Position of Intrauterine Contraceptive Device (IUCD) in 3D Ultrasound Coronal Plane of the Uterus in Women with Menorrhagia

Thesis

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First and foremost, I feel always indebted to **Allah** *the Most Beneficent and Merciful.*

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Dedication

I would like to dedicate this work to my **Parents,** *my brothers, my* **Wife** *and all my* **Family** *members for their continuous encouragement, enduring me and standing by me.*

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List of Abbreviations

Abb.	Full term
AAFP	**:** American Academy of Family Physicians
ACOG	**:** American College of Obstetricians and Gynecologists
AUB	**:** Abnormal uterine bleeding
AUC	**:** Area under the curve
Cu	**:** Copper
DUB	**:** Dysfunctional uterine bleeding
FI	**:** Flow Index
FIGO	**:** International Federation of Gynecology and Obstetrics
hCG	**:** Human chorionic gonadotropin
HMB	**:** Heavy menstrual bleeding
IUCD	**:** Intrauterine contraceptive device
IVC	**:** inferior vena cava
JZ	**:** Junctional zone
LARC	**:** Long-acting reversible contraception
LNG	**:** Levonorgestrel-releasing
MRI	**:** Magnetic resonance imaging
NPV	**:** Negative predictive value

NSAID **:** Non-steroidal anti-inflammatory drugs

PI **:** Pulsitility index

PPV **:** Positive predictive value

PTT **:** Partial thromboplastin time

RI **:** Resistance Index

ROC **:** Receiver operating characteristic

SD **:** Standard deviation

SPSS **:** Statistical package for social science

TVUS **:** Transvaginal ultrasound

VCI **:** Volume contrast imaging

VFI **:** Vascularization flow Index

VI **:** Vascularization Index

VOCAL **:** Virtual organ computer-aided analysis

2D **:** Two dimensional

3D **:** Three-dimensional

3DPD **:** Three-dimensional power Doppler

INTRODUCTION

Intrauterine contraceptive device (IUCD) is a widely accepted method for birth control among many women around the world. However, menorrhagia is among its side effects that may cause iron deficiency anemia and usually ends by removing the IUCD in the first year after its insertion in many cases ***(de Souza and Geber, 2007).***

Many studies suggested possible mechanisms that explain the cause of menorrhagia in patients using IUCD; one of them reported that IUCD insertion increases the production of prostaglandins in the endometrium which cause an increase in vascularity, vascular permeability and inhibit platelet activity and therefore, increase menstrual bleeding ***(Xin et al., 2009).***

Three-dimensional (3D) imaging technology has established itself as a useful adjunct complementary to traditional two-dimensional imaging of the female pelvis. One of its advantages is its ability to demonstrate the coronal view of the uterus, which allows further explanation of many gynecological disorders. Coronal plane of endometrium may be assessed prior to IUCD insertion. IUCD transverse limbs should not extend past the endometrial cavity into the myometrium ***(Wong et al., 2015).***

Three-dimensional power Doppler enables quantitative evaluation of vessels in the volume studied due to the use of angio histogram function in which 3-dimensional vascularization and

blood flow indices: Vascularization Index (VI), Flow Index (FI) and Vascularization flow Index (VFI), are counted automatically ***(Dubiel et al., 2010).***

AIM OF THE WORK

To study 3D coronal plane of the uterus and subendometrial 3D power Doppler indices in cases using intrauterine contraceptive devices for contraception with and without menorrhagia, aiming to find the best predictor of menorrhagia with IUCD insertion.