

Assessment of Hepatobiliary System with Dentoalveolar Anomalies in School children

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Abstract: *The combination of hepatobiliary system diseases in schoolchildren with DAA has an adverse effect on biliary tract function, which reflected not only in an increase in dysfunctional disorders with bile rheology, but also in launching such diseases as a chronic cholecystocholangitis.*

Key words: anomaly, hepatobiliary system, bile acids, dental system.

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Dentoalveolar anomalies and deformities (DAA) are the second most common dental pathology in school-age children. Their diagnosis and treatment is one of the urgent tasks in orthodontics, as they significantly reduce quality of life, chewing function affect, lead to

speech disorders, aesthetic deficiencies, health and social adaptation affect, leads to limited professional choice and human potential realization (2, 6, 8). Based on common factors conception forming both dental status and somatic health, functional disorders in dental-facial complex are always combined with mandatory «set» of chronic symptoms at organs and systems of the body. Communication «oral cavity – liver» is existed already during embryogenesis. Both organs are it based derivatives, ectodermal lepidic tissue of the primary intestinal tube (gut); therefore, mucous membrane color of soft palate has a diagnostic importance at diseases of the biliary tract (1, 3, 5, 7). Biliary tract dysfunctions are enough investigated section of functional pathology of

gastrointestinal tract, but, unfortunately, combined pathology issue has still not given enough attention in specialized literature. The role of psychotraumatic factors in dyskinesia pathogenesis of the biliary tract was confirmed by the fact that the majority of schoolchildren regularly fall under the stress; conflicts at school/family, excessive educational and computational loads, i.e. all of these are very stressful predictor for schoolchildren (4). Based on the above, in our opinion, the diagnosis, treatment tactics and prevention of dental anomalies and deformities should be considered in the context of child's body integrity, form and function interdependence its organs and systems. Study goal was to identify the correlation features between the hepatobiliary system and dentoalveolar anomalies in schoolchildren based on studying of volatile fatty acids (VFA) in saliva in schoolchildren with DAA.

Research material and methods.

We were examined 63 schoolchildren in aged 12-16 years (beginning period of orthodontic treatment with fixed

equipment). Of these, 35 schoolchildren with DAA combined with the hepatobiliary system diseases (main group) and 28 schoolchildren with DAA without the biliary pathology. The groups were comparable by sex and age. According to obtain data the biliary dysfunction has been a secondary character at all schoolchildren. Children with the biliary dysfunction had a multifactorial nature: unfavorable course of pre -, ante -, neonatal periods, early artificial feeding, family predisposition, frequent respiratory viral infections, chronic gastroduodenitis, dysmetabolic nephropathy, obesity or overweight, food allergy, gallbladder deformation.

All schoolchildren have been had irrational day mode (sedentary lifestyle, fatigue at school) and nutrition (irregular or rare meals at long intervals, overeating, selective diet). More often at examined schoolchildren (88,6%, 31 people — main group and 71,4%, 20 people — comparison group) there was a hypokinetic-hypotonic type of BTD (biliary tract dysfunction) on the sufficiently long course disease

background, which can be explained by increased influence of the sympathetic nervous system in adolescence. The duration disease at examination time in most patients was 2-3 years, while symptoms were unspoken non-permanent, passed of spontaneously or after a spasmolytic single dose, enzymes (AA Weyn, 1998).

Examination of patients with orthodontic pathology included an in-depth general examination; shape assessment and proportionality, face symmetry, lip-closure exercises nature, chin's severity and nasolabial folds. Particular attention was took into account the bite assessment, which was carried out in three basic planes, dentition shape, single teeth position was noted; jaws' models diagnostic access control analysis was carried out.

DAA diagnosis carried out according to the generally accepted classifications.

Based on an "Informed consent to participate in the study" by adolescents and their parents (guardians) were conducted all studies.

Criteria for inclusion of issues in the research agenda was an increasing in serum levels of alkaline phosphatase, gamma-glutamyl transpeptidase and functional studies, where were excluded focal liver abnormalities and biliary hypertension, occurrence assessment and hepatomegaly degree, and portal hypertension.

In the blood serum was determined an activity of alkaline phosphatase, gamma-glutamyl transpeptidase in the «Mindray» blood serum biochemical analyzer using by «HUMAN» firm reagents.

Determination of the short-chain VFA concentration: acetic (C2), propionic (C3), butyric (C4), isovalerian (C5) in saliva was performed using by the gas-liquid chromatography with analytical standards.

Statistical data processing carried out using a standard package of the «STATISTICA 10.0» application, adapted for biomedical research. The prevalence values of some nosological forms were presented as X [95% CI], where X was the ratio factor percentage

and 95% confidence interval for this value. Statistical difference was at $P < 0,05$.

Research results and discussion.

In everyday practice, routine laboratory indicators of the presence of biliary tract

dysfunction are primarily increased enzyme activity: aspartate aminotransferase (AST), alkaline phosphatase (ALP), gamma-glutamyl transpeptidase (GGTP) that we observed in our studies (table 1).

Table 1

Liver enzyme systems activity indicators in blood serum in schoolchildren associated with pathology

Indicators	Healthy children (n=16)	Children with DAA associated with hepatobiliary system diseases (n=35)	Children with DAA and without associated pathology (n=28)
Aspartate aminotransferase (IU/L)	12,56+0,79	41,33+3,18*	18,72+2,01*
Gamma-glutamyl transpeptidase (IU/L)	23,12+1,93	58,03+8,92*	28,01+1,92
Alkaline phosphatase (IU/L)	24,83+1,24	52,61+3,94*	29,11+3,03

Note: * - significance of differences ($P < 0,05$)

ALP blood levels can be greatly increase, as the main causes, in cases where one or more bile ducts are blocked or hepatic enzyme restriction. Elevated activity of alkaline phosphatase reflects an increase of its synthesis by hepatocytes and epithelial cells of the biliary tract and to a lesser extent, back into the blood supply of the enzyme, and

biliary tract obstruction. Gamma-glutamyltransferase is an enzyme that catalyzes the transfer of gamma-glutamyl functional groups from gamma-glutamyl transpeptidase to an acceptor that may be an amino acid, and other peptides. The low-molecular enzyme component localized in the cytoplasm, and the high-molecular

component has closely related to microsomal fraction membranes of hepatocyte and membranes of the smallest bile ducts. The main clinical significance of the GGTP study is a cholestasis diagnosis, especially in association with other enzymes.

Thus, obtained results has showed that some serum enzymes activity in associated with disease (AST, ALP and GGTP) significantly increased with

elevated combined disease in schoolchildren with DAA.

Presented study results analysis in table 2 in children with DAA associated with disease of the hepatobiliary system has been showed an increase in total quantities of VFA in 1,3 times in comparison with control children group (0,049±0,003 mol/l vs 0,038±0,002 mol/l at healthy individuals group P<0,05) (table. 2).

Table 2

Indicators of fatty acids in schoolchildren saliva with DAA associated with diseases of the biliary system (mol/L)

Fatty acids indicators	Healthy children (n=16)	Children with DAA associated with hepatobiliary system diseases (n=35)	Children with DAA and without associated pathology (n=28)
Acetic	0,024±0,03	0,045±0,001*	0,033±0,03
Propionic	0,013±0,001	0,009±0,001	0,010±0,001
Butyric	0,004±0,0001	0,001±0,0001*	0,002±0,001
Isovaleric	0,0008±0,001	0,0003±0,001*	0,0004±0,001
Overall level	0,053±0,003	0,041±0,004*	0,049±0,003
Anaerobic index	0,64±0,01	0,15±0,034*	0,23±0,02

Note: * - significance of differences (P<0,05)

As can be seen from the presented study results, the acetic acid level in

saliva, which is a metabolite not only anaerobic, but also aerobic opportunistic

microflora, in children with DAA associated with disease of the hepatobiliary system was increased by almost 2 times with compared to that in healthy children, which indicates an increase in aerobes content. Absolute content of butyric acid was reduced by 4 times, isovaleric acid - by 2,6 times, respectively. Elevated total number of VFA indicates a change in the main bacterial families and genera, namely bifido, fuzo- and eubacteria.

Apparently, an anaerobic index reduction at 4 times in children with DAA associated with disease of the biliary system could indicate microbiocenosis infrastructure disorders and strictly anaerobic microflora population inhibition that may contribute to hyper innidiation of E.coli, Staphylococcus and Proteus.

Decreased level of propionic and butyric acids by an average of 1,4 times and 4 times, respectively, seemed to indicate a decrease in severe anaerobes activity that participate in enterohepatic circulation of bile acids.

A significant ($P < 0,05$) decrease in the content of isovaleric acid in patients with DAA associated with hepatobiliary disease indicates a decrease in proteolytic activity of anaerobic microflora and enzymatic insufficiency of the upper gastrointestinal tract.

The evidence shows that an increased relative rate of acetic acid in children with DAA associated with hepatobiliary system disease indicates microbiocenosis disorders at the infrastructure, accompanied by a decreased in ammount of strictly anaerobic microflora, which provides a multifactorial system of mucosal protection. In children with DAA associated with the disease of the hepatobiliary system in saliva revealed a lower ($P < 0,05$) content of the total level of VFA compared with children with DAA without associated pathology, which may be indicated significant disorders of microbiocenosis. As a result, there may be expressed disorders of bile acids conjugation followed by a damage of the digestive processes. The decreased levels of propionic and butyric

acids in children with associated form of the disease occurs because of reducing severe anaerobes concentration that participate in the enterohepatic circulation of bile acids. A significant ($P < 0,001$) decrease in isovaleric acid level can be explained by weakening of the proteolytic activity of the anaerobic microflora.

Conclusion

Thus, it can be concluded that the associated with diseases of the hepatobiliary system in schoolchildren with DAA has an adverse effect on the biliary tract function, which is reflected not only in the strengthening of dysfunctional disorders with a bile rheology disorder, but also in the threat of diseases such as chronic cholecystocholangitis. In light of the above, following a detailed explanation, it is necessary to create conditions for normal functioning of liver cells, and thus the entire hepatobiliary system, stabilization of cell membranes, providing physiological secretion of bile, restoration of intercellular connections to normalize the outflow of bile in children

with functional disorders of the hepatobiliary system against the background of DAA.

References

- [1]. Belousov YuV. Disfunktsiya biliarnoy sistemyi u detey (Biliary system dysfunction in children) //Zdorove Ukrainyi (Ukraine's health). 2006;22:60-61. (in Russian).
- [2]. Daminov TO, Yakubov RK. Otsenka sostoyaniya zubochehlyustnoy sistemyi u detey s patologiyey zheludochno-kishechnogo trakta (Dental system assessment in children with gastrointestinal tract pathology) //Stomatologiya (Stomatology). 2001;4:63-64. (in Russian).
- [3]. Minushkin NO, et al. Vozmozhnosti i perspektivy izucheniya korotkotsepochechnykh zhirnykh kislot pri patologii zheludochno-kishechnogo trakta na primere zabolevaniy kishechnika i organov gepatobiliarnoy sistemyi (The possibilities and prospects of studying short-chain fatty acids in the pathology of the gastrointestinal tract on the example of intestinal diseases and organs of the hepatobiliary system) //Klin. lab. diagnostika (Klin. lab. diagnostics). 2004;2:19-39. (in Russian).
- [4]. Guseva AA, Gurova MM. Sostoyanie gepatobiliarnoy sistemyi, metabolicheskie harakteristiki i kachestvo zhizni u detey s izbytkom massyi tela i ozhireniem (Hepatobiliary system status, metabolic

characteristics, and quality of life in children with excess body weight and obesity) //Aktualnyie problemyi abdominalnoy patologii u detey: Mater. XX Mezhdunarodnogo kongressa detskih gastroenterologov Rossii i stran SNG (Actual problems abdominal disease in children: Mater. XX International Congress of pediatric gastroenterologists of Russia and CIS countries). Moskva (Moscow). 2013:360-365. (in Russian).

[5]. Krasnova EV, et al. Diagnosticheskoe znachenie opredeleniya urovney letuchih zhirnyih kislot v krovi i slyune u detey s gastroduodenalnymi zabolevaniyami (Diagnostic value of determination of volatile fatty acids levels in blood and saliva in children with gastroduodenal diseases) //Aktualnyie problemyi abdominalnoy patologii u detey: Mater. XII Kongressa detskih gastroenterologov Rossii i stran SNG (Actual problems of abdominal pathology in children: Mater. XII Congress of pediatric gastroenterologists of Russia and CIS countries). Moskva (Moscow). 2005:90-100. (in Russian).

[6]. Zaytseva OV, Samsyigina GA. Sovremennyye predstavleniya o lechenii detey s diskineziyami zhelchevyivodyaschih putey (Modern ideas about the treatment of children with biliary dyskinesia) //Ros. zhurnal gastroenterologii, gepatologii, koloproktologii (Russian journal of gastroenterology,

hepatology and coloproctology). 1998;1:84-87. (in Russian).

[7]. Krasnova EE, et al. Letuchie i zhirnyie kisloty v krovi i v slyune detey s gastroduodenalnymi zabolevaniyami (Volatile and fatty acids in blood and saliva of children with gastroduodenal diseases) //Klin. lab. diagnostika (Klin. lab. diagnostics). 2005;8:38-40. (in Russian).

[8]. Shames D., Krajden S., Fuksa M. Evidence for the occurrence of the same strain of *Campilobacter pylori* in the stomach and dental plaque //J. Clin. Microbiol. 1989;27:2849-2850. (in English).