Patient Characteristics, Treatment Patterns, Healthcare Resource Utilization, and Cost Associated with First-Line Therapies for Elderly Patients with Mantle Cell Lymphoma

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INTRODUCTION

- Mantle cell lymphoma (MCL), a rare non-Hodgkin lymphoma (NHL) subtype, accounts for approximately 3% of NHL cases.[1]
- As MCL has an aggressive clinical nature, with low sensitivity to traditional chemotherapy and high relapse rates, it is associated with a poor prognosis.[2,3]
- A majority of patients with MCL are male, Caucasian, older than 60 years, and diagnosed at advanced stages of the disease.[4,5]
- First-line (1L) MCL treatment includes chemotherapy, immunotherapy, radiation, bone marrow transplant, or a combination of these options,[6] and it is essential to select the most appropriate 1L therapy when designing a treatment plan for patients with MCL.
- There is limited evidence on real-world treatment utilization and the economic burden associated with 1L treatments for elderly patients with MCL.

OBJECTIVE

- To examine 1L MCL treatment patterns for elderly patients (≥66 years) and quantify healthcare resource utilization (HRU) and costs associated with therapies

METHODS

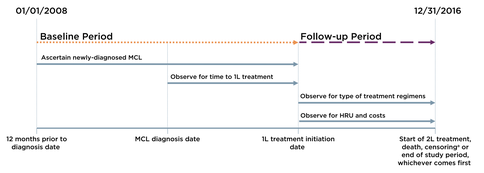
- The Surveillance, Epidemiology, and End Results (SEER)-Medicare database (2008-2016) was used to conduct this retrospective analysis. These data are the result of linkage between cancer data from the SEER program[7] and Medicare administrative claims data.[8]

Study Design

Table 1. Eligibility Criteria

Inclusion Criteria	Exclusion Criteria
• Newly diagnosed with MCL (International Classification of Diseases for Oncology, 3rd edition,[9] histology code of 9673) as primary cancer from 2008 through 2015 • ≥66 years of age at the time of diagnosis • Continuously enrolled in Medicare Parts A and B from at least 12 months prior to MCL diagnosis until the start of 2L treatment, death, censoring, or the end of the study period (12/31/2016), whichever coming first • Received 1L MCL treatment at least three months prior to the end of the data cut (ie, 12/31/2016) • Have ≥1 months of follow-up after 1L MCL treatment	• Without known month or year of diagnosis • Diagnosis of MCL was postmortem • Died within 30 days of MCL diagnosis • Diagnosed with other cancer(s) during the baseline or follow-up period • Received chemotherapy in the 12 months prior to MCL diagnosis • Enrolled in an HMO in the 12 months prior to diagnosis or during study follow-up • Received stem cell transplant during the baseline or follow-up period • Received treatments (such as Bruton's tyrosine kinase inhibitors) that are not indicated for 1L MCL treatment per treatment guidelines

Figure 1. Study Design



2L, second-line.
**Censoring includes Medicare disenrollment and health maintenance organization (HMO) enrollment – in both cases, claims will no longer be available in the dataset.*

- Elderly patients newly diagnosed with MCL who met the inclusion/exclusion criteria (**Table 1**) were identified and followed from their MCL diagnosis date (**Figure 1**).

Study Outcomes and Analysis

- Treatment patterns
  - The proportion of patients receiving each type of 1L treatment regimen was calculated.
  - 1L treatment regimens were defined as follows:
    - First date of an FDA-approved 1L MCL treatment was considered as the index date.
    - All therapies received after the index date without a gap of >35 (parenteral) or >60 (oral) days were considered part of the same regimen.
    - For parenteral drugs, 1L therapy was considered to have ended 35 days after the last administration. For oral medications, 1L therapy was considered to have ended 60 days after the date of the end of the days' supply based on the last observed refill of the oral regimen.
  - Kaplan-Meier methodology was used to determine time to next treatment (TTNT).
- HRU and healthcare costs
  - HRU (inpatient, outpatient, physician office, emergency room [ER], durable medical equipment [DME], home health aide [HHA], skilled nursing facility [SNF], and hospice visits) and costs were reported per-patient-per-month (PPPM) during the 1L treatment period.
  - All-cause and MCL-related HRU and costs were reported separately. Total costs were calculated using Medicare payment, patient payment, and other primary payer payment for services incurred. All costs were inflated to 2018 USD using the medical consumer price index.

RESULTS

Table 2. Baseline Demographic and Clinical Characteristics

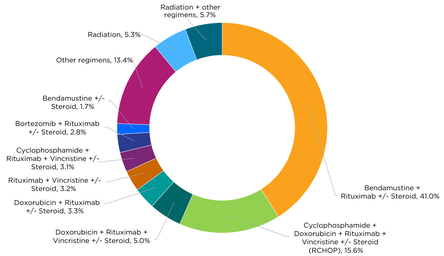
Characteristic	Category	Patients with MCL (N=719)
Demographics		
Age, years	Mean (SD)	76.3 (6.5)
	Median (Q1 to Q3)	76.0 (71.0–81.0)
Gender, n (%)	Male	473 (65.8)
	Female	246 (34.2)
Race/ethnicity, n (%)	Non-Hispanic white	628 (87.3)
	Non-Hispanic black	20 (2.8)
	Hispanic	46 (6.4)
	Other	25 (3.5)
Marital status at diagnosis, n (%)	Single (never married)	59 (8.2)
	Married	427 (59.4)
	Separated/divorced/widowed	182 (25.3)
	Unknown	51 (7.1)
Census location, n (%)	West	317 (44.1)
	South	148 (20.6)
	Northeast	160 (22.3)
	Midwest	94 (13.1)
Urban location, n (%)	Rural	76 (10.6)
	Urban	643 (89.4)
Clinical		
Stage at diagnosis, n (%)	Stage I	62 (8.6)
	Stage II	64 (8.9)
	Stage III	100 (13.9)
	Stage IV	366 (50.9)
	Unknown	127 (17.7)
Charlson comorbidity index, n (%)	0	291 (40.5)
	1	227 (31.6)
	2	57 (7.9)
	3+	144 (20.0)
Poor performance status[a], n (%)	Yes	311 (43.3)
	No	408 (56.7)

[a]Defined as claims for wheelchair use, oxygen use, walking aid, hospital bed, hospice, and skilled nursing facility.

- Patients with MCL were on average 76.3 years old and predominately male (65.8%), non-Hispanic white (87.3%), married (59.4%), and had stage III (13.9%) or stage IV (50.9%) MCL (**Table 2**).

Treatment Patterns

Figure 2. Types of 1L MCL Treatment Regimens (N=719)



- The most commonly used 1L MCL treatment regimen was bendamustine/rituximab (41.0%), followed by rituximab/cyclophosphamide/doxorubicin HCl/vincristine sulfate/prednisone (R-CHOP; 15.6%; **Figure 2**).
  - 5.3% of patients received radiation only; 5.7% received radiation in a combination regimen.

Table 3. Treatment Patterns

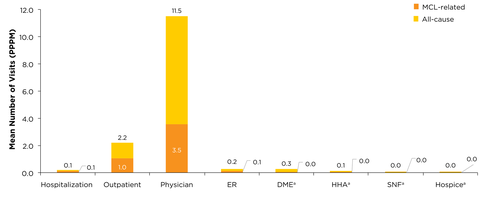
Treatment Characteristic	Statistic	Patients with MCL (N = 719)
Time to initiation of 1L MCL treatment (months)	Mean (SD)	3.4 (7.8)
	Median (Q1–Q3)	1.4 (0.9–2.1)
Duration of 1L treatment (months)	Mean (SD)	4.3 (2.8)
	Median (Q1–Q3)	4.6 (2.4–5.8)
TTNT (months)	Mean (SD)	11.2 (0.5)
	Median (Q1–Q3)	7.2 (5.1–11.5)

- Median time to 1L treatment initiation was 1.4 months, duration of 1L treatment was 4.6 months, and TTNT was 7.2 months (**Table 3**).

Healthcare Resource Utilization

- The proportions of patients with ≥1 all-cause inpatient, outpatient, office-based, and ER visits were 17.7%, 92.1%, 99.6%, and 43.5%, respectively.
- The mean monthly all-cause inpatient length of stay for patients with at least one hospitalization was 3.7 days.

Figure 3. HRU PPPM During 1L MCL Treatment Period

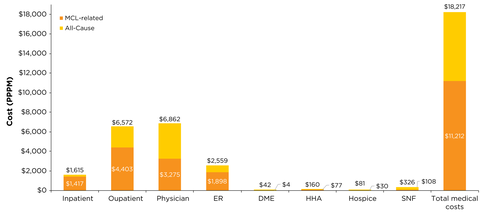


[a]Non-zero values <0.05 were rounded down to 0.

- The mean number of physician visits PPPM during 1L treatment was 11.5 and accounted for the highest among the HRU categories (**Figure 3**).
- The mean number of outpatient visits PPPM was 2.2, of which about half was MCL-related (PPPM, 1.0; **Figure 3**).

Healthcare Costs

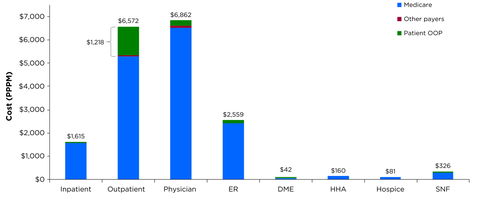
Figure 4. All-Cause and MCL-Related Healthcare Costs PPPM During 1L MCL Treatment[a]



[a]Total cost is shown at the top of each bar.

- Mean PPPM all-cause total medical costs during 1L MCL treatment were $18,217, of which MCL-related costs accounted for 61.5% ($11,212; **Figure 4**).
  - Mean physician visits ($6,862 PPPM) and outpatient visits ($6,572 PPPM) were the largest drivers, accounting for approximately 75% of all-cause healthcare costs (**Figure 4**).
  - MCL-related inpatient costs accounted for almost 90% of the total all-cause inpatient costs (**Figure 4**).

Figure 5. All-Cause Healthcare Costs PPPM During 1L MCL Treatment, by Payment Type



OOP, out-of-pocket.

- Medicare payments accounted for the largest proportion of the costs across all HRU categories (**Figure 5**).
  - However, OOP expenses accounted for $1,218 (18.5%) of total outpatient costs ($6,572; **Figure 5**).
- Similar trends were noted with MCL-related costs, where Medicare payments accounted for the largest proportion of costs across all HRU categories.

LIMITATIONS

- As with all administrative claims database analyses, this study is subject to several limitations, including potential coding errors and incomplete data, which may result in misclassification of patients.
- The generalizability of these results may be impacted by the sample population, which was limited to those patients with Medicare health insurance coverage.
- The exclusion of patients who died within 30 days of MCL diagnosis may have biased the sample population towards relatively healthy patients.

CONCLUSIONS

- 1L treatments for elderly patients with MCL in this study consisted primarily of bendamustine/rituximab and R-CHOP-based regimens, which is in line with recommended 1L MCL treatments.
- This real-world analysis suggests that elderly patients with MCL are faced with substantial all-cause HRU and healthcare costs.
- MCL-related healthcare costs also accounted for a large portion of the total costs, especially for inpatient and ER visit-related costs.
- Taken together, these data highlight the need for novel agents to lower the healthcare resource and economic burden in this population.

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DISCLOSURES

SC and AO: employment with Pharmacyclics LLC, an AbbVie Company; stock ownership in AbbVie; **RS and XN:** consultancy/advisory role with Pharmacyclics LLC, an AbbVie Company; **DA:** previous employment with Eli Lilly and Company, and employment with Pharmacyclics LLC, an AbbVie Company; stock ownership in AbbVie and Eli Lilly and Company; **RI:** employment with Pharmacyclics LLC, an AbbVie Company; stock ownership in AbbVie; patents, royalties, or other intellectual property with Express Scripts.

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