

**DOPPLER STUDY OF UTERINE AND OVARIAN
ARTERIES USING 3D POWER DOPPLER
ANGIOGRAPHY OF ENDOMETRIAL AND
SUBENDOMETRIAL VESSELS IN CASES OF
UNEXPLAINED INFERTILITY**

Thesis

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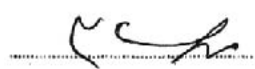
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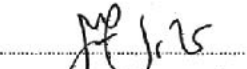
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**TO MY FAMILY WHO ARE
ALWAYS THERE**

**TO MY HUSBAND FOR HIS
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ABSTRACT

OBJECTIVE: to evaluate the mid-luteal phase resistant index (RI) and pulsatility index (PI) of uterine and ovarian arteries with evaluation of endometrial and sub endometrial blood flow in unexplained infertility patients and compare those parameters with fertile controls in order to reveal the possible role of the uterine perfusion in the infertility etiopathogenesis. **METHODS:** in this study, randomized study include 100 participants presented to the outpatient clinic in Kasr El Aini maternity hospital, they were classified into two groups (Group A): 50 participants presented with unexplained infertility either primary or secondary (the case group). (Group B): 50 participants who had no history of infertility and multipara who came for any gynecological procedure (the control group) Primary outcome measures resistant index (RI) and pulsatility index (PI) of both uterine and ovarian arteries with detection of (VI) (FI) & (VFI) of endometrial and subendometrial areas using (VOCAL) in mid luteal phase after measurement of serum progesterone level in both groups. **RESULTS:** The uterine artery (RI) is higher in case group (0.86 ± 0.06) (0.85 ± 0.07) than in control group (0.77 ± 0.04), The ovarian artery (RI) is higher in case group (0.66 ± 0.03) (0.65 ± 0.08) than in control group (0.63 ± 0.02). The uterine artery (PI) is higher in case group (2.17 ± 0.22) (2.14 ± 0.16) than in control group (1.80 ± 0.10) (1.80 ± 0.15) and the ovarian artery (PI) is higher in case group (1.97 ± 0.13) (1.97 ± 0.12) than in control group (1.54 ± 0.17) (1.56 ± 0.17) which all statistically significant. As regards endometrial vascularity index (VI), it was higher in control group (0.64 ± 0.05) than in case group (0.51 ± 0.09), Sub endometrial (VI) also was higher in control group (2.34 ± 0.13) than in case group (1.92 ± 0.22), endometrial flow index (FI), it was higher in control group (29.26 ± 1.98) than in case group (24.47 ± 4.19), sub endometrial flow index (FI), it was higher in control group (36.29 ± 3.10) than in case group (30.52 ± 2.52), endometrial vascular flow index (VFI), it was higher in control Group (0.36 ± 0.05) than in case group (0.25 ± 0.04) & subendometrial vascular flow index (VFI), it was higher in control Group (1.13 ± 0.25) than in case group (0.83 ± 0.07) all of that are statistically significant. As regards to serum progesterone level it was higher in control group (12.87 ± 2.47) than in case group (12.66 ± 3.17) which was statistically insignificant. **CONCLUSION:** From our study we found that improvement of uterine perfusion could be of value in cases of unexplained infertility.

Key words:

Unexplained infertility - uterine artery Doppler - subendometrial blood flow by VOCAL)

LIST OF ABBREVIATIONS

3D	Three dimensional
AFC	Antral follicle count
AMH	Anti-mullerian hormone
ART	Assisted reproduction technology
ASRM	American society for reproductive medicine
BBT	Basal body temperature
BMI	Body mass index
CC	Cubic centimeter
CDI	Color wave Doppler
CL	Corpus luteum
COH	Controlled ovarian hyperstimulation
CW	Continuous wave Doppler
E	Estradiol
EBAF	Endometrial bleeding associated factor
EE	Endometrial epithelium
EFT	Endometrial function test
EGF	Epidermal growth factor
ER	Estrogen receptors
ETBF	Endometrial tissue blood flow
FGF	Fibroblast growth factor
FI	Flow index
FSH	Follicle-stimulating hormone
G.A	Gestational age
GC	Granulosa cell
HB-EGF	Heparin binding epidermal growth factor
HCV	Hematocrit value
HSG	Hystrosalpingograghy
ICSI	Intracytoplasmic sperm injection
IGFBP-1	Insulin like growth factor binding protein 1
IU	International unit
IUI	Intrauterine insemination
IV	Intravenous
Kg	Kilogram
L	Liter
LGL	Large granular lymphocytes
LH	Lutenizing hormone
LIF	Leukaemia inhibitory factor
MAG	Mouse ascites Golgi

MRI	Magnetic resonance imaging
MUC1	Mucin 1
NO	Number
OH	Ovarian hyperstimulation
OPN	Osteopontin
PGE	Prostaglandins E
PI	Pulsitily index
PPH	Post partum hemorrhage
PR	Pregnancy rate
PRs	Progesterone receptors
PW	Pulsed wave Doppler
RCT	Randomized controlled trial
RI	Resistant index
SD	Standard deviation
SEM	Scanning electron microscopy
Sig	Significance
TE	Trophoectoderm
Temp	Temperature
TGF3	Tumour growth factor
TNF	Tumour necrosing factor
TVS	Transvaginal ultrasonography
US	Ultrasound
USAG-1	Uterine sensitization associated gene 1
UtA	The uterine artery
VEGF	Valvular endothelial growth factor
VFI	Vascularization flow index
VI	Vascularization index
VOCAL	Virtual organ computer aided analysis
WHO	World Health Organization

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INTRODUCTION

INTRODUCTION

Infertility is considered as failure to conceive after 12 months of unprotected regular intercourse. It affects almost 17% of the couples, with 40% of the cases related to female pathology (**Hill ME *et al.*, 2005**)

Infertility can be primary, in women who have never conceived, or secondary, in women who have previously conceived. This review will deal with infertility owing to unexplained infertility which represents 10% to 20% of infertility cases (**Isaksson R *et al.*, 2004**)

Unexplained infertility is a term used to describe couples with infertility in whom standard investigations including semen analysis, tests of ovulation, and tubal patency have failed to detect any gross abnormality (**Cahill DJ; 2002**)

Endometrial receptivity is regulated by many factors including uterine perfusion (**Yilmaz N *et al.*, 2010**)

Several studies have shown that uterine receptivity is decreased when the uterine artery impedance has been increased during the mid luteal phase (**Gong X *et al.*, 2005**)

Abnormal uterine perfusion may be a contributing factor to etiopathology of infertility especially in couples with unexplained infertility.

Pulsed Doppler is an important tool for examining the female reproductive system and is a non-invasive method to assess the uterine perfusion (**Steer CV *et al.*, 1994**)

It has been proved that 3-D ultrasound is a highly reproducible technique. With 3-D ultrasound, a volume of a region of interest can be acquired and stored. 3-D ultrasound, allows for a whole assessment of

relevant vessels and quantitative assessment of vessel density and perfusion within a specified area. A whole evaluation is then possible for endometrial and subendometrial vascularization (**Chun Kai *et al.*, 2007**).

Transvaginal ultrasonography with colour Doppler imaging and pulsed Doppler spectral analysis have been used to measure resistant index (RI) and pulstility index (PI) of uterine and ovarian arteries with evaluation of endometrial and subendometrial vascularization through detecting vascularization index (VI), flow index (FI), and vascularization flow index (VFI).