Cancer Immunotherapy

An evidence-based overview and implications for practice

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BACKGROUND: Significant research progress has been made in immunotherapies since the mid-1990s, and this rapid evolution necessitates evidence-based education on immunotherapies, their pathophysiology, and their toxicities to provide safe, effective care.

OBJECTIVES: The aim of this article is to provide an evidence-based overview, with implications for practice, of checkpoint inhibitors, monoclonal antibodies, oncolytic viral therapies, and chimeric antigen receptor T-cell therapies.

METHODS: Each immunotherapy category is presented according to the pathophysiology of its immune modulation, the classes of agents within each category, evidence-based toxicities associated with each class, and implications for practice.

FINDINGS: Immunotherapies vary in their pathophysiology and offer potential to be highly effective for the management of a wide array of cancer types. Understanding the unique pathophysiology and toxicities is necessary to assess, manage, and provide safe, effective patient-focused care.

IMMUNOTHERAPY IS AN APPROACH TO CANCER TREATMENT, management, and cure developed on the pathophysiologic foundations of harnessing a patient's own immune system to fight diverse cancer types (Farkona, Diamandis, & Blasutig, 2016). Although the concept of immunotherapy has been researched for more than a century, discoveries have more recently led to the development of new classes of agents. This article presents the pathophysiology, target cancer types, and toxicities of four major categories of immunotherapies: checkpoint inhibitors, chimeric antigen receptor (CAR) T-cell therapy, monoclonal antibodies, and oncolytic viral therapies (Farkona et al., 2016). As clinical trials provide insight into the efficacy of these agents and broader populations of patients have access to immunotherapy-based treatments, an urgent need exists for comprehensive education for nurses on this content to empower safe, evidence-based care of patients undergoing these treatment modalities.

Checkpoint Inhibitors

Pathophysiology

In a healthy body, the immune system has internal regulatory mechanisms that enable immune cells to identify abnormal cells that need to be attacked while protecting normal tissue. Cancer cells take advantage of abnormalities that cause decreased expression of checkpoint proteins that would otherwise keep tumors from developing (Trivedi et al., 2015). Malignant cells learn to evade these mechanisms, enabling them to multiply, like cloaking themselves in a disguise. Drugs that prevent cancer cells from using these pathways are called checkpoint inhibitors and are among the newest agents used to treat cancer (Trivedi et al., 2015).

These drugs prevent the abnormal cells from bypassing the immune response, removing their disguise, and flagging them for destruction by activated T cells. So far, three known checkpoint pathways have been identified and can be acted upon with targeted treatments (Collin, 2016). These checkpoints maintain a balance, making the immune system able to fight infections and malignancies, while concurrently preventing tissue injury (Bockorny & Pectasides, 2016). The U.S. Food and Drug Administration (FDA) has approved four different checkpoint inhibitors (see Table 1),