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COCHLERAR IMPLANTATION - A MODERN SOLUTION FOR HEARING DEFICIENCY

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Abstract
The article discusses creating the necessary conditions for the successful development of children's speech through cochlear implant surgery, fine-tuning children's general speech processor, developing communication skills, developing the ability to hear surrounding sounds and speech using the device, developing language skills, developing oral speech, non-verbal intelligence and other mental functions and motor skills, as well as psychological support for the child and his family.

Keywords: Cochlear implantation, rehabilitation, speech processor, localization, frequency, integration, visual thinking.

Introduction

The primary defect that occurs in childhood - hearing impairment - deviates from the norm in the developmental path of the child's psyche, leading to the emergence of secondary diseases. The limited flow of information in the auditory analyzer creates unusual conditions for the development of the child's psyche: first of all, the development of speech deficiency is observed. In addition to the main deficiency of the auditory analyzer, we note deviations in the formation and functioning of speech, as well as related mental processes, in the structure of the development of a child with hearing impairment. It should also be noted that not only does the primary defect create a fertile ground for the development of secondary symptoms, but conversely, the secondary defect enhances the manifestation of the primary defect.

Let's look at what categories of children are studying in general education schools today: hearing, vision, locomotor problems, speech problems, mental retardation, mild mental retardation, mild autism, cochlear implants children. The characteristics of the listed children are: sluggishness and distraction, impaired pronunciation of sounds, insufficient formation of speech reserves, problems with fine motor skills, variable emotional state, limited comprehension and imagination.

The level of language proficiency, developmental skills, and access to general education depend in many ways on the level of speech development of a child with hearing impairment [1].

A hearing-impaired child's full mastery of oral speech implies the development of the interlocutor's ability to understand the speech freely and to speak clearly and intelligibly to others. The formation of oral speech is based on the development of hearing in deaf children with the constant use of individual hearing aids [2].

Even the most modern hearing aids do not allow a deaf child to fully understand speech. Cochlear implantation (CI) is an effective way to rehabilitate people with high levels of hearing loss and deafness.

Cochlear implantation is the surgical insertion of a system of electrodes into a patient's inner ear, which in turn allows the preserved fibers of the auditory nerve (afferent fiber) to perceive sound information through electrical stimulation. Sensory impairment of hearing is mainly manifested by damage to the inner ear, ie its hairy tissue. However, despite the significant damage to the sensory tissues, in most of these patients, the fibers of the auditory nerve are preserved, allowing the brain to receive signals directly from the electrical current that triggers the formation of auditory sensations.

Cochlear implant surgery is a modern method of overcoming the health limitations of a child with hearing impairment. With properly organized rehabilitation work, it will be possible to fully integrate such a child into society. In an inclusive education environment, a child with a cochlear implant will have the opportunity to learn and develop together with healthy peers. Psychological and pedagogical support is needed to ensure the most effective coverage of children with cochlear implantation in an inclusive education environment. In addition to special education needs, children in need of social protection have common needs as well as normal developing children - the need for loving and stimulating conditions, as well as their lives should be as close to normal as possible.

IV Koroleva (2005) noted that in addition to the operation itself, the selection of candidates and long-term postoperative hearing-speech rehabilitation should be included in the CI concept.

Cochlear implantation hearing involves three steps.

1. Preoperative stage. This stage includes complex diagnostic examination, autologic examination, autologous examination, vestibulometry, computed tomography, electrodiagnostic examination of the brain, as well as psychological preparation for surgery (through acquaintance with other clients with cochlear implants or the advice of a qualified specialist). includes z.

2. The stage of implementation of the surgical operation.
3. Postoperative stage. This stage is postoperative called the rehabilitation phase, which is the most time consuming of the previous two phases.

Approved by the Russian Ministry of Health in 2000, there is a single criterion for selecting patients for candidates for cochlear implantation, according to which the average perception of ambient pure sound should be more than 95 dB [4].

Bilateral sensory-deafness (average sound reception 0.5) in the "Regulations" on the procedure for selection and operation of patients for cochlear implantation in medical institutions, approved by the Ministry of Health of the Republic of Uzbekistan in 2019, At frequencies of 1, 2, 4 kGs (more than 90 dB); bilateral IV level of auditory neurosensory impairment (average sound reception was defined as more than 71 dB at frequencies of 0.5, 1, 2, 4 kGs.

However, in world practice there is a tendency to expand the indicators of cochlear implantation, the age limits associated with it have been significantly expanded and the principles of electroacoustic stimulation (EAS) have been formed, in which hearing is provided by peripheral hearing and ipsilateral electrical stimulation [11]. In this case, the outcome of electroacoustic stimulation depends on the quantitative properties of the residual hearing and, accordingly, how the active electrode of the cochlear implant is injected into the cochlea [10].

The issue of expanding indications for cochlear implantation is closely related to the surgical approaches used. Mastoidectomy and a “classical” approach and alternative approaches to the middle ear and tympanum through the triangular space between the facial nerve and the tympanic cord have been proposed [3, 14].

When performing cochlear implants, great attention is paid to aspects of surgical injury, both for the operation as a whole and for individual structures, such as the inner ear. The surgical injury inflicted during the surgical procedure is etrogenic and includes not only organ and tissue damage, but also the duration of the operation, the reaction to the foreign body, the consequences of the intervention, and the severity of the postoperative period.

Injury to the inner ear during KI is of particular importance. Inserting an electrode into the cochlea causes immediate damage to the inner ear, as well as additional changes over time that can adversely affect the electrical stimulation of auditory neurons.

Cochleostomy through the labyrinth capsule is the most common method of creating an electrode insertion pathway (Lehnhardt E., 1993). Trauma associated with cochleostomy includes periosteal lining and vascular injury! Bone chips entering the scale can lead to fibrotic changes and osteogenesis [10,12] .It has been reliably proven

that a significant reduction in inner ear injury is achieved when an active electrode is inserted through the membrane of the cochlear glass. In children, as well as in people with joint pathology of the middle and inner ear, the characteristics of KI are no less important [16].

KI is considered safe in patients aged 4 to 12 months. However, major complications (facial paralysis, valve insufficiency, implant extrusion, cholesteatoma) are rare in the pediatric population - in 3% of cases. Re-operation with transplantation is required in 2% of cases, and surgical tactics in children are not significantly different from those in adults [15].

In patients with chronic purulent otitis media, CI is also performed in the presence of perforation of the tympanic membrane and a cavity after radical ear surgery. In tympanoplasty and cochlear implantation, good results are obtained with one- and two-stage treatment, but the number of complications reaches 20% [9]. In a single-stage operation, a 4% carboxymethylcellulose sodium salt gel (Na-CMC gel) can be used to facilitate intervention and improve the outcome of the operation [5].

If there is a gap after radical surgery (RJ), the technique of closing the ear canal according to the type of “blind bag” and obliterating the mastoid cavity and the external auditory canal (EAM) is used.

On the other hand, it is known that obliteration of the trepanation cavity with a soft tissue cover after radical surgery often results in resorption of the latter, which can lead to the action of the active electrode of the cochlear implant [13].

Implants with two parallel electrode chains have now been proposed in the presence of cochlear ossification [8]. The method involves inserting separate electrode chains into artificially created tunnels in the projection of the basal and secondary (apical) folds.

A new area of local autism is bilateral or bilateral CI. The best effect when conducting computed tomography on both sides is provided by binaural effects ("head shadow") and redundancy of data ("better ear" and binaural collection effects) [6]:

Practical advantages of bilateral CI include sound localization, better comprehension of speech in a noisy environment, facilitation of language acquisition and learning process, guarantee of “better” ear implantation, and improved quality of life [7].

Children need postoperative rehabilitation to make full use of the hearing ability obtained as a result of cochlear implantation (CI). Without it, it is impossible to achieve the right optimal result from cochlear implant surgery in the formation and development of natural auditory-behavioral skills.

The main goal of a cochlear post-implantation rehabilitation course is to teach a child to perceive and understand verbal and nonverbal sound signals, as well as to use new

auditory senses to develop speech. The postoperative rehabilitation process involves the participation of a team of specialists: audiologists, psychologists, speech therapists, deaf educators and others.

The course of rehabilitation of patients with hearing impairment after cochlear implantation consists of the following components.

• Adjusting the speech processor for cochlear implantation.
• Develop hearing and speech skills.
• General development of the patient - memory, attention, motor skills, non-verbal intelligence.
• Psychological support to the patient and his family.

Connect to a speech processor

3-4 weeks after cochlear implant surgery, the speech processor is connected to the implant and its initial configuration. The audiologist adjusts the speech processor to achieve optimal results in the formation of auditory sensations. From this moment on, the child can hear the sounds, but long lessons with an audio teacher are required to correctly perceive and comprehend them. In young children, the first input and adjustment of a speech processor is a very complex process because they cannot take into account their emotions, even if they have a hearing experience. Therefore, special pedagogical exercises are needed to develop a conditioned motor response to a signal (e.g., placing rings on a cotton ball in a pyramid, assembling cubes on a car body to beat a drum, or throwing buttons in a box for 'pa-pa-pa', and so on.

To develop a child's hearing, it is important that training begins in the preoperative period and continues after surgery (one week after the sutures are removed) until the speech processor is turned on.

Developing Hearing and Speech The deaf educator teaches the child to use the emerging hearing, develops correct perception of the surrounding sounds, and helps to shape oral speech. Hearing perception in a child with CI should be developed in the following areas: sound detection, localization of the sound source in space, distinguishing between speech and non-speech sounds, distinguishing and knowing different features of sounds, distinguishing and knowing sounds in non-speech environment, different speech distinguishing, recognizing and recognizing signals. (phonemes, words, phrases).

Helping Parents

Basic principles of teaching hearing in a child with cochlear implantation:

1. Start developing your hearing skills by moving on to more complex things in sequence with simple tasks;

2. Before each demonstration of a sound or word, the child's attention should be drawn by pointing to the child's ear.
3. The child needs to hear the sound several times to remember and analyze it, so the parent repeats each sound clearly and slowly.
4. The child repeats the sound presented several times, at the same time listening carefully to his voice;
5. A lesson with a child should always end with a task that he or she is already doing well.

Develop listening skills and spontaneous speech in natural communication we need the special work of psychological, pedagogical professionals and the family to take advantage of the opportunities that open up for development.

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