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Original article

Maternal cerebral centralization of blood flow in pregnant women with specific gestational hypertension



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ABSTRACT

Objectives: To evaluate the occurrence of maternal brain centralization in pregnant women with specific gestational hypertension; to establish normal values of the ratio of the uterine artery with (mean and standard deviation) ophthalmic artery; to compare the ratio of uterine to the ophthalmic artery with normal and abnormal groups; and to establish the Receiver Operator Curve (ROC) for diagnosis of patients with specific hypertensive disease of pregnancy.

Methods: To achieve the proposed objectives a case–control study was carried out where the sample consisted of 178 pregnant patients divided into two groups. The control group included pregnant 83 pregnant normotensive women; a case group included 95 patients with clinical and laboratory diagnoses of specific gestational hypertension.

Results: Patients with preeclampsia had lower values than the patients who had eclampsia. The Doppler parameters that were statistically significant were those of the ratio of uterine artery with the ophthalmic artery (AU/AO) and vice versa. A comparison between the normal curve systole–diastole and the respective cut-off point was performed. A ROC is shown in the cut-off considering the systolic velocity, the diastolic velocity, the systole/diastole relation, and the index of resistance of the ophthalmic artery.

Conclusion: The maternal centralization in high risk pregnancies was observed when specific gestational hypertension is real. The normal curve has a mean and standard deviation of the relative Doppler of the uterine artery to the ophthalmic artery systolic/diastolic ratio was 0.43 ± 0.16 for normal pregnant patients. Comparing the group of patients with normal pathological group of patients there was a statistically significant difference between them

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considering the relation of Doppler uterine artery with ophthalmic artery. The cut-off point was more sensitive, verified by ROC, which defines maternal brain centralization in patients with specific gestational hypertension as 0.57 for the Doppler systolic/diastolic ratio of the uterine artery compared with the ophthalmic artery, with 78% sensitivity and 13% false positive.

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Centralização cerebral do fluxo sanguíneo materno em grávidas com hipertensão gestacional específica

R E S U M O

Palavras-chave:

Artéria oftálmica
Artéria braquial
Artéria uterina
Sonografia Doppler
Pré-eclâmpsia
Eclâmpsia

Objetivos: Avaliar a ocorrência de centralização no cérebro materno em grávidas com hipertensão gestacional específica; estabelecer os valores normais (média e desvio padrão) da razão artéria uterina/artéria oftálmica; comparar a razão artéria uterina/artéria oftálmica entre grupos normal e enfermo; estabelecer a curva ROC para o diagnóstico de pacientes com doença hipertensiva específica da gravidez.

Métodos: Estudo de caso-controle em uma amostra de 178 pacientes gestantes, divididas em dois grupos. O grupo controle consistiu em 83 grávidas normotensas; o grupo de casos consistiu em 95 pacientes com diagnóstico clínico e laboratorial de hipertensão gestacional específica.

Resultados: Pacientes com pré-eclâmpsia apresentaram valores mais baixos versus pacientes que sofreram eclâmpsia. Os parâmetros da sonografia Doppler estatisticamente significativos foram os referentes à relação artéria uterina/artéria oftálmica (AU/AO) e vice versa. Foi traçada uma curva de normalidade para sístole-diástole de comparação com os respectivos pontos de corte. A curva ROC exhibe os pontos de corte, respectivamente, para velocidade sistólica, velocidade diastólica, razão sístole/diástole e índice de resistência da artéria oftálmica.

Conclusão: Foi observada centralização materna em gestações de alto risco em casos de hipertensão gestacional específica. Na curva normal, a média \pm desvio-padrão da relação sistólica/diastólica entre artéria uterina e artéria oftálmica foi de $0,43 \pm 0,16$ (Doppler) para pacientes grávidas normais. Comparando-se o grupo de pacientes normais com o grupo de pacientes enfermas, houve diferença estatisticamente significativa entre grupos, considerando o estudo Doppler para a razão artéria uterina/artéria oftálmica. O ponto de corte mais sensível, verificado pela curva ROC, definindo centralização cerebral materna em pacientes com hipertensão gestacional específica, foi de 0,57 para a razão sístole/diástole da artéria uterina versus artéria oftálmica (Doppler), com 78% de sensibilidade e 13% de resultados falso-positivos.

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Introduction

Preeclampsia (PE) and eclampsia (E) are important causes of maternal and perinatal morbidity and mortality worldwide. They are complicated by other specific gestational hypertension in about 2–8% of pregnancies.¹⁻³

According to the National Monitoring Report on the Millennium Development Goals by the World Health Organization, Brazil reported a drop of 43% in the proportion of deaths among women experiencing complications during pregnancy or childbirth from 1990 to 2013. This is in line with the reduction in maternal mortality worldwide. However, this rate will not achieve the proposed 35 maternal deaths per 100,000 births by 2015.^{3,4}

PE is a disease of unknown cause. Various theories have been proposed to explain its pathophysiology, two of which greatly support the vascular theory and immune theory, respectively. The vascular theory is based on the presence of “ischemia-perfusion defects” that lead to oxidative stress and vascular disease. According to the immune theory, PE is caused by poor maternal and paternal immune adaptation i.e., a maternal alloimmune reaction triggered by rejection of the fetal graft.⁵⁻⁷

Effective prevention depends on the recognition of a latent and early stage of the disease that can be prevented or reversed and the availability of effective intervention methods. Clinical experience suggests that early detection and treatment of PE is beneficial to both the patient and fetus.^{2,5,8-11}

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