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Prediction and prevention of hypoxic-ischemic brain injury of the fetus and newborn

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According to retrospective analysis, hypoxic-ischemic brain damage and the development of neonatal HIE contribute to perinatal hypoxia, which occurs in complicated pregnancy: extragenital pathology in the mother (OR 1090.81; 95% CI 64.50–18447.40); placental dysfunction and fetal growth retardation (OR 7.39; 95% CI 2.94–18.57); premature placental abruption (OR 10.89; 95% CI 0.59–199.58); polyhydramnios (OR 2.19; 95% CI 0.85–5.62).

Pertrospective analysis of labor in cases of intranatal fetal hypoxia and HIE in newborns showed that the most significant risk factors are premature rupture of membranes and time without amniotic fluid over 24 hours (OR 6.25; 95% CI 1.36–28.70), chorioamnionitis (OR 17.6; 95% CI 2.28–135.40), anomalies of labor (OR 21.87; 95% CI 1.26–387.39); use of obstetric forceps (OR 357.62; 95% CI 21.60–5920.23).

Independent risk factors for severe asphyxia of the fetus and newborn and subsequent adverse neurological consequences are gestational age at birth: 26–27 weeks (OR 21.87; 95% CI 1.26–378.39); 29–30 weeks (OR 29.02; 95% CI 1.70–495.10); 31–32 weeks (OR 42.017; 95% CI 2.66–752.83); 33–34 weeks (OR 44.79; 95% CI 2.66–752.83); fetal weight at birth 500–999 g (OR 15.15; 95% CI 0.85–268.86); 1000–1499 g (OR 34.04; 95% CI 2.00–577.21); 1500–1999 g (OR 39.04; 95% CI 2.33–663.489). Extremely low birth weight infants most often had severe complications such as RDS type 1 or 2, intraventricular hemorrhage, depression or excitation syndrome, necrotic enterocolitis, and birth trauma that required intensive care and artificial ventilation.

Comparative analysis of neurospecific markers in umbilical cord blood and in the blood of newborns with hypoxic-ischemic lesions of the central nervous system showed that a highly specific marker of fetal brain damage is an increase in neuronspecific enolase (NSE) and S-100 protein in umbilical cord blood, which can be used as a prognostic test. NSE sensitivity was determined – 0.87 (95% CI 0.61–0.97), specificity 0.58 (95% CI 0.52–0.61), S-100 protein sensitivity – 0.8 (95% CI 0.46–0.96), specificity – 0.54 (95% CI 0.49–0.56).

Neuroprotection with magnesium sulfate in pregnant women at birth up to 32 weeks reduced the incidence of neonatal asphyxia and distant neurological complications in 92.8% of children, indicating high efficacy.

Key words: hypoxic-ischemic lesion of the fetal and newborn brain, prematurity, risk factors, neuroprotection.

Biography

Posokhova worked as an obstetrician-gynecologist in the Khmelnytsky region during 6 years. After studying in a residency she began working as the head of the obstetrics and gynecology department of the maternity hospital for 8 years. From 1993 to 2000 she worked as the head of the regional perinatal center. Since 2000 she has been working as a professor at the Department of Obstetrics and Gynecology of Odesa National Medical University. In 1993 she defended her dissertation on chlamydial injection after childbirth and received the degree of Candidate of Medical Sciences. In 2006 she defended her dissertation on prevention of mother-to-child transmission of HIV and received the degree of Doctor of Medical Sciences an Professor. Now she is a professor of OB/Gyn in obstetrics and gynecology department Odesa National Medical University.

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