Artificial Intelligence Approaches for Improved Ultrasound Diagnosis of Liver Cirrhosis: A Review

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Abstract

Cirrhosis is a chronic, progressive disease characterized by the replacement of normal liver architecture by scar tissue, forming regenerative nodules. Cirrhosis has become a major public health problem, both because of its growing prevalence and the diversity of its complications, and their negative impact on patients' quality of life. The complexity of diagnosing cirrhosis, particularly in its early stages, remains a challenge due to its clinical and morphological heterogeneity. Ultrasound, although widely used, has limitations in the subjective interpretation of images. Faced with these limitations, artificial intelligence (AI), and more specifically machine learning and deep learning techniques, offer great prospects for improving ultrasound image analysis. This review aims to: (1) present recent methods for assessing liver fibrosis (F0 to F4) using machine learning; and (2) list cutting-edge solutions for diagnosing liver cirrhosis based on artificial intelligence, radiomics and ultrasound-omics. Based on a comparative analysis of existing studies, we focus on advances, limitations and specific ways to improve the accuracy and efficiency of AI-assisted ultrasound diagnosis.

Keywords

Machine learning, Ultrasound, Liver Cirrhosis, Hepatitis, Deep learning, Machine learning, Diagnosis.