Understanding the CAR T Cell Therapy Treatment Experience

Chimeric antigen receptor (CAR) T cell therapy is a personalized approach to treating certain blood cancers. Unlike traditional cancer therapies, CAR T cell therapies are often administered as a one-time treatment made from a patient’s own T cells, which are “reprogrammed” during a sophisticated manufacturing process to help the T cells recognize and fight cancer cells.

**Step 1: Cell Collection**
T cells, which are a type of white blood cell that function as key fighters in the immune system, are removed through a process calledpheresis or leukapheresis, which takes place before the manufacturing process can take place. The collected T cells are shipped to a specialized cell therapy manufacturing facility where they undergo genetic “reprogramming” to become CAR T cells that have receptors (or hooks) added to the T cells to help recognize and fight cancer cells containing a specific antigen on the surface of the target cancer cells. The manufacturing process can take several weeks to complete.

**Step 2: T Cell Activation During Manufacturing**
The CAR T cells are then multiplied to create the appropriate dose consisting of millions of CAR T cells, which then undergo rigorous testing and quality control before being shipped back to the patient at a CAR T treatment center. The manufacturing process can take several weeks to complete.

**Step 3: Preparing for Treatment**
A few days before receiving their CAR T cell therapy, patients receive low-dose chemotherapy, known as lymphodepleting chemotherapy, to help prepare the body to receive the reprogrammed CAR T cells. This helps to create space in the patient’s immune system to accept the CAR T cells and target the cancer cells.

**Step 4: CAR T Cell Therapy Infusion**
At the treatment center, patients receive their personalized CAR T cells with one dose. The process usually takes about an hour or less. From there, the CAR T cells may expand and travel throughout the body to attack the target cells.

**Step 5: Monitoring**
All patients who receive a CAR T cell therapy are monitored closely by their care team for possible side effects, which may be life-threatening or fatal. Time at the hospital will vary based on the individual patient. Patients need to stay in proximity to the treatment center for at least four weeks, and may return home when their doctor says that it is safe to do so. However, they may need to stay nearby or return to the hospital if side effects develop after returning home.

**Step 6: Continued Follow Up**
The patient’s care team will continue to follow up with a patient via phone calls and in-person appointments to assess whether the CAR T cell therapy is working and to watch for side effects. Patients will work with their doctor for ongoing follow up after treatment, though the frequency of follow-up may vary and are determined by the doctor. A patient’s caregiver will also play a critical role in helping monitor the patient for potential side effects.

There are many side effects associated with CAR T cell therapy. Two of the potential serious side effects patients need to be aware of include:

- **Cytokine Release Syndrome (CRS)**
  - Fatigue
  - Fever
  - Chills
  - Hypertension
  - Swelling
  - Headache
  - Low oxygen level (hypoxia)
  - Muscle/joint pain (myalgia/arthralgia)
  - Confusion
  - Seizures
  - Difficulty breathing (dyspnea)
  - Weakness (asthenia)
  - Rapid heartbeat (tachycardia)

- **Neurotoxicity**
  - Confusion
  - Difficulty or inability to speak
  - Difficulty walking
  - Loss of coordination
  - Weakness

Neurotoxicity can cause cellular or structural change in the nervous system. It usually happens in the first few days to several weeks after a patient’s CAR T cells are put back into their body. Symptoms may include, but are not limited to:

- Memory loss
- Headache
- Shaking
- Seizures
- Difficulty speaking
- Difficulty walking
- Difficulty swallowing
- Hiccups
- Muscle/joint pain
- Weakness
- Seizures
- Difficulty walking
- Low oxygen level
- Weakness
- Difficulty breathing
- Confusion

There are many side effects associated with CAR T cell therapy, and the list above is not all-inclusive. Side effects can vary based on a patient’s individual factors. It is important to work closely with your doctor and discuss any potential side effects they may experience.

Learn more about how CAR T cell therapy works and consult with a physician.