

Use of Cytosorb for treatment of CAR-T therapy-induced CRS

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Introduction

Chimeric antigen receptor T (CAR-T) cell therapy is a novel treatment for haematological malignancies. Yet, the adverse effects can be severe, like cytokine release syndrome (CRS) and CRS-related coagulopathy. The typical treatment for CRS involves vital support, Tocilizumab, and hemadsorption to reduce cytokines levels.

Case Report

A 43-year-old patient with IgG lambda multiple myeloma, began Teclistamab treatment in 2023. The day after starting treatment, the patient experienced hyperpyrexia and chest pain, which escalated to cardiogenic shock and cardiac arrest. After resuscitation, the patient was transferred to the ICU, requiring mechanical ventilation and high doses of catecholamines (noradrenaline 0.8 mcg/kg/min; MAP 60 mmHg; Vasoactive-Inotropic Score VIS 80). Initial blood tests showed high Procalcitonin (PCT) (>100 ng/ml), leukopenia ($0.42 \times 10^3/\mu\text{L}$), thrombocytopenia ($10 \times 10^3/\mu\text{L}$), anemia (HB 8.1 g/dl) and negative culture results. The patient was diagnosed with CAR-T induced CRS and started Tocilizumab therapy.

On day 2, the patient experienced persistent hemodynamic instability (noradrenaline 0.4 mcg/kg/min; MAP 70 mmHg), elevated VIS, PCT > 100 ng/ml, and acute renal failure (Creatinine 2.5 mg/dl). This necessitated the initiation of Continuous Veno-Venous Hemodiafiltration (CVVHDF) and CytoSorb therapy to mitigate the cytokine storm.

During the second CytoSorb cycle, PCT levels significantly decreased to 35.9 ng/ml, hemodynamics and respiratory parameters improved (noradrenaline 0.1 mcg/kg/min; MAP 83 mmHg).

By day 4, after additional CytoSorb administration, inflammatory indices further decreased (PCT 20.4 ng/ml). Noradrenaline administration was discontinued as blood pressure normalized (MAP 87 mmHg), and respiratory weaning began.

On day 5, CVVHDF and CytoSorb treatment were discontinued (Creatinine 0.6 mg/dl), PCT decreased to 8.8 ng/ml, and the patient exhibited stable hemodynamics (MAP 90 mmHg) and valid respiratory exchanges, leading to extubation.

Final hematological assessments on day 6 showed continued reduction in inflammatory markers (PCT 4 ng/ml), improved blood cell count, afebrile, optimal respiratory exchanges, and normalized blood pressure readings (MAP 97 mmHg). The patient was discharged from the ICU.

Conclusion

In conclusion, the use of CytoSorb helped to mitigate the CAR-T-induced CRS with not side effects or adverse events, and represents a valid supportive treatment for the potentially life-threatening complications of CRS.