

Recognition of Baroflex Activation Therapy in Advanced HFrEF

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Abstract:

We present a 71-year-old female with an unknown past medical history who was brought to the hospital by her daughter for progressive altered mental status, bilateral lower extremity edema, and dyspnea over several weeks. The patient previously resided in an out-of-state nursing facility, and prior medical records were unavailable. On evaluation, she was alert and oriented to self only. Vital signs were notable for hypertension (162/93 mmHg), heart rate 88 bpm, and oxygen saturation of 98% on room air. Physical exam demonstrated severe pitting edema to the knees with ruptured bullae and an implantable device over the right chest wall. Point-of-care ultrasound (POCUS) was suggestive of reduced left ventricular ejection fraction, an enlarged inferior vena cava (IVC), and diffuse B-lines. Lab findings were significant for an NT-proBNP >30,000 pg/mL, creatinine 2.5 mg/dL, BUN 54 mg/dL, potassium 5.2 mmol/L, and hemoglobin 11.1 g/dL. Electrocardiogram (EKG) showed normal sinus rhythm with significant artifact. Chest X-ray demonstrated cardiomegaly, bronchovascular congestion, a right-sided pleural effusion, and an unknown implantable device on the right chest wall. On further evaluation, this device was identified as a cardiac neuromodulator.

Discussion:

Cardiac neuromodulators are implantable devices that target the autonomic nervous system and can be used to treat arrhythmias, heart failure, and angina. In her case, this patient had a Barostim™ which focuses on baroflex activation therapy (BAT) that stimulates carotid baroreceptors to improve symptoms in patients with heart failure with reduced ejection fraction (HFrEF). The proposed mechanism of action revolves around delivering electrical impulses to the carotid sinus which eventually lead to modulation of the rostral ventrolateral medulla and nucleus ambiguus. This results in a centrally mediated decrease in sympathetic activity and an increase in parasympathetic outflow. In patients with HFrEF, there is a strong correlation with autonomic dysregulation with parasympathetic withdrawal and overactivation of sympathetic activity leading to disease progression. This is a relatively new form of therapy with the Barostim™ receiving FDA approval in 2019. There are small sample trials (BeAT-HF and HOPE4HF) having data that supports an increased quality of life and exercise capacity. However, there was no statistical difference in cardiovascular mortality and heart failure morbidity. Further studies are currently being done (BENEFIT-HF) to evaluate a mortality and morbidity benefit. This case recognizes emerging technologies which may become more readily available in the upcoming years.