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Electromagnetic fields as a part of the complex of factors of the neonatal intensive-care units

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Introduction: Medical equipment's are largely used to preserve preterm and sick babies from postnatal stressors, but their motors produce high electromagnetic fields (EMFs). Newborns are chronically exposed to these EMFs, but no studies about their effects on the fragile developing neonatal structure exist. EMFs produced by incubators influence newborns' heart rate variability (HRV), showing an influence on their autonomous nervous system. More research is needed to assess possible long-term consequences, since premature newborns may be exposed to these high EMFs for months.

The aim of our study was to examine adverse effects of high levels of electromagnetic fields on the premature infants in the neonatal intensive care units.

Materials and methods of researches. Hygienic assessment of the electromagnetic fields have been conducted by the hygienic methods BE-Meter-AT-002 according to State Sanitary Rules and Norms 3.3.2.007 – 98 «Державні санітарні правила і норми роботи з візуальними дисплейними терміналами електронно-обчислювальних машин».

Results of researches. This hygienic assessment have been conducted from monitors, apparatus from artificial lung ventilation, aspirators, infuzators, incubators, resuscitation systems, beds with overhead heating lamps, heated mattress. Increased levels of the electric component of EMFs with exceeding of 42.0 V/m and magnetic component of EMFs with exceeding of 29.0 nT were registered.

The effects of EMFs of myocardial repolarization, brain development of premature newborns were studied. Damage of myocardial repolarization was observed in the 52.63 % of premature newborns, damage of brain development of premature newborns was observed in the 100 % of cases in the NICU № 1. Damage of myocardial repolarization was observed in the 12.5 %, damage of brain development of premature newborns was observed in the 62.5 % of cases in the NICU № 2.

Conclusions. The highest electric component of EMFs has been registered in the NICU № 1 from incubator ISOLETTE, the magnetic component of EMFs – in the NICU № 2 from heated mattress Aquaterm Ginevri. The lowest levels of EMF have been registered in the NICU № 2.

Therefore, organization of protective regimen is obligatory in the neonate intensive care unit. It is necessary to decrease light levels. Future medical equipment in the Neonatal intensive care units should be designed to minimize the EMFs exposure of the newborn.

Currently, we will to continue to study the impact of EMFs on the development of preterm infants.

Discussions. These observations suggest that newborns deserve in which a policy of prudent avoidance of an EMF is warranted, perhaps because no study has so far excluded the possibility of negative consequences of their chronic exposition to a high EMF in incubators. International recommendations and laws set levels to safeguard the health of workers exposed to EMFs: newborns deserve similar protection, and next programs of premature infants should include the study of nervous system