Poster
RWD178

Real-world Treatment Patterns, Healthcare Resource Utilization (HRU), and Costs for Relapsed/Refractory (R/R) Large B-cell Lymphoma (LBCL): Chimeric Antigen Receptor T-cell (CAR T) and Monoclonal Antibody (MAB) Therapies

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BACKGROUND AND OBJECTIVES

- Recently approved novel therapies for relapsed/refractory large B-cell lymphoma (LBCL) include chimeric antigen receptor T-cell (CAR T) and monoclonal antibody (MAB)-based treatments
  - Promising outcomes in clinical trials[1-7] with limited real-world evidence for these novel therapies
- The study examined treatment patterns, healthcare resource use (HRU), and total costs of care for these novel therapies in real-world setting

METHODS

Inclusion Criteria

- Using Optum Research Database (ORD), patients were Commercially and Medicare Advantage Plan (MAPD)-insured with evidence of:
  - CAR T infusion (7/2017—10/2021) [(axicabtagene ciloleucel (axi-cel); tisagenlecleucel (tisa-cel); Lisocabtagene maraleucel (liso-cel)]; or
  - MAB administration (6/2019—10/2021) [polatuzumab vedotin (pola); tafasitamab (tafa); loncastuximab tesirine (lonca)]
- Age ≥18 years at index (date of first claim for CAR T infusion or MAB administration, respectively)
- ≥3 months pre-index continuous enrollment with medical and pharmacy benefits
- ≥1 non-diagnostic medical claim with an LBCL diagnosis on or before index therapy

Outcomes Analyses

Treatment Patterns

- Demographic and clinical characteristics described
- Time from leukapheresis to CAR T infusion, and from index treatment to next oncology treatment analyzed using Kaplan-Meier (KM) method, all among CAR T index patients
- Evidence of MAB or CAR T after index therapies were examined to understand treatment sequence among these novel therapies
- Top 10 oncology treatments after CAR T and MAB index therapies also described

HRU & Costs

- Mean per-patient-per-month (PPPM) HRU and costs analyzed for all patients by insurance type, specifically:
  - HRU: inpatient stays and length of stay, and ambulatory and emergency room (ER) visits
  - Costs: all-cause and LBCL-related costs for both CAR T and MAB cohorts; also, post-CAR T infusion for CAR T cohorts
- Multivariable gamma regression models of all-cause costs which adjusted for patient baseline characteristics

RESULTS

- Total of **195** patients with identified CAR T products: axi-cel (n=137), liso-cel (n=9), and tisa-cel (n=49)
- Total of **238** MAB-treated patients: tafa (n=56), pola (n=188), and lonca (n=6)
- Outcomes for liso-cel and lonca are unreported because of small sample sizes

Patient Characteristics

- Between two CAR T treated cohorts, axi-cel was younger (p= 0.016) with higher percentage of commercially-insured (p <0.001)
  - Other patient characteristics not significantly different (Table 1)
- Compared to CAR T cohort, MAB cohort mean age=71-76 years with high percentage of MAPD-insured
- Median follow-up ≥7 months for CAR T and ≥5 months for MAB

Table 1. Demographic and Clinical Characteristics During Baseline

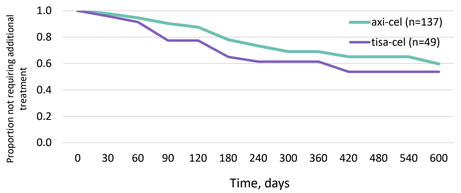
	CAR T Cohorts		MAB Cohort	
	axi-cel (n=137)	tisa-cel (n=49)	tafa (n=56)	pola (n=188)
Age at Index Year, Mean (Median)	61 (62)	66 (71)	76 (78)	71 (72)
Gender: Men, %	64	57	48	60
Insurance coverage, %				
Commercial	58	31	9	26
Medicare Advantage (MAPD)	42	69	91	74
Geographic region, %				
Northeast	19	14	9	13
Midwest	29	22	29	27
South	37	41	45	48
West	15	22	18	13
Charlson comorbidity score, mean (SD)	3.8 (2.2)	4.0 (2.2)	4.0 (3.0)	4.0 (3.0)
Common AHRQ comorbidities, %				
Heart disease	70	73	68	69
Other lower respiratory disease	66	63	48	61
Anemia	66	59	46	53
Other nervous system disorders	55	51	46	44
Other gastrointestinal disorders	58	41	36	53
Mean (median) follow-up time (days)	386 (271)	364 (237)	180 (174)	238 (182)

AHRQ, Agency for Healthcare Research and Quality

Treatment Patterns

- Axi-cel patients had a significantly shorter vein-to-vein time, i.e., time from leukapheresis to CAR T infusion (medians for axi-cel=26 days and tisa-cel=35 days, p<0.001)
- At 1 year, proportion of tisa-cel patients not requiring additional oncology therapies was lower: axi-cel=0.69, tisa-cel=0.61; p=0.141) (Figure 1)
- By day 600, less than half of patients required additional oncology treatment (axi-cel=0.40, tisa-cel=0.46, p=0.141)

Figure 1. Time from CAR T Infusion to Next Oncology Treatment*



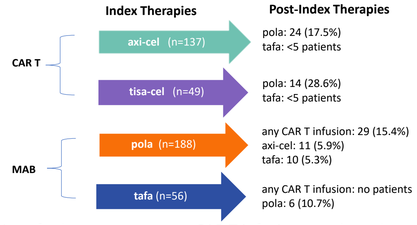
Log-rank test for comparison of axi-cel and tisa-cel: p=0.141

*Time to next oncology treatment was claims-based. It was defined as time from CAR T infusion date to first systemic anti-cancer claim. Patients were censored at date of death, health plan disenrollment, or at end of follow up or study period

Treatment Patterns, continued

- MAB and CAR T also used in sequence (Figure 2):
  - Post-CAR T, pola use was higher among tisa-cel (29%) than axi-cel (18%)
  - Post-MAB, 15% of pola had CAR T compared with no tafa patients

Figure 2. Evidence of MAB after CAR T infusion or CAR T infusion after MAB



- Use of other common post-CAR T infusion oncology therapies, rituximab and bendamustine, was also higher for tisa-cel patients (Table 2)
- For pola index therapy patients: 8.5% used bendamustine (B), 14.4% used rituximab (R) only, and 71.3% used bendamustine and rituximab (B/R), as combination therapies (Pola + B/R), per the FDA label
- For tafa index therapy patients: 46.4% received lenalodamide (L), mostly as combination therapies (i.e., Tafa + L), per the FDA label.
- Other top oncology therapies (≥10%) in Table 2

Table 2. Other Top Oncology Treatments after CAR T and MAB Treatment*

Index medication: CAR T	axi-cel (n=137)	tisa-cel (n=49)	Index medication: Monoclonal antibodies	tafa (n=56)	pola (n=188)
Post-infusion medication	**n (%)**	**n (%)**	**Post-index medication**	**n (%)**	**n (%)**
Rituximab	27 (19.7)	12 (24.5)	Cyclophosphamide	--	29 (15.4)
Bendamustine	15 (11.0)	8 (16.3)	Fludarabine phosphate	--	26 (13.8)
			Oxaliplatin	6 (10.7)	--

* Therapies ≥ 10% presented for each category. For CAR T, percentage who received medication after CAR T infusion. For pola, 1 and 3 of the patients receiving cyclophosphamide and fludarabine phosphate, respectively, also had a CAR T infusion during the study period follow up period.

HRU and Costs

- Commercially-insured tisa-cel patients had higher PPPM ambulatory visits, ER visits, and inpatient stays and days than axi-cel (Table 3)
- For MAPD-insured patients, axi-cel patients had higher/comparable PPPM inpatient days relative to tisa-cel, comparable ER visits, and comparable or lower ambulatory visits (Table 3)

Table 3. CAR T Cohorts HRU: PPPM over Variable Follow-up

	All-Cause Mean PPPM (SD)		Post CAR T infusion Mean PPPM (SD)		LBCL-related Mean PPPM* (SD)	
	axi-cel	tisa-cel	axi-cel	tisa-cel	axi-cel	tisa-cel
Commercially insured, n	80	15	80	15	80	15
Ambulatory visits	8.9 (5.9)	11.5 (5.5)	8.8 (5.8)	11.3 (5.4)	6.0 (4.6)	7.6 (3.9)
ER visits	0.2 (0.3)	0.5 (0.6)	0.2 (0.3)	0.5 (0.6)	0.1 (0.2)	0.2 (0.2)
Inpatient stays	0.3 (0.3)	0.6 (0.6)	0.2 (0.3)	0.5 (0.5)	0.3 (0.3)	0.5 (0.5)
Inpatient days	5.1 (6.1)	5.6 (5.8)	2.1 (3.3)	3.4 (3.3)	4.6 (6.1)	4.9 (5.5)
MAPD, n	57	34	57	34	57	34
Ambulatory visits	8.5 (5.4)	10.0 (5.4)	8.4 (5.4)	9.7 (5.3)	6.3 (4.6)	7.4 (5.0)
ER visits	0.2 (0.2)	0.2 (0.3)	0.2 (0.2)	0.2 (0.3)	0.02 (0.1)	0.04 (0.1)
Inpatient stays	0.3 (0.3)	0.4 (0.4)	0.2 (0.2)	0.2 (0.3)	0.3 (0.2)	0.3 (0.4)
Inpatient days	5.2 (5.8)	4.9 (6.6)	1.8 (3.6)	1.9 (2.4)	4.8 (5.7)	4.5 (6.5)

Other HRU includes durable medical devices, ambulance services, laboratory services outside of ambulatory care and inpatient setting

HRU and Costs, continued

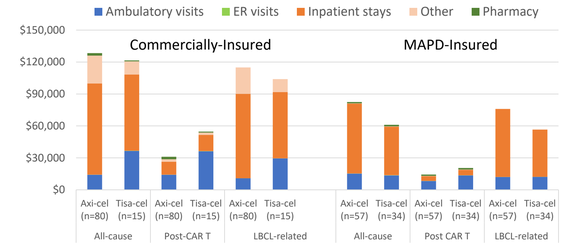
- All-cause and LBCL-related ambulatory visits during follow-up were comparable among CAR T and MAB patients (Tables 3 and 4, respectively)
- Similar all-cause and LBCL PPPM inpatient days across insurance types

Table 4. MAB HCU: All-cause and LBCL-related, PPPM over Variable Follow-up

	All-Cause Mean (SD) PPPM		LBCL-related Mean (SD) PPPM	
	tafa	pola	tafa	pola
Commercially insured, n	5	48	5	48
Ambulatory visits	9.3 (4.6)	10.0 (5.6)	8.0 (5.5)	7.2 (4.4)
ER visits	0.1 (0.1)	0.2 (0.4)	0.1 (0.1)	0.1 (0.2)
Inpatient stays	0.4 (0.2)	0.4 (0.4)	0.4 (0.2)	0.3 (0.4)
Inpatient days	5.5 (5.4)	4.3 (4.8)	5.5 (5.4)	3.8 (4.9)
MAPD, n	51	140	51	140
Ambulatory visits	8.9 (6.2)	7.6 (4.5)	6.3 (4.9)	5.5 (4.0)
ER visits	0.3 (0.4)	0.3 (0.4)	0.0 (0.1)	0.1 (0.2)
Inpatient stays	0.3 (0.4)	0.2 (0.3)	0.2 (0.3)	0.1 (0.2)
Inpatient days	2.4 (4.2)	2.7 (4.2)	1.9 (4.1)	1.7 (3.2)

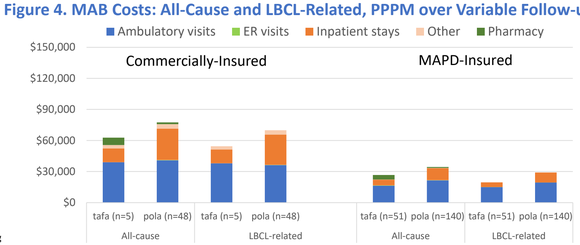
- For all CAR T patients, inpatient costs accounted for large portion of all-cause and LBCL-related costs (Figure 3)
- Similar mean (SD) all-cause PPPM healthcare costs for axi-cel and tisa-cel patients (e.g., commercially-insured axi-cel =$128,362 ([$138,271]; tisa-cel= $121, 528 [$81,143])
- Mean (SD) post-CAR T infusion costs were significantly lower for commercially insured axi-cel ($31,027 [$30,552] than tisa-cel $54,686 [$38,913]) (p=0.01)

Figure 3. CAR T Cohort Costs: All cause, Post-CAR T infusion, and LBCL-related (PPPM)



- For MAB-treated patients, total all-cause and LBCL-related costs were consistently higher for pola than tafa
- For commercially insured patients, mean (SD) PPPM all-cause costs were $34,484 ($32,865) and $26,728 ($13,346) for pola and tafa, respectively
- For MAB-treated patients, ambulatory visits were main driver of tafa and pola all-cause and LBCL-related costs (Figure 4)

Figure 4. MAB Costs: All-Cause and LBCL-Related, PPPM over Variable Follow-up



Multivariable Analysis

- Similar baseline characteristics for axi-cel and tisa-cel patients, except age and insurance type
- Predicted all-cause costs were axi-cel=$113,985 and tisa-cel=$102,174 (p=0.54)
- Insurance type and baseline comorbidities were primary drivers of cost (p<0.05)
  - Age, gender, region, and pre-index costs were not statistically different predictors

CONCLUSIONS

- Shorter vein-to-vein time for axi-cel
- At 1-year, higher proportion of tisa-cel patients required additional oncology therapies
- Axi-cel patients had significantly lower post-CAR T infusion costs potentially due to less systemic LBCL oncology therapies and HRU after initial CAR T infusion
- No significant differences in all-cause costs for axi-cel and tisa-cel
- MAB use was common after CAR T
  - Tisa-cel patients had higher use of pola, which was associated with relatively expensive cost

LIMITATIONS

- Limitations of claims data may include coding errors and missing data
- Liso-cel and lonca had small sample sizes which limited analyses by insurance type
- CAR T and MAB cohorts are not mutually exclusive
  - Study is not intended to compare HRU and costs across these two classes of therapies

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DISCLOSURES

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