

Reduced Arrhythmia Burden in a Resistant Hypertensive Patient Receiving Baroreflex Activation Therapy® from an Implantable Device

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Heart Rhythm 2009;6(5):S327.

Introduction

Chronic hypertension is associated with adverse left atrial and ventricular remodeling which provides a greater substrate for cardiac arrhythmia due to increased fibrosis and myocardial mass.

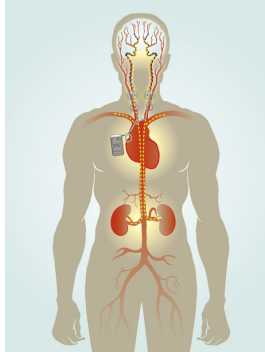
Rheos® Hypertension Therapy (HT), an implantable device which uses Baroreflex Activation Therapy® (BAT®) technology, has been shown to be effective in reducing blood pressure (BP) and myocardial mass in drug-resistant hypertensive patients.

It has also been shown to decrease sympathetic tone and increase parasympathetic tone in resistant hypertensive patients.

This case describes marked reduction in ventricular arrhythmia burden in a patient with resistant hypertension who was treated with the Rheos HT device.

Mechanisms of Rheos Therapy

The Rheos HT device is designed to electrically activate the carotid baroreceptors, the body's natural cardiovascular regulation sensors. When the baroreceptors are activated, signals are sent through neural pathways to the brain and interpreted as a rise in blood pressure. The brain works to counteract this perceived rise in blood pressure by sending signals to other parts of the body (heart, blood vessels and kidneys) that relax the blood vessels and inhibit the production of stress-related hormones. These changes enable the heart to increase stroke volume, while maintaining or reducing workload, thereby alleviating symptoms of chronic hypertension.



Methods

A 54 year old male (BMI: 30.6 kg/m²) without history of renal disease or diabetes, but history of resistant HTN (Office BP = 202/116 mmHg and 24-hour Ambulatory BP = 180/113 mmHg despite taking five different anti-hypertension medications) was implanted with the Rheos HT System as part of the U.S Feasibility trial assessing the efficacy of the device. The patient did not receive any anti-arrhythmic medications during the course of follow-up.

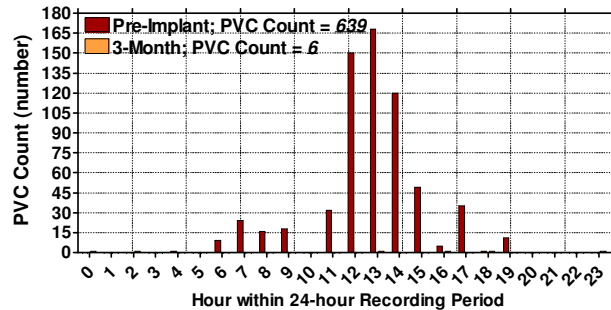
Twenty-four hour Holter monitoring was performed prior to implant and after 3 months of therapy.

Echocardiogram analysis was performed at a blinded core laboratory.

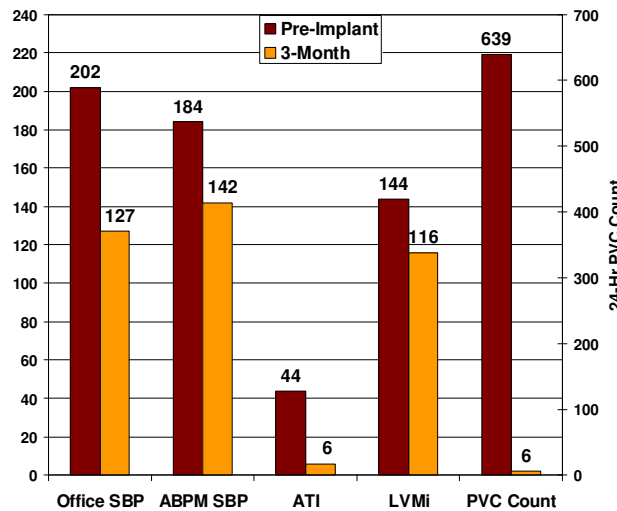
Anti-hypertensive Therapeutic Index (ATI) was calculated to provide a metric that incorporated the dose and quantity of medications. This index thus provided a measure of overall medication load.

Results

Reduction in PVC Count Following 3 Months of BAT



Improvements in BP, ATI, LV Mass Index and Total PVC Count After 3 Months of BAT



Improvement in Cardiac Function and Structure

<u>Cardiac Function</u>	<u>Pre-Implant</u>	<u>3-Month</u>
Heart Rate	85 bpm	81 bpm
Ejection Fraction	67 %	72 %
Stroke Work	292 g/m	182 g/m
Rate Pressure Product	17160 bpm*mmHg	10320 bpm*mmHg
Midwall Fractional Shortening	17.1 %	20.3 %
Mitral E Wave Velocity	78 cm/s	74 cm/s
Mitral A Wave Velocity	100 cm/s	88 cm/s
E:A Ratio	0.78	0.84
<u>Cardiac Structure</u>		
Left Atrial Diameter	42 mm	34 mm
LV Mass	280 gm	227 gm
Left Ventricular Outflow Tract	21 mm	20 mm
Septal Wall Thickness	11 mm	10 mm

Other Findings

- No significant change in BMI was observed in the patient.
- Pre-implant medications included an ACE-inhibitor, ARB, beta-blocker, calcium channel blocker, and diuretic. Due to therapeutic effect of Rheos, patient had all anti-HTN meds, except a diuretic, removed over the 3 month period.
- 6 Minute Hall Walk Distance increased from 360 to 390 meters after Rheos.

Conclusions

- In addition to sustained BP reduction and improved cardiac function, chronic Rheos Therapy reduced occurrence of ventricular ectopy in this patient.
- One possible mechanism explaining these findings is substantial left atrial and ventricular reverse-remodeling.
- These physiologic changes occurred in the presence (early on) and then in the absence of several anti-hypertensive medications.
- Further study is in progress to confirm the potential benefit of Rheos Therapy on arrhythmia reduction in a large patient cohort.

CAUTION: The CVRx Rheos System is an investigational device and is limited by Federal (or United States) law to investigational use only.

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