ABSTRACT PF720

Medical Costs Associated With Relapse Among Patients With Follicular Lymphoma

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BACKGROUND

- Follicular lymphoma (FL) occurs in 3.18 per 100,000 persons per year in the USA and is the second most common form of non-Hodgkin lymphoma[1]
- Patients with FL have a high 5-year survival rate (53–91%), although the disease is considered incurable and cycles of relapse and remission are common[2,3]
- Relapse in other lymphomas is known to be costly, e.g. a median of USD 20,000 per month for Hodgkin lymphoma;[4] however, little is understood about the cost of relapse in FL

OBJECTIVE

- To examine the real-world cost of relapse in patients with FL

METHODS

Study Design and Data Source

- Retrospective cohort analysis of 2007–2014 Surveillance, Epidemiology, and End Results (SEER)-Medicare data
  - The SEER registry collects clinical, demographic, and cause of death information for persons with cancer residing in SEER regions; cancer diagnoses are confirmed through pathology reports and medical records
  - Medicare claims cover healthcare services received by beneficiaries in the US from the time of Medicare eligibility until death

Patient Population and Time Frame

- Patients with FL identified on the basis of International Classification of Diseases for Oncology, 3rd edition codes 9690–9691, 9695, and 9698, and initiating a target first-line (1L) FL treatment during the identification period January 1, 2008–December 31, 2012
- Date of diagnosis occurred on or before the first claim date for 1L treatment (index date)
  - Patients using any FL drug treatment before the index date were excluded
- Patients were followed for ≥ 1 year until death, disenrollment (from Medicare fee-for-service Part A/B or Part D), or study end
- Target 1L treatments identified by presence of ≥ 1 claim for all agents (except prednisone):
  - Rituximab monotherapy (R-mono)
  - Bendamustine and rituximab (BR)
  - Rituximab, cyclophosphamide, vincristine, and prednisone (R-CVP)
  - Rituximab, cyclophosphamide, doxorubicin, vincristine, and prednisone (R-CHOP)
    - As clinicians may modify the mix of "CHOP" agents, this study focused on R-CHOP-like regimens in which patients were not on R-CVP and received rituximab and ≥ 1 agent of cyclophosphamide, doxorubicin, and vincristine

METHODS (cont.)

Measures

- Outcomes included:
  - 1L-treatment patterns: regimen count and first relapse
    - Patients initiating second-line (2L) therapy after ≥ 4 cycles of 1L therapy and remission of ≥ 90 days (≥ 180 days for R-mono) were considered to have relapsed FL
    - New drug therapy received before completing all cycles and achieving full remission was considered part of the previous line of therapy
  - Annualized medical Part A/B costs (2014 USD) measured both during the 1L treatment and remission period, and during the first relapse period, starting from 30 days before the first relapse until a second relapse or end of follow-up, whichever occurred first

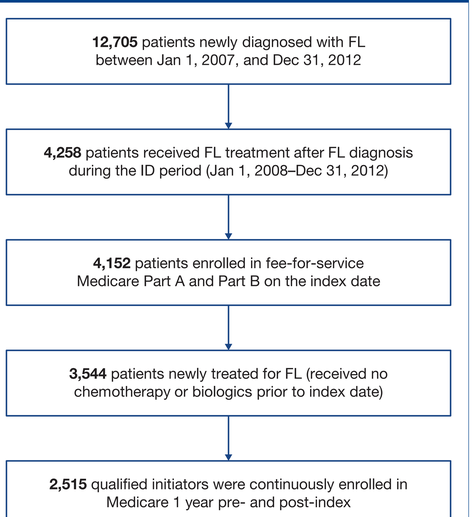
Statistical Analysis

- Descriptive analyses are presented for the cohort overall and stratified by treatment regimen

RESULTS

- 2,515 patients were identified who initiated 1L therapy for FL and met all selection criteria (Figure 1)

Figure 1. Patient Identification Flowchart



Patients receiving rituximab and ibritumomab tiuxetan were excluded.
FL, follicular lymphoma; ID, identification.

RESULTS (cont.)

- Overall mean age (standard deviation [SD]) was 74.1 (8.2) years, 87.2% were white, and 53.8% were female (Table 1)
- Most patients had Ann Arbor stage III (28.4%) or IV (26.8%) FL, followed by stage I (20.8%), stage II (17.1%), or unknown stage (6.8%; Table 1)
- Two-thirds of patients (66.4%) completed 1L therapy and entered remission during follow-up (Table 2)
  - Of these, 26.4% (n = 440) experienced a relapse and began 2L therapy (Table 2)

Table 1. Demographic and Clinical Characteristics

Characteristic	Index Treatment Regimen					
	R-mono (n = 1,124)	R-CHOP-like (n = 888)	R-CVP (n = 229)	BR (n = 274)	All (N = 2,515)	*P* Value
Age at index, mean (SD), years	75.6 (8.8)	72.6 (7.5)	73.9 (7.7)	73.1 (6.8)	74.1 (8.2)	< 0.001
Female, n (%)	641 (57.0)	443 (49.9)	121 (52.8)	149 (54.4)	1,354 (53.8)	0.016
Race/ethnicity, n (%)						
White	989 (88.0)	778 (87.6)	192 (83.8)	235 (85.8)	2,194 (87.2)	0.227
Black	33 (2.9)	37 (4.2)	—[a]	—[a]	86 (3.4)	
Hispanic	67 (6.0)	53 (6.0)	17 (7.4)	18 (6.6)	155 (6.2)	
Other	35 (3.1)	20 (2.3)	11 (4.8)	14 (5.1)	80 (3.2)	
US region, n (%)						
Midwest	117 (10.4)	115 (13.0)	27 (11.8)	36 (13.1)	295 (11.7)	< 0.001
Northeast	230 (20.5)	191 (21.5)	32 (14.0)	50 (18.2)	503 (20.0)	
South	297 (26.4)	268 (30.2)	72 (31.4)	55 (20.1)	692 (27.5)	
West	480 (42.7)	314 (35.4)	98 (42.8)	133 (48.5)	1,025 (40.8)	
FL histologic grade, n (%)						
Grade I: 0–5 centroblasts/HPF	287 (25.5)	110 (12.4)	44 (19.2)	55 (20.1)	496 (19.7)	< 0.001
Grade II: 6–15 centroblasts/HPF	316 (28.1)	176 (19.8)	74 (32.3)	90 (32.8)	656 (26.1)	
Grade III: > 15 centroblasts/HPF	112 (10.0)	292 (32.9)	33 (14.4)	45 (16.4)	482 (19.2)	
NOS	409 (36.4)	310 (34.9)	78 (34.1)	84 (30.7)	881 (35.0)	
Ann Arbor staging, n (%)						
Stage I	254 (22.6)	181 (20.4)	51 (22.3)	37 (13.5)	523 (20.8)	< 0.001
Stage II	204 (18.1)	144 (16.2)	39 (17.0)	44 (16.1)	431 (17.1)	
Stage III	307 (27.3)	266 (30.0)	61 (26.6)	81 (29.6)	715 (28.4)	
Stage IV	264 (23.5)	247 (27.8)	69 (30.1)	95 (34.7)	675 (26.8)	
Unknown	95 (8.5)	50 (5.6)	—[a]	—[a]	171 (6.8)	
Number of chronic conditions, mean (SD)	6.8 (2.1)	6.9 (2.1)	6.8 (2.1)	6.8 (2.1)	6.9 (2.1)	0.717

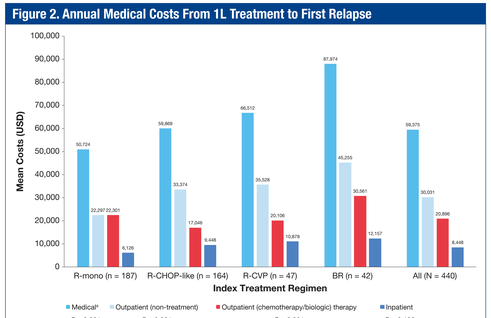
[a] Reported per SEER-Medicare cell size suppression policy.
BR, bendamustine and rituximab; FL, follicular lymphoma; HPF, high-power field; NOS, not otherwise specified; R-CHOP-like, regimens in which patients were not on R-CVP and received rituximab and ≥ 1 agent of cyclophosphamide, doxorubicin, and vincristine; R-CVP, rituximab, cyclophosphamide, vincristine, and prednisone; R-mono, rituximab monotherapy; SD, standard deviation; SEER, Surveillance, Epidemiology, and End Results.

Table 2. 1L Therapy: Number of Treatment Regimens Received and Relapse Status

	Index Treatment Regimen				All (N = 2,515)
	R-mono (n = 1,124)	R-CHOP-like (n = 888)	R-CVP (n = 229)	BR (n = 274)	
Treatment regimens received during 1L therapy until reaching a full course of treatment or end of follow-up, n (%)					
1	782 (69.6)	744 (83.8)	148 (64.6)	237 (86.5)	1,911 (76.0)
2	260 (23.1)	93 (10.5)	40 (17.5)	27 (9.9)	420 (16.7)
3	58 (5.2)	33 (3.7)	—[a]	—[a]	130 (5.2)
≥ 4	24 (2.1)	—[a]	—[a]	—[a]	54 (2.1)
Patients who completed 1L therapy (reached a full course of treatment and entered remission), n (%)	613 (54.5)	674 (75.9)	168 (73.4)	214 (78.1)	1,669 (66.4)
Patients with relapse after completing 1L therapy, n (%)	187 (30.5)	164 (24.3)	47 (28.0)	42 (19.6)	440 (26.4)

[a] Reported per SEER-Medicare cell size suppression policy.
1L, first-line; BR, bendamustine and rituximab; R-CHOP-like, regimens in which patients were not on R-CVP and received rituximab and ≥ 1 agent of cyclophosphamide, doxorubicin, and vincristine; R-CVP, rituximab, cyclophosphamide, vincristine, and prednisone; R-mono, rituximab monotherapy; SEER, Surveillance, Epidemiology, and End Results.

Figure 2. Annual Medical Costs From 1L Treatment to First Relapse

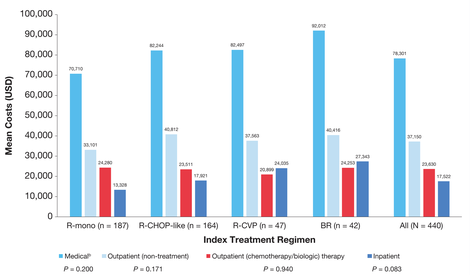


[a] Difference in total medical costs and sum of outpatient and inpatient components due to rounding of numbers.
1L, first-line; BR, bendamustine and rituximab; R-CHOP-like, regimens in which patients were not on R-CVP and received rituximab and ≥ 1 agent of cyclophosphamide, doxorubicin, and vincristine; R-CVP, rituximab, cyclophosphamide, vincristine, and prednisone; R-mono, rituximab monotherapy.

- For patients with relapsed FL (n = 440), mean (SD) annual medical costs from initiation of 1L therapy to first relapse were USD 59,375 (35,726; Figure 2)
  - These consisted of outpatient non-treatment costs (USD 30,031), outpatient (chemotherapy/biologic) therapy costs (USD 20,896), and inpatient costs (USD 8,448)
- During the first relapse period (mean 2.1 years), mean (SD) annual medical costs were USD 78,301 (68,939; Figure 3)
  - These consisted of outpatient non-treatment costs (USD 37,150), outpatient (chemotherapy/biologic) therapy costs (USD 23,630), and inpatient costs (USD 17,522)
  - Among a small group of patients who experienced a second relapse after completing 2L therapy and entering remission (n = 57), slightly higher costs with a similar pattern were observed (results not shown)

RESULTS (cont.)

Figure 3. Annual Medical Costs During the First Relapse Period[a]



[a] The first relapse period was from 30 days prior to the first relapse to 30 days prior to the second relapse or the end of follow-up, whichever occurred first.
[b] Difference in total medical costs and sum of outpatient and inpatient components due to rounding of numbers.
BR, bendamustine and rituximab; R-CHOP-like, regimens in which patients were not on R-CVP and received rituximab and ≥ 1 agent of cyclophosphamide, doxorubicin, and vincristine; R-CVP, rituximab, cyclophosphamide, vincristine, and prednisone; R-mono, rituximab monotherapy.

CONCLUSIONS

- The largest increases in cost during the relapse period are for outpatient non-treatment and inpatient services
- The burden of annual medical costs is substantial among patients with relapsed FL, with costs rising after subsequent relapses

REFERENCES

1. Freedman AS, Aster JC. 2019. Available from: https://www.uptodate.com/contents/clinical-manifestations-pathologic-features-diagnosis-and-prognosis-of-follicular-lymphoma. Accessed 2019 May 10.
2. Freedman AS, Friedberg JW. 2017. Available from: https://www.uptodate.com/contents/histologic-transformation-of-follicular-lymphoma. Accessed 2019 May 10.
3. Foster T, et al. *PharmacoEconomics*. 2009;27:657-679.
4. Szabo SM, et al. *PLoS One*. 2017;12:e0180261.

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DISCLOSURES

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