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THE PLACE FOR NEONATOLOGIST IN PROPER PERINATAL CARE

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Abstract

Prenatal diagnosis and the possibility to detected and diagnose fetal abnormalities or abnormal fetal growth, created a new era in obstetrics and in neonatology. The most difficult problem for neonatologists in current perinatal care is lack of information about prenatal investigation and/or very late incorporation in the process of perinatal care. There is a need to create a special protocol in medical records which unites the obstetrical medical record and neonatal medical record in case of important prenatal findings.

Key words: *neonatology, prenatal diagnosis, prenatal therapy, cooperation*

Prenatal diagnostics and the possibility of diagnosing developmental or fetal growth abnormalities have initiated a new era in the fields of obstetrics and neonatology. It has been the direct stimulus for neonatologists to gain new skills connected, among others, with infant management immediately upon birth, as well as in the first hours and days of neonatal life. The new quality has forced the expansion of our knowledge about screening tests for metabolic and genetically conditioned diseases. The increasingly precise diagnoses of multiple defects, as well as complex cardiac anomalies, have broadened neonatal horizons as far as general teratology, as well as pediatric surgery, cardiology, neurosurgery and urology are concerned. On one hand, prenatal diagnostics has largely simplified postnatal diagnostic procedures and decreased the related costs, but on the other hand it gave rise to new ethical and psychological issues. Prenatal diagnosticians and the quality of their diagnoses play a vital role in correct neonatal interpretation of prenatal test results. Insufficient information about the results of prenatal tests, combined with delayed inclusion into multi-specialist teams and the process of consultation, constitute the main causes of interpretative difficulties for neonatologists. In Poland there are only a few isolated cases of medical centers with multidisciplinary committees among their organizational structures. These teams, comprising of medical and non-medical specialists, make decisions about the pregnancy and the fetus affected by a congenital defect or, often incurable, disease. Such an organizational model ought to be common practice in every tertiary obstetric-neonatal referral and perinatal center. Polish Mother's Memorial Hospital is the only such center in Poland[1].

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As far as the question of when a neonatologist ought to be informed about abnormal results of prenatal tests is concerned, the period over 22 weeks of gestation, after the second ultrasound examination recommended by Polish and worldwide perinatal societies, remains the optimal date. It heralds the end of time when spontaneous miscarriage of an abnormal fetus or pregnancy termination, as regulated by law, may take place. Neonatologists should also receive the results of prenatal tests performed in the first weeks of pregnancy, i.e. the triple test – a screening examination that is applicable in early detection of developmental defects in a fetus. It comprises plasma concentration levels of alpha-fetoprotein (AFP), subunit of human chorionic gonadotropin (-HCG) and estriol (E3) evaluations in maternal blood. The triple test, recommended by the Polish standards of puerperal care, is typically performed between 15 and 20 weeks of gestation[2,3,4,5,6,7].

Early markers of chromosomal abnormalities, such as Down and Edward's syndromes, are of significance as well. Nuchal translucency (NT) is assessed during fetal ultrasound which investigates the edema of the subcu-

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Pregnancy trimester	Fetal anomaly	Fetal / Maternal Specialist	Consultant 1	Consultant 2	Consultant 3
1st TRIMESTER	*Pregnant woman & fetus as a patient*	*Obstetrician*	*Fetal Echocardiography*	*Geneticist*	
2nd TRIMESTER	Ciężarna + płód jako pacjent *Pregnant woman & fetus as a patient*	Położnik *Obstetrician*	Echokardiografia u płodu !!! *Fetal Echocardiography*	Genetyk *Geneticist*	
3rd TRIMESTER	*Pregnant woman & fetus as a patient*	*Obstetrician*	*Fetal Echocardiography*		*Neonatologist*
BEFORE THE DELIVERY	*Pregnant woman & fetus as a patient*	*Obstetrician*	prenatalny *Fetal cardiologist*		*Neonatologist*
AFTER DELIVERY	*Neonate*			*Geneticist*	*Neonatologist and other specialists*

Table 1. Neonatologist involvement in prenatal care in cases of fetal malformations

1	*Results of screening in 1st trimester*
2	*Results of examinations in the middle of pregnancy*
3	*In 3rd trimester was progression or regression or the same situation as in mid pregnancy?*
4	*Was cytogenetic diagnosis performed? At what level? Chromosomal , microdeletion, monogenic diseases*
5	*Was fetal development in second half of pregnancy normal? or too small for gestational age or too large for gestational age?*
6	*What kind of heart evaluation was performed? Basic? or complete echocardiography?*
7	*Was there pharmacotherapy? What medications? For how long?*
8	*Was fetal invasive therapy performed? At which week of gestation? What kind of therapy? Antibiotic prophylaxis? Tocolitic therapy?*
9	*For how many days this therapy had been applied?*
10	*In case of CHD what was last examination results of fetal blood flow at the level of foramen ovale and ductus arteriosus?*
11	*How was fetal circulation evaluated before the delivery?*
12	*In case of fetal CHD was Prostin planned for the newborn baby?*
13	*In neonate with CHD was baloon valvuloplasty planned before the delivery?*
14	*Is surgery planned for neonate after prenatal diagnosis? as an emergnecy procedure or planned procedure?*
15	*In case of lethal anomaly was organised perinatal consyllium? Who took part in such consyllium? Who and when talk to parents?*
16	*Was fetal MRI performed?*
17	*Any photos or movies from prenatal evaluation?*

Table 2. Data which should be taken into account by neonatologist in case of fetal malformation

taneous tissue in the area of the nape of the neck; it is the distance between subcutaneous tissue and the skin at the level of fetal nape of the neck. Elevated NT values are observed in some syndromes caused by chromosomal aberrations, e.g. Down or Edward's syndrome, but especially Turner's syndrome. However, in 40% of cases abnormal NT may in fact signify other congenital defects and genetic syndromes8,9. Such information is valuable to neonatologists only in cases when parents decide not to terminate the pregnancy, which is the proper moment for the first neonatal interpretation of the obtained results. Timely presentation of neonatal opinions regarding the type of suggested care or neonatal treatment after birth to the parents facilitates the choice of the place of delivery (primary, secondary or tertiary referral ward). Additionally, the offer of either palliative care after birth, minimal treatment, or application of all medical procedures available in such cases, gives the parents a chance to ponder all their options in detail. Parental counseling sessions, often with the participation of a psychologist, ought to be repeated a few times during the pregnancy as they permit the personnel of the neonatal center selected for delivery of the child to gain the trust of the parents-to-be. Lethal defects diagnosed during pregnancy allow the withdrawal from resuscitation in the event of delivering a child in critical condition. In such cases our actions aim to ensure the infant a painless and quiet death or palliative hospice care. Although the delivery of such a child may in fact take place also at a primary referral ward, in light of the fact that the 'do not resuscitate' (DNR) procedure is still rarely used in Polish wards, I recommend the delivery and neonatal care to take place in hospitals and wards that have ethics committees and clearly defined management rules for infants with lethal defects. Regardless, the emotional comfort of the gravida, her husband, partner or accompanying person, as well as their trust in the obstetric personnel of the chosen hospital, remain matters of the utmost importance[10,11,12,13,14].

Evaluation of chorionicity and of the course of multiple pregnancy also requires the early notification of neonatologists. The problem of twin-to-twin transfusion syndrome, treated in utero, does not require particular attention of a neonatologist. Such children significantly more often present with intensified circular abnormalities that persist for many days after the delivery. Thus, apart from circulatory failure in the recipient, patent ductus arteriosus (PDA) or necrotizing enterocolitis are common occurrences in the affected infants. Therefore, complete medical documentation from the prenatal period is very important for proper postnatal interpretation and treatment, as well as directed ultrasound or echocardiographic monitoring of the child. A steadily growing number of neonatologists in highly specialized neonatal centers have already acquired the skills of ultrasound evaluation of the abdomen and echocardiographic assessment of the heart[15].

Neonatal management and interpretation of the obtained results of prenatal testing with regard to congenital defects depends on the type of anomaly and examination precision. The majority of neonates requiring surgical intervention soon after birth need stabilization in the first days of life. A neonatal ward should not be a 'transmitter station', especially when the contact with physicians had been initiated early in the pregnancy and the post-delivery management had been discussed with the parents in great detail. Stabilization is necessary, among others, in children with meningocele and ductal-dependent congenital heart diseases (CHD)16. Precise prenatal diagnosis of the latter in highly specialized centers for prenatal cardiology has greatly changed neonatal management. In cases of ductal-dependent CHD, the prenatal diagnosis is not verified but the pharmacological closure of the ductus arteriosus (prostin) is initiated in the first minutes of neonatal life in the delivery room. Such infants spend one or even several days in the neonatal ward, which in no way influences the date of invasive cardiologic diagnostics or surgical procedures. Naturally, delivery of such infants ought to take place in tertiary referral centers that offer the possibility of cardiologic consultations and specialized echocardiography, and employ neonatologists trained in performing echocardiographic tests. Developmental defects of other organs require verification by ultrasound and/or other imaging techniques (magnetic resonance, computed tomography) and establishment of a detailed plan of postnatal management[17,18].

In certain situations the critical condition of an infant calls for resuscitative measures with intubation and introduction of mechanical ventilation from the first minutes of neonatal life, followed by extubation after verification and interpretation of the prenatal tests. A highly challenging intrauterine diagnosis of renal agenesis is a good example of a case that requires ultrasound evaluation immediately upon birth, followed by the implementation of correct treatment (if the perinatal test is not confirmed) or cessation of mechanical ventilation (if that lethal condition is indeed verified). Obviously, such course of action requires earlier agreement of the ethics committee, as well as parental consent.

Neonatologists report a considerable deficiency in prenatal diagnostic tests in fetuses with intrauterine growth restriction. We would expect complete virologic and genetic testing for rare chromosomal aberrations or metabolic disorders from obstetricians and prenatal diagnosticians. Postnatal diagnostics requires expensive tests as well as high costs of long-term hospitalization. Also, evaluation of acid-base balance is among tests that are rarely performed to assess fetal well-being in cases of severe placental pathology or problems with the amniotic fluid production. Most children with congenital diseases may be delivered vaginally. There are no indications for elective cesarean section until other medical indications, maternal or fetal, occur[18].

Thus, medical documentation of the entire course of the pregnancy, prenatal procedures, and echocardiography testing ought to be precise, detailed, comprehensible and available to neonatologists, pediatricians, surgeons, all medical and non-medical specialists who will provide medical care after the birth of the child and in future life.

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