II. PEDIATRICS

PERINATAL HYPOXIA-ISCHEMIA MAJOUR COUSE OF SYSTEMIC DISFUNCTION IN NEWBORNS

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Abstract
The aim of this work to show the role that hypoxic ischemia has in inducing newborns manifestations (neurological, cardiovascular, digestive, respiratory dysfunctions) and a short time evolution affected newborns. The evolution of the hypoxia-ischemia depends on the number of affected organs, influenced by the functional maturity grade and the individual genetic heritage. The lot of study included 88 from 237 newborns hospitalized in First Pediatric Clinic between 01.Jan.2003 to 01.July.2004. The newborns studied were all affected by different grades of hypoxic-ischemia without other infections.
Key words: hypoxic-ischemia, newborns.

Introduction

Increasing hypoxemia, leads to fetal compromise due to tissue Hypoxia, anaerobic metabolism and a metabolic acidosis. Tissue hypoxia of particular degree and duration will cause multiple organ damage including brain.

Material and methods.

The lot of study included 88 from 237 newborns hospitalized in First Pediatric Clinic between 01.Jan.2003 to 01.July.2004. The newborns studied were all affected by different grades of hypoxic-ischemia without other infections.

We formed 3 lots of newborns based on the time of delivery: preterms-26, intrauterine growth retardation (IUGR)-29 and 33 on term newborns.

We analyzed the functional response in each organ and cases evolution.

Results and discussions

Regarding the time criteria of illness and the onset of hypoxic-ischemia stress:

- at 19(22%) cases studied hypoxic-ischemia reached chronic level in intrauterine phase: disgravidia with inevitable abortion, obstetrical anomalies, vicious behavior (smoking, intense physical effort, coffee and alcohol consumption), maternal affections (anemia, hypertension, spasmofilia and physical trauma), twins pregnancy
- at 25(28%) cases the hypoxic-ischemia installed acute – at delivery: fetal distress during labor, not medical assisted delivery, abnormal fetus outcome
- 20 (23%) cases associated chronic and acute perinatal asphyxia: abnormal outcomes, umbilical cord anomalies, hemolytic disease and aspiration pneumonia
- at 11(13%) the hypoxic-ischemia stress appeared after birth (heart malformations, pneumotorax, heart rate modifications);

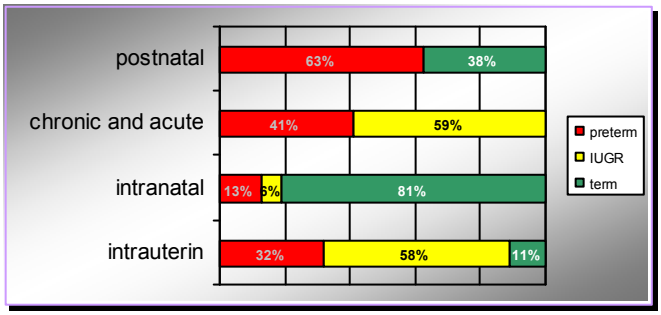

Fig.1-time criteria of illness and the oncet of hypoxic-ischemia stress

only 6 pregnancies had a medical long term observation so the onset of hypoxic-ischemia stress had been measured based on post-delivery clinical , biological and paraclinical examsl.

Affected organs and body systems (descending order): central neural system (CNS) (88 cases), acido-basic status (86 cases-98%), cardiovascular (57 cases-65%), respirator tract (48 cases-55%), gastro-intestinal and hepatic system (43 cases-52%), hemo-coagulation (41 cases-47%) renourinal tract (26 cases-30%).

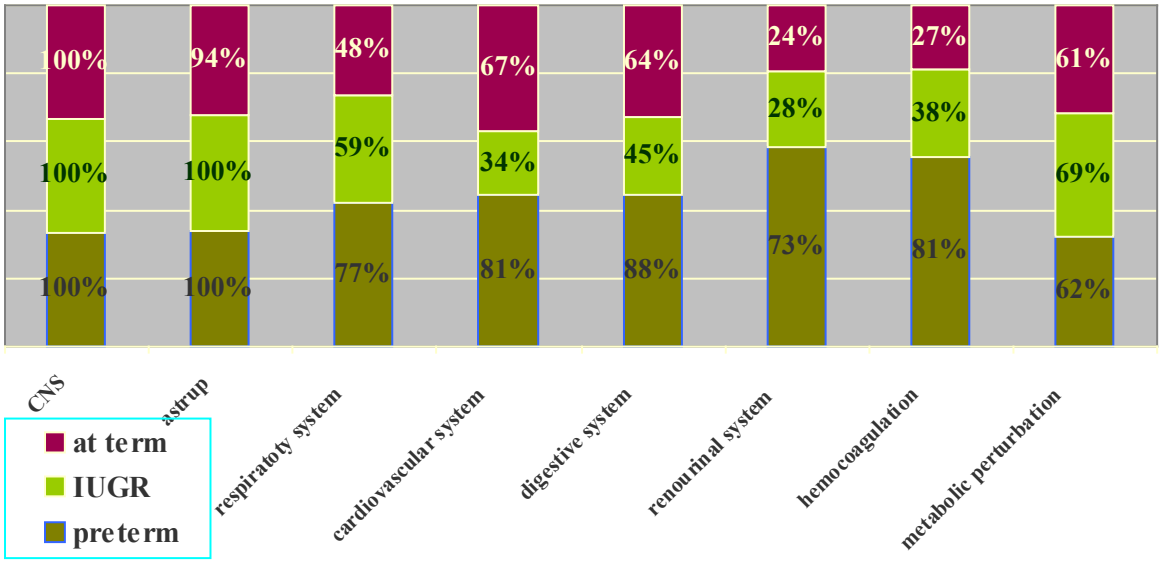

Fig.2. Organ and system distress (type of disease in %) appear at the hypoxic-ischemic affected newborns.

Vaso-motor disorders were found more often at the term newborns.

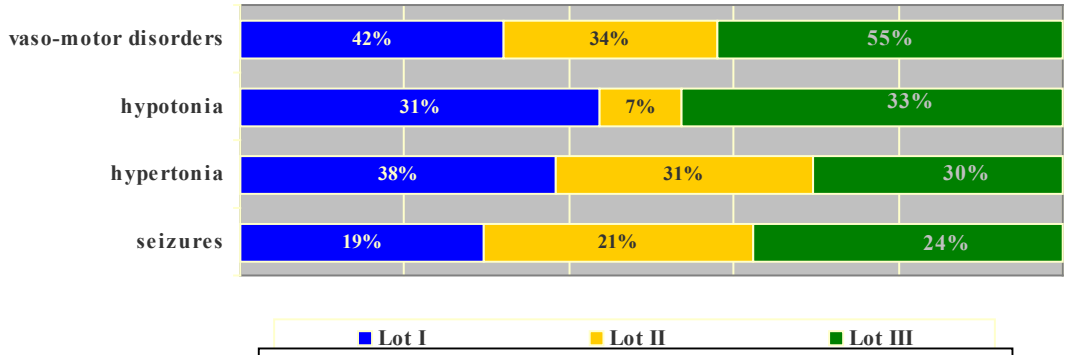

Fig.3. Neurological disorders found at the subjects (in percentage).

Echo transfontanelar

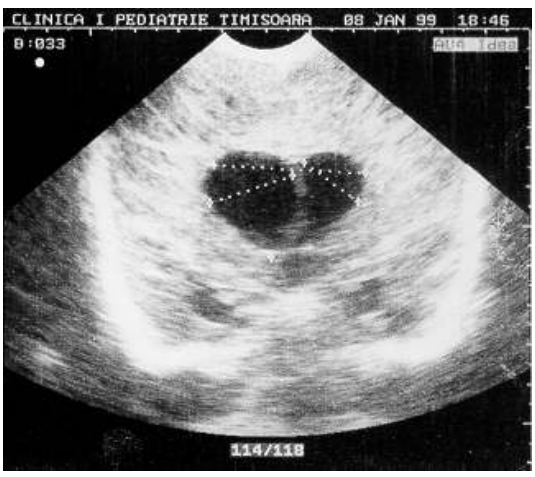

Fig.4. Periventriculare and coroids plexis hemorrhage.

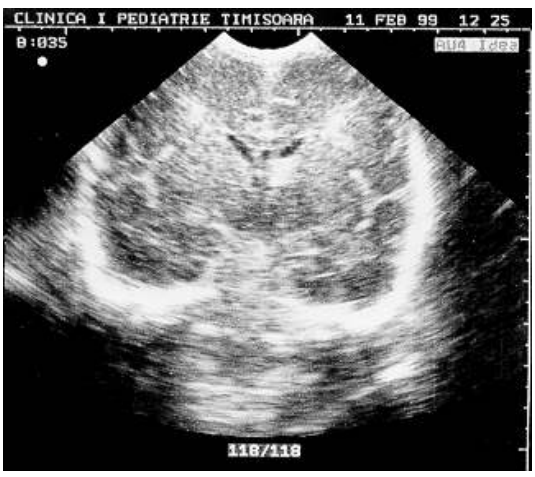

Fig.5. Hydorcefalia as a follow-up of intraventricular hemorrhage.

Heart rate proved to be a very good clinical criteria for hypoxic-ischemia split into the following forms: easy- tachycardia; medium – bradicardia; sever tahy-bradicardia.

ECG shows a high rate of repolarization dysfunctions (50 from 88 cases).

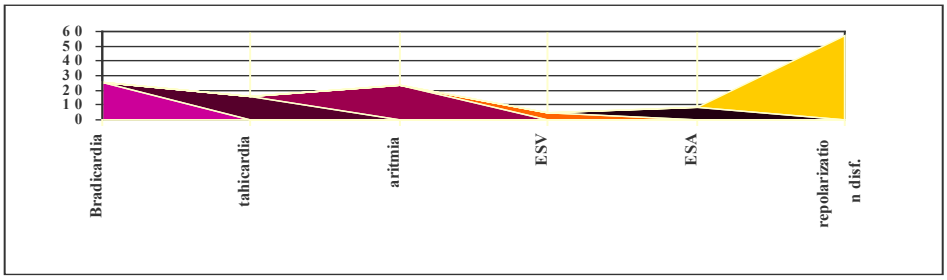

Fig.6. Heart disfunctions a clinical criteria for hypoxic-ischemic affection.

The respiratory dysfunctions showed a higher rate of the apnea (48%).

Apnea being in our cases a dominant central symptom.

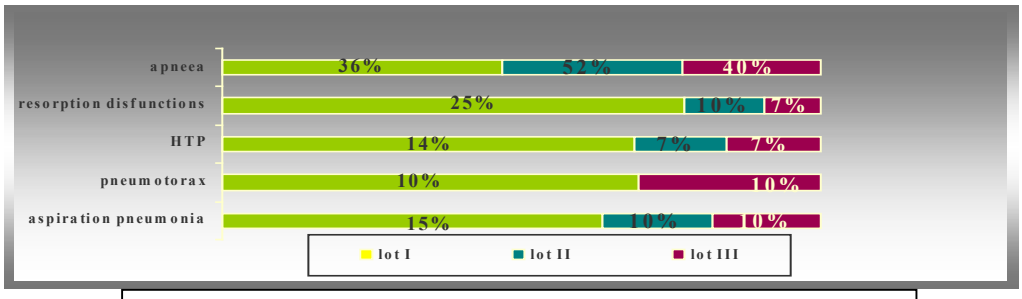

Fig.7. Respiratory disfunctions appears at the 88 cases (in percentage).

The digestive function proved to be difficult to all the 3 lots. The preterm lot had the slowest adaptation; 6(23%) of them developed ulcero-necrotic enteritis (EUN) < that wasn't found at the IUGR lot > 14(54%) vomiting, 20(77%) gastric residuum and 18(69%) abdominal distension.

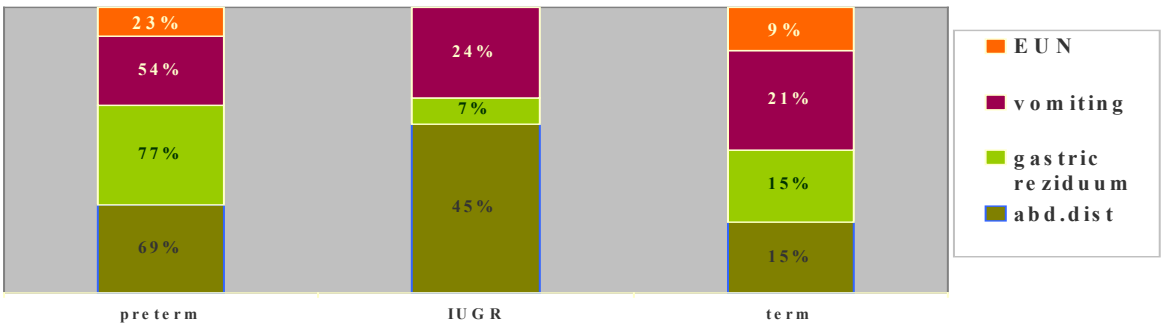

Fig.8. Digestive disfunctions at the 88 newborns studied.

The modification of the acido-bazic status and cytolyses enzymes (**LDH**, TGP, TGO) represents both a marker and a prognostic factor in hypoxic-ischemia.

Lot	Acidosis	Cytolysis	BI	CID	Azotes retention	hypoCa	Hypoglic.	hyperglic

I	100%	100%	31%	23%	35%	50%	42%	**9**
II	79%	69%	28%	3%	17%	41%	52%	**3**
III	88%	61%	12%	21%	21%	55%	18%	**7**

Fig.9. Biological modifications appeared at the 88 newborns studied.

Case evolution–no preterm had a good evolution, 31% died in the first 2 weeks-4% of them showing complex heart malformations, 50% continued to experience neurological dysfunctions, 3(8%) were transferred to Cardiology, the IUGR had the best evolution (79%).

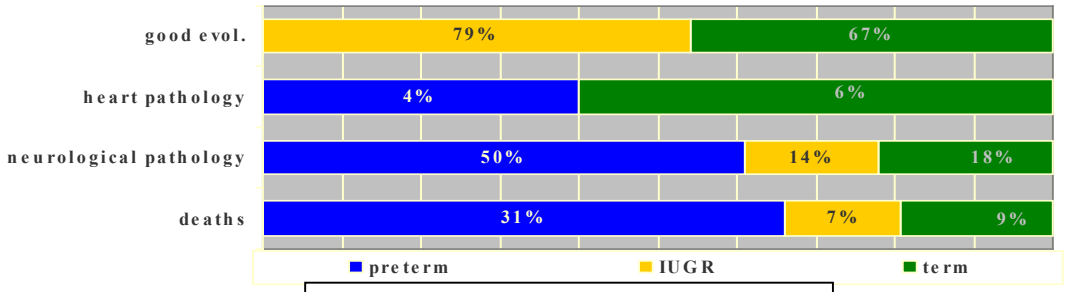

Fig.10. First month evolution (in percentage).

The evolution of the hypoxia-ischemia depends on the number of affected organs, influenced by the functional maturity grade and the individual genetic heritage. Two preterm (8%) with 2 organs affected died. High rate of decease appears at the newborns with more then two organs affected.

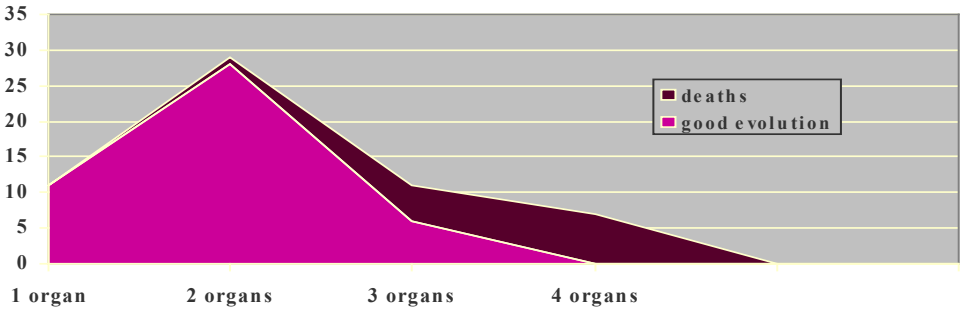

Fig. 11. Corelation between short term and number of affected organs.

Conclusions:

- Clinical trials of interventions must address the phase of injury therapy for reperfusion injury must be given before the insult or early during the insult
- Neuronal rescue strategies to arrest apoptosis to reduce the inflammatory response and to suppress post asphyxia seizures seem most promising

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