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FEATURES OF FETAL CRANIAL INJURY DURING THE ANTENATAL PERIOD ACCORDING TO MRT DATA

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Resume: Magnetic resonance imaging (MRT) is a neuroradiological method of choice for diagnosing perinatal lesions of the central nervous system of hypoxic-ischemic type. An important advantage of MRT is the absence of ionizing radiation and The Associated carcinogenesis and absence of mutagenesis effects, which determine the safety of the technique for the mother and fetus. The advantage of MRT over other research methods is due to the objectivity of the data and the presence in the arsenal of diffusion weighted images (DWI) applications, a unique specialized sequence of pulses with a measured diffusion coefficient (CDI). There are few sources of literature with radiological criteria for determining the time of injury of the perinatal central nervous system of hypoxic-ischemic type, and they mainly include descriptions of several cases.

Keywords: Magnetic Resonance Imaging, antenatal period, gestational duration, fetal hemolytic disease, ischemic foci, retrocerebral subarachnoidal space.

Relevance: Another relatively new method for diagnosing HGK is the fetal cranial MRT examination, a method for determining the extent of fetal cranial injury from hemolytic disease. The advantage of MRT is the absence of ionizing radiation, which determines its safety for the mother and fetus. The advantage of MRT over other research methods is due to the objectivity of the data.

Aim: To improve the accuracy of the diagnosis of HGK and determine the characteristics of fetal cranial injury in the antenatal period according to MRT data.

Research material and methods.

In our study, somatic pathology at the decompensation stage for MRI transfer, the condition of the decompensated fetus is a counter-indication, rejection of MRI transfer, as well as congenital developmental abnormalities in MNS were also considered counter-indication. In the study of the fetal cranial brain, we first evaluated the number, size and localization of ischemic foci, in addition, we analyzed the separation of hemispherical structures, the displacement, expansion and asymmetry of the ventricular system of the cranial brain, as well as the state of the retroserebral subarachnoidal space. The fetal cranial MRI study was conducted in 27 rhesus - sensitized pregnant women in the main group and 14 rhesus-immunized pregnant

women (comparison group). The relatively low prevalence of MRI studies is due to the presence of contraindications, as well as the refusal of some pregnant women to undergo examination. In patients with Rhesus immunization and those with HGK, a fetal brain MRI scan found acute ischemic damage to brain structures (100%), mainly in the upper area (55.6%) and in 33.3% of cases ischemic foci were observed simultaneously in both the forehead area and the upper area. In patients in the comparison group, ischemic foci occurred only in 28.6% of cases, 3.5 times less than in pregnant women with HGK.

The study of the localization of pathological foci in the ventricular system of the brain showed that they are most often located in the periventricular zone, 18.5% in the group of pregnant women with rhesus-sensitization and HGK, and in the group without HGK, the frequency of pathological areas in this localization was observed in 7.1%, which is 2.6 times less ($P < 0.05$).

According to the literature, the localization of pathological sites in the periventricular area is a prognostically risk factor in the development of neurological pathology in the postnatal period. To determine the importance of MRT studies in the diagnosis of pathologically altered areas of the fetal cranial brain, we conducted a correlation analysis.

Results:

Thus, the analysis showed a high level of correlation between HGK and focal ischemic injury of fetal brain structures, that is, between the number and size of ischemic foci (correlation coefficients 0.69 and 0.76). Similarly, when analyzing the number and size of pathological foci in the periventricular area of the fetal brain, an almost identical high correlation rate was noted (correlation coefficient 0.51 and 0.56). Thus, the study of the frequency of localization of ischemic foci in relation to brain structures found that the main part of pathological foci is located in the upper area (55.6%). Also, our correlation analysis found a high level of correlation between midbrain artery and Vps in HGK, the total number and volume of ischemic foci, especially in the area of the top. Our data is confirmed by sources of foreign literature.

Conclusions:

- measurement of systolic blood flow peak rate in the middle artery of the brain (Vps MBA) has hypersensitivity (98%) and specificity (93%) and can be used to diagnose severe forms of HGK in pregnant women with rhesus-immunization;

- HGK is characterized in 100% of cases by acute ischemic damage to the structures of the cranium, with damage in the upper area (55.6%) predominating. Administration of anti-rhesus immunoglobulin when carrying out pregnancy in rhesus-negative women with a potential sensitizing factor and subsequent measurement of systolic blood flow peak rate in the midbrain artery (Vps MBA) of the fetus and MRI examination in the diagnosis of fetal hemolytic disease significantly reduce the need for invasive intrauterine diagnostic interventions.

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