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Mini Review

Indicators Of Pulmonary Blood Flow in Assessing the Degree of Maturity of Fetal Lungs

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Abstract:

Morpho structural change of lung tissue due to the degree of its maturation should be accompanied by a change in peripheral blood flow, and therefore we set the goal of determining the characteristics of peripheral blood flow of lung tissue in fetuses with different degrees of lung maturity.

Key Words: Pulmonary Blood Flow; fetal lungs; pathology; Pregnancy

Introduction:

88 pregnant women were examined at different gestational periods, taking into account the possible different degree of maturity of the fetal lungs. So there were 30 women at 22-28 weeks of pregnancy, 22 at 29-35 weeks and 36 people at more than 36 weeks of pregnancy. The average age of the women studied was 24.9±1.8 years. At the same time, in the first and second groups, the average age did not have a statistically significant difference and was respectively equal to 24.5±2.1 and 22.1±3.4 years (P≥0.05), and in the third it significantly exceeded these indicators and was 28.2± 1.4 years (P≤0.05). 48 (54.5%) pregnant women had a medical history of abortions, 32 (36.4%) had repeat births.

Pregnancy proceeded without complications in all examined patients and there was no somatic pathology. Ultrasound examination determined the blood flow in the right left quadrant of the fetal lung tissue and the left lobe of the liver. For control and comparison, the echo structure of the lung tissue and the fetal liver was determined and compared. When assessing blood flow, the blood flow resistance index (IRC) was automatically calculated.

The results obtained:

In the first group of women with a gestation period of 22 to 28 weeks, the echo structure of the liver and lungs of the fetus in all cases prevailed an echo-positive picture of the liver structure compared with the echo structure of the lungs. At the same time, the IRC of the liver had a statistically significant difference with the same indicator of the fetal lungs and averaged 0.68± 0.005, while the IRC of the lungs on average was 0.79±0.02 and was higher than the same indicator of the liver.

In the second group of women with a gestation period from 29 to 36 weeks, the same pattern was maintained, but with a decrease in the IRC indicators of both the liver and lungs. Thus, the average liver IRC in this group of women was 0.53±0.003 and was significantly less than the same indicator in the first group of women studied (P≤0.05). At the same time, the comparative echostructure of the liver and lungs of the fetus showed a different picture. Thus, the coincidence of the echostructure of the liver and fetal lung tissue was noted only in 14 (63.6%) observations, and in 8 (37.4%) the picture was interpreted as pronounced immaturity of fetal lung tissue. At the same time, in this group of women out of 8 people, 3 had a gestation period of 34-35 weeks, which indicates that there is no absolute significance of the gestation period in assessing the degree of maturity of the fetal lungs.

Confirmation of the stated idea is also the results of comparing the echo structure of the liver and fetal lungs in the third group of women whose gestation period exceeded 36 weeks of pregnancy, so a sufficient degree of maturity of the fetal lungs was indicated by a more echo-positive picture of his lungs compared with the echo structure of the liver in 28 (77.8%) observations. At the same time, in 6 (16.7%) cases, the echostructure of the liver was equivalent to the echostructure of the fetal lungs, confirming the moderate immaturity of the lung tissue. At the same time, the gestation periods were mainly borderline in 4 people (36-37 weeks) and in two cases 38-39 weeks. In two observations, the comparative characteristics of the echostructure of the liver and lungs of the fetus indicated pronounced immaturity of the lung tissue, and the gestational period in these observations was equal to 36 and 38 weeks of pregnancy.

The assessment of blood flow in these observations showed a sufficient degree of maturity of light fetuses with IRC data of 0.56 at 36 weeks and 0.52 at 38 weeks.

The average IRC in the lungs was 0.5± 0.02 with a fluctuation from 0.45 to 0.55 and the liver 0.5±0.0.03 with a fluctuation from 0.47 to 0.59.

Thus, with an increase in the gestational gestation period, the pattern of a decrease in the IRC of both the liver and lungs remains, while the comparative characteristics of the echo structure of the liver and lungs of the fetus are not always coincide with the peculiarities of blood flow in these organs.

In the course of further observation of women who were assessed for fetal lung and liver blood flow, it was noted that 5 (6.25%) people had premature births and occurred at 35-37 weeks of pregnancy. In 8 people, the assessment of the birth process and the condition of newborns could not be traced. In 75 (93.75%) women, childbirth occurred on time, of which 6 (8%) ended with cesarean section due to a violation of the contractile activity of the uterus with increasing intrauterine fetal hypoxia and functional inferiority of the pelvis in one case.

All children in the examined groups of women with full-term pregnancy were born without signs of hypoxia. The average Apgar score in this group of children was 8.8±0.04 points. And the average weight of the fruits at birth was equal to 3658.7 ± 54 gr.

In the group of women with preterm labor, the average weight of newborns was 3020 ± 386 grams, and the Apgar score was 7.8± 0.7 points.

Conclusions:

Thus, the assessment of blood flow with the determination of IRC in the peripheral parts of the fetal lung tissue reflects the degree of maturity of the lung tissue.

A comparative assessment of fetal liver and lung echostructure is less objective than an assessment of fetal lung blood flow in determining their degree of maturity.

With immaturity of the fetal lung tissue, the IRC of their peripheral parts is 0.7 or more. With an average degree of maturity of the fetal lungs, the IRC ranges from 0.6 to 0.7 and with a sufficient degree of maturity of the fetal lungs, the IRC is 0.55 or less, while the IRC of the liver and fetal lungs usually do not differ significantly

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