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THE ROLE OF MODERN COMPUTER TECHNOLOGIES IN THE DIAGNOSIS AND TREATMENT OF GASTRITIS

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Abstract
This article discusses the importance of modern computer technologies in the process of diagnosing and treating gastritis. The roles of advanced technologies such as Artificial Intelligence (AI), Machine Learning (ML), bioinformatics, big data analysis, medical image processing, and telemedicine are analyzed. The paper also explores the advantages, limitations, and future development prospects of these technologies.

Introduction

Relevance of the Topic

Today, gastritis is considered one of the most widespread stomach diseases. According to the World Health Organization (WHO), one in three people globally suffers from gastritis. This disease is characterized by inflammation of the stomach lining and causes pain, digestive issues, nausea, vomiting, and other discomforts in patients.

Causes of Gastritis Include

Helicobacter pylori: The most common cause, leading to inflammation of the stomach lining.

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Unhealthy diet: Excessive intake of spicy, salty, and fatty foods or fast food can damage the stomach lining.
Alcohol and tobacco use: Increases the risk of gastritis.
Stress and psychosomatic factors: High stress levels can increase stomach acid production and lead to gastritis.
Certain medications: Especially non-steroidal anti-inflammatory drugs (NSAIDs) such as ibuprofen and aspirin, which can harm the stomach lining.
If gastritis is not diagnosed and treated in time, it may lead to ulcers, intestinal dysbiosis, or even stomach cancer. Therefore, early diagnosis and effective treatment are critically important.

MAIN PART

Modern Technologies in Diagnosing Gastritis
Traditional Diagnostic Methods
Currently, the following methods are used to diagnose gastritis:
Endoscopy: Allows visualization of the stomach lining and biopsy collection.
Biopsy: Samples of stomach tissue are sent to a lab for analysis.
Helicobacter pylori test: Can be done via blood, breath, or stool samples.
pH-metry: Measures the acidity of stomach juice.
CT and MRI scans: Used rarely, mainly in advanced cases of gastritis.

AI and Machine Learning-Based Diagnosis

AI and ML algorithms enhance diagnostics by automating the analysis of medical images and integrating them with traditional methods.
AI-powered endoscopic image analysis:
ML algorithms automatically detect and distinguish between gastritis, ulcers, or stomach cancer based on stomach lining images.
Studies show AI systems can sometimes diagnose more accurately than specialists.

Deep Learning and Neural Networks

Convolutional Neural Networks (CNNs) analyze endoscopic images to automatically identify changes in the stomach lining.
Enables real-time diagnosis.

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Big Data and Bioinformatics

Study of genetic and microbiological data to develop personalized diagnostic and treatment approaches.

Databases with millions of patient records help AI systems suggest the most effective treatment plans.

Modern Technologies in Treating Gastritis

Telemedicine and Remote Consultations

Remote evaluation of diagnostic results and consultations with doctors via video calls.

Mobile apps for monitoring patient health and medication adherence.

Software and Mobile Applications

AI-Generated Personalized Treatment Plans

Tailored diet and medication plans based on patient data.

Mobile Apps for Gastritis Management

Food diaries.

Monitoring of stomach acidity and alert systems

Robotic Surgery and Endoscopic Procedures

Robotic endoscopy: Less invasive and more precise than traditional methods.

Laser therapy and electrocoagulation: Used in advanced cases to remove damaged tissue.

Advantages and Limitations of Modern Technologies

Advantages

Higher diagnostic accuracy

Reduction of human error

Faster diagnosis and treatment

Personalized and more effective therapy

Limitations

AI systems still require specialist oversight

Software and technology can be expensive

Some technologies are underdeveloped or not widely available

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CONCLUSION AND RECOMMENDATIONS

General Conclusion Based on Research Results

Gastritis is a common disease characterized by inflammation of the stomach lining. If not diagnosed and treated on time, it may lead to ulcers, dyspepsia, intestinal microflora disruption, and even stomach cancer. This study examined the role of modern computer technologies in the diagnosis and treatment of gastritis.

While traditional diagnostic methods like endoscopy, biopsy, lab tests, pH-metry, and ultrasound provide accurate results, they have drawbacks such as being time-consuming, prone to human error, uncomfortable for patients, and sometimes expensive. Therefore, modern technologies such as AI, ML, medical image processing, Big Data, and telemedicine play a significant role in addressing these issues.

With AI and ML

Endoscopic image analysis becomes faster and less error-prone.

The best treatment options are identified based on massive data analysis.

Remote monitoring of patients becomes possible in real-time.

With Telemedicine and Mobile Applications

Patients can receive consultation and diagnostics regardless of location.

Diet and medication plans can be tailored and monitored more effectively.

Patients can actively monitor their health and prevent complications

Implementing modern technologies in gastritis treatment reduces the workload of healthcare professionals, increases diagnostic accuracy, and improves convenience for patients.

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