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Autonomic neuromodulation to treat atrial fibrillation

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Atrial fibrillation (AF) is the most commonly encountered arrhythmia. Catheter or surgical ablation, aiming at isolating the pulmonary veins to eliminate the triggers and substrate of AF is the therapy of choice for drug-refractory AF. Despite the advances of the ablation technologies, the success rate of AF ablation remains disappointing. It is evident that pulmonary vein isolation (PVI) is not enough to treat even the earliest stage of AF, paroxysmal AF, not to speak more advanced stages of AF. It is known that simultaneous activation of the sympathetic and parasympathetic nervous system plays a major role in the initiation and maintenance of AF. Interventions targeting these neural elements have been shown to favorably affect the clinical course of AF. Multiple preclinical studies demonstrated that low-level vagal stimulation at the strength not slowing the sinus or atrio-ventricular conduction was capable of suppressing AF initiation as well as terminating AF. Injection of botulinum toxin into major atrial ganglionated plexi, the integration centers of the cardiac autonomic nervous system, not only prevented post-operative AF in paroxysmal AF patients undergoing open-heart surgeries but also significantly suppressed the progression of AF in these patients. Recently, a novel therapy by transcutaneous stimulation of the auricular branch of the vagus nerve demonstrated its efficacy on shortening the AF duration, prolonging the atrial effective refractory period as well as suppressing the inflammatory markers such as TNF- α and CRP in paroxysmal AF patients undergoing AF ablation. Results of these recent clinical studies indicate that autonomic neural modulation may be a novel and noninvasive therapy for patients suffering from drug-refractory AF.

Biography

Sunny Po is a Cardiac Electro-physiologist and has his expertise in "The effects of the autonomic nervous system on cardiac arrhythmias". He has discovered that simultaneous activation of the sympathetic and parasympathetic nervous system plays a great role in triggering atrial fibrillation. He also pioneered the therapy of using low-level vagal stimulation at the strength not slowing the sinus rate or atrioventricular conduction to treat atrial fibrillation.

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