Quality and Cost Outcomes in Chimeric Antigen Receptor T-cell Immunotherapy in Pediatric and Young Adult Patients with Acute Lymphoblastic Leukemia from the Vizient Clinical Database

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Background:

Chimeric Antigen Receptor T-cell (CAR-T) immunotherapy was approved by the FDA in August 2017 for pediatric and young adult patients with second or later relapsed or refractory B-cell acute lymphoblastic leukemia (ALL). CAR-T immunotherapy uses a patient's own T cells and modifies them in a laboratory to recognize and kill the patient's cancer. Since the CAR-T modified cells multiply and persist in the patient's bloodstream, they have the potential to protect the patient against recurrence.

Beginning October 1, 2017, two new, unique ICD-10 procedure codes were assigned to CAR-T immunotherapy (XW033C3 for peripheral venous route and XW043C3 for central venous route). Additionally, in the outpatient setting, CPT code 0540T can be used to identify patients, allowing for tracking of the procedure in administrative dataset.

The objective of this poster is to describe quality and cost outcomes in pediatric and young adult patients with ALL using the CAR-T procedure codes in administrative data.

Demographics	n=139
Sex	**n (%)**
Male	89 (64.0%)
Female	50 (36.0%)
Age	**Mean (SD)**
Age (years)	15.8 (7.3)
Payer	**n (%)**
Commercial	36 (52.9%)
Medicaid	22 (32.4%)
Other	10 (14.7%)
Race / Ethnicity	**n (%)**
Hispanic	52 (37.4%)
Non-Hispanic White	47 (33.8%)
Non-Hispanic Black	13 (9.4%)
Other	27 (21.6%)

Figure 1. Demographic information, young adult and pediatric patients CAR-T procedure; Source: Vizient CDB/RM

Methods:

The Vizient Clinical Data Base/Resource Manager™ (CDB/RM) is an analytic platform for performance improvement populated by hundreds of health systems and community hospitals nationwide, including nearly all academic medical centers.

A retrospective cohort of 139 patients 25 years and under with a diagnosis of acute lymphoblastic leukemia undergoing CAR-T procedures was identified from Vizient Clinical Data Base/Resource Manager™ (CDB/RM) from hospitals between October 2017 and October 2019.

Patients who were in clinical trials or did not have complete drug charge information were excluded from the cost analysis. Vizient derives cost to produce care. Hospital-specific cost-to-charge ratios are applied to patient encounters, along with adjustments for area wage index, to calculate a cost to produce care.

Outcome Measure for In-Hospital Procedures	
In-hospital death, n (%)	8 (5.8%)
Median LOS in days, (IQR)	21 (IQR 15-33.8)
Mean ICU Days, (stdev.)	5.9 (17.4)
30 day unplanned readmission for all patients, n (%)	28 (20.1%)
Adverse Effects	
Adverse effect due to immunotherapy	90 (64.7%)
Fever	69 (49.6%)
Headache and/or migraine	32 (23.0%)
Nausea	32 (23.0%)
Tachycardia	32 (23.0%)
Hypotension	28 (20.1%)
Acute kidney failure	22 (15.8%)
Sepsis	18 (12.9%)

Figure 2. Outcomes and adverse effects for young adults and pediatric patients receiving CAR-T, all encounters; Source: Vizient CDB/RM

Findings:

The 139 patients were largely Hispanic (37.4%) and non-Hispanic white (33.8%), male (64.0%), commercial (51.1%) patients with a diagnosis of acute lymphoblastic leukemia. Out of the 139 patients, 9 (6.5%) patients received their infusion in an outpatient setting. In the inpatient setting, the median length of stay was 21 days. Eight patients (5.8%) had an in-hospital death. Within 30 days, 28 patients (20.1%) had an unplanned readmission to the index hospital, with 13 (9.4%) patients being readmitted within 7 days of discharge from the index procedure.

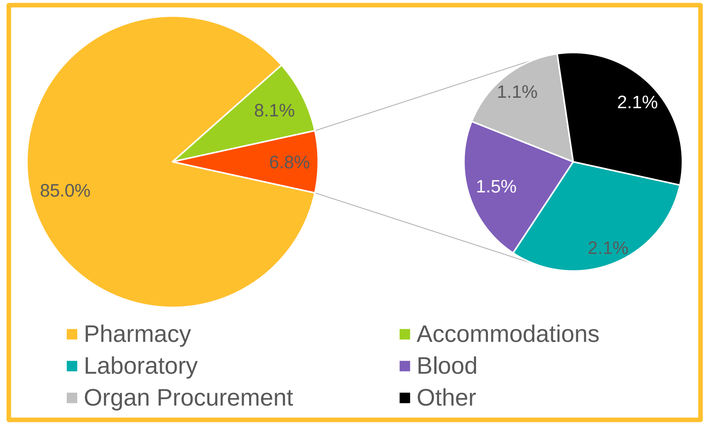

Figure 3. Distribution of total cost of index CAR-T encounters by service group; Source: Vizient CDB/RM

The median total cost of hospitalization for CAR-T encounter was $380,052 and median direct cost was $262,981. The median non-drug cost for the hospitalization for the CAR-T encounter was $44,427 and the median direct cost was $23,491. Non-pharmacy costs were mainly driven by accommodations (48% of average costs), followed by laboratory costs (15%), organ procurement revenue codes (11%) and blood (11%).

Patients included in the cost analysis had an average of 1.8 encounters in the 30 days preceding and 4.3 encounters in the 100 days post-infusion period, in addition to an average of 16.2 clinic and diagnostic testing encounters.

Conclusions:

Administrative data is an important source of information on newly approved technologies and codes since it is available for analysis sooner than larger public datasets. Since the pediatric and young adult CAR-T population is limited, synthesizing all available clinical and cost data is important to understanding and tracking outcomes and significant adverse events. Because claims data can be analyzed with only a short delay compared to other data sources, it can be a useful source for information on this population.

No relationships to disclose.

References:

1. Vizient Clinical Data Base/Resource Manager™. Irving, TX: Vizient; 2020. Accessed February 3, 2020. https://www.vizientinc.com/Our-solutions/Clinical-Solutions/Clinical-Data-Base.