The characteristics and diagnostic value of serum lipids metabolomics profile in atrial fibrillation patients

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Introduction: The pathophysiologic mechanism of AF remains poorly understood, and there has been a lack of circulatory markers to diagnose and predict prognosis of AF. In this study, by measuring serum lipids metabolic profile and analyzing serum lipids levels in AF patients, we sought to determine if serum lipids metabolism was correlated to the occurrence of atrial fibrillation.

Methods: In this cross-sectional study, we analyzed serum lipids profile in AF and control patients using a lipidomics approach. Consecutive patients admitted to hospital for AF were enrolled. Serum samples were obtained after overnight fast. Nontargeted metabolomics was applied to demonstrate lipids metabolic profile in control and AF patients.

Result: A total of 63 and 62 lipids were detected in negative and positive ion mode respectively. Among them, 16:0 Lyso PC, 18:0-20:4 PE, 24:0 SM, 20:0 ceramide, 24:0 ceramide, 24:1 ceramide in negative ion mode and 18:0 PC (DSPC) and 24:1 ceramide in positive ion mode were significantly altered in AF as compared to control. 24:0 ceramide, 24:1 ceramide, 20:0 ceramide, 18:0-20:4 PE in negative ion mode and 24:0 ceramide, 24:1 ceramide, 20:0 ceramide in positive ion mode showed prediction value for AF.

Conclusion: Using non-targeted metabolomics profiling, we have successfully identified a group of circulating lipids that were significantly altered in AF. The lipids metabolic signatures shed light on potential new biomarkers and therapeutics for preventing and treating AF.