CAR T-Cell Therapy Effects

Review of procedures and patient education

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BACKGROUND: Chimeric antigen receptor (CAR) T-cell therapy is a cellular immunotherapy that redirects the killing activity of T cells to fight tumor cells. CD19 CAR T-cell therapies have demonstrated high rates of complete response in clinical trials in patients with relapsed or refractory B-cell malignancies and have been associated with on-target side effects.

OBJECTIVES: This article describes educational opportunities for patients and families during the CAR T-cell therapy procedure, highlighting specific points where education by nurses is critical for safety and protocol adherence.

METHODS: Current literature on CAR T-cell therapy was reviewed and supported by the authors' professional experiences.

FINDINGS: CAR T-cell therapy is a novel treatment, and repetition of information and building the knowledge base of patients and families is important. The role of nurses in educating patients about the side effects of CAR T-cell therapy is critical for the safety and psychological well-being of patients.

KEYWORDS
CTL019 chimeric antigen receptor; adoptive cellular immunotherapy; clinical trial

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ONCOLOGY NURSES PRACTICE IN A RANGE OF CLINICAL SETTINGS and, in addition to their direct involvement in treating patients, their role in providing education to patients and families regarding new therapy procedures, side effects, and requirements of home management is crucial. One new type of cancer treatment, known as cellular immunotherapy, involves more steps than current standard-of-care therapies, thereby increasing the amount of educational information that must be communicated by nurses to the patient and family during the course of treatment. Chimeric antigen receptor (CAR) T-cell therapy is a type of cellular immunotherapy that redirects the killing activity of T cells (often the patient's own) to fight tumor cells (Kalos et al., 2011). CARs are engineered fusion proteins—including an extracellular antigen-binding domain derived from an antibody—that can recognize a protein expressed by the patient's cancer cells. This antibody fragment is fused to intracellular stimulatory domains that initiate T-cell function. To generate CAR T cells, a patient's T cells are collected and genetically modified with a viral vector encoding the CAR. The cells are expanded in the laboratory in a process that can take as long as two weeks and then infused back into the patient to target and potentially destroy cancer cells. To date, most investigation in the CAR T-cell field has used the CD19 antigen as a target. CD19 is not expressed on bone marrow stem cells, but rather on developing B cells, mature B cells, and most B-cell malignancies; for these reasons, CD19 represents a rational target for therapy of relapsed or refractory B-cell malignancies (Kershaw, Westwood, Slaney, & Darcy, 2014; Scheuermann & Racila, 1995).

CD19-targeted CAR T-cell therapies have demonstrated high rates of complete response in patients with relapsed or refractory B-cell malignancies, including acute lymphoblastic leukemia (ALL), chronic lymphocytic leukemia (CLL), and non-Hodgkin lymphoma. Many of the patients treated with CD19 CAR T cells have previously experienced multiple relapses after prior therapies, such as chemotherapy, radiation, and bone marrow transplantation; however, obtaining and maintaining subsequent remissions after multiple relapses can be challenging. Despite either being refractory to therapy or having one or more relapses after multiple therapies, pediatric patients with relapsed or refractory ALL who were treated with CD19 CAR T cells