BIOETHICAL PROBLEMS OF MEDICL INNOVATIONS IN EXTREMELY PREMATURE INFANTS

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The main bioethical problems during the organization and intensive therapy conduction of extremely preterm infants (EPI) 22–26 weeks of gestation are presented. The questions about development of palliative care principles to critically ill EPI, work reorganization with care implementation, oriented on family ethical and legal regulation of medical practice in accordance with international principles of perinatal care and universal notions about humanity were raised.
Key words: extremely preterm infants, bioethical survival problems, therapy to certain prognosis achievement, palliative care.

Introduction

Over the past three decades there significant changes in the intensive neonatology have been done. If in the 70 years of the XX century child survival up to 32 weeks was rare event so then 28 weeks of gestation seemed insurmountable barrier. Since that time, the chances of EPI changed significantly due to the development of specialized equipment, evidence-based intensive care and huge investments to the neonatal researches and stuff training.

However, just advantages in the neonatology intensive have raised a host of problems, the solution of which is probably never going to be easy and straightforward. It is going about the problems of survive and quality of life of EPI. It is difficult to predict which child will die and who will live with severe disorders of neuropsychiatric and physical states [11,18,23]. Therefore, medical stuff and parents should work out a set of tactical decisions about which interventions are necessary and permissible. The most difficult decision connected with conduction of resuscitation of EPI, about early intensive therapy or refusal from aggressive management and palliative care [2,12,29]. The absence of legislative ethical principals in the intensive neonatology, lack of training in bioethics and psychology lead to dysfunctional activities of doctors in spite of their high motivation [1].

According to the World Assessment the 5 of the 16 most popular in 2020 approaches of development are related to health care that is more emphasizes the strategic nature of innovation in medicine. Most ethical problems of intensive neonatology connected with innovations and devoted to EPI [22]. The belonged to them are diagnostic of death criteria, efficacy and futility of treatment estimation, the organization of clinical and experimental studies and palliative care, the problem of new reproductive technologies, sociolegal problems of passive or active euthanasia, the introduction of modern methods of gene diagnostics, manipulations with stem cells, etc.

The aim of the study is to cover the discussion questions about the ethical-legal regulation of perinatal care to EPI. Development of regulatory documents which will allow to medical staff and the family to make a difficult ethical decision as to the appointment of the total treatment for children at the border of viability, which is exist in the most countries and is essential for perinatal community of Ukraine.

The frequency of survival of extremely premature infants for the last 20 years according to the data of National Institute of Child Health and Development, USA (2008)

Gestational age	Period		
	1987–1988	1999–2000	2003–2007
22 weeks	–	–	6%
23 weeks	–	–	26%
≤23 weeks	–	20%	24%
24 weeks	34%	55%	59%
25 weeks	54%	72%	72%

Results of studies and its discussion

The transition of Ukraine on the international criteria of EPI registration in 2007 year led to a revision of organizational, health care, qualifications, staff and many other issues. However, ethical issues in the intensive care of premature infants in Ukraine are not considered. The main goal for today is survival.

It must be taken in account that for EPI in 22–26 weeks of pregnancy the complex of general medical ethical principals is inadequate and contradictory.

What is the likelihood of a favorable outcome of such preterm infants? What do we mean by a good outcome: survival, survival without neuropsychiatric disorders or survival without severe neuropsychiatric damages? Whether to continue the massive aggressive treatment if from the medical point of view it's seems hopeless? Can we avoid thinking about quality of life? And how to take proved facts that actually adult intensive care is higher in cost and less «productive» and so parents appreciate the quality of life of their children is higher than the doctors who treat them.

During the view of ethical problems of EPI we need to pay attention on three medical and ethical areas:

— nonviable children (22–23 weeks);

— «gray» zone (24–26 weeks);

— high survival area(26 weeks) [3,20,23].

Three sources of «grayness» — it is low chances of survival (futility of efforts), the negative effects among survivors (quality of life), the excessive cost while low efficiency [20].

Of course, modern statistics says that our achievements in the nursing of EPI very impressive [5,14,15,21]. In fact, child survive at 22–23 weeks of pregnancy has great success. However, child survive in the category of 24–25 weeks almost remain unchanged.

Moreover, the frequency of severe neuropsychiatric disorders among EPI remains high: in 22 weeks — 70%, 23 weeks — 54%, 24 weeks — 52%, 25 weeks — 45%, 26 weeks — 33% [14,25].

During the year in the UK and Ireland was made control over the all EPI born in 22–26 weeks of gestation. Only a quarter of them survived and was discharged home: 1% of born in 22 weeks, 11% — in 23 weeks, 26% — in 24 weeks, 44% — in 25 weeks. Test had found that at the age of 2.5 years in 25% were severe developmental disorders, at the age 6–21% of cognitive disorders of moderate and severe degree. Only 41% of cases children showed standard means of testing [7,24].

Obviously, such data on outcomes among EPI raise many ethical, moral and legal problems.

According to perinatal psychologists, the first contact of neonatologist with parents should take place immediately after the diagnosis of «premature birth» [8,9,12,25]. The role of physicians is to:

— define the medical and ethical area for children;

— discuss the chance of survival, the risk of severe injuries taking on account the data from the most current statistics;

— describe and discuss all procedures;

— develop a joint decision on the amount of compulsory treatment;

— assess the value and effectiveness of treatment.

Most foreign professionals pointed out at necessity to obtain informed agreement before the onset of preterm birth so after birth of child and also estimation of its actual state [9]. The absence of refusal of resuscitation from parents does not mean that doctor will certainly revive the child. The physician should make a professional choice — whether resuscitation ethically justified, critically evaluation own decision, taking into account all points of view. For choice was delineated 5-steped scheme of such decisions making:

1. Evaluate the facts of mortality, morbidity and long-term outcomes at this gestational age.

2. Determine, what is the best in the interest of child.

3. Clarify ethical principles.

4. To take clinical decision according to the particular condition of the child.

5. Explain and discuss own decision, evaluating comprehension by parents the specific situation, the logic of actions, efficacy and expenses [7].

After birth, the ethical issues take particular importance as for the need of jointly development of individualized prognostic strategy [21,24,29]. There are two basic decisions for EPI: active (aggressive) treatment with the provision of intensive care in total value or palliative care organization. In most countries, the final decision is often taken after the «therapy to certain prognosis achievement» [5,11,23].

Selective refusal from treatment is taken in the case of three situations:

— no chance (the child has so severe condition that the beginning or continuation of treatment of life-sustaining not in the interests of the child);

— no purpose (the child has such level of damages that it makes no sense to expect that the family will take it; EPI with the large bilateral parenchymal

hemorrhages and leukomalacia — as an example of this category);

— no force (intolerable situation against progression and irreversibility of the disease, when child have a chance to survive with an average level of damages, but will suffer from persistent pain syndrome, constantly in need of re-hospitalization and invasive treatment during all life, die in infancy; this situation may occur in severe injuries of the nervous system associated with defective function of pelvic organs, paresis of the legs and increasing hydrocephalus) [21,28].

Each country chooses its own standard, but sometimes the amount of interference is determined not by medical reasons but amendments to the laws. Thus in the USA after a series of trials there is a Law of Baby Doe [10,26]. It is going about the refuse from the part of doctors from surgery of premature baby with Down syndrome, severe heart disease, esophageal atresia with the presence of tracheo-esophageal fistula. Instead of protection of the child interests from the undertreatment in the USA is now adopted a strategy of hard «overtreatment»

The last few years in Italy were discussed the question about the appointment of treatment which is prolongs the life of children with critical viability [16,19]. In 2006 year the majority of health professional associations adopted «Carta di Firenze» (CdF) recommendations for responsible conduction of intensive care to EPI in 22–25 weeks of gestation [16]. But this project was replaced by the Order of the Ministry of Health of Italy, which is prescribed to resuscitate all infants regardless of their gestational age and solutions of parents. Confrontation between the Association of Children's Podiatrists, Resuscitation Specialists and Neonatologists of Italy and the Ministry led to the facts that care in the full amount realized to all babies form 26 weeks of gestation in total value.

EPICure study is shown that despite a slight increase in survival rate among children of 24–25 weeks of gestation for the last 10 years it remains disproportionately low at increasing activity of resuscitation [14]. Thus, average life expectancy of children born at 22–23 weeks increased from 11 hours in 1993 year to 20 hours in 1998–2002 years and up to 3–7 days in 2003–2007 years. But it is due to the extension of active resuscitation and treatment assignation for life support.

On the base of national experience of child survive at 22–23 weeks of gestation in the UK, Sweden, Holland, Italy and France the total resuscitation is not conducted; in 24 weeks virtually in all countries the resuscitation is conducted up to the certain prognosis [3,15,24]. Temporary intensive therapy or «treatment to the certain prognosis achievement» is one of the selection variants of choice in condition of parents understanding of the possible consequences of aggressive treatment and the willingness of doctors to stop ineffective or hopeless interventions [3,13,28].

In 2008 year, were randomly assigned 500 neonatologists from perinatal centers of USA by four scenarios, depending on gestational age: 23, 24, 25 and 26 weeks. It was offered to choose the answers: active total resuscitation, palliative care, the preference of the family, other. It is found that, in 23 weeks 92% prefer palliative care; at 24 weeks 80% — active resuscitation, 20% may defer resuscitation by their parents; in 25 weeks and a large majority (99%) preferred an active total resuscitation [15].

Conducted studies had shown that just indication of gestational age often determines the decision about the level of care. At presence of gestational age, doctors are more likely to hold total amount of resuscitation measurements.

Important part of the quality neonatology care, which helps to solve a lot of ethical issues of EPI is counseling- the modern professional form of interpersonal communication between neonatologists and parents (relatives of the child). Counseling for parents of the child on various issues is no less important aspect of medical practice than any drug treatment or diagnostic procedures [8,28,29].

The term «counseling», adopted in many documents of the WHO, is understood not examination but clarification of all issues related to the disease, emotional support, ensuring a positive attitude for treatment, and training to practical skills needful in the treatment process. The main method of a patient-centered counseling is active listening and reflection statements of mother by indirectly, friendly way that creates a favorable environment for the evaluation, understanding of situation and making a decision without the imposition of external evaluations [1,6]. During counseling it should be awarded that mother who gave birth to a premature baby has a lot of negative emotions [2,4,6]:

1. Feeling of guilty for the difficulties which experienced helpless babe, «Only I am responsible for what happened, because I ...».

2. Fear. In the early days mother is afraid that her baby would not survive. Then become the fear of pos-

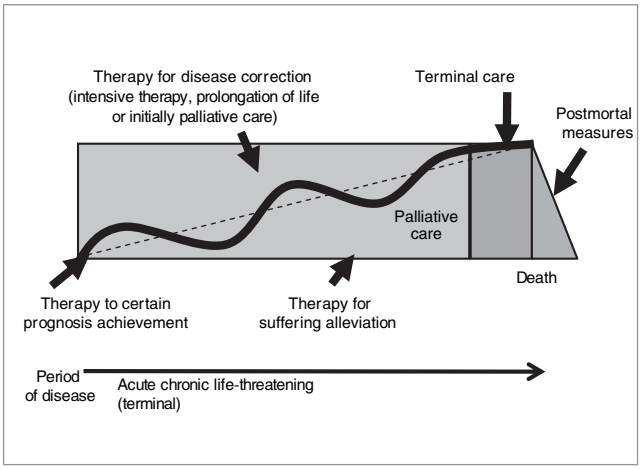

Fig. Model of neonatal palliative care: the integration of curative and palliative care

sible disturbances in the development of baby. Next — the fear to not manage with detected abnormalities, to be late in treatment.

3. The feeling of helplessness that arises due to the inability to participate in the nursing baby. About 50% of mothers of premature babies are not aware of diagnoses of their children, and 20% can not understand the medical terms.

4. Frustration caused by the collapse of expectations. All is going wrong: instead of balanced last weeks of pregnancy she has previously unknown diagnoses and confusing terminology; instead of multi-colored ribbons and carefully prepared clothes — tubes and lines by which entangled helpless baby.

5. Search of guilty in the family instead of such needful help for mother. Unfortunately, very often the accusation lies on the young mother for her reckless behavior during the pregnancy. It happens that the blame attributed to the father of baby: «Badly care of his pregnant wife,» or to grandmother, «Does not help much!»

6. Loss of mutual understanding in the couple arises for the reason of such fact that prematurely child birth complicates the challenges facing parents in further.

Ethical problems of neonatology from the part of parents point of view:

— The difficulties in obtaining of information about the status, treatment and prognosis.

— Exclusion of parents from the making process of treatment modality.

— Overtreatment of conditionally viable children.

— Undertreatment of pain.

— Problem of ruthless environment.

— Inadequate gestation and/or multiply therapy.

— Unnecessary restrictions on parental care in the Reanimation and Intensive Therapy Department.

— Collapse of overly optimistic discharge plans [4,6,7].

Parents are in need of constant maintenance of their role (changing diapers, bathing, skin care, kisses, rocking); to use the name as a sign of respect to the child's personality; to communicate as a partners but not as visitors; in the continuum of care without showing hyper-vigilance on the part of staff; in communication with other parents [19].

Why are the problems in the planning treatment in the interest of the child appears? [15,16,24].

— lack of knowledge: neonatologists are in need of big quantity of most diverse information;

— time pressure: neonatologists should act immediately and have no time on meditation and reflection on the problem;

— shortage of interest: some members of the team may be those whom you know well, can have another opinion and dose not act as a team;

— emotional barriers and fear of past experience with an adverse outcome often prevent the adoption of an objective decision;

— shortage of experience or concept of weak team: lack of life skills and qualification as a barrier for care conduction;

— shortage of strategic installations and authoritative advices does not help to alleviate the decisions or the organization of work;

— deficit concept of tasks for a certain child;

— shortage of resources: the financial deficit, lack of equipment, personnel or other resources.

What is scientifically proved during the extreme prematurity?

— mostly there are small retrospective studies;

— data limit in the frequency of survival with mild to acute disturbances of nervous and mental development;

— gestational age is not a standard that can be measured with adequate precision;

— It is recorded the lower gestational age for majority of EPI;

— medical uncertainty [5,13,20,25,29].

Wherein expressed the predictive uncertainty during the extreme prematurity? Children born on the edge of viability make challenge to all who nursed them. Life-saving measures are not always successful and the loss of these children has a truly devastating effect. As a result, from the ethical, medical and finan-

cial point of view it is reasonable to refuse from resuscitation at birth, depending on gestational age and condition of the child. On the other hand, it is permissible and acceptable to refuse from the life support measures during the delayed but more accurate prognosis, after «treatment to the certain prognosis achievement.» Accurate prediction takes time — children must «declare themselves» [3,20,23,29].

Although the best interests of the child should direct every medical doctor's decision, children are not in isolation. Best interests of the child must be always interfered with the interests of the family. Parents should have the legal right to make decision but in condition of the presence of accurate and honest assessment situation [12].

Responding to uncertainty of prognosis in the most countries the early introduction of palliative care is in practice [5,16,18,24,29]. Most doctors are emphasizing the importance of legislative consolidation of the concept of palliative care for extremely premature baby in the hospitals of Ukraine. According to the WHO, palliative care is provided to children for whom survival is not or ceases to be real hope or possibility. Such assistance to critically immature infants should include general care, nutrition, pain, symptomatic events, and psychosocial support to family members. Crucial to early palliative care around the world have gestational age, and informed consent of the mother (parents) [28,29].

In solution of the question about palliative care the electronic monitoring, diagnostic tests, treatment (including oxygen therapy), therapeutic procedures (including resuscitation and intravenous infusions), which can prolong dying should be stopped. Admissible is warming, suctioning mucus and adequate analgesia (morphine). At this time widely practiced child staying in the kangaroo position on the breast of his mother or relatives [17].

The time frame of disease curse in EPI depends from their care, provision of equipment, training of personnel and the development of independent life-threatening complications (Figure).

In case of birth of EPI the palliative measures are almost coexist with the medical [21]. Early initiation of palliative care during the medical uncertainty significantly relieves parent's condition who had found themselves in the face of the inevitable adverse outcome. Palliative care is defined as a model for suffering alleviation and treatment of life through the illness [17,29]. Psychological preparation for bereavement counseling and support before and after death of a child should be carried out with the participation of a psychologist who is in practices in the Critical Care Medicine Departments.

In the studies conducted in 2000 year in Belgium, were found that 44% death cases of EPI in the first year of life were preceded by a decision of abstinence or cessation of treatment, 21% received opioids (morphine) at a dose that could potentially shorten life, and 9% has got lethal doses of opioids. The lethal drugs were used in five times frequently in the early neonatal death than later. With 79% of the physicians believed that doctors hastened death for the benefit of the child [17,27].

The conducted studies in the Netherlands in 2003–2004 years had shown that 68% of all deaths of EPI occurred due to decision about the end of life-sustaining treatment [28]. The comparison of the data with the common of 1995 year has shown that despite the fact that in the Netherlands was adopted a liberal conception of the regulation of the active ending of life, the frequency of this practice is not increased. Retrospective studies in the USA in the 84% have found the use of opioids in the case of parent's refuse from life-sustaining treatment [2,4,12,17,29].

Conclusions

The decision of the question of value and intensity of care to EPI with a gestational age less than 26 weeks is one of the most difficult discussion questions of intense neonatology. In most countries, the long-serving according to the WHO criteria, the national ethical principles of care for such children are developed and implemented, based on the decisions of professional associations or state laws.

In the new reality of health care provision to EPI in Ukraine it is need to develop standardized national guidelines for ethical and legal regulation of medical practice in accordance with international principles of perinatal care and universal understandings about humanity of the critical states therapy.

Change of the model of relationships with parents from paternalistic to interpretative with counseling introduction, training of medical staff by ethical and legal framework will allow better reorganize the offices of the intensive care unit. Providing care based on the child and family, humanization of intensive neonatology will allow resolve many ambiguous and difficult ethical questions for EPI nursing.

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