

Abstract

INFLOXAR - Investigation of causes of atrioventricular conduction disorders with comparison of muscle and physiological cardiac stimulation through multiparametric assessment of oxidative stress, immune response and common mechanisms.

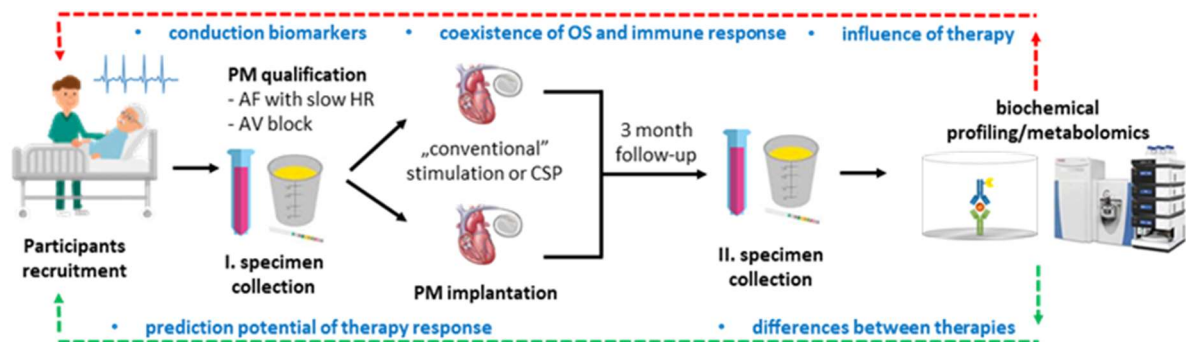
Introduction

Atrioventricular block (AVB) is a condition where the electrical signals between the heart's atria and ventricles are disrupted, leading to a slow heart rate. It can cause symptoms like: fatigue, dizziness and reduced physical efficiency. AVB can also lead to serious complications like heart failure, syncope and sudden cardiac death. One of the therapeutic options for managing severe AVB is pacemaker implantation. There are two main pacing methods: muscle and conduction system pacing (CSP). CSP is a new era in cardiology, with increasing interest in said procedure in recent years. CSP in the long-term is said to have less harmful effects on functioning of the heart and may even mitigate or prevent the development of heart failure in patients with prolonged pacing. CSP may also significantly improve available treatment for patients suffering from pacemaker induced cardiomyopathy (PICM). PICM is a severe complication caused by long-term pacing and its effect on cardiac remodeling.

Objective

Pathogenesis of atrioventricular block is complicated and still underexplored. Recent studies suggest that systemic and mitochondrial oxidative stress may play a significant role in it. Immune system and inflammatory response are also said to play an important part in AVB pathogenesis. This study aims to explore how oxidative stress and inflammation impact heart health and function. Our key objectives include:

1. Investigating Oxidative Stress: Analyzing levels and causes of oxidative stress and inflammation in AVB patients to understand their effects on heart function.
2. Understanding Molecular Pathways: Studying how oxidative stress and immune response influence the heart's electrical conduction processes.
3. Comparing Pacing Methods: Evaluating the effects of traditional pacing versus physiological pacing on cardiac functions and related biochemical changes.
4. Developing Diagnostic Tools: Creating new biomarkers to predict risks of developing certain conduction disorders and assess the effectiveness of different pacing treatments.



Potential outcomes

This research project focuses on improving diagnostics and treatments for patients with atrioventricular blocks and slow heart rate who require pacemaker implantation. By examining cytokines, redox markers, and proteins involved in cardiac conduction, this study could provide new insights into arrhythmia management, offering a pathway for novel diagnostics and treatments options and improved patient care. Furthermore through this research, the project aims to provide data that will stimulate development of personalized treatment strategies for individuals with heart conduction disorders.