EE508

Healthcare Resource Utilization (HCRU) Analysis in Newly Diagnosed Mantle Cell Lymphoma (MCL): Autologous Stem Cell Transplantation (ASCT) and HCRU Alleviation With Adoption of the TRIANGLE Ibrutinib Regimen Without ASCT

Jonas Wißkirchen[1], Nora Rogmann[1], Michael Greiling[2], Frederic Ries[1], Anke Ohler[1], Georg Hess[1], Julia Osygus[3]

[1]Department of Hematology and Medical Oncology, Medical School of the Johannes Gutenberg-University, Mainz, Germany; [2]Institute for Workflow-Management in Health Care (IWiG), European University of Applied Sciences, Cologne, Germany; [3]Institute for Workflow-Management in Health Care (IWiG), Rheine, Germany

Key Takeaway

Adaptation of first-line MCL treatment with the TRIANGLE ibrutinib regimen without ASCT would liberate substantial healthcare resources and be less burdensome on patients

Conclusions

For newly diagnosed patients with MCL who are eligible for ASCT, the TRIANGLE ibrutinib regimen could eliminate ≥ 23 hospitalization days and prevent both acute and long-term complications associated with HDCT-ASCT

HCP time that could be saved by adopting the TRIANGLE ibrutinib regimen without ASCT totaled 214 hours, highlighting considerable potential to reduce demands

Our study reports direct costs of €50,815 associated with the total clinical pathway, representing a typical patient with MCL, and does not take into account costs of managing acute and long-term complications of the pathway

Further studies are warranted to validate these findings, given the limitations of subjective time estimation methodology and uncertainty associated with perceived time spent on tasks

Acknowledgments

Writing assistance was provided by Emma Beddie, BSc(Hons), of Parexel. This study is sponsored by Johnson & Johnson.

Disclosures

JW: travel expenses from Pierre Fabre, Gilead-Kite; honoraria from Takeda. MG: scientific director of software-based academic training with a university certificate for Certified Workflow-Manager in Health Care with ClipMed[PPM]; was remunerated by Johnson & Johnson for this analysis. GH: consultancy/honoraria for AbbVie, ADC, AstraZeneca, Beigene, Bristol Myers Squibb, Gilead-Kite, Incyte, Janssen, Lilly, Milenyie, MSD, Novartis, Roche, Sobi; consultancy for Pierre Fabre; research funding from AbbVie, Gilead-Kite, Johnson & Johnson, Lilly; travel grants from Incyte, Johnson & Johnson, Pierre-Fabre. JO: employee of IWiG; was remunerated by Johnson & Johnson for this analysis. NR, FR, AO: no disclosures.

Introduction

- MCL is an aggressive lymphoma with varying clinical course and is still considered incurable.[1,2] For younger, fit patients, dose-intensified chemoimmunotherapy, followed by consolidation with high-dose chemotherapy (HDCT) and ASCT with rituximab maintenance, is the current standard of care[3,4]
- HDCT and ASCT phases can contribute to early death and add significant burden to patients and healthcare resources due to adverse events (AEs), hospitalization, and late effects of the procedure[5-7]
  - Patients spend around 30 days in the hospital (range, 18-51),[8] with 3% to 5% admitted to the intensive care unit (ICU) due to complications,[7,8] often sepsis[9]
  - At a median 8 years post–HDCT-ASCT, most (98%) survivors experience at least 1 moderate or severe late effect, and around half experience severe or life-threatening effects[6]
  - In Germany, mean direct healthcare costs of €107,457 have been reported with ASCT for aggressive lymphomas[10]
- There remains an unmet need for safer, less burdensome treatment regimens for patients with newly diagnosed MCL that will also prolong survival
- In the phase 3 TRIANGLE study (NCT02858258), the ibrutinib regimen demonstrated clinically meaningful improvements in outcomes compared with ASCT in patients with newly diagnosed MCL who were eligible for ASCT[11]
  - The ibrutinib regimen consisted of ibrutinib with R-CHOP, alternating with R-DHAP, for six 21-day cycles, followed by 2 years of daily ibrutinib
- Since August 2025, European Society for Medical Oncology (ESMO) treatment guidelines recommend the TRIANGLE ibrutinib regimen for first-line MCL[12]

Objective

- This study aimed to develop a comprehensive clinical model for the ASCT total procedure for patients newly diagnosed with MCL, and assess the impact on hospital duration, HCRU, and cost of omitting the HDCT-ASCT phase of treatment by adopting the TRIANGLE ibrutinib regimen

Methods

- The total clinical pathway, including all treatment components and processes, was modeled using ClipMed® [PPM] software-based process analysis ("Soft-warebasierte Prozessuale Gesundheitsökonomische Analyse" [SPGA])
- HCRU data were sourced from the Institute for Workflow-Management in Health Care (IWiG®) reference model[13] for quantitative activity-based health economic evaluation based on > 300 clinical-established pathways developed and validated in > 150 projects, and further validated by clinical experts and standard operating procedures
- The total clinical pathway covered patient care from first to last doctor-patient contact. However, it deliberately excluded management of severe AEs and other comorbidities unrelated to MCL, representing a typical patient on a hematology ward
- Standard reimbursement sources and tariff publications in Germany were used to obtain cost inputs for the model. Direct material costs encompass commonly administered medications, derived from national average values in Germany according to the InEK cost matrix[14]

Results

Mapping the total clinical pathway

- The pathway, from assessing ASCT eligibility to 100 days post-ASCT, covered:
  - 49 patient-clinician interaction days
  - 346 patient services (inpatient and outpatient settings)
  - 1653 processes
- Of 49 treatment days, 34 days required inpatient stays for R-DHAP (3 cycles), apheresis, and HDCT-ASCT (23 days, including 15 days post-stem cell transplantation) (Figure 1)

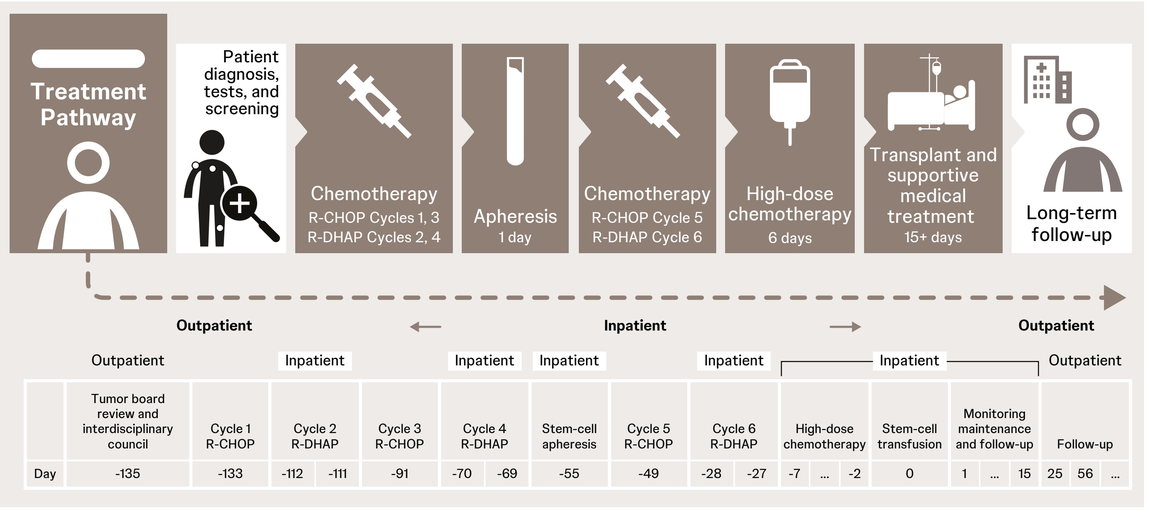
Time associated with the total clinical pathway

- The total healthcare provider (HCP) time for patient care and service provision was 317 hours 5 minutes
  - The most HCP time-intensive procedures occurred during inpatient stays (Figure 2)
  - Hematology nurses spent the most time on this provision (Figure 3)

Time associated with HDCT-ASCT

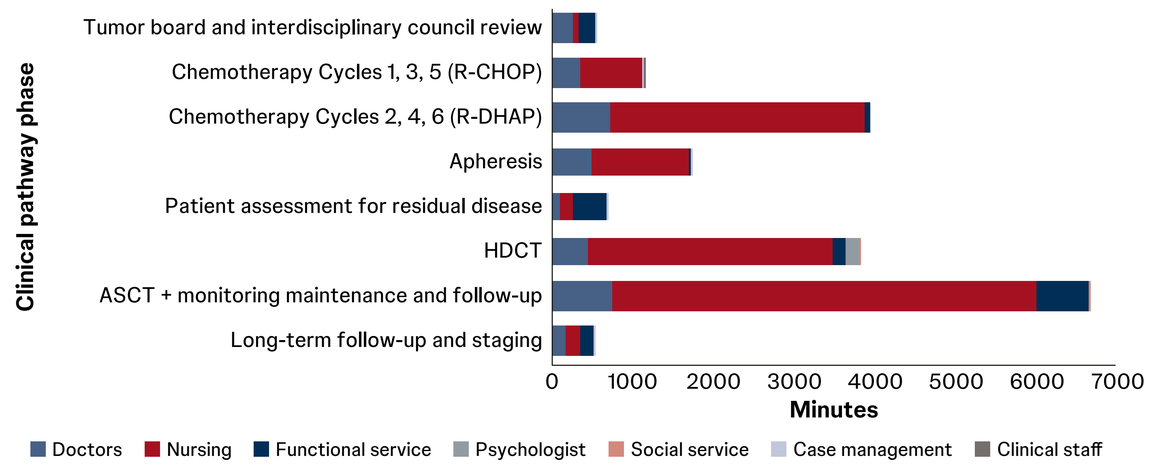
- HCP time spent on apheresis and HDCT-ASCT phases, time that could be spared if the TRIANGLE ibrutinib regimen without ASCT was adopted, totaled 214 hours 42 minutes (Table 1)
  - A total of 215 services and 1089 processes were associated with apheresis and HDCT-ASCT procedures

Figure 1: Total clinical pathway



Days and routine care between treatment components are not included.
Induction immunochemotherapy consisted of 6 alternating cycles of R-CHOP (rituximab on Day 0 or Day 1 [ie, the day prior to or first day of chemotherapy], cyclophosphamide, doxorubicin, and vincristine on Day 1, and prednisone on Days 1-5, and R-DHAP (rituximab on Day 0 or 1, dexamethasone on Days 1-4, cytarabine on Day 2, and cisplatin on Day 1).
R-CHOP, rituximab + cyclophosphamide + doxorubicin + vincristine + prednisone; R-DHAP, rituximab + dexamethasone + cytarabine + cisplatin.

Figure 2: HCRU associated with the total clinical pathway



Induction immunochemotherapy consisted of 6 alternating cycles of R-CHOP (rituximab on Day 0 or Day 1 [ie, the day prior to or first day of chemotherapy], cyclophosphamide, doxorubicin, and vincristine on Day 1, and prednisone on Days 1-5, and R-DHAP (rituximab on Day 0 or 1, dexamethasone on Days 1-4, cytarabine on Day 2, and cisplatin on Day 1).

Figure 3: Percent of total clinical pathway time by HCP

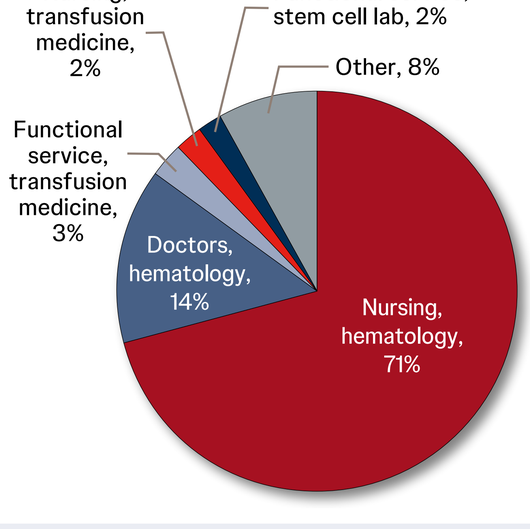


Table 1: Time for patient care and service provision by HCP role

HCP Role, Organizational Unit	Total Clinical Pathway Time[a] (Hours:Minutes)	HDCT-ASCT Time[b] (Hours:Minutes)	HDCT-ASCT vs Total Clinical Pathway
Nursing, hematology	224:38	154:02	69%
Doctors, hematology	45:48	24:01	52%
Functional service, transfusion medicine	8:00	8:00	100%
Nursing, transfusion medicine	7:30	7:30	100%
Functional service, stem cell laboratory	7:20	7:20	100%
Other	23:49	13:49	58%
Total	317:05	214:42	

[a]HCP time from ASCT-eligibility assessment (Day -135) to 100 days of follow-up post-transplantation.
[b]HCP time for apheresis, HDCT-ASCT, and 15-day inpatient post-transplantation observation phases of treatment.

Costs associated with total clinical pathway

- Total cost associated with the total clinical pathway was €50,815. This comprised: medical and non-medical infrastructure, as well as material costs for medical supplies (48.5%); service-volume-driven personnel costs (28.7%); direct medication costs (21.5%) and non–service-volume-driven personnel costs (1.3%)
  - These costs represent a typical patient with MCL, excluding additional costs from aggressive lymphomas with complex AEs and ICU transfers. HDCT-ASCT is associated with frequent long-term complications further increasing HCRU and costs, which were not in scope of this analysis

References

1. Smith A, et al. *Br J Cancer*. 2015;112:1575-1584. 2. Eskelund CW, et al. *Blood*. 2017;130:1903-1910. 3. Dreyling M, et al. *Ann Oncol*. 2017;28(suppl_4):iv62-iv71. 4. Dreyling M, et al. Onkopedia. Mantelzell-Lymphom. June 2023. Accessed August 7, 2025. 5. Wullenkord R, et al. *Ann Hematol*. 2021;100:2733-2744. 6. Smeland K, et al. *Haematologica*. 2022;107:2698-2707. 7. Kerhuel L, et al. *Leuk Lymphoma*. 2015;56:3090-3095. 8. Widmer F, et al. *Ann Hematol*. 2018;97:277-287. 9. Garcia Borrega J, et al. *Ann Hematol*. 2023;102:191-197. 10. Mayerhoff L, et al. *J Comp Eff Res*. 2019;8:121-131. 11. Dreyling M, et al. *Lancet Oncol*. 2024;403:2293-2306. 12. Eyre T, et al. *Ann Oncol*. 2025 [Article in Press]. 13. Institute for Workflow Management in Healthcare (IWiG). IfW-MiG. ClipMed PPM. The Path and Process Cost Manager. https://iwig-institut.de/clipmed-ppm/. Accessed August 20, 2025. 14. Institut für das Entgeltsystem im Krankenhaus (InEK) Vereinbarung über die Teilnahme an der Kalkulation von Investitionskosten in Krankenhäusern für Zwecke gem. https://www.g-drg.de/. Accessed August 20, 2025.

Presented by J Wißkirchen at ISPOR Europe 2025; November 9-12, 2025; Glasgow, Scotland, UK