

STUDYING PATHOLOGICAL FACTORS THAT CONTRIBUTE TO THE DEVELOPMENT OF HEARING DISORDERS IN NEWBORNS

Khaydarova G. S.

Shaykhova Kh. E.

Rasulova N. Sh.

Akhmedova Z. A.

Rakhimjonova G. A.

Tashkent Medical Academy

Abstract

We analyzed the development of hearing loss factors in newborns. In pediatric cases, the collection of anamnesis is crucial for the early diagnosis of hearing loss. This anamnesis includes questions concerning the perinatal anamnesis of the child, his birth and the first days of life, as well as the postpartum anamnesis before the onset of symptoms, as well as the family history of hearing loss.

Keywords: Hearing loss, risk factors for hearing loss

Introduction

There are many causes of hearing impairment. In the pediatric population, genetic causes are the most common, accounting for more than 50% of cases of hearing loss. Genetic causes include various syndromes, one of the features of which is hearing loss; however, there is a whole form of nonsyndromic genetic hearing loss, in which patients suffer from hearing loss, while the rest of their functions are normal [1]. Mutations, autosomal differences, as well as unknown genetic diversity are associated with this type of hearing loss [2]. Prenatal causes may also be associated with hearing loss in infants. These include exposure to various bacterial or viral infections, as well as various teratogens. Perinatal causes are less common and are mainly associated with prematurity, low APGAR score, neonatal jaundice and sepsis [3]. Postnatal causes, such as meningococcal infection and mumps, can also cause hearing loss as a late complication, as well as head injuries or chronic or recurrent otitis media [4].

Statistics show that hearing disorders are detected in 1 out of 1000 infants, while the frequency of pathology of non-fusion of the lip (palate) and Down syndrome occur 2 times less. Compared with phenylketonuria, the frequency of hearing impairment exceeds 10 times. In the general structure of hearing loss in children, sensorineural lesions account for 91.4%. In children of the first year of life, the percentage of detection of hearing disorders does not exceed 10%.

According to the literature, in 82% of cases, hearing loss in children occurs in the first year of life, that is, in the prelingual period or during the formation of speech. Of this number, only 38.5% of



violations are detected in the perinatal period, and only gross hearing impairment is manifested. However, it should be noted that there is no data concerning mild and moderate hearing loss. This is due to late access to specialists, as well as the lack of proper attention from pediatricians and GP doctors (in one third of cases, mild and moderate hearing loss is detected only at the age of 3-7 years) [5].

Numerous researchers have revealed that the auditory function begins to form already in the prenatal period in parallel with the maturation of the structures of the hearing organ. The formation of deprivation changes in the ear is facilitated by limited access of stimuli. In turn, hearing disorders in children cause deviations in speech development, as well as the formation of intelligence and personality of the child as a whole.

The purpose of this study was to study the risk factors for the development of hearing loss in newborns.

Research material and methods:

Audiological examination of newborns was carried out on the basis of the maternity complex of the 2-nd clinic of the Tashkent Medical Academy.

A total of 300 newborns were examined. Of these, 58 were premature (gestation period of less than 37 weeks) – 1 st group and 242 were full-term (gestation period of 37 weeks or more) – 2 – and group newborns. In accordance, the study of the influence of pathological factors on the receptor department and the auditory system was carried out in all examined newborns.

A detailed medical history was collected for all newborns. We conducted a thorough study of prenatal factors that aggravate the course of pregnancy, lead to premature birth and affect the condition of the child after birth. Risk factors for hearing loss and deafness were taken into account, including: infectious and viral diseases of the mother during pregnancy (rubella, influenza, cytomegalovirus, herpes, toxoplasmosis); pregnancy toxicosis; fetal asphyxia; intracranial birth trauma; hyperbilirubinemia; hemolytic disease of the newborn; birth weight less than 1500 g; prematurity; ototoxic drugs used by the child and mother during pregnancy; gestational age of more than 40 weeks; hereditary diseases in relatives accompanied by damage to the auditory analyzer.

Results

The age composition of mothers ranged from 16 to 43 years. 192 children were born from a second or more pregnancy (64%). A burdened obstetric history was noted in 125 (41.7%) women. The data on the presence of medical abortions, spontaneous miscarriages, premature birth, severe toxicosis in the mothers' anamnesis turned out to be quite significant. Thus, gestosis in the 2nd trimester was detected in 33.7% of women in the 1st group and in 13.5% in the second. Gestosis in the 3rd trimester was observed in 12.5% of women of the first group, in 3.8% of the second group of subjects (tab.1).



Table 1 The incidence of gestosis in pregnant women (%)

	2nd trimester of pregnancy	3rd trimester of pregnancy
Group 1 (n=58)	32,7	12,5
Group 2 (n=242)	13,5	3,8

As is known, infections that occur in the intrauterine or neonatal period of life are one of the important causes contributing to the spread of deafness worldwide. These infections include herpes simplex virus, CMV, measles virus, mumps, toxoplasmosis, ureoplasmosis. The main risk for a child occurs with primary infection (1-2 trimesters of pregnancy). In children with congenital CMI, hearing loss can reach 25% or more. Thus, sensorineural hearing loss with clinical symptoms can be 58%, and asymptomatic – 7.4%. According to the literature, there is currently a noticeable increase in hearing loss caused by one of the listed.

As a result of the analysis of the results obtained, it was revealed that 51.9% of the mothers of premature newborns examined by us had infectious diseases during the period of this pregnancy. The results also showed that 11.5% of mothers had herpes virus during pregnancy, 7.7% had cytomegalovirus; rubella virus was found in 7.7% of cases (tab 2).

Table 2 Infectious diseases of the mother during pregnancy (%)

	CMV	Rubella	Toxoplasmosis	Herpes
Group 1 (n=58)	11,5	7,7	9,6	23,1
Group 2 (n=242)	9,2	1,0	1,0	20,2

During the study, attention was paid to the somatic state of the mother: infection, in particular, of the urinary tract in mothers, was noted by us in 3% of cases, chronic arterial hypertension - in 2% of women. Chronic gynecological diseases, such as chronic adnexitis, salpingoophoritis, cervical erosion accounted for 17%.

In the intranatal period, a long anhydrous interval was recorded in 4% of cases, bleeding and premature placental abruption were observed in 8 women. Caesarean section for medical reasons was performed on 52 women, which was 11.7%.

It is believed that 40-90% of pregnant women take certain medications, especially in the early stages of pregnancy, which they may not yet suspect. The incidence of birth defects in newborns associated with taking medications by pregnant women is approximately 1%.

The use of medicines during pregnancy always poses a threat to the fetus. It is known that most of the medications used pass through cell membranes and are passively transported through the placenta to the fetus. With prolonged drug treatment, accumulation of these drugs in fetal tissues is possible. In some cases, medications act as teratogens, in other cases they cause a toxic effect and contribute to immaturity or delay in intrauterine growth and development of the newborn. The critical dominant for the occurrence of a teratogenic effect is formed by individual signs (the dose used, the method of application, the duration of use, the phase of embryonic development, the features of the genotype of the child's mother). In clinical conditions, it is not realistic to determine



the teratogenicity of the medications used. Only the accumulation of clinical observations makes it possible to isolate drugs with a possible teratogenic effect. Among them, it is especially necessary to highlight those that have an ototoxic effect. These primarily include antibiotics-aminoglycosides. When collecting anamnesis, the use of gentamicin by mothers was detected in 8.7% in group 1. In group 2, 2.8% of mothers used ototoxic antibiotics during pregnancy (tab 3).

Table 3 The use of ototoxic drugs during pregnancy

	Name of the drug (antibiotic)		
	Gentamicin	Kanamycin	Other
Group 1 (n=58)	4	1	0
	7,0 %	1,7 %	0 %
Group 2 (n=242)	11	0	0
	2,8 %	0 %	0 %

Table 4 The frequency of anemia in pregnant women (%)

	2 trimester			3 trimester		
	1 degree	2 degree	3 degree	1 degree	2 degree	3 degree
Group 1 (n=58)	30,6	18,4	10,2	24,7	18,1	15,6
Group 2 (n=242)	32,7	1,9	1,9	38,5	1,9	1,9

Comparison of factors aggravating somatic and obstetric anamnesis (tab.3.6), showed that the interaction of the above factors led to the birth of a premature baby. For most women, as a rule, it was the result of several factors.

In accordance with the objectives of the study, we also studied the pathological conditions of newborns. Table 5 presents the pathological conditions detected in the newborns examined by us. A clinical analysis of the somatic state of the neonatal infants we observed showed that children had one or another perinatal lesion of the central nervous system. They are more often diagnosed with hypoxic-ischemic CNS lesion, which was noted in 53% of cases, intraventricular hemorrhage and hemorrhage into brain tissue were detected by neonatologists-neuropathologists in 29.7 children (12.7%), hydrocephalus was detected in 1% of cases.

Table 5 Pathological condition in newborns (%)

	Group 1 (n=58)	Group 2 (n=242)
Asphyxia in childbirth	36	17
Hyperbilirubinemia	32	2
Hypoxic-ischemic CNS lesion	49	4
Hemorrhages in brain tissue	28	1,7
Hydrocephalus	1	0
Acute edematous syndrome	2	
Syndrome of respiratory disorders	25	2,5
Pneumonia, tracheobronchitis	5,6	0
Respiratory failure	14,3	2,1
Convulsive syndrome	1	0
Anemia	3	5
Fetal development delay	2	1,6
Intrauterine infection	7,7	1,0
Hemolytic disease of newborns	37	13



The syndrome of respiratory disorders was detected in 27.5% of cases. In addition, these children often develop pneumonia (5.6%) and respiratory failure (16.4%), asphyxia in childbirth was diagnosed in 53% of cases. Hyperbilirubinemia was observed in 34% of the newborns we examined. Intrauterine infection was detected in 8.7% of the subjects. Hemolytic disease of newborns was found in 50% of patients. Anemia of premature babies was found in 8%. 3.6% of newborns had intrauterine development delay.

It is necessary to pay special attention to the fact that 8.1 (37 children) of the newborn premature infants we observed received ototoxic drugs. 10 children were on long-term artificial lung ventilation, which is 2.2% of cases.

Thus, the state of the mother's health, the severity of the pathological pregnancy and its outcome largely determine the condition of the premature baby. In pediatric cases, the collection of anamnesis is crucial for the early diagnosis of hearing loss. This anamnesis includes questions concerning the perinatal anamnesis of the child, his birth and the first days of life, as well as the postpartum anamnesis before the onset of symptoms, as well as the family history of hearing loss. A child with hearing loss may have a lack of reaction to sounds, behavioral problems, speech problems, speech delay or even failure at school, as well as incorrect pronunciation of words. A family history, especially if there is a member with early hearing loss, is also of great importance when hearing loss is suspected.

References

1. Roizen NJ. Etiology of hearing loss in children. Nongenetic causes. *Pediatr Clin North Am.* 1999 Feb;46(1):49-64
2. Erenberg A, Lemons J, Sia C, Trunkel D, Ziring P. Newborn and infant hearing loss: detection and intervention. *American Academy of Pediatrics. Task Force on Newborn and Infant Hearing, 1998- 1999. Pediatrics.* 1999 Feb;103(2):527-30
3. Beswick R, Driscoll C, Kei J, Khan A, Glennon S. Which risk factors predict postnatal hearing loss in children? *J Am Acad Audiol.* 2013 Mar;24(3):205-13
4. Beswick R, Driscoll C, Kei J. Monitoring for postnatal hearing loss using risk factors: a systematic literature review. *Ear Hear.* 2012 Nov-Dec;33(6):745-56
5. Madrimova, A., Shaykhova, K. Assessment of hearing in children with cerebral palsy. *Indian Journal of Forensic Medicine and Toxicology, Volume 14, Issue 4, 2022.*

