MicroRNAs as potential biomarkers of heart failure

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Introduction: Heart failure (HF) affects 38 million people globally, contributing to increasing hospitalization rates and placing a significant burden on healthcare systems worldwide. Routinely used biomarkers for diagnosis, therapy monitoring, and evaluation of HF are B-type natriuretic peptide (BNP) and its N-terminal prohormone's fragment of B-type natriuretic peptide (NT-proBNP); however, both have limitations.[1-3] Therefore, it is important to discover new biomarkers for early diagnosis. MicroRNAs (miRNA, miR) are small, non-coding ribonucleic acids with around 22 nucleotides. They are involved in the posttranscriptional regulation of numerous genes.[2] Their stability, non-invasive availability, high sensitivity, and specificity for disease make them promising biomarkers for various pathological states, including HF.[3]

Methods: The PubMed database was searched using the keywords "microRNA" and "heart failure". The analysis included systematic reviews and meta-analyses published from 2019 to 2024.

Results: According to the research, several miRNAs (miR-21, miR-30c, miR-210-3p, let-7i-5p, miR-129, let-7e-5p, and miR-622) were identified as potential biomarkers for HF diagnosis.[3] Studies also indicate that the expression of specific miRNAs is positively or negatively correlated with the New York Heart Association functional class and left ventricular ejection fraction (LVEF), which may be valuable for evaluating the severity and prognosis of HF.[1-2] Panels of various miRNAs have demonstrated high sensitivity and specificity in distinguishing between HF with reduced and preserved LVEF.[2]

Conclusion: MicroRNAs have big potential as novel biomarkers of HF.[3] They remain unusable in routine diagnostics due to issues including unstandardized methods for measuring their expression and long turnaround times. However, when combined with well-known biomarkers and diagnostic tools like BNP, NT-proBNP, and echocardiography, they could enable earlier and more precise diagnoses and better monitoring of patients with HF.[2]

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LITERATURE

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