Study suggests novel biomarker for predicting AFib progression

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A human study published in *The FASEB Journal* suggests a novel type of biomarker to predict the progression of atrial fibrillation (AF), the most common form of irregular heart rhythm. Despite inconsistent evidence to date, one idea that has surfaced is that AF may be regulated by alterations in circulating microRNAs (miRNAs), which regulate cell-to-cell communication. If this hypothesis were correct, by better understanding such alterations, scientists could potentially monitor the progression of heart disease.

Researchers at Seoul's Yonsei University recently tested a hypothesis that exosomal miRNAs could be used as biomarkers to monitor AF progression. Exosomal miRNAs are highly stable, as they are protected from degradation by their encapsulation in exosomes (small membrane vesicles secreted by most cell types that contain samples mirroring the genetic information of their original cells).

In conducting the human study, the research team aimed to identify differences in exosomal miRNA by evaluating different stages of AF. Researchers assessed serum exosomal miRNA from three groups: 1) patients with a sinus rhythm, or supraventricular tachycardia (SVT); 2) patients with intermittent AF; and 3) patients with persistent AF. Patients with SVT were designated as controls.

Interestingly, the study found that patients with persistent AF demonstrated the highest expression of five miRNAs that are associated with signaling pathway, atrial function and structure, oxidative stress, and fibrosis involved in AF. Significant miRNA changes can be observed in persistent AF patients; thus, serum exosomal miRNAs may be used as novel biomarkers to predict the various stages of AF.

"Our study shows that early diagnosis of AF will be possible through exosomes, the messenger of the cells," said Dasom Mun, a researcher with the Division of Cardiology, Yonsei University College of Medicine, and Brain Korea 21 PLUS Project for Medical Science, Yonsei University. "It is our hope that these newly discovered biomarkers will eventually be helpful for heart disease risk stratification and therapy."

"The idea that circulating microRNAs impact cells at distal sites is expanding but not confirmed. This study adds a bookmark in this evolving hypothesis," said Thoru Pederson, Ph.D., Editor-in-Chief of *The FASEB Journal*.

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