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National Trends in the Utilization of Chimeric Antigen Receptor T-cell Therapy: The Real World Story Since its Approval

D. Solipuram [1], S. Katragadda [2] and A. Podrumar[3]
1. Internal Medicine, Nassau University Medical Center, NY
2. Hematology Oncology, Nassau University Medical Center, NY

NuHealth Nassau University Medical Center

INTRODUCTION

Chimeric antigen receptor T-cell [CAR-T] therapy has marked a new era in the treatment of relapsed/refractory hematological malignancies since its approval in 2017.

Globally there is extensive research to broaden its application in various hematological and solid tumors. However studies analyzing the outcome trends in the real world are lacking.

AIM

To analyze CAR-T cell therapies utilization along with their mortality and morbidity outcomes for various cancers

METHODS

- Patients admitted to hospital for CAR-T cell therapy for various indications from 2017 to 2021 were identified using ICD codes using National Inpatient Sample.
- Patients were categorized based on their diagnosis into non-Hodgkin's Lymphoma[NHL], Acute Lymphoblastic Leukemia[ALL] and Multiple Myeloma[MM].
- NHL patients included Diffuse Large B cell Lymphoma, Primary Mediastinal B cell Lymphoma, Mantle Cell lymphoma, Follicular Lymphoma.
- Analysis done using STATA 18.0 software

RESULTS

- Utilization of in-hospital CAR-T therapy increased from 70 to 3145 from 2017 to 2021.
- Among the 3145 patients receiving CAR-T therapy in 2021, the majority of them were for NHL 2285 [73%] and there were 260[8%] for ALL while there were 600[19%] for MM.
- The trends in the utilization of CAR-T therapy from 2017 to 2021 remained more or less stable for NHL[70-80%] while it gradually reduced for ALL from 14% to 8% and increased for MM from 13% to 19%.
- Majority of CAR-T therapy recipients belonged to lower charlson comorbidity index with an increased utilization among males from 56% to 63% and increase in mean patient age from 53 to 57 years from 2017 to 2021.

Figure 1. Mortality Trends among CAR T-cell Therapy patients

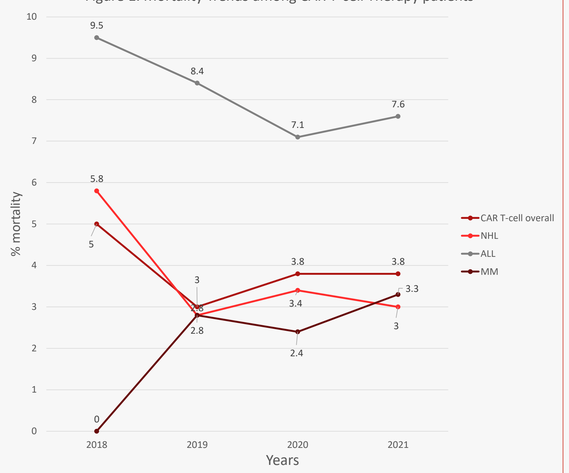


Figure 2. Trends in the Mean length of Hospitalization

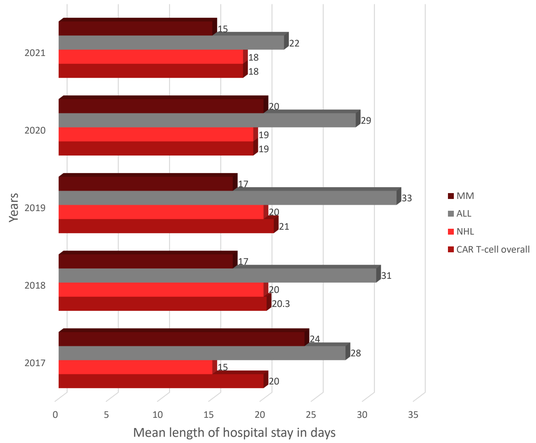
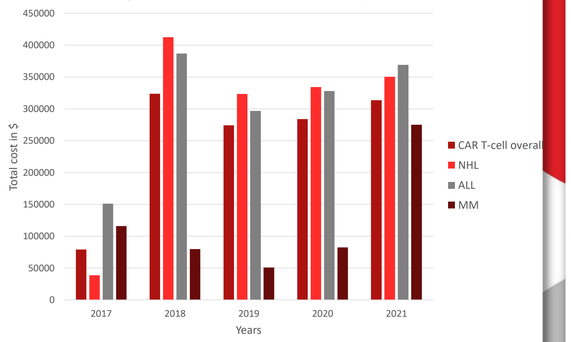


Figure 3. Trends in the total cost of hospitalization



- Overall the incidence of Acute Kidney Injury[AKI] remained stable for all CAR T-cell therapy patients with higher AKI rates in MM.
- Similarly overall sepsis trends were stable over the years with increasing trends in ALL and lower rates among MM.
- A similar pattern was noted with respiratory failure and intubation rates as well.

CONCLUSION

- CAR-T cell therapy usage has almost doubled from 2018 to 2021 with highest utilization among NHL.
- Overall Mortality, LOS and total cost of hospitalization have remained stable over the years in CAR-T cell therapy.
- Specifically, CAR-T therapy in ALL is associated with higher mortality, LOS, total costs and poorer outcomes with respect to respiratory failure, intubation and sepsis.
- There is a declining trend in CAR-T cell therapy usage among ALL.
- Long term follow ups are required to validate these findings and improve outcomes.