Biomedical and Case Reports Open Access Open Journal

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Case Report

Acute ST Elevation Myocardial Infarction Following an Initial Sipuleucel-T Infusion for Castration Resistant Prostate Cancer

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Received: Jan 19th, 2021; **Revised:** Jan 21st, 2021; **Accepted:** Jan 22nd, 2021; **Published:** Jan 25th, 2021

Citation: Balanchivadze N*, Afana M, Al-Saheli Z, Singh S, Hwang C. Acute ST elevation myocardial infarction following an initial sipuleucel-t infusion for castration resistant prostate cancer. Biom Case Rep Open A Open J. 2021; 2(1): 41-43. doi: 10.33169/biomcase.BACROAOJ-2-114

ABSTRACT

Sipuleucel-T is a therapeutic cancer vaccine used in patients with metastatic castration resistant prostate cancer. We describe a case of acute ST elevation myocardial infarction in a patient with metastatic prostate cancer receiving his first Sipuleucel-T infusion.

Keywords: *Sipuleucel-T; Castration resistant metastatic prostate cancer; Acute myocardial infarction, Infusion reaction, Therapeutic cancer vaccine, cellular immunotherapy.*

BACKGROUND

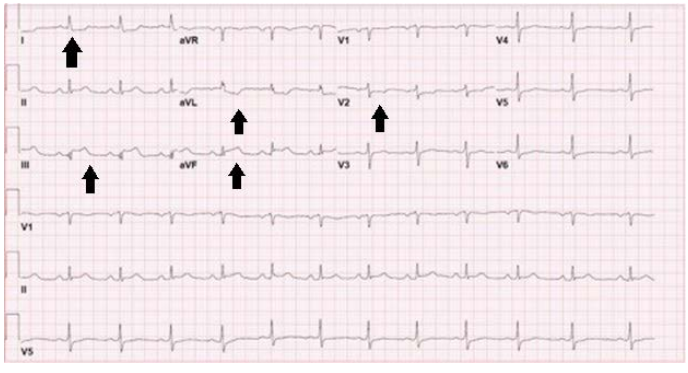
Advances in cancer therapy have improved patient survival; however, treatment-related adverse events (AE) can lead to significant morbidity and may be life-threatening. Sipuleucel-T is the first FDA approved therapeutic cancer vaccine that has shown improved overall survival in patients with metastatic castration resistant prostate cancer (mCRPC).[1,2]

We describe a case of acute ST-segment Elevation Myocardial Infarction (STEMI) that occurred during a patient's first Sipuleucel-T infusion. Our aim is to increase physician awareness of this possible life-threatening complication and to encourage physicians to consider cardiac risk stratification of patients prior to Sipuleucel-T infusion in order to avoid catastrophic outcomes.

CASE PRESENTATION

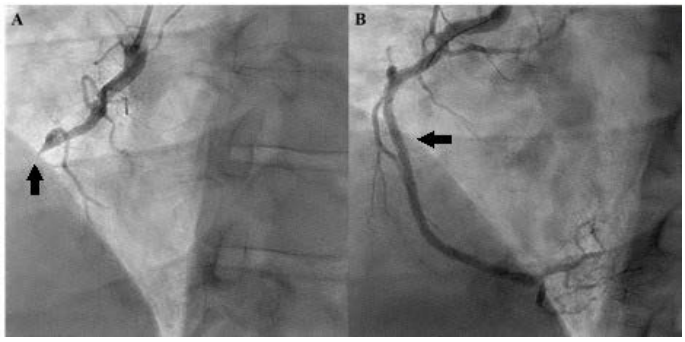
A 59-year-old African American man with mCRPC, hypertension, and type II diabetes developed sudden chills while he was receiving his first Sipuleucel-T infusion. His symptoms resolved after administration of 50 mg of diphenhydramine and the event was initially considered to be an infusion reaction. However, within 20 minutes, he developed substernal chest tightness radiating to his left arm, dyspnea, and diaphoresis. His vital signs included a BP 90/40, HR 94, and oxygen saturation 96% on room air. Aside from diaphoresis, cardiopulmonary, abdominal, and extremity examinations were normal. He was given aspirin 81 mg and sublingual nitroglycerin. EKG showed ST-segment elevation in leads III and AVF with reciprocal depressions in the anterolateral leads (Figure 1).

Figure 1: EKG showed ST-segment elevation in leads III and AVF with reciprocal depressions in the anterolateral leads.



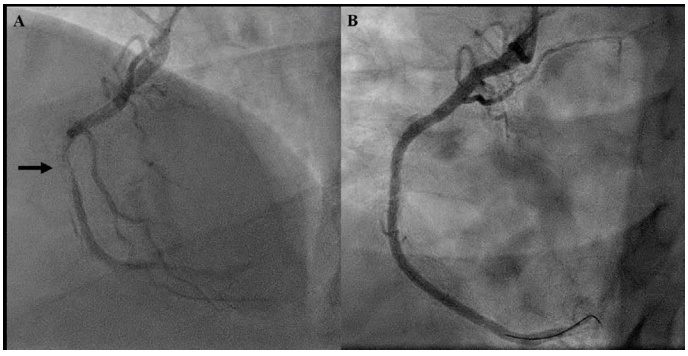
Emergent coronary angiogram revealed a mid-RCA culprit lesion with 99% obstruction with TIMI I flow for which a Synergy drug-eluting stent (DES) was placed (Figure 2).

Figure 2: Emergent coronary angiogram revealed a mid-RCA culprit lesion with 99% obstruction with TIMI I flow for which a Synergy drug-eluting stent (DES) was placed.



During post-procedural recovery, he developed recurrent chest pain with worsening inferior ST-elevations. Repeat angiogram of the recently placed stent revealed acute in-stent thrombosis with distal thrombus embolization (Figure 3). The lesion was treated with balloon angioplasty, and an additional DES was placed proximally to exclude the thrombus. Also, eptifibatide was administered and an intra-aortic balloon pump was placed to improve coronary perfusion. He improved quickly and was later discharged in good condition with appropriate goal directed therapy.

Figure 3: Repeat angiogram of the recently placed stent revealed acute in-stent thrombosis with distal thrombus embolization.



Of note, the patient had no known history of coronary artery disease, and he recently had a normal pharmacologic stress test, echocardiogram, and unremarkable coronary CT scan. Therefore, the acute STEMI was attributed to the Sipuleucel-T infusion, and the primary oncologist deferred future treatments with Sipuleucel-T.

DISCUSSION

Prostate cancer is the most common non-cutaneous malignancy and a leading cause of cancer mortality in men.[3] Androgen-deprivation therapy, the most common treatment, is effective, but the disease eventually progresses in most patients.[4] Castration Resistant Prostate Cancer (CRPC) occurs when the cancer progresses despite low testosterone levels.[5] Historically, the prognosis for CRPC has been guarded, with survival estimates of 18 to 24 months.[6]

Sipuleucel-T, a therapeutic cancer vaccine, is thought to work through antigen presenting cells to stimulate the T-cell immune response targeted against prostatic acid phosphatase, an antigen that is highly expressed in most prostate cancer cells.[2,7] Based on phase 3 randomized trials, Sipuleucel-T is a category 1 recommended option for patients with metastatic CRPC who are asymptomatic or minimally symptomatic, and who have good performance levels.[8] Although almost a decade has passed since its approval, there remains a paucity of literature describing safety data for Sipuleucel-T in the post-marketing period.[1] Safety database information from the studies that led to Sipuleucel-T approval includes 904 patients (601 patients treated with Sipuleucel-T; 303 controls) from 4 randomized, placebo-controlled clinical trials.[9] The most commonly reported AEs inpatients treated with Sipuleucel-T were chills, fatigue, fever, back pain, nausea, arthralgia, and headache. Serious AEs occurred in 24% of treated men and 25.1% of non-treated controls.[10] A recent descriptive analysis of the FAERS database identified 38 reports (all serious) of acute Myocardial Infarction (MI) during Sipuleucel-T treatment. Cardiac risk factors such as hypertension, diabetes, coronary artery disease, and hyperlipidemia were specified in 68% of the reports. Most events occurred after the second or third dose of Sipuleucel-T, with only 6 events occurring after the first dose. Most MI occurred within 1 week of a Sipuleucel-T infusion (19 [53%], with 12 reports ofMI on the same day as an infusion) or 8 to 30 days after an infusion (n = 11).[1,11]

Acute STEMI is a cardiac emergency with a potential for substantial morbidity and mortality.[12] STEMI is a clinical syndrome defined by characteristic symptoms of myocardial ischemia in association with persistent electrocardiographic ST elevation and subsequent release of biomarkers of myocardial necrosis.[13] The mechanism of acute STEMI development with Sipuleucel-T infusion is unclear. The process could be related to activation of T cells and release of cytokines and other immune mediators which could lead to inflammation and possibly coronary vasospasm and/or intracoronary thrombus formation. Our patient did not have any imaging evidence of ischemic heart disease, however, considering his risk factors we also wondered if Sipuleucel-T uncovered his underlying cardiac disease

CONCLUSION

Sipuleucel-T is a category 1 recommended option for patients with metastatic CRPC. Infusion related AEs are common, and include serious cardiac events such as MI, particularly in patients with cardiac risk factors. Increased physician awareness of this potential cardiac AE is crucial not only for prompt diagnosis to avoid significant morbidity and mortality, but also for accurate identification of patients who may be at high risk for AE during Sipuleucel-T infusion.

CONFLICTS OF INTEREST

None.

REFERENCES

1. Dores GM, Bryant-Genevier M, Perez-Vilar S. Adverse Events Associated With the Use of Sipuleucel-T Reported to the US Food and Drug Administration's Adverse Event Reporting System, 2010-2017. *JAMA Netw Open*. 2019; 2(8): e199249. doi: 10.1001/jamanetworkopen.2019.9249

2. Kantoff PW, Higano CS, Shore ND, Berger ER, Small EJ, Penson DF, et al. Sipuleucel-T Immunotherapy For Castration-Resistant Prostate Cancer. *N Engl J Med*. 2010; 363(5): 411–422. doi: 10.1056/NEJMoa1001294

3. Beltran H, Beer TM, Carducci MA, de Bono J, Gleave M, Hussain M, et al. New Therapies for Castration-Resistant Prostate Cancer: Efficacy and Safety. *Eur Urol*. 2011; 60: 279-290. doi: 10.1016/j.eururo.2011.04.038

4. Lee DJ, Cha EK, Dubin JM, Beltran H, Chromecki TF, Fajkovic H. Novel Therapeutics for The Management of Castration-Resistant Prostate Cancer (CRPC). *BJU International*. 2012; 109: 968-985. doi: 10.1111/j.1464-410X.2011.10643.x

5. Shapiro, David & Tareen, Basir. Current and Emerging Treatments in The Management of Castration-Resistant Prostate Cancer. *Expert Rev Anticancer Ther* . 2012; 12(7): 951-964. doi: 10.1586/era.12.59

6. Afshar, Mehran, Evison, Felicity, James, Nicholas D, Patel, Prashant. Shifting Paradigms in The Estimation of Survival for Castration-Resistant Prostate Cancer : A Tertiary Academic Center Experience. *Urol Oncol*. 2015; 33(8): 338. e1-e7. doi: 10.1016/j.urolonc.2015.05.003

7. Anassi e, Ndefo UA. Sipuleucel-t (provenge) Injection: The First Immunotherapy Agent (Vaccine) For Hormone-Refractory Prostate Cancer. *P T*. 2011; 36(4): 197-202.

8. Website: https://www.nccn.org/professionals/physician_gls/pdf/prostate.pdf. Version 4.2019, 08/19/19 © 2019 National Comprehensive Cancer Network® (NCCN®)

9. Maia MC, Hansen AR. A Comprehensive Review of Immunotherapies in Prostate Cancer. *Crit Rev Oncol Hematol*. 2017; 113: 292- 303. doi: 10.1016/j.critrevonc.2017.02.026

10. PROVENGE® (sipuleucel-T) prescribing information. Dendreon Pharmaceuticals LLC.

11. Higano CS, Armstrong AJ, Sartor AO, Vogelzang NJ, Kantoff PW, McLeod DG, et al. Real-world outcomes of sipuleucel-T treatment in PROCEED, a prospective registry of men with metastatic castration-resistant prostate cancer. *Cancer*. 2019. doi: 10.1002/cncr.32445

12. Anderson JL, Morrow DA. Acute Myocardial Infarction. *N Engl J Med*. 2017; 376(21): 2053-2064. doi: 10.1056/NEJMra1606915

13. Patrick T O'Gara, Frederick G Kushner, Deborah D Ascheim, et al. ACCF/AHA guideline for the management of ST-elevation myocardial infarction: A report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines. *J Am Coll Cardiol*. 2013; 61: e78-e140. doi: 10.1161/CIR.0b013e3182742cf6