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ORIGINAL ARTICLE

A Comparative Study of Uterine Artery Doppler Parameters and Endometrial Characteristics in Women with Unexplained Infertility and Fertile Women at a Nigerian Teaching Hospital

Une Étude Comparative des Paramètres Doppler de l'Artère Utérine et des Caractéristiques de l'Endomètre chez les Femmes Atteintes d'Infertilité Inexpliquée et les Femmes Fertiles dans un Hôpital Universitaire Nigérian

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ABSTRACT

OBJECTIVES: To investigate the uterine artery Doppler parameters and endometrial characteristics in women with unexplained infertility.

METHODS: A prospective case-control study of 42 women with unexplained infertility and 42 fertile controls. Their mid-luteal phase transvaginal Doppler parameters of both uterine arteries and endometrial characteristics (endometrial blood flow, thickness and volume) were investigated and analysed. P values ≤ 0.05 was statistically significant.

RESULTS: The mean uterine artery pulsatility index (PI) and resistivity index (RI) of the cases (women with unexplained infertility) were significantly higher compared to the values in the fertile controls (PI = 2.81 ± 0.61 vs 2.15 ± 0.65 ; $p=0.001$) (RI = 0.87 ± 0.08 vs 0.82 ± 0.07 ; $p=0.003$). In addition, the end-diastolic volume (EDV) (6.12 ± 4.17 vs 9.37 ± 5.14 ; $p=0.007$) and endometrial-subendometrial blood flow ($p=0.036$) were significantly lower in the cases compared to the controls. Multivariate logistics analysis showed that PI was independently associated with infertile status ($p=0.006$).

There was no significant difference in the mean PSV (48.69 ± 10.9 vs 50.58 ± 11.30 ; $p=0.602$), endometrial thickness (10.30 ± 3.13 vs 10.72 ± 3.10 ; $p=0.544$), endometrial volume (7.82 ± 1.56 vs 8.23 ± 1.71 ; $p=0.323$), mean age (32.28 ± 4.062 vs 31.91 ± 3.58 years; $p=0.502$), body mass index ($26.15 \pm 2.71 \text{ kg/m}^2$ vs $25.24 \pm 2.85 \text{ kg/m}^2$; $p=0.18$) menstrual bleeding days (4.07 ± 0.89 days vs 4.02 ± 0.95 days; $p=0.481$) duration of menstrual cycle (28.02 ± 1.09 days vs 27.64 ± 1.36 days; $p=0.162$), smoking history ($p=0.909$) and alcohol intake ($p=0.507$) of the infertile women compared with the fertile controls, respectively.

CONCLUSION: Women with unexplained infertility have significantly increased uterine artery Doppler PI and RI and reduced endometrial-subendometrial perfusion compared with fertile controls.

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Keywords: Unexplained infertility, Uterine artery, Doppler, Endometrial characteristics.

RÉSUMÉ

OBJECTIFS: Étudier les paramètres Doppler de l'artère utérine et les caractéristiques de l'endomètre chez les femmes atteintes d'infertilité inexpliquée.

MÉTHODES: Une étude cas-témoins prospective de 42 femmes atteintes d'infertilité inexpliquée et 42 témoins fertiles. Leur phase mi-lutéale les paramètres Doppler transvaginaux des artères utérines et des caractéristiques de l'endomètre (flux sanguin de l'endomètre, épaisseur et volume) ont été étudiés et analysés. Les valeurs $P \leq 0,05$ étaient statistiquement significatives.

RÉSULTATS: L'indice moyen de pulsatilité de l'artère utérine (IP) et l'indice de résistivité (IR) des cas (femmes atteintes d'infertilité inexpliquée) étaient significativement plus élevés par rapport aux valeurs des témoins fertiles (PI = $2,81 \pm 0,61$ vs $2,15 \pm 0,65$; $p = 0,001$) (RI = $0,87 \pm 0,08$ vs $0,82 \pm 0,07$; $p=0,003$). De plus, le volume diastolique final (EDV) ($6,12 \pm 4,17$ vs $9,37 \pm 5,14$; $p = 0,007$) et l'endométrie-sous-endomètre le débit sanguin ($p = 0,036$) était significativement plus faible dans les cas comparés aux contrôles. L'analyse logistique multivariée a montré que PI était indépendamment associé au statut infertile ($p = 0,006$). Il n'y avait pas de différence significative dans le PSV moyen ($48,69 \pm 10,9$ vs $50,58 \pm 11,30$; $p=0,602$), épaisseur de l'endomètre ($10,30 \pm 3,13$ vs $10,72 \pm 3,10$; $p = 0,544$), volume de l'endomètre ($7,82 \pm 1,56$ vs $8,23 \pm 1,71$; $p=0,323$), âge moyen ($32,28 \pm 4,062$ vs $31,91 \pm 3,58$ ans; $p=0,502$), indice de masse corporelle ($26,15 \pm 2,71 \text{ kg/m}^2$ vs $25,24 \pm 2,85 \text{ kg/m}^2$; $p=0,18$) jours de saignements menstruels ($4,07 \pm 0,89$ jours vs $4,02 \pm 0,95$ jours; $p = 0,481$) durée du cycle menstruel ($28,02 \pm 1,09$ jours vs $27,64 \pm 1,36$ jours; $p=0,162$), antécédents de tabagisme ($p = 0,909$) et consommation d'alcool ($p = 0,507$) des femmes infertiles par rapport aux témoins fertiles, respectivement.

CONCLUSION: Les femmes atteintes d'infertilité inexpliquée ont augmentation significative de l'artère utérine Doppler PI et RI et réduction perfusion endométriale-sous-endomètre par rapport aux témoins fertiles. WAJM 2022; 39(5): 451–458.

Mots-clés: Infertilité inexpliquée, Artère utérine, Doppler, Caractéristiques de l'endomètre.

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Abbreviations: 3D, Three-dimensional; AP, Anteroposterior; ART, Assisted Reproductive Technique; BMI, Body Mass Index; CI, Confidence Interval; EDV, End Diastolic Velocity; IVF, In vitro Fertilization; Kg, Kilogram; LS, Longitudinal; M, Meter; OR, Odds Ratio; PI, Pulsatility Index; PRF, Pulse Repetitive Frequency; PSV, Peak Systolic Velocity; RI, Resistivity Index; SPSS, Statistical Package for Social Sciences; TS, Transverse; VOCAL, Virtual Organ Computer-Aided Analysis; WF, Wall Filter; WHO, World Health Organisation.