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MOLECULAR MECHANISMS OF DEVELOPMENT OF HEPATIC STEATOSIS (LITERATURE REVIEW)

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Abstract: Fatty liver disease (liver steatosis) is the accumulation of fat in liver cells, which is often associated with metabolic disorders and various diseases. The main causes of fatty liver disease are obesity, diabetes mellitus, dyslipidemia and alcohol abuse. In the early stages, the disease may be asymptomatic, but as it progresses it can lead to inflammation (steatohepatitis), fibrosis and cirrhosis of the liver. Diagnosis is based on clinical manifestations, laboratory tests, and imaging techniques such as ultrasound, computed tomography, or magnetic resonance imaging. Treatment includes lifestyle changes, dietary modification, weight loss, and control of concomitant diseases. Early detection and adequate treatment of fatty hepatosis can prevent the development of severe complications and improve the prognosis of the disease.
Key words: Fatty hepatosis, hepatic steatosis, metabolic disorders, obesity, diabetes mellitus, dyslipidemia, alcohol, steatohepatitis, fibrosis, cirrhosis, diagnosis, treatment, lifestyle changes, diet correction, weight loss.

INTRODUCTION

Currently, abdominal obesity is a key diagnostic sign of metabolic syndrome (MS), which is characterized by a complex of clinically significant disorders associated with a decrease in tissue sensitivity to insulin. A number of studies have shown that visceral adipose tissue is more strongly associated with insulin resistance (IR) than subcutaneous fat, which, in turn, appears to be relatively less influential on metabolic processes [4].

The purpose of this study was to examine specific morphological changes in liver tissue associated with fatty liver disease. The study was based on forensic autopsy data and liver tissue samples from 40 patients with a confirmed diagnosis of fatty liver disease, carried out within 24-48 hours after death. The results showed that in fatty liver disease the liver enlarges increases in volume, acquires a rounded shape and a bright yellow tint both on the surface and when cut, and a decrease in tissue density is observed. Histological analysis revealed significant blood filling in the central veins, sinusoidal capillaries and portal venous vessels in all samples. In conclusion, the results of the study confirm that the detected morphological changes in liver tissue are characteristic signs of fatty hepatosis, characterized by fatty degeneration, intralobular inflammation, fibrosis and steatonecrosis, mainly with large-lobular degeneration [5].

The article examines the hypothalamic syndrome of puberty (HSPS) as a form of obesity in children and adolescents, accompanied by an increased risk of cardiovascular and metabolic complications. Particular attention is paid to the case of the development of severe fatty hepatosis in a patient with HSPP who had a history of cytomegalovirus infection. The authors emphasize the relevance of the problem of obesity, especially in childhood and adolescence, noting the increase in morbidity and mortality. They point to the need to study various forms of obesity depending on their etiopathogenesis [6].

MATERIALS, METHODS AND DISCUSSION

The materials of this study were articles, abstracts, abstracts taken from medical websites PubMed, Elsevier, Google academia, Cyberleninca. Their retrospective analysis was carried out.

The study demonstrated that the use of quantitative methods for assessing liver density using computed tomography significantly improves the diagnosis of fatty liver disease. The data obtained showed that indicators of the density of the liver parenchyma can serve as an objective

marker of the severity of changes in the liver. The identified differences in the density of the liver parenchyma in patients with fatty hepatosis and the control group confirm the possibility of using these indicators for early diagnosis and monitoring of pathophysiological changes in the liver.
Thus, the proposed method makes it possible to increase the accuracy and objectivity of X-ray diagnostics of fatty hepatosis, which contributes to the timely diagnosis and treatment of this disease [1].
From the analysis of the article on fatty hepatosis in adolescents with simple obesity (exogenous-constitutional) it follows that clinical and metabolic risk factors play an important role in the development of this disease and the progression of obesity. It has been established that abdominal obesity, insulin resistance and oxidative stress are highly sensitive risk factors, while atherogenic dyslipidemia, hypertriglyceridemia, proinflammatory and prothrombotic status, as well as microalbuminuria are highly specific. In adolescents with obesity and fatty hepatosis, the risk of developing insulin resistance, hypertriglyceridemia, and pro-inflammatory status is significantly higher (3.48, 8.36 and 3.62 times, respectively), which emphasizes the need for the prevention and treatment of fatty hepatosis at the early stages of its formation. It is recommended to use drugs with lipid-lowering and hepatoprotective activity to prevent the development of concomitant pathologies [2].
The article discusses the optimization of diagnostic and treatment approaches in multimorbid patients with fatty hepatosis in the practice of a general practitioner. Particular attention is paid to medical tactics when identifying fatty hepatosis in such patients, taking into account its effect on the course of concomitant diseases, in particular on the cardiovascular system. The authors of the article substantiate the need to determine not only the degree of steatosis, but also the stage of fibrotic changes in the liver, which can progress due to apoptosis of hepatocytes and lead to the development of endothelial dysfunction, which is important for the patient's prognosis. A working option for the treatment of liver steatosis is also proposed, aimed at reducing the progression of fatty degeneration, reducing the risk of developing steatohepatitis and fibrotic changes in the liver. The most promising drugs include ursodeoxycholic and glycyrrhizic acids [3].
An analysis of an article on diabetic ketoacidotic coma (DKA) indicates its high prevalence among acute complications of endocrine diseases. The authors emphasize the importance of teaching patients with diabetes mellitus self-control and behavioral tactics in emergency situations, which helps reduce the risk of ketoacidosis. The study of the pathogenesis of ketoacidosis and the development of optimal treatment regimens led to a decrease in the incidence of deaths, which is confirmed by literature data. However, despite improvements in treatment, the article notes the continued high mortality rate from ketoacidotic coma, estimated at 5-15%. This problem is especially acute in non-specialized medical institutions, where this indicator can be even higher (4-5). The article draws attention to the need to further improve approaches to the diagnosis, treatment and prevention of DCAC, as well as the importance of training not only medical workers, but also patients themselves to prevent acute decompensation of diabetes mellitus. This emphasizes the relevance of further research in the field of endocrinology and diabetes mellitus in order to reduce mortality and improve the quality of life of patients [7].
Analysis of the article on the problem of obesity and metabolic syndrome emphasizes the importance and relevance of this topic in modern medical science and healthcare. The authors note the high prevalence of overweight and obesity among the population, which requires the development and implementation of modern, scientifically based methods of treatment and prevention. The article points out that many researchers call obesity an epidemic of the 21st century. Data from the Research Institute of Nutrition of the Russian Academy of Medical Sciences confirm that overweight is observed in a significant part of the adult population: 60% of women and 50% of men over 30 years of age. These statistics illustrate the scale of the problem

and the need for public health intervention. Particular attention is paid to metabolic syndrome, the prevalence of which among people over 30 years of age in industrialized countries ranges from 10 to 30%. The variability in data on the prevalence of the syndrome is due to the uncertainty of diagnostic criteria. To standardize the diagnosis of metabolic syndrome, clinical criteria have been developed by various international organizations such as the WHO, the US National Cholesterol Education Program and the American Association of Clinical Endocrinologists. Despite differences in definitions, stable criteria for metabolic syndrome remain abdominal obesity, arterial hypertension, hypertriglyceridemia, hypoalpha-cholesterolemia, insulin resistance and carbohydrate metabolism disorders. The article also emphasizes that metabolic syndrome includes diseases such as non-alcoholic fatty liver disease, polycystic ovary syndrome and sleep apnea syndrome. Thus, the authors of the article emphasize the need for further research and development of integrated approaches to the treatment and prevention of obesity and metabolic syndrome, which will reduce their prevalence and improve the quality of life of patients [8].

An analysis of an article on fatty hepatosis, or steatohepatosis, highlights the lack of public awareness of this disease, despite its high prevalence. Fatty hepatosis is characterized by the accumulation of fat in the liver and occurs quite often, rivaling in frequency such well-known pathologies as arterial hypertension and osteochondrosis. The lack of awareness of fatty liver disease among the general public is alarming as the disease can lead to serious complications including liver cirrhosis and hepatocellular carcinoma. Conclusion: The article highlights the importance of raising awareness of fatty liver disease di population and medical community. The prevalence of this disease requires the development and implementation of effective methods of diagnosis, treatment and prevention. Education and public awareness can play a key role in the early detection and successful treatment of fatty liver disease, which in turn will help reduce the risks of serious complications and improve the quality of life of patients [9].

Analysis of an article on non-alcoholic fatty liver disease in children and adolescents reveals important aspects of the pathogenesis and prevalence of this disease among young people. The disease occurs not only in adults, but also in adolescents and children, which is associated with an increase in the number of patients with obesity, diabetes and insulin resistance. The purpose of the study was to evaluate and compare laboratory and instrumental data in children with non-alcoholic fatty liver disease of endocrinological nature. The study involved 67 children and adolescents, among whom 41 children had type I diabetes mellitus and 27 were obese[13,14,15]. The results showed that obese children were more likely to have increased alanine transaminase levels compared to children with diabetes ($p=0.047$). There was also a trend toward more frequent increases in triglycerides, cholesterol, and low-density lipoprotein levels in children with diabetes, but no significant differences were found between groups[16,17,18]. Ultrasound examination of the abdominal organs revealed signs of fatty hepatosis in all patients, without significant differences between the groups.

CONCLUSION

The article highlights the importance of early diagnosis and treatment of non-alcoholic fatty liver disease in children and adolescents, especially in the context of endocrinological diseases such as diabetes and obesity[11,12]. The results of the study indicate the need to develop specialized prevention and treatment programs for this age group. Increasing awareness among the medical community and the public about the risks and signs of fatty liver disease may lead to more effective management and treatment of this disease, which in turn will improve the health and quality of life of young patients [10].

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