

بِسْمِ اللّٰهِ الرَّحْمٰنِ الرَّحِیْمِ

قال الله تعالى:

إِنَّ اللّٰهَ لَا یَخْفٰی عَلَیْهِ شَیْءٌ فِی الْاَرْضِ وَلَا فِی السَّمٰوٰتِ (5) هُوَ
الَّذِیْ یُصَوِّرُكُمْ فِی الْاَرْحَامِ کَیْفَ یَشَآءُ لَا اِلٰهَ اِلَّا هُوَ الْعَزِیْزُ الْحَکِیْمُ
((6)).

صدق الله العظيم

سورة آل عمران

-الايه (6 5)

Dedication

To my mother and my father.

To my husband and children.

To my sisters and brothers.

&

To all whom I love and respect.

ACKNOWLEDGEMENT

First of all I thank God who helps me completing this effort.

I also thanks, Dr. Elsafi Ahmed Abdalla who help me very much.

My thanks extend to Dr Bushra Hussan Ahmed for his help through all stages of this thesis.

My thanks extend to Dr Mohamed Elfadil for his help and support.

My thanks extend to all those who contributed in a way or another for the success of this study.

My thanks also extend to my patients.

ABSTRACT

Ultrasound has been used for assessment of the gestational age of the fetus for years. Umbilical cord diameter is not used in assessing the gestational age routinely.

The main objective of this study was to determine the gestational age by ultrasound measuring the umbilical cord diameter in the second and third trimester of pregnancy, as well as to compare between GA by UCD, FL and BPD.

A total of 50 pregnant ladies from police hospital and Elazhary center were enrolled to U/S measurement of BPD, FL and two diameters of UC, using (SIEMENS-SONOLINE G60S) machine, those measurements were compare with the GA that taken by LMP, also maternal age and number of parity are included during a period of two months has been taken into account from December 2011 to February 2012 . In the manual assessment of gestational age, from one to three days were omitted and from four to six days were considered a week. UCD was measured in millimeters. The gestational ages by certain last menstrual period was compared to that obtained from measuring. It was found that the gestational age using umbilical cord diameter¹ (depth), the equation show strong correlation where GA increase by 1.4/5mm, when used UCD² (width) the equation showed GA

increase by 1.5/5mm. The result showed that there was unsubstantial relation between UCD and maternal age, where the UCD increased by 0.02mm/10year and with an insignificant correlation at $p = 0.05$ with $r = 0.03$.

Also there was a direct linear effect of the parity on the UCD1 increased by 0.55 mm/2parity and the UCD2 by 0.5 mm/2parity with a significant correlation at $p = 0.05$ with a correlation coefficient equal to 0,78 and 0.71 respectively.

Using paired t-test it indicates that the GAs calculated from FL were accurate i.e. there is no significant difference at $p = 0.05$ detect between the LMP age and the estimated with $t = 0.63$ and $p = 0.53$ as well as the UCD1, UCD2 with $t = 0.02$ for both and $p = 0.9$ but BPD showed significant difference at $p = 0.005$ with $t = 2.92$.

So these equations can be using to estimate the fetal age.

ملخص الدراسة

استخدمت الموجات فوق الصوتية لتحديد عمر الجنين لسنوات عدة. قطر الحبل السري لم يستخدم لتحديد عمر الجنين. بالفحص الروتيني. الهدف الاساسي. من هذه الدراسة هو تحديد عمر الجنين بالموجات فوق الصوتية باستخدام قطر الحبل السري في الثلوث الثاني والثالث من الحمل والمقارنه بين عمر الجنين من الحبل السري مع عمره من عرض عظمتي الجدار للجنين وطول الفخذ. مجموع 50 امرأة من مستشفى الشرطة والازهري خضعن لقياسات عرض عظمتي الجدار للجنين وطول الفخذ وقطرين للحبل السري باستخدام جهاز (سيمنس صونولاين ج 60 س) وقورن العمر المتحصل عليه مع عمر الجنين المأخوذ باخر

دورة شهرية وكذلك اخذ عمر الحامل وعدد الولادات خلال شهرين من فترة دراسته منذ
ديسمبر 2011 و حتى فبراير 2012

في التقييم اليدوي لعمر الجنين تم حذف الايام من واحد الى ثلاثة كما تم اعتبار الايام
من اربعة الى ستة اسبوعاً كاملاً، كما تم قياس قطر الحبل السري بالمليمترات، تمت
مقارنة عمر الجنين- الماحوز باخر دورة شهرية مع الماحوز بواسطة قطر الحبل السري
الاول (السك) اظهرت المعادلة ان عمر الجنين- يزيد بمقدار 1.4 لكل 5 مليمترات.
وعند ما استعمل القطر الثاني كانت الزيادة بمقدار 1.5 لكل 5 مليمترات.

واظهرت النتائج ان العلاقة ليست ذات اهمية بين- قطر الحبل السري مع عمر
الحامل حيث ان قطر الحبل السري يزيد بمقدار 0.02 ملم لكل 10 سنة عندما
مع $p=0.05$ مع $r=0.03$

كذلك وجد اثر خطي مباشر في عدد الولادات مع قطر الحبل السري الاول بمقدار 0.55
ملم لكل ولادتين ومع قطر الحبل السري الثاني بمقدار 0.5 ملم لكل ولادتين وذلك بعلاقة
ذات اهمية عند $0.05 =$ ب مع معامل ارتباط يساوي 0.78 و 0.71. على التوالي .

استعمل اختبار تي اشار الى ان الاعمار التي حسبت من طول الفخذ كانت دقيقة لا يوجد
اختلاف ذو اهمية عند ب تساوي 0.5 حدد مع العمر الذي اخذ باخر دورة شهرية، قياس
باحتمال تي كان 0.63 و ب تساوي 0.53 كما هو بواسطة قطر الحبل السري 1 و 2 تي
تساوي 0.02 للاثنين و ب تساوي 0.9. لكن العمر بواسطة عظمتي الجدار وجد اختلاف
ذو اهمية عند ب تساوي 0.005 مع تي تساوي 92. 2. لذا يمكن استخدام معادلة قطر
الحبل السري في تحديد عمر الجنين .

TABLE OF CONTENTS

TITLE	PAGE
الإيه	I
Dedication	II
Acknowledgement	III
Abstract English	IV
Abstract Arabic	V
Table of contents	vi, vii
List of Tables	viii
List of Figures	ix
Abbreviations	X
CHAPTER ONE: INTRODUCTION	
1.1 introduction to umbilical cord	1
1.2 problem of the study	3
1.3 Objectives of the study	3
1.3.1 General objective	3
1.3.2 Specific Objective	3
1.4 over view of the study	4
CHAPTER TWO: LITRETURE REVIEW	
2.1 Anatomy of umbilical cord	5

2.2	connection to fetal circulatory system	7
2.3	umbilical cord complications	8
2.4	previous studies	25
CHAPTER THREE: METHODOLOGY		
3.1	Material	27
3.2	Method	39
3.2.1	Sample size	39
3.2.2	Method of estimation of GA	39
3.2.2.3	Estimation of GA by BPD	30
3.2.2.4	Estimation of GA by FL	31
3.3	Study method	32
3.4	Inclusion criteria	32
3.5	Exclusion criteria	32
3.6	Study variables	32
3.7	Study area	33
3.8	Data collection, analysis, storage	33
3.11	Duration of the study	33
3.12	Ethical considerations	34
CHAPTER FOUR: RESULT		
4.1	findings	35
4.2	Comparative analysis	43
CHAPTER FIVE		
5.1	Discussion	45
5.2	Conclusion	47

5.3	Recommendations	48
5.4	References	49
5.5	Appendices	53

LIST OF TABLES

NO	Titles	Page
Table 4.1	shows the relation between maternal age group and mean UCDS	35

Table 4.2	: shows the relation between Number of parity and mean UCDS:	36
Table 4. 3	shows the relation between GA by LMB and other parameters	43
Table 4. 4	Shows t value and p value	44

LIST OF FIGURES:

Figure NO	Title	Page
2-1	Umbilical cord of a three-minute-old child	6
2-2	Cross section of umbilical cord	6
2.3	ultrasound appearance of single umbilical artery	10
2-4	ultrasound appearance of velamentous insertion	12
2-5	ultrasound appearance of vasa previa	14
2-6	ultrasound appearance of (a>true knot(b>false knot	16
2-7	ultrasound appearance of nuchal cord	17
2-8	ultrasound appearance of cord cyst	19
2-9	ultrasound appearance of cord varix	20
2-10	ultrasound appearance of cord Haemmangiomas:	22
2-11	ultrasound appearance of cord prolapsed	24
3-1	Shows ultrasound machine (Siemens).	28
3-2	Transverse section of the fetal head BPD	30
3-3	Measurement of the fetal femur FL	31
4-1	Shows UCD1 verse the LMP gestational age	37
4-2	Shows UCD2 verse the LMP gestational age	38

4-3	Shows the UCD1 verse the maternal age	39
4-4	Shows the UCD2 verse the maternal age	40
4-5	Shows the UCD1 verse the number of parity	41
4-6	Shows the UCD2 verse the number of parity	42

LIST OF ABBREVIATIONS:

AC	Abdominal circumference
AFP	Alpha feto protein
B_HCG	Beta human chorionic gonadotropin
BPD	Biparietal Diameter
DM	diabetes mellitus
FL	Femur Length
GA	Gestational Age
HC	Head circumference
IUGR	Intra uterine growth restriction
LMP	Last Menstrual Period

MM Millimeters
PT patient
SPSS statistically package for social sciences
UCA umbilical cord area
UCD Umbilical cord diameter
US Ultrasound
WKS Weeks