Treatment patterns and healthcare resource utilization in ruxolitinib-treated patients with myelofibrosis with and without anemia: a real-world analysis

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Digital poster

Supplemental data

Introduction

- Myelofibrosis (MF) is a blood cancer characterized by abnormalities in the production of red blood cells (RBCs), white blood cells, or platelets and buildup of scar tissue within the bone marrow, leading to anemia, spleen enlargement, severe constitutional symptoms, and reduced survival[1]
  - MF can present de novo (primary MF) or secondary to polycythemia vera or essential thrombocythemia
- Approximately 40% of patients with MF have anemia at diagnosis, which increases to approximately 60% within a year of diagnosis[2,3]
- Anemia is associated with long-term need for transfusion, reduced quality of life, increased medical costs, and poor survival in patients with MF[2-6]
- The Janus kinase (JAK) inhibitor ruxolitinib, a standard of care for MF, is often used regardless of patients' anemia status but may worsen anemia[7,8]
- In this study, healthcare claims data were analyzed to evaluate healthcare resource utilization (HCRU), treatment patterns, and costs in ruxolitinib-treated patients with MF with and without anemia prior to treatment

Methods

Patients

- This retrospective cohort study included patients with MF (ICD-9/10-CM 238.76/D47.4 or 289.83/D75.81) treated with ruxolitinib in the IQVIA PharMetrics® Plus claims database from January 1, 2011, to December 31, 2022
- Eligible patients were required to have continuous enrollment for ≥6 months before (baseline) and ≥3 months after (follow-up) the first ruxolitinib prescription (index date) (**Figure 1**)

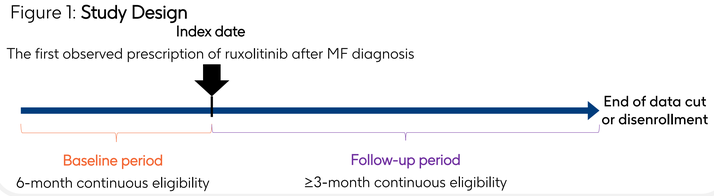
Variable Definitions

- Baseline anemia: ≥1 inpatient medical claim of anemia or ≥2 outpatient (on separate dates within 90 days) claims with a medical diagnosis for anemia (ICD-9/10-CM codes may be viewed behind the QR code) during baseline
- Suboptimal ruxolitinib dosing (at month 3 or 6): no claims for ≥20 mg/day within the first 3- or 6-months post-index
- Ruxolitinib discontinuation: no further claims of ruxolitinib after the end of ruxolitinib prescription plus a grace period of 60 days

Statistical Analyses

- Baseline characteristics, treatment patterns, per-patient per-year (PPPY) HCRU, and cost were described and stratified by baseline anemia status
- All-cause HCRU and cost outcomes were aggregated and described during the entirety of the follow-up period from index until the end of enrollment or data availability among all patients

Figure 1: **Study Design**



Limitations/Future Study

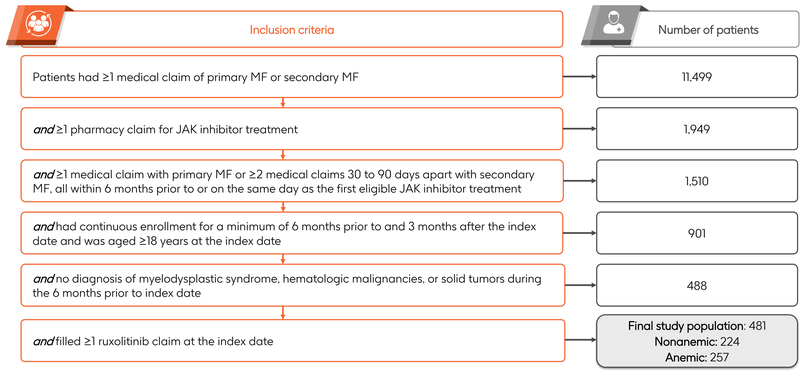
- Because only patients with 9 months of continuous enrollment were studied, survival bias may have resulted in the exclusion of those with early mortality after the index date[9,10]
- Administrative claims data are subject to potential data coding limitations and data entry errors, which may result in missing or erroneous information[11]
- This study was limited to patients in the IQVIA PharMetrics® Plus claims database, which primarily included individuals with employer-sponsored commercial insurance and patients who were self-insured, alongside some patients with Medicaid, Medicare Advantage, and Medicare Supplemental. Therefore, the results may not be broadly generalizable to the entire US population
- The current study focuses only on patients with and without anemia prior to ruxolitinib treatment; HCRU and costs associated with new or worsening anemia on ruxolitinib are not addressed but warrant investigation in future studies

Results

Patient Characteristics

- Of 11,499 patients with myelofibrosis, 481 met eligibility criteria during the study period. Mean follow-up was 2.0 years (range, 0.3-9.3 years) (**Figure 2**)
- Anemic patients were older than nonanemic counterparts with a slightly higher male prevalence (**Table 1**)
- Anemic patients also had a higher Charlson Comorbidity Index (CCI) score and more frequent thrombocytopenia during the baseline period (**Table 1**)

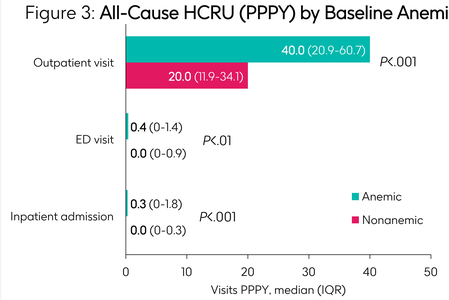
Figure 2: **Patient Selection and Attrition**



HCRU and Costs

- During follow-up (from index to end of enrollment or data availability), anemic patients also exhibited higher median PPPY all-cause HCRU (inpatient admission, outpatient visits, and emergency department visits) than those without anemia (**Figure 3**)

Figure 3: **All-Cause HCRU (PPPY) by Baseline Anemia Status**



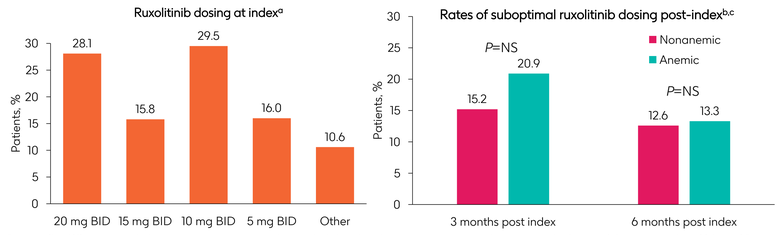
	Nonanemic (n=224)	Anemic (n=257)	*P* value
≥1 outpatient visit, n (%)	224 (100)	257 (100)	-
≥1 ED visit, n (%)	103 (46)	145 (56)	<.05
Inpatient admissions			
≥1, n (%)	71 (32)	137 (53)	<.001
Length of stay, median (IQR), days[a]	7.7 (1.7-19.1)	10.9 (4.5-29.8)	.860

[a] The length of inpatient stay was calculated among only those patients who had ≥1 inpatient admission during the time frame of interest.

Treatment Patterns

- At index, most patients received an optimal starting dose of ruxolitinib (≥20 mg/day) (**Figure 5**)
- Rates of suboptimal ruxolitinib treatment (<20 mg/day) were numerically higher in anemic vs nonanemic patients at 3 months post index and 6 months post index among patients who had not discontinued ruxolitinib (**Figure 5**)

Figure 5: **Ruxolitinib Dosing at Index and 3 or 6 Months Post Index**



[a] Patients (N=481) were included in a given category only if they could follow that dosing schedule without breaking a pill in 1 sitting. [b] Percentages from 224 and 254 patients in the 3-month post-index nonanemic and anemic subgroups, respectively; 174 and 165 patients in the 6-month post-index nonanemic and anemic subgroups, respectively. [c] A patient's ruxolitinib usage was included in this analysis only if they were continuously using ruxolitinib during the time frame of interest.

Conclusions

- This retrospective analysis of the IQVIA PharMetrics® Plus claims database suggests that ruxolitinib-treated patients with MF and anemia have higher HCRU and medical costs compared with nonanemic patients
  - Notably, median all-cause outpatient visits were 2 times higher for anemic vs nonanemic patients
  - Anemic patients had higher all-cause total healthcare costs than nonanemic patients despite numerically lower pharmacy costs
- Patients with anemia at baseline discontinued ruxolitinib approximately 1 year earlier than those without baseline anemia, and a substantial proportion of patients in both groups received a suboptimal dose of ruxolitinib during the first 3 or 6 months post index
  - Anemic patients had significantly lower JAK inhibitor costs than nonanemic patients, which may be due to lower ruxolitinib dosing and higher and more rapid rates of ruxolitinib discontinuation, leading to less JAK inhibitor treatment overall
- Overall, this study highlights the need for durable and effective treatments that reduce the risk of anemia, which could potentially offset medical resource burden and costs for patients with MF

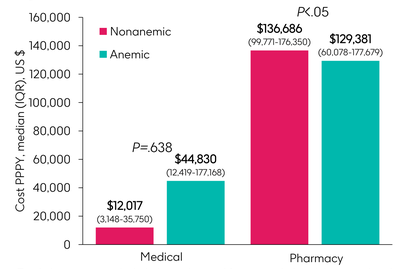
Table 1: **Baseline Characteristics by Anemia Status**

	Nonanemic (n=224)	Anemic (n=257)	*P*value[c]
Age, mean (SD), years	56.8 (8.4)	60.2 (8.6)	<.001
Male, n (%)	115 (51)	149 (58)	.172
Primary MF, n (%)[a]	66 (30)	96 (37)	.084
Secondary MF, n (%)[a]	180 (80)	197 (77)	.383
Transfusion status, n (%)[b]			
Transfusion dependent	0 (0)	20 (8)	<.001
Transfusion requiring	7 (3)	47 (18)	<.001
Transfusion independent	217 (97)	190 (74)	<.001
MF-related comorbidities during 6-month baseline, n (%)			
Splenomegaly	108 (48)	155 (60)	<.05
Cardiovascular disease	85 (38)	147 (57)	<.001
Hypertension	73 (33)	128 (50)	<.001
Thrombocytopenia	18 (8)	61 (24)	<.001
CCI score during 6-month baseline, mean (SD)	0.5 (1.0)	1.0 (1.4)	<.001

[a] Patients could meet criteria for both primary and secondary MF at different times during the baseline period, so percentages may total >100%. [b] Transfusion status was assessed using data in the last 84 days (ie, between days 6 and 90 [inclusive]) of the baseline period. Transfusion independent was defined as no blood transfusions in the 84-day interval; transfusion dependent was defined as ≥6 transfusion claims during the 84-day interval; and transfusion requiring was defined as not meeting either of the previous criteria.

- Anemic patients had numerically higher median all-cause total and medical costs but lower median pharmacy costs compared with nonanemic patients (**Figure 4**)

Figure 4: **All-Cause Healthcare Costs by Baseline Anemia Status[a]**

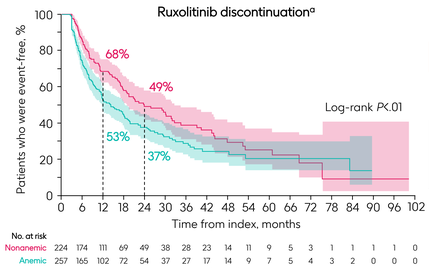


Cost PPPY, median (IQR), US $	Nonanemic (n=224)	Anemic (n=257)	*P*value
Medical costs			
Outpatient	8,776 (3,016-19,789)	23,781 (8,924-62,045)	<.001
ED	0 (0-1,250)	237 (0-2,673)	<.01
Inpatient	0 (0-7,847)	5,486 (0-101,321)	.494
Pharmacy costs			
JAK inhibitor costs	135,752 (99,545-175,893)	122,283 (56,157-172,421)	<.01
Non–JAK inhibitor BAT costs	0 (0-16)	0 (0-45)	.248

[a] Total pharmacy costs included costs incurred from prescription claims associated with MF treatments and included costs for JAK inhibitors, non–JAK inhibitor BAT, iron chelation therapy, durable medical equipment, and dental or vision care.

- However, anemic patients also discontinued ruxolitinib earlier than nonanemic patients (**Figure 6**)

Figure 6: **Time to First Ruxolitinib Discontinuation by Baseline Anemia Status**



	Nonanemic (n=224)	Anemic (n=257)
Patients who discontinued ruxolitinib, n (%)	110 (49.1)	155 (60.3)
Time to first ruxolitinib discontinuation, median (95% CI), months	23.8 (18.7-32.6)	14.1 (11.5-18.3)
Proportion who remained on ruxolitinib, %		
At 3 months	97.8	91.4
At 6 months	85.5	73.2
At 12 months	68.4	52.5
At 24 months	48.9	37.3

[a] Patients were censored at end of data or end of enrollment.

Abbreviations

BAT, best available therapy; BID, twice daily; CCI, Charlson Comorbidity Index; ED, emergency department; HCRU, healthcare resource utilization; ICD-9/10-CM, *International Classification of Diseases, 9th or 10th Edition, Clinical Modification*; IQR, interquartile range; JAK, Janus kinase; MF, myelofibrosis; NS, nonsignificant; PPPY, per patient per year; RBC, red blood cell.

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TL and **SZ** report employment with and stock and/or stock options from GSK. **MF, JC, GS,** and **JS** report employment with Analysis Group, Inc., which received funding from GSK to conduct the present analysis.

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