Immune Checkpoint Inhibitor–Related Myocarditis: Recognition, Surveillance, and Management

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BACKGROUND: Immune checkpoint inhibitor (ICI) therapy is an effective treatment for many patients. Although rare, immune-mediated cardiovascular adverse events can occur, including myocarditis.

OBJECTIVES: This article provides an overview of the incidence, proposed pathophysiology, and current surveillance for myocarditis in patients receiving ICI therapy.

METHODS: A literature search was conducted using PubMed®, CINAHL®, and Scopus® for articles published from 2016 through 2021 to evaluate current recognition, surveillance, and management protocols for ICI-related myocarditis. A case study illustrates the challenges in managing patients experiencing ICI-related cardiac adverse events.

FINDINGS: The incidence of myocarditis in patients treated with ICI therapy is 0.04%–1.14%, but it carries a high mortality rate of 25%–50%. A baseline cardiac evaluation and scheduled surveillance throughout therapy is recommended, particularly for patients with cardiovascular risk factors. Through continuing education and proper training, clinicians and nursing staff can recognize and promptly diagnose immune-related cardiac adverse events.

KEYWORDS
cardio-oncology; myocarditis; cardiotoxicity; immune checkpoint inhibitor therapy

DIGITAL OBJECT IDENTIFIER
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IMMUNOTHERAPIES HAVE EMERGED AS FRONTLINE TREATMENTS where past treatments have been ineffective (Murciano-Goroff et al., 2020), and they represent a major advancement in the treatment of cancer. However, their autoimmune effects, however, can target organs other than those involved in cancer treatment, causing edema, inflammation, and organ failure (Murciano-Goroff et al., 2020). This article addresses the pathophysiologic changes associated with immune checkpoint inhibitor (ICI)–related myocarditis, early recognition of sometimes asymptomatic cardiac changes, and a plan for surveillance that can mitigate overall morbidity and mortality. Oncology nurses are an integral part of the interprofessional team and are well positioned to recognize and intervene on these early changes because they maintain close, therapeutic relationships with patients in the context of treatment.

Methods

A review of the literature and guidelines was performed to evaluate current recognition, surveillance, and management protocols for ICI-related myocarditis, also commonly referred to as myopericarditis (Di Bella et al., 2019). Electronic searches were conducted for articles published from 2016 through 2021 in PubMed®, CINAHL®, and Scopus® using the following search terms: *cardio-oncology*, *myocarditis*, *myopericarditis*, *immune checkpoint inhibitor therapy*, and *immune-related cardiotoxicity*. A case study is also presented that illustrates the challenges in managing patients who are experiencing ICI-related cardiac adverse events.

Myocarditis

Prior to ICI-related myocarditis, most cases of myocarditis in the United States were related to a viral cause (Palaskas et al., 2020). In general, myocarditis refers to a global inflammation of the myocardium associated with necrosis and degeneration of myocytes (Palaskas et al., 2020). Myocarditis can occur at any age and is one of the few heart diseases that can produce acute heart failure in previously healthy young adults (Palaskas et al., 2020). Causes of myocarditis in the general population can be idiopathic but are likely related to viral (e.g., coxsackievirus, influenza, HIV), rickettsial (e.g., typhus, Rocky Mountain spotted fever), or bacterial (e.g., staphylococcal, streptococcal, meningococcal) causes or causes related to fungi and protozoan parasites, such as Chagas disease, toxoplasmosis, or trichinosis (Tschöpe et al., 2019). Noninfectious causes include any immunologic-related disease, such as rheumatoid arthritis, lupus, scleroderma, or sarcoidosis (Tschöpe