Assessment of Tooth Decay Risk in Children Suffering from Nephrotic Syndrome

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Abstract:

Introduction:The assessment of tooth decay risk is based on a combination of clinical and para-clinical indicators. The last being related with environmental characteristics. One of the most essential criteria of dental caries risk is the individual general health status. The nephrotic syndrome concerns a complex of pathological conditions including reduction of the serum calcium concentration, compensated with an increase of protein-linked one.

Theaim of this study is to be evaluated the risk of tooth decay in children suffering from nephrotic syndrome.

Material and methods:Ten children aged from 3 to 13 years participated in the investigation. All of them were diagnosed with kidney disorder, namely nephrotic syndrome. There have been evaluated indices of epidemiology of tooth decay in primary and permanent teeth and plaque index of Silness-Lòe. Specifics of fluorides prophylactic cares, frequency of visits by the dentist and carbohydrates' nutrition were also taken into account.

Results:All the participants have been estimated of high decay risk.

Conclusion:These children need prophylactic cares for improvement of the oral-dental status.

Key words: *tooth decay, indicators of risk, nephrotic syndrome;*

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1. Introduction

The most common etiological factor of the nephrotic syndrome in children's age (in approximately 85 % of all the cases) are the minimal glomerular changes. Distribution by gender shows prevalence of boys to girls in a ratio of 2:1. Predominantly affected are children from 1 to 6 years of age. The nephrotic syndrome is characterized with proteinuria of high degree, hypo-proteinemia, hypo-albuminemia, hyper-lipoproteinemia, related with an increase of cholesterol and triglycerides. The clinical manifestation of the disease is most often provoked by infections, procedures of immunization, intoxications, allergic reactions, injuries of burning. An essential para-clinical indicator of this kidney disorder is reduction of the concentration of serum calcium at the expense of increased amount of protein-linked fractions. In order to ensure proper treatment of the disease there has to be applied a specific dietary regime avoiding proteins' compounds and salt. Diuretic medicines, especially the groups of potassium-saving, together with thiazide and loop diuretics are of great importance for overcoming the effects of edema. In condition of bacterial infections are prescribed antibiotics combined with γ-globulin therapy. More than 90 % of children suffering from nephrotic syndrome are very well influenced by application of corticosteroids (De-hydrocortisone, Prednisolone). It is necessary for children and their parents to become acquainted with the fact that the nephrotic syndrome is a long-lasting disorder, related with potential complications as a consequence of the disease and its treatment protocol. [8]

The initiation and progression of the systemic disorder require frequent procedures of hospitalizationof these patients. All the efforts of doctors, parents and children are concentrated upon overcoming the somatic problem. The attempts to cope with the restrictions accompanying dietary regime and medicine programs can result in negligence of preventive cares addressed to oral health status, therefore to its severe deterioration.

Tooth decay is the most widely spread chronic disease among children and adolescents, which often reflects not only upon oral, but also on the general health status of the individual. [7, 5] The intensity of caries impacts correlates with plenty of factors: age of the child, depth of the lesion, topographic characteristics of cavity clinical findings. It has been established that more vulnerable to decay attacks are younger children, these suffering from chronic systemic failures, as well as those who are with limited access to complex, properly performed dental cares. [1]

Models of caries risk assessment accentuate on a great variety of indices:

- Specifics of nutrition, especially frequency and consistency of consumed carbohydrates;
- Exposure to the effects of endogenous and exogenous fluoride products of preventive cares;
- Susceptibility of the host to acid attacks;
- Micro-flora- representatives, quantity characteristics;
- Traits of the social-economic environment;
- Cultural markers;
- Behavioral patterns. [3, 2]

With explicitly strong protective potential against tooth decay are characterized fluorides of systemic and topical application, influencing the development of hard teeth tissues during the periods of pre-eruptive mineralization and post-eruptive maturation, respectively. The following effect of caries reduction concerns primary, as well as permanent teeth. [6, 9]

The accessibility of children and their parents to dental services is related with determination of tooth decay risk level, too.

Some authors, including participants in the National Initiative for improving oral health under the patronage of the American Academy of Pediatrics, put an accent on some significant indicators of tooth decay risk:

- Active at the time of clinical investigation decay lesions;
- Treated decay lesions, registration of present fillings on definite teeth and teeth surfaces;
- Caries lesions on teeth roots' surfaces;
- Performance of oral hygiene procedures;
- Records of oral hygiene status. [4]

The aim of this paper is to be assessed the risk of tooth decay in children of different age suffering from nephrotic syndrome.

The performance of this purpose is related with accomplishment of some tasks.

Task 1 Assessment of tooth decay risk based on clinical signs illustrating the state of hard teeth tissues. Evaluation of the indices of epidemiology of tooth decay in primary and permanent teeth for each participant.

Task 2 Assessment of tooth decay risk according to the level of dental plaque accumulation upon teeth surfaces.

Task 3 Application of environmental criteria of caries risk assessment.

2. Material and methods

A number of 10 children aged from 3 to 13 years took participation in the investigation. All of them were hospitalized at the Department of Pediatrics at the University Hospital "St Marina", Medical University-Varna, city of Varna, Bulgaria. These patients have been diagnosed with nephrotic syndrome.

The actual detailed intraoral status of each of the participants was recorded applying the documentary method of individually addressed medical card. The oral cavity examination was performed in daily light, to the bed of the patient, using sterile kits of dental instruments. Registration of presence or absence of: teeth affected by tooth decay (D-decayed permanent, d-decayed primary); extracted teeth as a consequence of complicated dental caries (M-missing permanent teeth; no registration of missing primary teeth because of processes of physiological exchange); teeth with fillings (F-fillings in permanent teeth, f-fillings of primary teeth).

Calculation of the index of epidemiology of tooth decay in teeth separately for permanent and primary teeth. This index gives information about the percent of teeth affected by caries compared with all the examined teeth. The sum of all the decayed, filled and extracted permanent teeth is divided into the total number of examined permanent teeth and the value obtained is multiplied with 100. Concerning primary teeth this index is calculated as the sum

of decayed and filled primary teeth is divided into all the examined primary teeth and the result is multiplied with 100.

By the means of the plaque index by Silness-Lòe we can evaluate the amount of accumulated dental plaque on teeth surfaces in the role of an essential factor for initiation and progression of the tooth decay process. With scraping movements of the periodontal probe (UNC-15) with the figures from 0 to 3 we record dental plaque upon vestibular, palatal (respectively lingual), medial and distal surfaces of these representative teeth: 16, 22, 36, 42 and 44. In tooth 24 we estimate the amount of dental plaque only on the medial and distal surfaces. 0 means no plaque on tooth surface. The figure 1 equals to a small amount of plaque. 2 corresponds to a moderate level of plaque and equivalent of a great amount of plaque is the figure 3. The sum of all the figures of all the examined teeth surfaces of an individual is divided to the total number of these surfaces (22), thus calculating the average value of the plaque index in each of the examined participants.

Implementing the documentary method of individually addressed inquiry we obtain data about environmental criteria of tooth decay risk assessment. The target-oriented enquiry is associating with information about general health status of the child; application of various modalities of fluorides' exposure- exogenous and endogenous; specifics of carbohydrates' nutrition- frequency of consumption, consistency, content of disaccharides). An indicator of great significance is the frequency of visits by dentist for the child and its parents, respectively.

3. Results:

- The values of epidemiology of tooth decay in primary teeth in the examined patients vary from 25 % to 66 %.
- The values of epidemiology of tooth decay in permanent teeth are in the range from 14% to 44 %.
- One fifth (20 %) of all the examined are with PI equal or less than 1.
- One half of the participants (50 %) are with PI values registered in the interval from 1,1 to 2.
- In 30 % of all these children PI values are equal or more than 2,1.
- No patients apply regular endogenous fluorides' prophylactic cares.
- Sporadic endogenous fluorides' exposure is relevant to 40 % of the children.
- Regular exogenous fluorides' modalities are applied by 70 % of the examined.
- Sporadic exogenous fluorides are used by 10 % of investigated children with nephrotic syndrome.
- Predominant portion of the patients (90 %) consume irregularly and incessantly carbohydrates of the group of disaccharides.
- Prevailing part of these children have never visited dentist (80 %).
- Only 1 of 10 participants visits dentist on each 6 months. And 1 of the 10 examined turns to the dentist on a period longer than 1 year.**[Table 1]**

№ of patient	age	epidemiology of tooth decay in teeth	Plaque Index of Silness-Lòe	Fluoride prophylaxis cares				Frequency of carbohydrates' nutrition	Frequency of visits by the dentist	
				exogenous		endogenous			patient	parents
				regular	sporadic	regular	sporadic			
1	3 years of age	Et = 33%	PI = 2,04	no	no	no	no	all the day incessantly	never	only in emergency
2	5 years of age	Et = 60%	PI = 1,95	no	yes	no	no	all the day incessantly	never	only in emergency
3	6 years of age	Et = 50% ET= 33%	PI=2	yes	no	no	no	all the day incessantly	never	only in emergency
4	6 years of age	Et = 60 %	PI = 2,18	no	no	no	no	all the day incessantly	never	never
5	6 years of age	Et = 38% ET=14%	PI = 1	yes	no	no	yes	all the day incessantly	never	only in emergency
6	6 years of age	Et = 28 %	PI= 0,95	yes	no	no	yes	all the day incessantly	never	never
7	7 years of age	Et = 66% ET = 44 %	PI = 1,14	yes	no	no	yes	only as a dessert once or twice per day	never	on a period longer than 1 year
8	8 years of age	Et = 58% ET= 33%	PI = 1,55	yes	no	no	no	all the day incessantly	never	only in emergency
9	9 years of age	Et = 25% ET = 25%	PI = 1,32	yes	no	no	yes	all the day incessantly	on each 6 months	only in emergency
10	13 years of age	ET = 25%	PI = 2,27	yes	no	no	no	all the day incessantly	on a period longer than 1 year	only in emergency

Table 1 Illustration of tooth decay risk factors in children of different age suffering from nephrotic syndrome

4. Conclusions:

Based on considerable criteria of caries risk assessment, we can conclude that all of the examined children suffering from nephrotic syndrome are in high risk of tooth decay. In order to restrict this tendency of caries progression and stop the deterioration of oral-dental health these measures have to be taken into account:

- Motivation for performance of regular proper oral hygiene procedures.
- Precise age-dosed regular application of fluorides' products with exogenous and endogenous mechanisms of effects.
- Total restriction of carbohydrates' consumption, especially disaccharides- only as a dessert once per day.

- Increased frequency of regular visits by dentist for performance of primary, secondary and tertiary prophylactic cares.

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