ABSTRACTS

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Forecasting of kidney damage in neonates with asphyxia

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Background. The frequency of newborn asphyxia varies from 1 to 1.5%. A disturbance of kidney function in neonates with asphyxia occurs in 45-50%.

Aim. The aim of the work is to create a system of prognosis kidney damage in newborns with asphyxia.

Methods. Investigation included 200 full-term newborns with disturbance of kidney function: 100 infants who had severe asphyxia, and 100 – with moderate asphyxia. Comparison group consisted of 20 healthy children without asphyxia. Clinical and anamnesis data, as well as laboratory parameters (level of biomarkers, enzymes, cytokines, etc.), parameters of macro- and microelement homeostasis on 1-2 days of life were analyzed. Mathematical prediction performed using Wald-Genkin’s sequential procedure of statistical analysis with calculation the informative level for each sign.

Results. Most indicators of obstetric anamnesis showed a high predictive informativeness (3.0≥I(x)i≥1.0) and may play role as risk factors of kidney damage in newborns with asphyxia. The three signs had the highest level: the fetal distress (I(x)=2.19), the threat of abortion (I(x)= 1.77) and entanglement an umbilical cord around the neck (I(x)= 1.75). Moderate predictive significance (1.0> I(x) ≥0.50) was typical for urinary tract infections in the mother during pregnancy. Among the neonatal indicators, respiratory distress demonstrated the highest informative level (I(x)= 6.71). High informativeness was associated with a low Apgar score on the 1st (I(x)= 4.36) and the 5th minute (I(x)= 3.62), with male gender (I(x)= 1.82), peripheral (I(x)= 1.55) or brain edema (I(x)= 1.10). Kidney damage is also associated with: low blood pH <7.25 (I(x)= 3.00), reduced partial pressure of oxygen in blood <50 mm Hg (I(x)= 7.06), serum neuron- specific enolase >56.2 ng/ml (I(x)= 8.17), serum cystatin C>2600 ng/ml (I(x)= 8.63), urinary IL-18 >25 pg/ml (I(x)= 1.76), serum IL-6>35 pg/ml (I(x)= 4.13), serum TNFα>8.5 pg/ml (I(x)= 7.21), serum IL-10>10 pg/ml (I(x)= 7.25), serum gamma-glutamyl transpeptidase (GGT)>120 nm/l (I(x)= 4.08) urinary GGT> 47 nmol/(sec*l) (I(x)= 2.20), as well as serum K>4.5 mmol/l (I(x)= 2.68), urinary Ca> 0.8 mmol/l (I(x)= 5.69), serum Pb>0.200 mmol/l (I(x)= 7.08).

Conclusions. The most informative factor for prognosis of kidney damage in newborns with asphyxia is serum cystatin C. Among non-invasive markers for confirm kidney injury in newborns in critical condition due to asphyxia should recommended urinary interleukin-18, gamma-glutamyl transpeptidase and calcium.

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