of Gestational Age Estimation

Accurate assignment of gestational age may reduce post-dates labor induction and may improve obstetric care through allowing the optimal timing of necessary interventions and the avoidance of unnecessary ones. More accurate dating allows for optimal performance of prenatal screening tests for aneuploidy **(Butt et al., 2014).**

The 3 basic methods used to help estimate gestational age (GA) are menstrual history, clinical examination, and ultrasonography. The first 2 are subjected to considerable error and it's better to be used with ultrasonography facilities. The date of feeling the first fetal movements (quickening) is far too unreliable to be useful. The date of the first documented positive pregnancy test and the beta-human chorionic gonadotropin (bHCG) level may help ascertain the minimum gestational age. In women who conceived following assisted reproduction techniques, the date of embryo transfer is known and may date the pregnancy accurately. In rare cases, the date of coitus is known, and this may be useful in calculating the length of pregnancy **(Mongelli et al., 2014).**

Significance of Gestational Age:

1. The expected date of delivery (EDD):

The expected date of delivery (EDD) is one of the earliest pieces of information a pregnant woman requests