

Chimeric antigen receptor (CAR) T-cell therapy is an evolving treatment used for hematologic malignancies; it requires specialized nursing care and knowledge. This article discusses updates in the nursing management of CAR T-cell therapies and their use in adult patients. A comprehensive review of the literature, including peer-reviewed articles and pharmaceutical drug labels, was conducted. Oncology and intensive care unit nurses will need to be knowledgeable about and remain current in the management of patients receiving CAR T-cell therapies because they pose different challenges than seen with traditional chemotherapy regimens.

AT A GLANCE

- CAR T-cell therapies are on the rise, with nursing playing an integral role in the care of patients receiving them.
- Nurses should know their facility's standard operating procedures in the care of patients undergoing CAR T-cell therapy.
- Patients receiving CAR T-cell therapies require high levels of close monitoring and vigilant nursing care during their treatment course; prompt toxicity intervention is key to improved patient outcomes.

KEYWORDS

chimeric antigen receptor T-cell therapy; cytokine release syndrome; neurotoxicity

DIGITAL OBJECT

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CAR T-Cell Therapy

Updates in nursing management

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Chimeric antigen receptor (CAR) T-cell therapies have rapidly emerged in the oncology world, particularly for hematologic malignancies, including diffuse large B-cell lymphoma, mantle cell lymphoma, and acute lymphoblastic leukemia. The U.S. Food and Drug Administration (FDA) approved CAR T-cell therapies tisagenlecleucel (Kymriah®) and axicabtagene ciloleucel (Yescarta®) in 2017 (Lamprecht & Dansereau, 2019). Since then, three additional CAR T-cell therapies have received FDA approval: brexucabtagene autoleucel (Tecartus®), lisocabtagene maraleucel (Breyanzi®), and idecabtagene vicleucel (Abecma®) (Munshi et al., 2021). All five CAR T-cell therapies are used in the relapsed/refractory setting for their associated disease types (see Table 1). With increased use of these therapies and as more follow-up patient outcomes data become available, there is a demand for updated education as nurses care for patients receiving these therapies and manage the unique side effects of CAR T-cell therapy. Nurses need to be current in understanding the mechanism of action of CAR T-cell therapies, associated toxicities, and treatment strategies.

Manufacture of CAR T-Cell Therapies

CAR T-cell therapies are developed in an approved manufacturing facility, typically run by the pharmaceutical company. All FDA-approved CAR T-cell therapies are autologous CAR T-cell products, meaning that the cellular product is manufactured using the patient's own T cells. The

patient's T cells are collected during a process called leukapheresis. After the patient has completed leukapheresis, the collected cells are sent to the associated manufacturing facility. The T cells are separated from the other white blood cells, and an inactivated virus is inserted into the T cell's DNA. This is called transduction of the T cells, and it changes the DNA construct to allow for receptors to be expressed on the T cell. These receptors are used to target the associated antigen expressed on the malignant cells.

For the first four FDA-approved therapies (i.e., tisagenlecleucel, axicabtagene ciloleucel, brexucabtagene autoleucel, and lisocabtagene maraleucel), the associated antigen is CD19, which is expressed by many types of lymphoma and leukemia. Idecabtagene vicleucel instead targets the B-cell maturation antigen. The cells are harvested after transduction and are grown to the number of cells desired for adequate treatment. After harvesting is complete, the cells go through a series of quality checks to ensure that the cells are, in fact, targeting the appropriate antigens and that they are free from any viral, fungal, or bacterial infections from the patient. This process takes about 17–21 days. Once complete, the cells are shipped back to the facility where the patient will receive the CAR T-cell therapy (June & Sadelain, 2018).

Mechanism of Action

Once the manufactured cells have been returned to the treating facility, the patient can begin lymphodepleting chemotherapy. The two chemotherapy drugs used as preparative chemotherapy prior