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ULTRASOUND EXAMINATION IN THE DIAGNOSIS OF FETAL MACROSOMIA

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Abstract
Fetal macroosomy is an obstetric complication that occurs in 10% of all pregnancies and is associated with severe complications for both the mother and the fetus. Ultrasound examination provides information about the state of the fetus, but the degree of significance of individual parameters for predicting PMF is not fully understood. Early detection of macrosomia markers can influence further tactics in relation to mother and fetus, and improve perinatal outcomes.

Keywords: ultrasound fetometry, macrosomia, estimated fetal weight.

Macrosomia in most literature is considered a birth weight> 4000 g and occurs in 10% of pregnancies. This condition is associated with risks for both the mother and the fetus: an increase in the frequency of cesarean section (CS), traumatization of the birth canal, shoulder dystocia (DP) and perinatal asphyxia. The American Association of Obstetricians and Gynecologists (ACOG) defines macrosomia as birth weight> 4500 g, since it is after this value that the incidence of postpartum complications

increases significantly. According to an alternative approach, macrosomia is considered to be an increase in actual or estimated weight above the 90th or 95-97th percentile for a given gestational age.

Birth weight depends on many factors: genetic, environmental and constitutional, metabolic disorders, gender, ethnicity, currently there are normative values even for specific ethnic groups. The data showed that the likelihood of developing fetal macrosomia is influenced by previous large-fetal delivery, parity, diabetes mellitus, father's body mass index (BMI), male fetal sex, and overall weight gain during pregnancy.

Gestational diabetes mellitus (GDM) is a known clinical risk factor for fetal macrosomia and accounts for 90% of all types of diabetes observed during pregnancy. In women with GDM, fetal macrosomia is the main complication, which, together with others, is an indication for elective CS in order to reduce potential perinatal complications. Macrosomia of diabetic origin is characterized by a disproportionate distribution of subcutaneous fat (SFA) in the fetus with a predominant localization in the upper half of the body, which contributes to an increase in the likelihood of shoulder dystocia (DP) and damage to the brachial plexus.

Brachial plexus injury is the most common complication of childbirth. According to numerous studies, the incidence of trauma to the brachial plexus ranges from 4 to 40%. In 10% of cases of brachial plexus injuries, lifelong disability remains. Clavicle and humerus fractures occur in 10.6% of DP cases and usually recover without complications. Hypoxic brain damage was noted in 0.5-23% of cases. The risk of PD is about 0.2% in medium-sized fruits. With a weight of 4000-4500 g, this risk increases to about 5%, and with a weight above 4500 g, it is about 30%.

Attempts to identify the factors that necessarily lead to DP and allow in practice to take preventive measures were unsuccessful. In most cases, the reasons are reduced to macrosomia. Macrosomia occurs quite often, while DP does not always develop. The assumptions that ultrasound measurement of fetal weight and more accurate measurement of the width of the shoulder girdle will help to accurately predict LTP have not been confirmed. Even if it is possible to accurately establish the PMF, the LF prediction remains highly inaccurate.

The choice of delivery method for pregnant women with GDM and fetal macrosomia is determined taking into account the increased risk of perinatal mortality (PS) and perinatal morbidity (PZ), in addition, the risk of postpartum hemorrhage and fourth degree perineal rupture increases.

The detection of macrosomia in uncomplicated pregnancy according to ultrasound fetometry varies from 15% to 79%, clinically from 40% to 52%. The accuracy of the

aggregate (clinical and with the help of ultrasound diagnostics) diagnosis slightly exceeds 60%.

When assessing the standing height of the uterine fundus and abdominal circumference, it is not always possible to determine the PMP accurately enough. Likewise, ultrasound assessment of PMF can be inaccurate. Overestimation of fetal weight leads to a significant increase in the frequency of CS. There are more than 30 different formulas for determining PMP. However, the search for the most reliable formulas continues. According to Coomarasamy et al., When comparing the diagnostic value of different formulas, the best "result" was obtained with a sensitivity of 45% and a specificity of 81%. According to Mongelli and Benzie, who compared 18 formulas for determining fetal macrosomia, some formulas were found to be inadequate to diagnose macrosomia, while others show high false-positive rates. Poon et al. demonstrated a 34% diagnostic accuracy for fetal macrosomia with 10% false positives. To improve the accuracy of ultra Sound assessment of PMF requires standardization of the measurement technique and the search for additional parameters to improve the diagnostic accuracy of ultrasound.

Diagnostics of macrosomia of diabetic genesis has a number of features, since in this case there is an asymmetric growth of the fetus with an excess of muscle and adipose tissue in the upper half of the body: in the scapular region, in the region of the anterior abdominal wall, which increases the risk of DP in comparison with the fetus with macrosomia of non-diabetic genesis ... In addition, fetuses of mothers with diabetes have an increased risk of PS and PZ (metabolic disorders, morphological and functional immaturity, etc.), so they need more careful ultrasound monitoring. It is important to note that the recommendations of the UK National Institutes of Health (NICE) consider the possibility of initiating hypoglycemic therapy in the presence of ultrasound signs of development of diabetic fetopathy and fetal macrosomia.

Recommendations include measuring the thickness of soft tissue in the shoulder, thigh and anterior abdominal wall. Based on the fact that adipose tissue in this particular location undergoes the greatest changes as the fetus grows, the work of M. Scioscia et al. demonstrated not only a strong correlation between the thickness of the VLC and the PMF, but also proposed a new formula for calculating the PMF. At the same time, other studies have shown a good correlation between the thickness of the pancreas during prenatal assessment with the thickness

Postnatal VFA, however, when studying the relationship between soft tissue thickness and PMF (based on the combined consideration of head circumference, abdomen and femur length), no advantages of this method for antenatal detection of macrosomia were demonstrated.

Sharing soft tissue measurements with PMF could improve the prediction of macrosomia compared to any isolated method. In addition, an antenatal magnetic resonance imaging (MRI) measurement of the shoulder girdle has been shown to correlate well with shoulder width at birth; this can serve as an additional marker for predicting LTP in fetuses with macrosomia. However, MRI is a more expensive diagnostic method than ultrasound. Monitoring fetal growth is an important part of prenatal diagnosis. Despite the inaccuracy, ultrasound diagnostics allows you to identify fetuses with abnormal growth and affects the decision about the timing and method of delivery.

Despite the fact that fetal macrosomia is associated with a 2-3-fold increase in the risk of PS and PZ, there is not enough research in the literature on how prenatal ultrasound monitoring should be carried out when fetal macrosomia is suspected, especially in patients without diabetes. The difficulty lies in the lack of data on the diagnostic accuracy of macrosomia markers.

Ultrasound is the most widely used method for diagnosing macrosomia, although studies show lower accuracy in predicting the weight of a large fetus compared to determining normal weights. Many authors argue that dynamic fetometry is more accurate in determining PMF.

The main factors influencing the inaccuracy in the conclusions are: the inaccuracy of the formulas for calculating the PMF, inaccuracies of technical measurements.

Other factors that increase the error are maternal obesity, lack of water, poor quality equipment and inadequate qualifications of an ultrasound doctor. Measurement of the fetal abdominal circumference is of greatest importance in assessing fetal weight. Evaluation of PMP has a significant impact on further obstetric tactics, since the risk of complications for both the mother and the fetus increases with increasing fetal weight. Therefore, it is extremely important for the physician to have at his disposal other sonographic approaches, including formulas for calculating the PMF for fetuses over 4,500 g, in order to keep system errors to a minimum. Because tissue ratios can vary greatly, differences in birth weight can be significant among fetuses with similar biometric parameters. On average, body fat is 14% of birth weight, but the percentage can be much higher. Adipose tissue undergoes major changes when conditions associated with accelerated or decreased growth are present. Mothers with diabetes with poor glycemic control are at increased risk of having a fetus with macrosomia and a high volume of subcutaneous fat. With the help of ultrasound diagnostics, it is possible to assess the amount of subcutaneous fat in the fetus, which will provide a better assessment of normal and abnormal growth. Measuring the thickness of the soft tissue in the hip and shoulder area is a simple method for estimating the amount

of fat and predicting the birth weight of a newborn. This method has two main advantages: firstly, it has good reproducibility and, secondly, it is based on linear 2D measurements, which can be adequately obtained even by novice ultrasound specialists.

Fetal macrosomia is an obstetric complication that occurs in 10 % of all pregnancies and is associated with severe complications for both the mother and the fetus. Ultrasound examination provides information about the state of the fetus, but the degree of significance of individual parameters for predicting PMF is not fully understood. Early detection of macrosomia markers can influence further tactics in relation to mother and fetus, and improve perinatal outcomes.

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