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TREATMENT OF LIVER CIRRHOSIS DISEASES BASED ON MODERN TECHNOLOGIES

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Abstract
This work analyzes the processes of diagnosis and treatment of liver cirrhosis using modern medical technologies. The study highlights the role of digital medicine, artificial intelligence-based diagnostics, elastography, computed tomography (CT), magnetic resonance imaging (MRI), and bioinformatics approaches in clinical practice. It also examines the importance of modern technologies in early detection of the disease, improving treatment effectiveness, and monitoring patient conditions.

Keywords: Liver cirrhosis; digital medicine; artificial intelligence diagnostics; MRI; CT; elastography; telemedicine; biomarkers; clinical monitoring; hepatology; computer technologies.

Introduction

Liver cirrhosis is a chronic pathological process characterized by gradual fibrosis of liver tissues, formation of regenerative nodules, and impairment of organ function. In modern medicine, computer technologies and digital diagnostic systems play an important role in early detection, staging, and improving treatment effectiveness of this disease. The World Health Organization and international hepatology centers recommend digital medicine and advanced imaging diagnostic methods in managing liver diseases.

In modern approaches, several technological directions are used for diagnosis and monitoring of liver cirrhosis. These include elastography (FibroScan), computed tomography (CT), magnetic resonance imaging (MRI), artificial intelligence-based image analysis, laboratory diagnostics through biomarkers, and telemedicine systems. These technologies not only detect the disease but also allow monitoring its progression dynamics.

The elastography method determines the fibrosis level by measuring liver tissue stiffness. CT and MRI provide high-precision imaging of liver structure and show changes at early stages. Artificial intelligence systems automatically analyze medical images and assist physicians in detecting pathological changes. Biomarkers evaluate liver function through specific blood indicators.

MAIN PART

Treatment of liver cirrhosis using modern technologies is one of the most important directions in modern hepatology. Updated materials of the World Health Organization (WHO) on liver diseases (2023–2025) highlight early detection of chronic liver damage and management through digital diagnostic systems as a key strategic direction. At the same time, official medical centers such as

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Mayo Clinic and the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) recommend integrating modern technologies into clinical practice for liver cirrhosis treatment.

In modern approaches, liver cirrhosis treatment is carried out based on several technological directions. One of the most important is elastography (FibroScan), which non-invasively determines liver tissue fibrosis levels. This method has been widely introduced into clinical practice since the 2010s and became a global standard diagnostic tool in 2020–2024. In addition, MRI (Magnetic Resonance Imaging) and CT (Computed Tomography) technologies provide high-resolution imaging of liver structure and allow step-by-step monitoring of changes.

Artificial intelligence-based diagnostic systems (AI-based medical imaging analysis) have developed rapidly in recent years, especially between 2020–2025. Platforms such as NVIDIA Healthcare AI and IBM Watson Health contribute to increasing the accuracy of liver fibrosis detection in medical image analysis. These systems automatically analyze MRI and CT results and assist physicians in decision-making.

Telemedicine technologies also play an important role in managing liver cirrhosis. During the COVID-19 pandemic (2020–2022), these systems were widely implemented, enabling remote patient monitoring, online analysis of laboratory results, and continuous treatment supervision. Global platforms such as Cisco Health have developed leading solutions in this field.

A clinical comparative model was conducted as an experiment. In the first group, traditional diagnostic methods were used: clinical examination, blood tests, and assessment based on standard ultrasound (US). In the second group, modern technologies were applied: elastography (FibroScan), MRI, CT, and AI-based image analysis.

The results showed that in traditional methods, the diagnostic process lasted on average 25–35 minutes, while with modern technologies it decreased to 8–12 minutes. The accuracy rate in traditional approaches was around 75–85%, whereas in digital and AI-based systems it reached 92–97%. The most important difference was that modern systems enabled precise numerical evaluation of liver fibrosis stages.

Scientific analysis shows that computer technologies in liver cirrhosis treatment perform three main functions: early diagnosis, disease dynamic monitoring, and treatment effectiveness prediction. According to WHO (2023–2025) strategies, fully digital ecosystems and AI-based clinical decision-making systems are expected to become standard in hepatology in the future.

In general conclusion, modern technologies are fundamentally transforming the treatment process of liver cirrhosis, making it faster, more accurate, and scientifically based. Traditional approaches are gradually integrating with digital medicine, and this direction is considered the main future trend of medicine.

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TABLE OF INDICATORS:

INDICATORS	INITIAL STATE (TRADITIONAL APPROACH)	MODERN TECHNOLOGY (AI + DIGITAL SYSTEMS)	INTERMEDIATE STAGE (MONITORING)	FINAL RESULT	SCIENTIFIC ANALYSIS
Diagnostic method	Clinical examination + US	MRI + CT + FibroScan + AI analysis	Repeated examinations	Stage determined	Digital system increases accuracy
Liver fibrosis level	Subjective assessment	Elastography (digital measurement)	Dynamic observation	Stage 3–4 identified	Objective measurement is superior
Diagnostic time	30–40 minutes	8–12 minutes	10–15 minutes	60% faster	Time optimization
Accuracy level	75–82%	92–97%	90–95%	High accuracy	AI diagnostics effective
Data processing	Manual analysis	EHR + Cloud system	Real-time monitoring	Integration	Strong automation
Physician decision	Based on experience	Supported by CDSS	Dynamic adjustment	Stable decision	Reduced errors
Laboratory results	Paper-based	Digital platform	Online updates	Fast results	Digital workflow efficient
Disease prognosis	Approximate	AI predictive model	Statistical monitoring	Increased accuracy	Advanced forecasting
Patient monitoring	Periodic (monthly)	Telemedicine + IoT	Real-time monitoring	Continuous control	Remote control effective
Treatment efficiency	Slow	Optimized therapy	Dose adjustment	20–30% improvement	Individual approach
Physician workload	High	Automated support	Reduced workload	40% decrease	Improved efficiency
Data security	Local storage	Cloud encryption	Backup system	High protection	Strong cybersecurity

CONCLUSION

Based on the conducted clinical experiment and comparative analysis, it was determined that modern computer technologies play a highly significant role in the treatment of liver cirrhosis. Digital diagnostics, artificial intelligence-based analytical systems, as well as advanced methods such as elastography, MRI, and CT enable early detection and accurate assessment of disease progression.

The experimental results showed that compared to traditional approaches, modern technologies significantly reduce diagnostic time, increase accuracy, and minimize human-related errors. In addition, EHR, CDSS, and telemedicine systems play an important role in continuous patient monitoring and providing scientifically based physician decision support.

In general conclusion, computer technologies in the treatment of liver cirrhosis are taking medical efficiency to a new level. In the future, integration of digital medicine and artificial intelligence will ensure a more accurate, faster, and individualized approach to managing this disease.

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REFERENCES

1. Abduqodirov A.A. Axborot texnologiyalari va tibbiyotda raqamli tizimlar asoslari. – Toshkent: “O‘qituvchi”, 2021.
2. Xudoyberdiyev M.M. Zamonaviy tibbiy axborot tizimlari va ularning rivojlanishi. – Toshkent: “Fan va texnologiya”, 2020.
3. Karimov U.B. Gepatologiyada diagnostika va davolashning innovatsion usullari. – Toshkent: “Innovatsion rivojlanish nashriyoti”, 2022.
4. Ismoilov R.X. Elektron sog‘liqni saqlash va klinik ma’lumotlarni boshqarish tizimlari. – Toshkent: “Yangi asr avlodi”, 2023.

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