

BACKGROUND

Tumor lysis syndrome (TLS), a potentially fatal oncologic condition, is characterized by metabolic disturbances resulting from rapid release of nucleotides, proteins, and other intracellular components from tumor cells that have undergone lysis¹.

TLS usually follows initiation of chemotherapy or other cytotoxic treatment and is the most common disease-related emergency in hematologic cancers².

Rasburicase, a recombinant form of urate oxidase, was approved by the US Food and Drug Administration for the initial management of plasma uric acid levels in patients with leukemia, lymphoma, and solid tumor malignancies who are receiving anticancer therapy expected to result in tumor lysis and subsequent elevation of plasma uric acid³.

Given the variable nature of TLS complications, management of TLS has significant economic effect including longer inpatient length of stay which may impact total cost of care.

OBJECTIVE

The aim of this analysis was to examine healthcare resource utilization in patients treated with rasburicase for the management of tumor lysis in the outpatient versus inpatient setting.

METHODS

Study Design

This retrospective cohort study used the Integra Connect (IC) Database. The IC database comprises electronic medical records for more than 750,000 community oncology patients, including 25,000 active Oncology Care Model (OCM) participants representing approximately 20% of the unique beneficiaries in this Medicare model.

The database provides detailed clinical and financial data for healthcare services provided in the inpatient setting along with services provided in the outpatient setting for OCM participants.

Study Cohort

The current analysis consists of patients who were treated with rasburicase between January 1, 2017 and March 31, 2019.

Inclusion Criteria

- Adults ≥18 years of age at the time of treatment
- Enrolled in the OCM
- Received rasburicase in the outpatient or inpatient setting

Exclusion Criteria

- Allopurinol alone for treatment of TLS documented in the EMR

Patients treated in the outpatient setting were placed into 3 groups based on the intent of rasburicase administration with chemotherapy.

Patients treated in the inpatient setting were placed into 2 groups based on whether they received rasburicase for TLS treatment or in conjunction with chemotherapy for prevention of TLS.

Table 1. Outpatient and Inpatient Groupings Based on Administration of Rasburicase After Chemotherapy

Outpatient Setting	Inpatient Setting
Group A (Primary Prophylaxis): Treatment with rasburicase administered days 0*-2 of chemotherapy	Group D (Inpatient TLS treatment): Patients admitted and treated for TLS with rasburicase and who had not received rasburicase as part of their outpatient chemotherapy regimen
Group B (Early Reactive): Rasburicase administration given 3-5 days after chemotherapy regimen	Group E (Inpatient Chemotherapy): Patients admitted for chemotherapy who were given rasburicase
Group C (Late Reactive): Rasburicase administration given after 5 days of chemotherapy regimen	

*Indicates rasburicase was given on the same day of chemotherapy

Table 2. Demographic and Clinical Characteristics in Study Cohort (N=265) by Rasburicase Administration Groups

	Outpatient Utilization (n=189)			Inpatient Utilization (n=76)	
	Group A n=112	Group B n=11	Group C n=66	Group D n=19	Group E n=57
Age, mean (SD)	74.9 (9.0)	78.9 (6.3)	74.7 (6.7)	74.9 (8.9)	77.1 (8.1)
Male, N (%)	61(54.5)	7 (6.3)	34 (51.5)	13 (68.4)	34 (59.6)
Weight, mean (SD), pounds	179.8 (40.8)	183.1 (37.8)	185.4 (45.8)	173.3 (46.8)	175.9 (42.3)
LDH, median (min, max), U/L	212 (95, 5254)	264 (151, 3627)	236 (114, 4922)	375 (126, 5392)	269 (101, 2841)
Creatinine, median (min, max), mg/dL	1.0 (0.4, 5.0)	1.0 (0.8, 2.9)	1.1 (0.5, 3.8)	1.3 (0.5, 4.3)	1.1 (0.5, 2.6)
Phosphate, median (min, max) mg/dL	3.1 (2.1, 5.9)	3.9 (2.4, 6.6)	3.5 (2.0, 7.0)	6.1 (6.1, 6.1)	3.3 (1.7, 6.9)
Uric acid, median (min, max) mg/dL	5.3 (2.3, 19.2)	6.8 (3.5, 19.0)	6.3 (2.1, 15.4)	8.5 (4.4, 17.1)	7.4 (2.0, 20.1)
Hospital Admissions due to TLS	0	0	0	19	N/A

RESULTS

A total of 265 patients treated with rasburicase were included in the analysis. Of those, 189 patients received rasburicase in the outpatient setting and 76 received rasburicase in the inpatient setting.

- None of the 189 patients in outpatient Groups A, B, and C who received rasburicase required admission due to TLS.
- Table 2 shows the demographic and clinical characteristics by patient groups. The results were similar between the cohorts.
- The results in Table 3 show that while 57.3% of patients in Groups B, C, and D were initially treated with allopurinol, these patients were switched to rasburicase, indicating failure of allopurinol alone.
- The total cost of rasburicase trended lower in the outpatient vs inpatient setting (\$9,287 vs \$11,959). A more appropriate comparator to this cost is the published data for charges incurred for inpatient treatment of TLS, shown to be \$151,9174.

Table 3. Rasburicase Dose, Allopurinol Utilization, and Total Cost of Rasburicase by Rasburicase Administration Groups

	Outpatient Utilization (n=189)			Inpatient Utilization (n=76)
	Group A n=112	Group B n=11	Group C n=66	Group D n=19
Dose, mean (SD), mg/kg	0.14 (0.1)	0.15 (0.1)	0.12 (0.1)	0.17 (0.1)
Number of doses, mean (SD)	1.4 (0.9)	1.5 (0.9)	1.5 (0.9)	1.6 (0.9)
Allopurinol, n (%)	39 (34.8)	7 (63.6)	39 (59.1)	9 (47.4)
Total cost of rasburicase [†]	\$9,287.40	\$10,803.25	\$8,713.09	\$11,959.74

Group E (not shown) represents patients who were admitted for chemotherapy and received rasburicase, therefore, they are not considered in the cost comparisons[†]Total cost of rasburicase was calculated as mean drug cost per patient

LIMITATIONS

- This study is limited only to those individuals who are participants in the OCM and who are being treated in a community oncology setting. Consequently, results of this analysis may not be generalizable to oncology patients who are not participants in the OCM.
- This study relies on EMR and administrative claims data, and these data are subject to coding limitations and entry error.

CONCLUSIONS

TLS continues to impact patients with diagnoses and chemotherapy regimens at intermediate and high risk for development of this syndrome.

- This study demonstrates that allopurinol is frequently inadequate and replacement with rasburicase is warranted.
- We found rasburicase to be effective from both a clinical and economic perspective in preventing TLS-related hospitalization thereby reducing total cost in patients.
- Rasburicase is most efficiently employed as primary prevention. However, if not used for primary prophylaxis, close clinical and laboratory monitoring is a necessity for effective reactive utilization, as evidenced by none of the patients in this study who received rasburicase in the outpatient setting being admitted for TLS.
- This study highlights the need for higher utilization of rasburicase in the outpatient setting, as a means to lower the total cost of care.

REFERENCES

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