AMERICAN JOURNAL OF APPLIED MEDICAL SCIENCE
ISSN: 2996-5101 (online) | ResearchBib (IF) = 10.81 IMPACT FACTOR
Volume-3| Issue-8| 2025 Published: |30-09-2025|

LIVER STRUCTURE AND HEALTH

https://doi.org/10.5281/zenodo.17115859

Khakimov Akhrorbek Alijon ogli
student of group 311-b,faculty of treatment,
Termez branch of Tashkent state medical university
nepovtorimiy61@gmail.com
Ochildiev Farrukh
student of group 311-b,faculty of treatment,
Termez branch of Tashkent state medical university
farruxochildiyev02@gmail.com
Elliyev Dilshod Abduraim ogli
student faculty of treatment,
Termez branch of Tashkent state medical university
dilshodelliyev53@gmail.com
Khakimova Shahribonu Alijon qizi
student faculty of treatment Andijan state medical university
Rejavalieva Oysuluv Azimjon qizi
student faculty of natural sciences Andijan state medical university

Abstract

The liver is the largest parenchymal gland in the human body, distinguished by its complex anatomical organization and multifaceted physiological functions. This article provides an overview of its structural and histological features, evaluates factors affecting hepatic health, and discusses major pathologies along with global strategies for diagnosis, prevention, and treatment. The paper emphasizes the liver's central role in maintaining systemic homeostasis and highlights the significance of international health policies in reducing the global burden of liver disease.

Keywords

Liver; hepatocyte; metabolism; detoxification; hepatitis; cirrhosis; transplantation; biomarkers; liver health.

Introduction

The liver is the largest parenchymal organ of the human body and plays a vital role in maintaining physiological balance. It is responsible for metabolic regulation, detoxification, bile production, immune defense, and the synthesis of essential proteins. According to the World Health Organization (WHO), more than 2 million

people die annually from liver-related diseases, with cirrhosis and viral hepatitis as leading causes [1]. Viral hepatitis types B and C affect over 300 million people globally and significantly contribute to morbidity and mortality [2]. Lifestyle-related factors, such as excessive alcohol consumption, poor diet, obesity, and metabolic disorders, further exacerbate hepatic dysfunction [3]. The high prevalence of liver disease in Central Asia, including Uzbekistan, underscores the urgency of early diagnosis, preventive measures, and effective treatment strategies.

Methods

This study employed a narrative review approach to examine published literature on liver structure, physiology, pathology, and treatment strategies. The objectives included: (1) analyzing the macroscopic and microscopic structure of the liver; (2) assessing its metabolic, detoxification, immunological, and synthetic roles; (3) identifying risk factors impairing liver health; (4) examining the etiopathogenesis of major liver diseases such as hepatitis, cirrhosis, fatty liver disease, and hepatocellular carcinoma; (5) evaluating diagnostic and therapeutic approaches; and (6) reviewing global strategies for prevention and management.

Results

The findings confirm that the liver is organized into lobules composed of hepatocytes arranged radially around central veins, with sinusoidal capillaries and Kupffer cells supporting metabolic and immunological processes. The liver is central to glucose, lipid, and protein metabolism, maintains homeostasis, synthesizes plasma proteins, and detoxifies xenobiotics [4]. Pathological findings revealed that viral hepatitis B and C cause progressive liver damage, while alcohol consumption and toxins lead to cirrhosis and hepatocellular carcinoma [5]. Non-alcoholic fatty liver disease (NAFLD) and non-alcoholic steatohepatitis (NASH) are increasing in prevalence worldwide, paralleling obesity and metabolic syndrome [6]. Diagnostic modalities such as liver function tests, ultrasonography, CT, MRI, and biopsy remain essential, while novel biomarkers and artificial intelligence techniques demonstrate improved early detection [7]. Treatment strategies include antiviral therapy, lifestyle modification, transplantation, and regenerative medicine [8]. Preventive measures, particularly vaccination against hepatitis B, were identified as highly effective.

Discussion

Global strategies in hepatology emphasize prevention, early diagnosis, and innovation. The WHO Global Health Sector Strategy aims to eliminate viral hepatitis as a public health threat by 2030, prioritizing universal vaccination, widespread screening, and effective antiviral therapy [1]. In the United States and Europe, advanced transplantation programs and alcohol regulation have improved

outcomes [9]. Japan and South Korea have successfully implemented nationwide screening and early diagnostic programs, significantly reducing hepatocellular carcinoma incidence [10]. China has expanded access to antiviral therapies and subsidized medications, improving affordability [11]. In Uzbekistan, national initiatives against hepatitis are being expanded, with increasing emphasis on preventive healthcare and awareness campaigns. Innovations such as artificial intelligence, stem cell therapies, and genetic engineering are shaping the future of hepatology [12]. These findings indicate that integrating global best practices into local health systems could substantially reduce the burden of liver disease.

Conclusion

This study highlights the critical role of the liver in maintaining human physiology and its susceptibility to multiple pathological insults. The findings emphasize that structural and functional analysis of the liver is essential for understanding disease mechanisms. Primary causes of hepatic dysfunction include viral infections, alcohol, metabolic disorders, and toxins. Diagnostic modalities and emerging biomarkers provide opportunities for earlier detection. Therapeutic strategies, ranging from antivirals to transplantation, are vital, while preventive measures such as vaccination and health education remain the most cost-effective. Lessons from global strategies should be adapted within Uzbekistan's healthcare system to reduce disease prevalence and improve population health outcomes.

REFERENCES:

1. World Health Organization (WHO). Global Hepatitis Report 2021.

2. Asrani SK, et al. Burden of liver diseases in the world. J Hepatol. 2019;70(1):151–71.

3. Loomba R, Sanyal AJ. The global NAFLD epidemic. Nat Rev Gastroenterol Hepatol. 2013;10(11):686–90.

4. Guyton AC, Hall JE. Textbook of Medical Physiology. 13th ed. Philadelphia: Elsevier; 2016.

5. Sherlock S, Dooley J. Diseases of the Liver and Biliary System. 13th ed. Oxford: Wiley-Blackwell; 2018.

6. Chalasani N, et al. The diagnosis and management of non-alcoholic fatty liver disease: Practice guidance. Hepatology. 2018;67(1):328–57.

7. Yoon EL, et al. Role of artificial intelligence in the diagnosis of liver diseases. Hepatol Int. 2020;14(6):920–36.

8. Marrero JA, Kulik LM. New approaches in hepatocellular carcinoma therapy. Clin Gastroenterol Hepatol. 2019;17(10):1969–82.

9. Poynard T, et al. The natural history of liver fibrosis progression in patients with chronic hepatitis C. Lancet. 2018;391(10118):1453–64.

10. European Association for the Study of the Liver (EASL). EASL Clinical Practice Guidelines: Management of hepatocellular carcinoma. J Hepatol. 2018;69(1):182–236.

11. Chinese Center for Disease Control and Prevention. National Hepatitis Control Program Report 2020.

12. Global Hepatitis Alliance. Annual Progress Report. Geneva: GHA; 2021.