CAR T-Cell Therapy Side Effect

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There are two main side effects of CAR T-Cell Therapy. There are different than really any other therapy we're given before. The first side effect is called Cytokine Release Syndrome; we abbreviate it CRS, so it's Cytokine Release Syndrome. What happens is these T-Cells are really good. Within about 24 to 48 hours, they go straight to the cancer, and they start killing. Now, when they kill these cells, the cells that are dying release a lot of inflammatory molecules. On top of that, if you think about these T-Cells, they're living drugs, which is quite amazing. So once they bind their target, the cancer cell, they will actually start proliferating and make copies. So, the actual therapeutic in the body can make copies of itself; it repopulates, which is part of the reason why these work so well. So, the problem is they work so well that these copies and proliferation happen very very rapidly, within 24 to 48 hours of administration of the product. And so, the patients get a huge inflammatory reaction, much like you have a very bad infection. So, patients who get very bad infections, something called sepsis or septic shock, can be in ICU. A similar-like phenomeon happens after the CAR T, where patients get very high fevers, again not from an infection; this is from the cells themselves. High fevers, from 102 to 105°F I've seen. They can get low blood pressures. They can get fluid or shortness of breath in the lungs. And, depending on the product used, upwards to 80/90% of patients can get some form of Cytokine Release Syndrome. The majority of patients who get Cytokine Release Syndrome, roughly two-thirds of them, get just fevers, that it. It's not pleasant to have a fever, but it's something that we can manage with supportive care. About 20% to 30% of patients though can get more severe Cytokine Release Syndrome, where their fevers are really high, or their blood pressure starts dropping. In that case, we have a very very good medicine, it's called Tocilizumab, and it's kind of like another antibody, it kind of mops up all those inflammatory cytokines. It clears them from the bloodstream so the Cytokine Release Syndrome stops. In many patients that settles it down. However, a few patients can get quite ill, where they need ICU-level support. That's why this is a quite intensive therapy. Most patients though, at the appropriate CAR T administration centres, especially at a centre like ours or at our colleagues who have given a lot of these therapies, are very well equipped to deal with the side effects and get the patients safely through their CAR T-Cell. So, that's the main, first side effect; Cytokine Release Syndrome. The other main side effect is called ICANS, and it's a long abbreviation, but it's basically a neurotoxicity syndrome. Immune cell effector neural toxicity syndrome, ICANS. Ans this typically happens more around five to seven days after infusion of the CAR T-Cell. And what happens is, the patient can get anywhere between being a little confused or tired, or in worse case scenarios, you can't even wake up the patient or seizures that require ICU-level support. Yet in most patients it is mild and it can be a little bit disturbing because the patient is confused and the caregiver is there. But I always reassure my patients (the patients don't remember it), and it resolves in just about everyone. It's not like having a stroke or a permanent side effect. It is unusual, but it resolves in nearly everyone. Again, a small percentage of patients can wind up in the ICU with more severe neural toxicity. Even in those patients, it does usually resolve, but it can take some time, okay. So, that kinda all happens while the patient is in the hospital. Again, some patients just have fevers or so side effects at all; other patients require more intensive therapy during their stay after their CAR T-Cell.