Steffen Koschmieder
skoschmieder@ukaachen.de

Characteristics of High-Risk Polycythemia Vera Patients With Suboptimal Response to First-Line Therapy Who Switched to Ruxolitinib vs Those Who Did Not Switch: Findings From PV-Switch, a Multinational, Retrospective Chart Review Study

Steffen Koschmieder, MD[1]; Clemens Schulte, MD[2]; Eyck von der Heyde, MD[3]; Lambert Busque, MD[4]; Françoise Boyer-Perrard, MD[5]; Timothy Devos, MD, PhD[6]; Francesco Passamonti, MD[7]; Mike W. Zuurman, PhD[8]; Carole Paley, MD[8]; Geralyn Gilotti, MSc[8]; Wendy Y. Cheng, PhD, MPH[9]; Chi Gao, ScD, MS[9]; Mu Cheng, MPH[9]; Melody Wu, MPH[9]; Mei Sheng Duh, ScD, MPH[9]; Claire Harrison, MD, FRCPath[10]

[1]Department of Hematology, Oncology, Hemostaseology, and Stem Cell Transplantation, Faculty of Medicine, RWTH Aachen University, Aachen, Germany; [2]Gemeinschaftspraxis für Hämatologie und Onkologie, Dortmund, Germany; [3]Onkologische Schwerpunktpraxis, Hannover, Germany; [4]Department of Hematology, Hôpital Maisonneuve-Rosemont, Montreal, QC, Canada; [5]Centre Hospitalier Universitaire d'Angers, Angers, France; [6]Department of Hematology, University Hospitals Leuven and Department of Microbiology and Immunology, Laboratory of Molecular Immunology (Rega Institute), KU Leuven, Leuven, Belgium; [7]Division of Hematology, University Hospital Ospedale di Circolo e Fondazione Macchi-ASST Sette Laghi, University of Insubria, Varese, Italy; [8]Novartis Pharmaceuticals Corporation, East Hanover, NJ; [9]Analysis Group, Inc, Boston, MA; [10]Guy's and St Thomas' NHS Foundation Trust, London, UK

Scan to obtain

- **Poster**
- **Presentation slide deck**
- **Supplementary material**

https://bit.ly/Koschmieder3646?r=qr

Presented at the 63rd ASH Annual Meeting and Exposition, held on December 11-14, 2021, in Atlanta, GA

Disclosures

- This study was supported by Novartis Pharmaceuticals Corporation

Steffen Koschmieder

- Received honoraria for consulting for Novartis, Bristol Myers Squibb Company, AOP Orphan Pharmaceuticals GmbH, Janssen Pharmaceuticals, Inc, Geron, Pfizer Inc, Incyte Corporation, Ariad Pharmaceuticals, Celgene Corporation, Shire, and Roche
- Served on advisory committees and other for Novartis, Bristol Myers Squibb Company, AOP Orphan Pharmaceuticals GmbH, Janssen Pharmaceuticals, Inc, Geron, Pfizer Inc, Incyte Corporation, Ariad Pharmaceuticals, Celgene Corporation, CTI BioPharma, Roche, Baxalta, and Sanofi
- Received travel support from Alexion Pharmaceuticals, Karthos, Imago BioSciences, and AbbVie Inc

Presented at the 63rd ASH Annual Meeting and Exposition, held on December 11-14, 2021, in Atlanta, GA

Background and Study Objectives

- Polycythemia vera (PV) is characterized by an abnormal increase in red cell mass and elevations in platelet and white blood cell counts[1] and is most commonly associated with mutations in the Janus kinase 2 (*JAK2*) gene (V617F or exon 12)[2,3]
- Cytoreductive therapy is recommended for patients with high-risk PV, with hydroxyurea and interferon often used as first-line (1L) therapy[4-6]
- However, nearly a quarter of patients discontinue therapy due to resistance or intolerance and require second-line (2L) therapy
- Ruxolitinib is approved by the US Food and Drug Administration and European Medicines Agency to treat hydroxyurea-resistant or -intolerant PV.[7] However, in real-world clinical practice, many patients continue 1L therapy after developing resistance or intolerance instead of switching to ruxolitinib as 2L therapy[5,8]
- The primary objective of this first-of-its-kind, multinational, retrospective chart review study is to assess the event-free survival rate of high-risk patients with PV who receive ruxolitinib as 2L therapy (switchers) vs those who continue receiving 1L therapy (non-switchers) after suboptimal response
- **The current analysis describes the characteristics of an interim sample of ruxolitinib switchers and non-switchers following suboptimal response to 1L therapy**

1. Vannucchi AM. *Blood*. 2014;124(22):3212-3220; 2. Adamson JW, et al. *N Engl J Med*. 1976;295(17):913-916; 3. Tefferi A, et al. *Leukemia*. 2013;27(9):1874-1881; 4. Barbui T, et al. *J Clin Oncol*. 2011;29(6):761-770; 5. Marchioli R, et al. *Thrombosis*. 2011;2011:794240; 6. Marchioli R, et al. *N Engl J Med*. 2013;368(1):22-33; 7. Jakavi (ruxolitinib). Prescribing information. Novartis; 2021. 8. Landolfi R, et al. *N Engl J Med*. 2004;350(2):114-124.

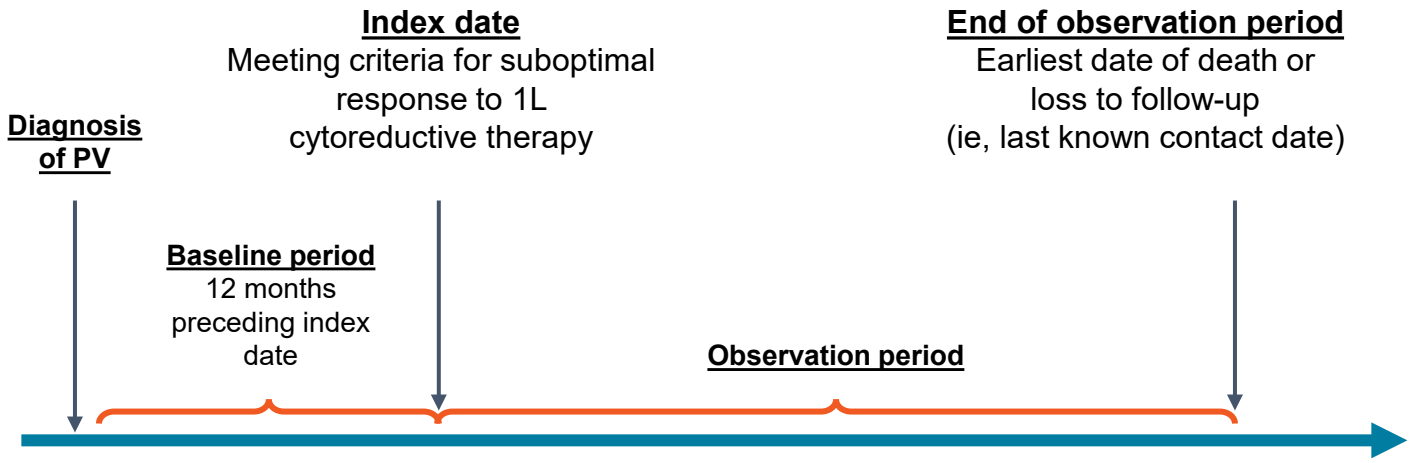
Presented at the 63rd ASH Annual Meeting and Exposition, held on December 11-14, 2021, in Atlanta, GA

Methods

Study design

- This is a multinational, retrospective chart review study with a recruitment target of 350 patients from 24 clinical sites across 9 countries
- The current analysis included an interim sample of eligible patients, with data extracted from February 2020 to June 2021

Study Design Scheme



Presented at the 63rd ASH Annual Meeting and Exposition, held on December 11-14, 2021, in Atlanta, GA

Methods

Study population

- Eligible patients included:
  - Aged ≥18 years
  - *JAK2*-positive PV diagnosed in 2012 or later
  - A high-risk constellation with indication for cytoreductive therapy
  - Established suboptimal response to 1L therapy after ≥12 months of treatment; suboptimal response is defined as meeting 1 of the following criteria:
    - Need for ≥3 phlebotomies within 1 year to maintain hematocrit <45%
    - Leukocyte count >15×10^9/L
    - Platelet count >600×10^9/L
    - Persistence of PV-related symptoms or presence of new PV-related symptoms
    - Cytopenias at lowest dose of cytoreductive therapy required to achieve a response
    - Failure to reduce splenomegaly by >50% as measured by palpation or progressive splenomegaly
  - ≥6 months of follow-up after suboptimal response except in the event of death
  - Did not initiate a PV treatment other than ruxolitinib after suboptimal response

Statistical analysis

- Patients were classified into two groups, switchers and non-switchers, based on whether they switched to ruxolitinib following first suboptimal response (ie, index date)
- Descriptive statistics were used to summarize patient demographics, criteria for suboptimal response, comorbidities (at any time prior to the index date), and PV-related symptoms and other clinical characteristics during the baseline period, for switchers and non-switchers respectively

Presented at the 63rd ASH Annual Meeting and Exposition, held on December 11-14, 2021, in Atlanta, GA

Patient Baseline Demographic Characteristics[a]

- Switchers tended to be younger than non-switchers at PV diagnosis (66.5 vs 70.2 years) and at the index date (68.9 vs 73.0 years) and were more likely male (52.3% vs 47.3%)
- Half of switchers had never smoked, while only 37.6% of non-switchers had never smoked
- Baseline body mass index (BMI) was comparable between the two groups
- Switchers were more likely than non-switchers to have been enrolled in an interventional clinical trial for an investigational PV treatment (6.8% vs 3.2%)

	Switch n=44	Non-switch n=93
Age at PV diagnosis, years		
Mean (SD) [median]	66.5 (12.0) [70.5]	70.2 (8.5) [70.0]
Age at index date, years		
Mean (SD) [median]	68.9 (11.9) [72.2]	73.0 (8.7) [73.7]
Sex, n (%)		
Male	23 (52.3)	44 (47.3)
Female	21 (47.7)	49 (52.7)
Smoking status, n (%)		
Current smoker	4 (9.1)	6 (6.5)
Former smoker	13 (29.5)	23 (24.7)
Never smoker	22 (50.0)	35 (37.6)
Unknown	5 (11.4)	29 (31.2)
BMI		
BMI available, n (%)	38 (86.4)	50 (53.8)
Mean (SD)	27.5 (5.0)	27.4 (5.6)
Median (IQR)	25.9 (23.7-30.9)	26.2 (23.5-30.1)
Previous enrollment in interventional clinical trial for an investigational PV treatment, n (%)	3 (6.8)	3 (3.2)

BMI, body mass index; IQR, interquartile range.
[a] Baseline period: 12 months prior to index date (ie, time of suboptimal response to 1L therapy).

Presented at the 63rd ASH Annual Meeting and Exposition, held on December 11-14, 2021, in Atlanta, GA

Patient Baseline Clinical Characteristics[a]

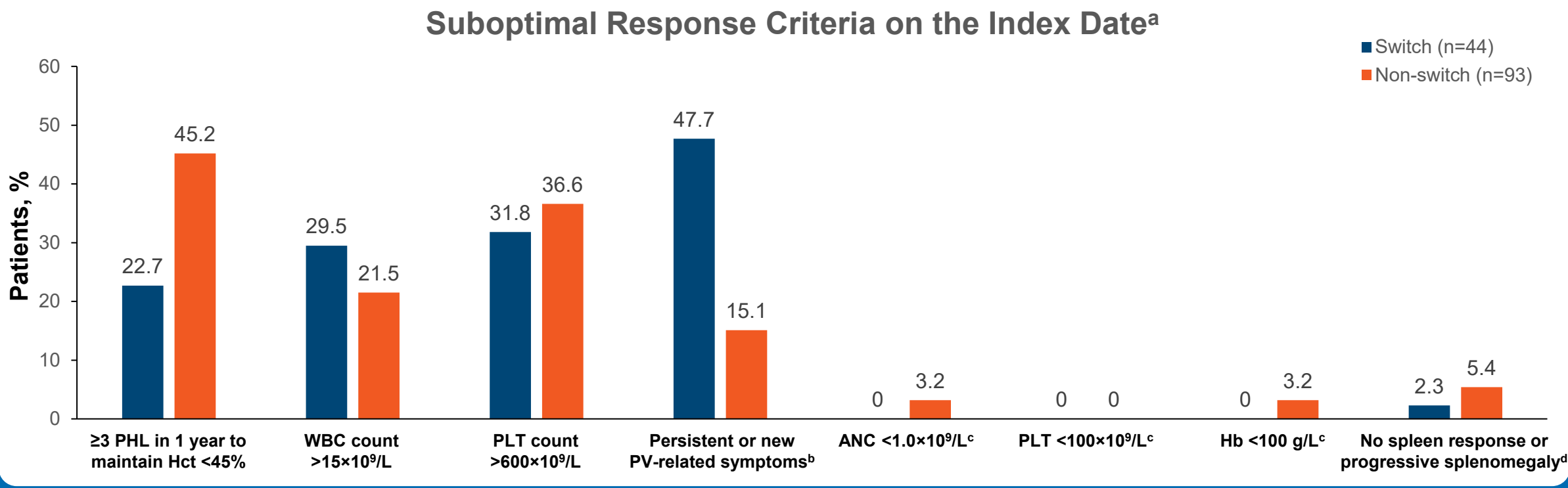
- More switchers (54.4%) than non-switchers (31.2%) had a history of thrombosis at time of PV diagnosis
- Comorbidities tended to be less prevalent in switchers than in non-switchers prior to the index date
  - Commonly reported comorbidities included hypertension, cardiac conditions, hypercholesterolemia, and diabetes
  - Switchers had a higher proportion of obesity than non-switchers
- Fatigue and pruritus were the most observed PV-related symptoms in the baseline period; proportions were similar between groups
- Fewer switchers (36.4%) than non-switchers (60.2%) received phlebotomies in the baseline period; mean number of procedures was similar between groups

	Switch n=44	Non-switch n=93
History of thrombosis at time of PV diagnosis, n (%)	24 (54.5)	29 (31.2)
Comorbidities prior to the index date, n (%)		
Hypertension	19 (43.2)	62 (66.7)
Cardiac	8 (18.2)	27 (29.0)
Obesity	7 (15.9)	7 (7.5)
Hypercholesterolemia	4 (9.1)	24 (25.8)
Cancer	4 (9.1)	10 (10.8)
Diabetes	1 (2.3)	15 (16.1)
Other	9 (20.5)	39 (41.9)
None of the above	13 (29.5)	11 (11.8)
PV-related symptoms during the baseline period, n (%)		
Fatigue	8 (18.2)	15 (16.1)
Pruritus	7 (15.9)	13 (14.0)
Night sweats	3 (6.8)	3 (3.2)
Abdominal pain	2 (4.5)	4 (4.3)
Inactivity	1 (2.3)	0
Early satiety	0	3 (3.2)
Problems with concentration	0	2 (2.2)
Unintentional weight loss	0	2 (2.2)
Fever	0	1 (1.1)
Other	4 (9.1)	11 (11.8)
None of the above	32 (72.7)	66 (71.0)
Phlebotomies received during the baseline period, n (%)	16 (36.4)	56 (60.2)
Number of phlebotomies received, mean (SD) [median]	3.8 (2.3) [3.5]	3.9 (2.8) [3.0]

[a] Baseline period: 12 months prior to index date (ie, time of suboptimal response to 1L therapy).

Presented at the 63rd ASH Annual Meeting and Exposition, held on December 11-14, 2021, in Atlanta, GA

Suboptimal Response to First-line Cytoreductive Therapy on the Index Date



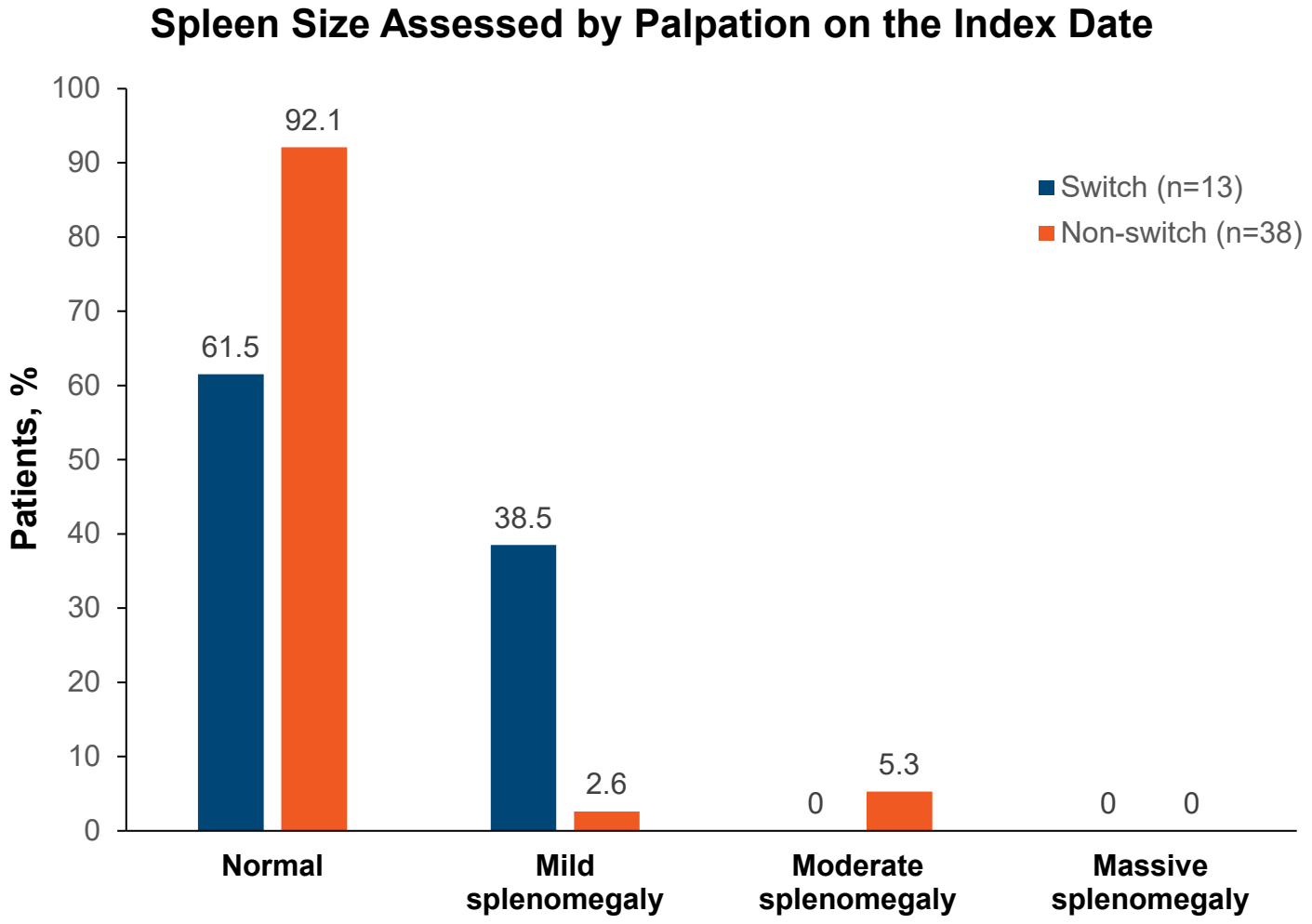
- The median time from PV diagnosis to index date was shorter for switchers than non-switchers (13.6 vs 20.6 months)
- Distribution of suboptimal response criteria on the index date differed between the 2 groups
  - For switchers, the most common criterion was “persistence of PV-related symptoms or presence of new PV-related symptoms”
  - For non-switchers, the most common criterion was “need for ≥3 phlebotomies within 1 year to maintain hematocrit <45%”

ANC, absolute neutrophil count; Hb, hemoglobin; Hct, hematocrit; PHL, phlebotomy; PLT, platelet; WBC, white blood cell.
[a] Patients can experience >1 criterion defining suboptimal response. [b] PV-related symptoms include pruritus, fatigue, night sweats, fever, unintentional weight loss, abdominal pain, early satiety, problems with concentration, and inactivity. [c] Cytopenias at the lowest dose of cytoreductive therapy required to achieve a response; >1 cutoff can be used to diagnose cytopenias. [d] Spleen response was defined as a >50% reduction in palpable splenomegaly.

Poster presented at the 2021 ASH Annual Meeting, held on December 11-14, 2021, in Atlanta, GA

Spleen Assessments on the Index Date

- A total of 13 switchers (29.5%) and 38 non-switchers (40.9%) had their spleen size assessed by palpation on the index date
- On the index date, switchers tended to have a lower proportion of normal spleen size (61.5% vs 92.1%) and a higher proportion of mild or moderate splenomegaly (38.5% vs 7.9%) than non-switchers
- Spleen length assessments revealed the following results:
  - 20 switchers (45.5%) and 14 non-switchers (15.1%) had available spleen length results
  - The mean (SD) spleen lengths were 15.6 (5.0) and 13.8 (2.6) cm, respectively, which further supported the findings from palpation
  - Almost all spleen lengths were assessed by ultrasound



The types of spleen assessment (ie, spleen length and spleen size) are not mutually exclusive categories. If data from the index date are unavailable, then the data from the most recent date prior to the index date are reported.

Presented at the 63rd ASH Annual Meeting and Exposition, held on December 11-14, 2021, in Atlanta, GA

Conclusions

- This interim analysis shows the trending existence of clinical differences between switchers and non-switchers, including a milder comorbidity profile in switchers
- Although switchers experienced similar PV-related symptoms as non-switchers at baseline (ie,12 months prior to establishing suboptimal response to 1L therapy), switchers were more likely to experience persistence of PV-related symptoms or presence of new symptoms as their suboptimal response type
- Together, these two factors may have influenced clinicians' decisions to switch patients to ruxolitinib or continue 1L therapy
- Clinicians and patients may be more likely to switch to 2L therapy when the patient has fewer comorbidities and continues to be symptomatic

Presented at the 63rd ASH Annual Meeting and Exposition, held on December 11-14, 2021, in Atlanta, GA

Thank You!

Steffen Koschmieder, MD,

on behalf of PV-Switch investigators

skoschmieder@ukaachen.de

Scan to obtain

- **Poster**
- **Presentation slide deck**
- **Supplementary material**

https://bit.ly/Koschmieder3646?r=qr

Presented at the 63rd ASH Annual Meeting and Exposition, held on December 11-14, 2021, in Atlanta, GA