



PRECLINICAL DIAGNOSIS OF HEARING IMPAIRMENT IN PRESCHOOL CHILDREN

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ABSTRACT

Early diagnosis of hearing impairment in preschool children with recurrent rhino-pharyngeal pathology is associated with forming a special minimum of competences in parents and kindergarten staff as teachers and speech-language therapists. The aim of this study is to establish an algorithm to achieve a preclinical diagnosis (hearing assessment) in the family and the kindergarten and to determinate the risk group. The stages (steps) of the algorithm and the expected results are described in the article.

Key words: Hearing disorders, rhino-pharyngeal pathology, preclinical diagnosis, hearing assessment, algorithm, family, kindergarten, and teachers.

INTRODUCTION

Children with persistent rhino-pharyngeal pathology often become with hearing impairment and they are most common patients of the otorhinolaryngologists and speech and language pathologists. The reason of hearing disorders is the narrow anatomical, physiological and functional connection of the middle ear with the rhino-pharynx through the Eustachian tube. It is known that there are age peculiarities in develop of the Eustachian tube. In children it is wider, shorter and almost horizontal stand, which explains the frequency of the tympanic dissemination of the inflammation in rhino-pharyngeal catarrhs. M. Tos (1979) (1) indicates on firsts and second place the tube dysfunction and catarrhs of the upper respiratory ways as determinably etiological factors for develop of hearing disorders and mostly Otitis media with effusion (OME) in children. M. L. Casselbrant (1984) (2) followed a big group of children with OME for 2 years, the children were observed with otoscopic and tympanometry examination every month. He established that

during the first year 53% and during the second year 61% of the group developed OME. The percentage of children with high negative pressure (HNP) in the middle ear was higher (66%). In 80% of the cases OME-episodes were with 2 month duration, they showed season dependence and high association with acute and often repeated infections of upper respiratory ways. According to R. Di Francesco (2008) (3) between 28% and 38% of children in preschool age pull through OME and this is due to tube dysfunction. He showed the deviation in the development of craniofacial structure at adenoids and adenoid hyperplasia as a reason of its occurrence.

The OME problem in Bulgaria is an object of research of many authors. E. Bogdanov (1980) (4) defined the place of OME in classification of the chronic no purulent inflammation of the middle ear and formulated the modern strategy for their surgical treatment. G. Edrev (1980) (5) studied the respiratory viruses as an etiological factor for hearing impairment. V. Pavlov (1986 (6), 2001 (7)), investigate in details the function of the Eustachian tube and the clinics-morphological mechanisms of its dysfunction on cell, tissue and organic level (2001). P. Dimov (1990) studied the etiology, pathogenesis and the treatment of OME (8).

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The direction of clinical attitude between rhinopharynx and middle ear is determinate etiologically from the triad rhino-pharyngeal obstruction, tube dysfunction, and tympanic hypofunction in order of the cause-consequence model. Catarrhs of the respiratory ways, hyperplasia of adenoid tissue, allergies, genetics predisposition are marked as the most frequent etiological factors.

For the other hand, to establish a hearing disorder in preschool age children is difficult because they still haven't the ability to evaluate their own auditory perception. Usually the hearing disorder of a child is noticed by the parents or the kindergarten staff. The parents or the teachers established a problem in child's communication – the child doesn't perform correct the instruction especially when he/she is tuned with the back to the speaking person. Usually it happens with children often suffering from acute catarrhs of respiratory ways, with persistent hypoapneic symptomatic during sleeping and even in active condition.

It should be noticed that the treatment of OME (also the surgical) is in correlation with the duration of the episode. If it continues more than three months the prognosis for successful end decreases. As the period of the "episode" is longer, the occurred changes are more irreversible. The most affected is the preschool age. For the period from 1981 to 1985 at the ENT Diseases Clinic for Children, Sofia were operated 265 patients of 2 to 14 years old, and almost half of them (123) were 4-6 of age.

Actuality of the discussion about hearing disorders in preschool children (who visit kindergarten) with recurrent or persistent rhinopharyngeal pathology evolves from the existing public evaluation for no effectiveness of the health system, which the last twenty years decisively withdrew from the family and kindergarten purposes. The program "Child Healthcare (2010)" of the National Healthcare Case "is realized by the GP (general practitioner) of the child" and it is expected a "general hearing assessment" during the sixth month and at 1 year of age. The concept "general hearing assessment" is not defined and it is not clear what and how the GP to assess. Often these doctors are not specialists and have no diploma in general medicine. The program includes children from 0 to 18 years and it is obvious that after completing 1 year it

is not expected any hearing assessment form anybody (9).

The realization of our work in the project we divided into two stages:

1. Preclinical;
2. Clinical;

The subject of our preliminary report is the preclinical stage of the study. The proceeding from the assumption that the existing risk of late recognizing the hearing disorders, we set the goal to create an algorithm for "general hearing assessment" (preclinical diagnosis of hearing disorder) in preschool children with recurrent or persistent rhinopharyngeal pathology, who are visiting kindergartens, where the role of respondents-inquirers of the preclinical expertise (general hearing assessment) would be given to the parents (in the family) and the kindergarten staff.

The item about the family and kindergarten role as partners in surmounting of hearing disorders as a retaining factor in the child development and socialization in Bulgaria is described in details in monographs "Deafness in Children: Early Detection and Intervention" (K. Dionisieva) (10) and "Book for parents of children with Hearing Disorders" (V. Kacarska and M. Hristova) (11). The discussion objects in both publications are children with lasting hearing disorders of sensorineural type (inborn or acquired prelingual deafness). The presented strategies for involving the family and the kindergarten as partners in the multiple team centers the attention over the educating process of the child after fitting the hearing prosthesis.

We focused our attention in the project on recognizing the OME problem connected with protracted process of rhinopharyngeal pathology where hearing disorders are conductive and with big resource of functional rehabilitation.

We set the next preliminary tasks to realize the goal of the project:

I. Preparing of project-texts (project-forms) for:

1. Collaboration contract with the directors (managers) of the kindergartens, which will be involved as partners in project's work;
2. Agreement declaration for teachers (in kindergartens) and for parents (in families) – to be situated in the project as respondent-inquirer. Because of the character of the researched contingent (preschool children) it

was necessary the parents and the teachers to realize the responsibilities of respondents and inquirers.

3. Inquire for child's health condition about the hearing and upper respiratory ways. For every child we provide two questionnaire forms:

a) Form filled from the respondent-inquirer – teacher, and

б) Form filled from the respondent-inquirer – parent.

Working with the inquiry in the family and in the kindergarten increases the level of the authenticity.

II. Educating of respondent-inquirers – parents and teachers, in order to acquire their necessary knowledge and competences for the

aim, organization and working with the inquiry.

III. Analyzing the results from the inquiry and forming the risk group.

All parents of the kindergarten's children (or all that accept to participate as respondents) fill individual by name the investigation for their child, answering the groups of questions depend on the structure of the investigation research. The respondents from the kindergarten fill the forms in the same way. After the analysis of the received results will be formed two groups (**fig. 1**): first group – children without data for rhino-pharyngeal pathology and hearing disorder, and second group – children with information about rhino-pharyngeal pathology and/or hearing disorder.

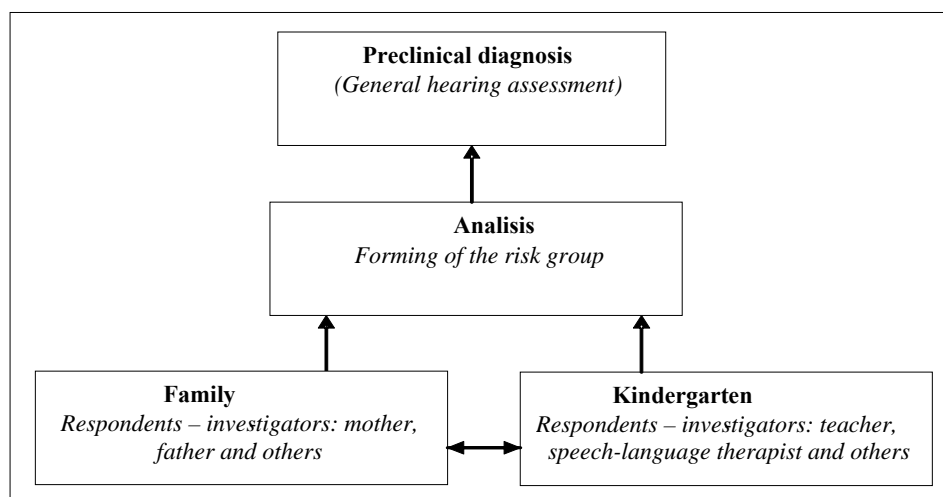


Fig. 1 Algorithm for preclinical diagnosis (general hearing assessment)

Obviously the second is a subject of new regrouping with the possibility to structure 3 subgroups: 2 **a** – children with data only about hearing disorder; 2 **b** – children with information about rhino-pharyngeal symptoms, and 2 **c** – children with data about hearing disorder and rhino-pharyngeal symptomatic. The aim of the preclinical research is to establish the second group of children with the three subgroups. This group we mark as risk (**Fig.2**).

The preclinical stage ends when the risk group is established. Every child from subgroups "a" and "b" of the risk-group has a preclinical assessment for hearing disorder. All children from the risk-group will be subject of a clinical

examination which includes otorhinolaryngologist, screening-audiometric test and tympanometry and if it is necessary – other examinations and consultations.

DISCUSSION

The complications in preschool children with persistent rhinopharyngeal pathology are well known and described in the literature. The existing researches are related mainly for the clinical examination of the concrete cases. The problem for the hearing disorders of these children is also well studied. In the accessible literature we could not find satisfactory answer about the problem of the early diagnosis through creating and using algorithm for observation and diagnostic control over organized groups of children in kindergartens.

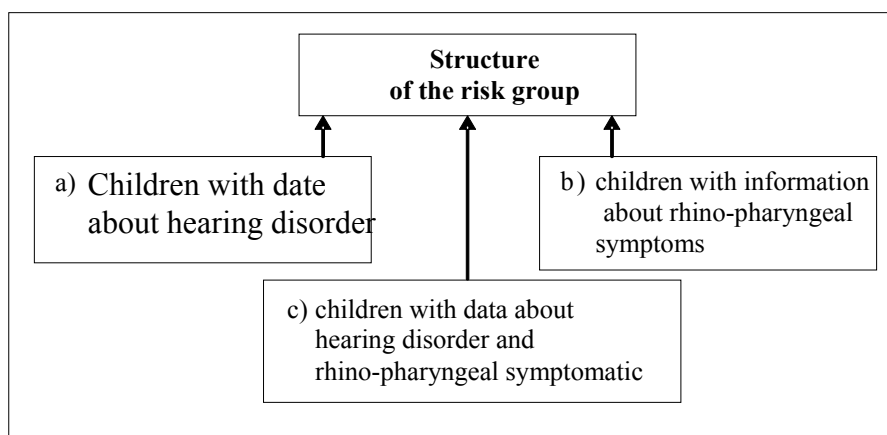


Fig. 2 Structure of the risk group

After the withdrawal of the health system from the family and the kindergarten, actually the two environments (family and kindergarten) urgently need creating and introducing health alternatives. These health alternatives should not be considered as concurrent of the existing public health model, but mostly as an extra systematic institutional products which are helping and supporting the solve of important public problems, as the health of the children.

EXPECTING RESULTS

1. Creating and including an “algorithm for general hearing assessment” (preclinical diagnosis of hearing disorders in children with rhino-pharyngeal pathology), it could move their health care closer to the family and the kindergartner (early diagnosis of hearing disorders);
2. Indisputable social effect after providing treatment on time
3. In circumstances of a closed model of health system like the Bulgarian, creating such systematic institutional products generate non-standard health resources (European fund etc.)

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REFERENCES

1. M. Tos and j.a. Etiologic Factors in Secretary Otitis. Arch Otolaryngol., 105(10), 582-588, 1979

2. M. L. Casselbrant. Otitis media with effusion in preschool children. Presented at the 87th Annual Meeting of the American Laryngological, Rhinological and Otological Society, Inc., Palm Beach, FL, May 10, 1984
3. R. Di Francesco and j.a. Craniofacial morphology and otitis media with effusion in children. International Journal of Pediatric Otorhinolaryngology., 72 (8), 1151-1158, 2008
4. Е. Богданов. Оперативно лечение на хроничните негнойни възпалителни заболявания на средното ухо и техните последици., канд. дис., С., 1980
5. Г. Едрев. Увреждания на слуховия анализатор от респираторни вируси., канд. дис., С., 1980
6. В.Павлов. Изследване функцията на Евстахиевата тръба чрез пневмотубография., канд.дис., С., 1986
7. В. Павлов. Клинико-морфологични проучвания на евстахиевата тръба и лечение напоследствията от нейната дисфункция., докт. дис., С., 2001
8. П. Димов. Върху етиологията, патогенезата и лечението на хроничния серозен отит., канд. дис., С., 1990
9. Програма „Детско здравеопазване” на Националната здравноосигурителна каса, НРД-2010
10. К. Дионисиева. Глухотата в детската възраст: Ранно откриване и въздействие., С., 120, 1996
11. В. Кацарска, М. Христова. Книга за родителите на деца със слухови нарушения., С., (не е отб. г. на изд.), 96