Double-Trouble: Pembrolizumab Induced Acute Myocarditis and Thyroiditis

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INTRODUCTION

- Novel immune checkpoint inhibitors (ICPi) have revolutionized the field of immuno-oncology. Pembrolizumab targets the programmed death (PD) pathway by binding to cancer cells that overexpress PD-1 ligands.
- The immunotherapy blocks the PD-1/PD-L1 pathway that certain tumors utilize to inhibit the host immune system; however, this effect can also lead to severe or fatal immune-mediated adverse reactions.
- Multiple reports in the literature have described isolated incidents of pembrolizumab-induced myocarditis or thyroiditis.
- We present the first documented case of concurrent myocarditis and thyroiditis after pembrolizumab therapy.

CASE PRESENTATION

- A 69-year-old female with past medical history of hypertension, hyperlipidemia, anemia, diabetes mellitus, recently diagnosed triple-negative breast cancer status post lumpectomy, neoadjuvant chemotherapy and immunotherapy, presented to the emergency department (ED) with a two-week history of generalized weakness and anasarca.
- Symptoms of weakness, swelling, and fatigue started after chemotherapy was initiated.
- Patient was receiving carboplatin/paclitaxel and cyclophosphamide/doxorubicin for chemotherapy and pembrolizumab for immunotherapy. The patient last received chemotherapy four months and immunotherapy two months prior to presentation.
- There was an elevated high sensitivity troponin I of 83 ng/L (ref range: <34 ng/L)
- Further investigation with cardiac magnetic resonance imaging (MRI) revealed findings consistent with myocarditis based on 2018 Lake Louise criteria. (Image 1)
- Thyroid stimulating hormone was elevated at 87.08 ulU/mL and free T4 was decreased at 0.14 ng/dL, with previous values being 1.365 ulU/mL and 1.37 ng/dL respectively.
- Hypothyroidism was suspected to be secondary to pembrolizumab and thyroid peroxidase antibodies were found to be elevated.
- The patient was started on five days of prednisone 80 mg daily for myocarditis and levothyroxine 125 mcg daily for thyroid hormone replacement.

DISCUSSION

- Mortality of 25-50% is associated with ICPi myocarditis and sequelae, including arrhythmias and cardiomyopathy, making this an important adverse effect to recognize.
- Recognizing these potentially fatal side effects of ICPis may increase patient safety, and also have additional clinical importance as the rate of response to immunotherapy was found to be higher in patients with reported immune-mediated adverse reactions.
- While immune checkpoint inhibitors have served as a major breakthrough in managing a multitude of cancers, it is important to be aware of the increasing incidence of immune-related adverse events.

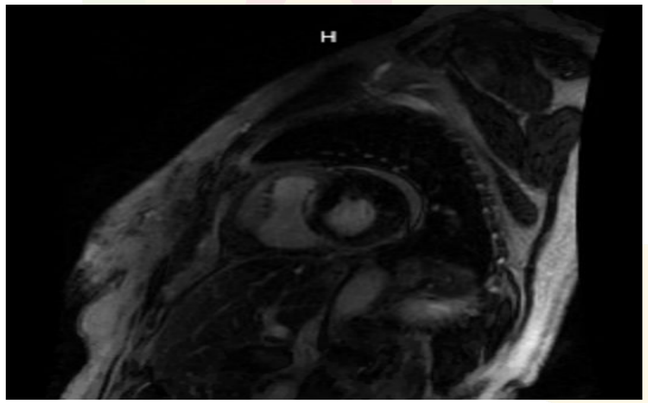

Image 1. Cardiac MRI. On late gadolinium enhancement imaging, there is myocardial fibrosis in the mid myocardium of the basal anteroseptal wall.

CONCLUSION

- Myocarditis and thyroiditis are two potential adverse affects of ICPis.
- Patients may benefit from routine cardiac and thyroid function screening before and during the initiation of ICPis.
- Further studies are needed to assess for prevalence and timely treatment of complications to help better patient outcomes.

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