Ischemic Stroke After CAR-T Cell Therapy

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Objective: N/A

Background: Two Chimeric Antigen Receptor T cells (CAR-T) are FDA-approved for the treatment of refractory Leukemias and Non-Hodgkin's Lymphomas. Neurological complications are relatively common in these patients and may include encephalopathy, seizures, aphasia, abulia, apraxia, tremors and diffuse cerebral edema. To our knowledge, this is the first description of ischemic stroke after CAR-T Cell therapy.

Design/Methods: N/A

Results: 53-year-old Hispanic man with diffuse large B-cell lymphoma (DLBCL) and secondary CNS lymphoma with left parietal leptomeningeal spread refractory to several lines of chemotherapy and stem cell transplant underwent Yescarta CAR-T cell therapy. His neurological exam on the day of CAR-T infusion was completely non-focal. On day 5 of CAR-T cell infusion, he developed critical neurotoxicity (Grade 4) with a drop in MD Anderson CARTOX score from 10/10 (normal) to 0/10 (worst). He was week on the left side, with no movement of his left lower extremity. Per protocol, he was started on osmotherapy (mannitol 0.5 gm/kg Q6H), levetiracetam 2 g BID, dexamethasone 20 mg Q6H and tocilizumab for diffuse cerebral edema. MRI brain demonstrated multiple acute infarctions in right ACA and left PCA territories. Intravenous thrombolysis was deferred given unknown time of onset with an overlying severe encephalopathy. CT angiogram of head and neck revealed distal occlusion of right ACA and proximal narrowing of the right A2 segment. Patient was started on aspirin and statin for secondary stroke prevention, with no other modifiable risk factors for ischemic stroke. On day 10 of CAR-T infusion, his CARTOX score was 10/10 with an NIHSS of 1 (incomplete R homonymous hemianopsia).

Conclusions: We conclude that acute ischemic stroke should be suspected in CAR-T cell recipients with focal neurologic deficits. Further research is needed to understand the exact mechanism behind such event. Focal vasospasm, hypercoagulability, hypo-perfusion from systemic cytokine release syndrome, direct CAR-T cell neurotoxicity are possible explanations.