

**Control Number:** 58

**Abstract Category:** Clinical Science in Cardio-Oncology

**Title:** Incidence of Cancer Treatment Induced Arrhythmia Associated with Immune Checkpoint Inhibitors

## **ABSTRACT BODY**

### **Background**

Cancer treated induced arrhythmia (CTIA) is a recognized form of cardiotoxicity associated with chemotherapy. Immune checkpoint inhibitors (ICI) have been associated with important forms of cardiotoxicity, in particular myocarditis. However, the incidence of CTIA associated with ICI has not been well characterized.

### **Methods**

We retrospectively reviewed all patients treated with ICI at our institution from Jan. 2010 to Dec. 2015. CTIA was defined as a new diagnosis of clinically relevant arrhythmias in the 6 months after treatment initiation. Arrhythmias included in the diagnosis of CTIA were atrial fibrillation/atrial flutter (AF), supraventricular tachycardia, sustained ventricular arrhythmias, symptomatic bradycardia and any arrhythmias requiring treatment (either medical or procedural). Arrhythmia diagnoses present prior to the initiation of ICI therapy were not included in the definition of CTIA. We used a combination of EMR database query, billing codes and manual chart review to identify and characterize cases of CTIA.

### **Results**

During the study period, 259 patients were treated with immune checkpoint inhibitors: ipilimumab (n=171), nivolumab (n=52) and pembrolizumab (n=36). Across the cohort, at the time of ICI initiation, mean age was  $60.9 \pm 12.5$  years, 68% were male, and comorbidities included hypertension (62%), diabetes (21%), coronary artery disease (36%), congestive heart failure (10%) and sleep apnea (9%). Four patients (1.5%) developed CTIA. Of these, 3 patients developed a new diagnosis of atrial fibrillation (AF) necessitating treatment by either cardioversion (n=1) or rate control through a cardio-selective beta blocker (n=2). Another patient developed symptomatic sinus bradycardia requiring discontinuation of existing medical therapy including beta blockers and digoxin. Six patients with a pre-existing diagnosis of paroxysmal atrial fibrillation experienced episodes of AF within 6 months of initiating ICI therapy. None of the arrhythmic events were associated with known or suspected myocarditis.

### **Conclusion**

The incidence of arrhythmic complications associated with ICI appears to be low. Male sex, diabetes mellitus, and a past medical history of congestive heart failure were all associated with an increased risk of CTIA.

### **Clinical Implications**

Patients with a history of paroxysmal AF may be at-risk for developing episodes during treatment. These findings add to the data on the safety and cardiovascular toxicity profile of ICIs's.