Viti i XIV-të i Botimit, Nr. 2,
Dhjetor 2022

TREGUESIT E DOPPLERIT TË ARTERIEVE UTERINE NË JAVËN 19-22 TË SHTATZËNISË PËR PARASHIKIMIN E PËRFUNDIMIT TË SHTATZËNISË

Dritan Shpati*, Bledar Benja*

*Spitali Universitar Obstetrike Gjinekologji " Mbretëresha Geraldinë" Tiranë

Hyrje: Preeklampsia (PE) dhe vonesa në rritjen intrauterine (IUGR) prekin 4–10% të shtatzënive dhe shoqërohen me rritje të lindjeve premature të induktuara dhe sëmundshmërinë amëtare në vendet e zhvilluara [1]. Parashikimi dhe parandalimi i PE dhe IUGR janë qëllim kryesor i mjekësisë materno fetale.

Qëllimi i këtij studimi është të përcaktojë vlerën e fluksiometrisë dhe praninë e notch të arterieve uterine në javën 19-22 për të parashikuar përfundimin e shtatzënisë mënyrën e lindjes, peshën në lindje dhe Apgare bebeve.

Materiali dhe Metodat: Ky është një studim retrospektiv i Dopplerit të arterieve uterine në shtatzënitë 19-22 javë në 200 shtatzëna me një fetus.

Rezultatet: Gjatë periudhës Janar- Dhjetor 2020 u ekzaminuan 200 shtatzëna (me një fetus) dhe u moren këto rezulztate: 52 (26%) gra me PI ose RI jonormale unilateral, for 20 (10%) gra me Pi ose RI jonormale në të dyja arteriet uterine, 10 (5%) gra me prani të notch unilateral dhe 8 (4%) me notch bilateral . U evidentuan vetëm 3 raste (2,4%) me preklampsi të rëndë. Prevalenca e insuficiences placentare, oligoamnios, SGA dhe vonesës së rritjes intrauterine ishin respektivisht 3.%, 1.9%, 15.8%, 7.2%.

Konkluzione: Treguesit patologjikë të Dopplerit të të dy arterieve uterine PI ose RI > 90% ose prania e notch në javën e 19-22 të shtatzënisë parqesin risik të lartë për përfundim jo të mirë të shtatzënisë si : lindje premature, vonesë në rritjen intrauterine, preklampsi e rëndë , HELLP oligoamnios, pamjaftueshëmri placentare dhe distago placente. Këto tregues përdoren në praktikën klinike për identifikimin e grave me risk të lartë. Këto duhen të rivlerësohen në tremujonrine tretë të shtatzënisë, për një monitorim më të mirë klinik të rasteve dhe reduktim të sëmundshmërisë dhe vdekshmërisë amtaro-fetale

Fjalë çelës: Doppler, preeklampsia, indeksi i pulsatilitetit, indeksi i rezistencës.

Dritan Shpati, Bledar Benja

DOPPLER INDICES OF UTERINE ARTERY BETWEEN 19th 22nd WEEK OF PREGNANCY IN PREDICTION OF PREGNANCY OUTCOME

Background

Pre-eclampsia (PE) and intrauterine growth restriction (IUGR) are estimated to affect 4–10% of all pregnancies, accounting for a large proportion of premature iatrogenic deliveries and maternal morbidity in developed countries. Therefore, prediction and prevention of PE and IUGR remain major goals in fetal–maternal medicine.

Aim: The aim of this study was to determine the value of Doppler indices and notching assessment of uterine artery between the 19th and 22nd week of gestation in the prediction of pregnancy outcome such as delivery mode, birth weight, Apgar score.

Material and Methods: This is a retrospective study of Doppler ultrasound of the uterine arteries at 19-22 week of gestation in 200 women with singleton pregnancies.

Results: During a period of January 2020- December 2020, 200 women with singleton pregnancies were examined, 52 (26%) women unilaterally abnormal PI or RI, for 20 (10%) women PI or RI were pathological for both uterine arteries, for 10 (5%) women the presence of a notch was unilaterally and for 8 women (4.0%) The study showed no significant differences in all four groups regarding maternal age as well as the development of placenta previa, polyhydramnios, amniotic infection syndrome, fetal death, CTG abnormalities, mild pre-eclampsia and shoulder dystocia. There were only 3 cases (2,4%) cases of severe pre-eclampsia The prevalence of placental insufficiency, oligohydramnios, SGA and intrauterine grow restriction was 3 %, 1.9%, 15.8%, 7.2% respectively.

Conclusion: Pathological Doppler indices on both uterine arteries meaning bilateral PI or RI > 90%-Interval or the presence of a notch between the 19th and 22th week of pregnancy represent a risk of developing severe adverse outcomes, such as preterm birth before 32 weeks of gestation, fetal growth restriction, severe preeclampsia, HELLP, oligohydramnios, placental insufficiency and placental abruption. These indices should be used in the clinical practice to identify the high-risk women. They should be reevaluated during a third-trimester screening to improve monitoring and the clinical management and reduce maternal and fetal morbidity and mortality.

Key Word: Doppler, preeclampsia, pulsatility-index, resistance-index

Introduction

Pre-eclampsia (PE) and intrauterine growth restriction (IUGR) are estimated to affect 4–10% of all pregnancies, accounting for a large proportion of premature iatrogenic deliveries and maternal morbidity in developed countries [1]. Therefore, prediction and prevention of PE and IUGR remain major goals in fetal–maternal medicine. Both PE and IUGR are associated with thiogenic evidence of placental under perfusion and ischemia [2]. In these cases, failure of the perivascular and endovascular trophoblastic invasion into the spiral arteries has been described [3].and maternal spiral arteries fail to become low-resistance vessels. Uteroplacental blood flow can be studied non-invasively by Doppler ultrasound. Flow resistance in the uterine arteries (UtAs) decreases progressively during the first and second trimesters in normal pregnancy [4]. In pregnancies with PE or IUGR, flow resistance in the UtAs fails to decrease before clinical signs of the disease become apparent [5].

A great number of Doppler studies in the last 25-30 years have confirmed the association between the increased blood flow resistance in the uterine arteries and a higher risk of the consequent development of preeclampsia, intrauterine growth restriction [6,7]. It is in fact the result of the physiological reduction in systemic vascular resistance as well as a reduction in blood viscosity. Abnormal uterine waveforms or the persistence of a diastolic notch beyond 24 weeks of gestation are associated with secondarily inadequate trophoblast invasion of the spiral arteries. The inadequate uteroplacental formation has been implicated in the pathophysiology of multiple pregnancy-associated pathologies such as pre-eclampsia, intrauterine growth restriction or small for gestational age (SGA) fetuses.

Patients and Methods

The Doppler ultrasound of the uterine arteries at 19-22 weeks of gestation was examined in women with singleton pregnancies. The ultrasound screening was performed in 200 women during a routine at University Clinic of Obstetrics and Gynecology " Queen Geraldine" between January 1, 2022 and June December 2022. We performed the examination of the Doppler of the uterine arteries between 19 and 22 weeks of pregnancy The uterine arteries are a measure of the uteroplacental flow and a branch of the anterior division of the internal iliac artery. Doppler examinations of this vessels were performed transabdominally.

Statistical analysis was performed using theIBM SPSS 24 Software. The Chi Test was used to compare variable outcomes in the four different patient groups (control group, pathological Doppler unilaterally, bilateral pathological Doppler, uni- and bilateral presence of a notch). A *p*-value below 0.05 was considered to be statistically significant.

Results

During a period of January 2020- December 2020, 200 women with singleton pregnancies were examined, 52 (26%) women unilaterally abnormal PI or RI, for 20 (10%) women PI or RI were pathological for both uterine arteries, for 10 (5%) women the presence of a notch was unilaterally and for 8 women (4.0%) The study showed no significant differences in all four groups regarding maternal age as well as the development of placenta previa, polyhydramnios, amniotic infection syndrome, fetal death, CTG abnormalities, mild preeclampsia and shoulder dystocia. There were only 3 cases (2,4%) cases of severe pre-eclampsia.

The prevalence of placental insufficiency, oligohydramnios, SGA and intrauterine grow restriction was 3%, 1.9%, 15.8%, 7.2% respectively.

Discussion

The data analysis in this study indicated that abnormal uterine Doppler indices and the presence of a notch between the 19th and 22nd weeks of gestation in normal singleton pregnancies is a risk factor of developing adverse maternal and fetal outcomes such as fetal growth restriction, SGA, severe preeclampsia, HELLP, oligohydramnios placental insufficiency and placental abruption. These findings are compatible with previous studies of uterine arteries Doppler screening and the combined screening including maternal characteristics and history [3, 5,7,8,9]. Although the identification of high-risk pregnancies in the second trimester could not yet improve maternal and fetal morbidity and mortality as demonstrated in several studies in the past, the administration of a daily low dose of aspirin starting before the 16th week of gestation has shown significant reduction in the prevalence of these complications [5,10,11,12,13].

Moreover, the study revealed that women presenting a bilateral uterine notching had higher maternal and fetal morbidity compared to women presenting only a unilateral uterine notching, which corroborates numerous studies researching second trimester screening methods to improve maternal and neonatal outcomes [5,14,15,16]. was significantly superior to the prevalence in the other groups.

References:

1. Steiner H, Schneider K-TM, Graf AH . Morphologie, Physiologie und Pathologie des maternoplazentaren, fetoplazentaren und fetalen Kreislaufs. *In*: Steiner H, Schneider K-TM (Hrsg.). *Dopplersonographie in Geburtshilfe und Gynäkologie: Leitfaden für die Praxis*. Berlin, Heidelberg: Springer Berlin Heidelberg, pp. 3-12, 2012.
2. Clapp JF Capeless E Cardiovascular function before, during, and after the first and subsequent pregnancies. Am J Cardiol **80**: 1469-1473, 1997. PMID: 9399724. DOI: 10.1016/s0002-9149(97)00738-8
3. McMaster-Fay RA: Midtrimester uterine artery Doppler studies in predicting preeclampsia. Am J ObstetGynecol **216**: 332-333, 2017. PMID: 27815061. DOI: 10.1016/j.ajog.2016.10.036
4. Steiner H, Schneider K-TM, Schaffer H, Jäger T, Steiner H: Technik der Blutflussmessung in der Geburtshilfe. *In*: Steiner H, Schneider K-TM (Hrsg.): *Dopplersonographie in Geburtshilfe und Gynäkologie: Leitfaden für die Praxis*. Berlin, Heidelberg: Springer Berlin Heidelberg, pp. 29-39, 2012. DOI: 10.1007/978-3-642-20938-3_4
5. Papageorghiou AT, Yu CKH, Nicolaides KH: The role of uterine artery Doppler in predicting adverse pregnancy outcome. Best Pract Res Clin ObstetGynaecol **18**: 383-396, 2004. PMID: 15183134. DOI: 10.1016/j.bpobgyn.2004.02.003
6. García B, Llurba E, Valle L, Gómez-Roig MD, Juan M, Pérez-Matos C, Fernández M, García-Hernández JA, Alijotas-Reig J, Higueras MT, Calero I, Goya M, Pérez-Hoyos S, Carreras E, Cabero L: Do knowledge of uterine artery resistance in the second trimester and targeted surveillance improve maternal and perinatal outcome? UTOPIA study: a randomized controlled trial. Ultrasound ObstetGynecol **47**: 680-689, 2016. PMID: 26823208. DOI: 10.1002/uog.15873
7. Gallo DM, Poon LC, Akolekar R, Syngelaki A, Nicolaides KH: Prediction of preeclampsia by uterine artery doppler at 20-24 weeks' gestation. FDT **34**: 241-247, 2013. PMID: 24192614. DOI: 10.1159/000356171
8. Wright D, Akolekar R, Syngelaki A, Poon LCY, Nicolaides KH: A competing risks model in early screening for preeclampsia. FDT **32**: 171-178, 2012. PMID: 22846473. DOI: 10.1159/000338470
9. Lesmes C, Gallo DM, Saiid Y, Poon LC, Nicolaides KH: Prediction of small-for-gestational-age neonates: screening by uterine artery Doppler and mean arterial pressure at 19-24 weeks. Ultrasound ObstetGynecol **46**: 332-340, 2015. PMID: 25810352. DOI: 10.1002/uog.14855
10. Abdel Razik M, Mostafa A, Taha S, Salah A: Combined Doppler ultrasound and platelet indices for prediction of preeclampsia in high-risk pregnancies. J Matern Fetal Neonatal Med 1-5, 2018. PMID: 29804487. DOI: 10.1080/14767 058.2018.1481953
11. Lai J, Poon LCY, Pinas A, Bakalis S, Nicolaides KH: Uterine artery doppler at 30-33 weeks' gestation in the prediction of preeclampsia. FDT **33**: 156-163, 2013. PMID: 23445882
12. Coleman MA, McCowan LM, North RA: Mid-trimester uterine artery Doppler screening as a predictor of adverse pregnancy outcome in high-risk women. Ultrasound ObstetGynecol **15**: 7-12, 2000. PMID: 10776006. DOI: 10.1046/j.1469-0705.2000. 00014.x
13. Steiner H, Schneider K-TMSchneider KTM: Integration der Dopplersonographie in das klinische Management. *In*: Steiner H, Schneider K-TM (Hrsg.). *Dopplersonographie in Geburtshilfe und Gynäkologie: Leitfaden für die Praxis*. Berlin, Heidelberg: Springer Berlin Heidelberg, pp. 203-214, 2012. DOI: 10.1007/978-3-642-20938-3_19
14. Roberge S, Nicolaides KH, Demers S, Villa P, Bujold E : Prevention of perinatal death and adverse perinatal outcome using low-dose aspirin: a meta-analysis. Ultrasound ObstetGynecol **41**: 491-499, 2013. PMID: 23362106. DOI: 10.1002/uog.12421
15. Papageorghiou AT, Yu CKH, Cicero S, Bower S, Nicolaides KH: Second-trimester uterine artery Doppler screening in unselected populations: a review. J Matern Fetal Neonatal Med **12**: 78-88, 2002. PMID: 12420836. DOI: 10.1080/jmf.12.2.78.88
16. Pedrosa AC, Matias A: Screening for pre-eclampsia: a systematic review of tests combining uterine artery Doppler with other markers. J Perinat Med **39**: 619-635, 2011. PMID: 21848482. DOI: 10.1515/JPM.2011.077