Sponsor
Novartis Pharmaceuticals

Generic Drug Name
Crizanlizumab

Trial Indication(s)
Sickle Cell Disease

Protocol Number
CSEG101AUS17

Protocol Title
Characteristics of Patients with Sickle Cell Disease Who Initiate Crizanlizumab Therapy

Clinical Trial Phase
NA

Phase of Drug Development
IV

Study Start/End Dates
Study start date: 30/08/2021

Study Completion date: 27/10/2021

Reason for Termination

NA

Study Design/Methodology

This was a retrospective descriptive analysis of health care claims data using the IQVIA open source medical and pharmacy claims databases.

Patients with a diagnosis of SCD between November 1, 2018 and April 30, 2021 were identified. Among these patients, those who initiated crizanlizumab between November 1, 2019 and January 31, 2021 (index period) were selected into the treatment cohort. The indexing timeframe allowed for a 1-year lookback period and a minimum of 3 months (3m cohort) of follow-up. A subset of the 3m cohort with 6-months of available (6m cohort) follow-up was performed. The index date was the date of the first crizanlizumab administration.

Study period: 01 November 2018 – 30 April 2021

Index period: 01 November 2019 – 31 January 2021

Index date: Date of the first claim for administration of crizanlizumab in the index period

Centers

Novartis Investigative Site

Objectives:

Primary objective(s)

- To describe the demographic and clinical characteristics of patients with SCD initiating crizanlizumab in a real-world setting.

Secondary objective(s)

- To describe concomitant SCD treatments with crizanlizumab

Test Product (s), Dose(s), and Mode(s) of Administration

NA

Statistical Methods

This was a descriptive study and involved no comparative analyses. For continuous variables, means, standard deviations, and medians were generated. For categorical variables, frequencies and percentages were presented.

Study Population: Key Inclusion/Exclusion Criteria

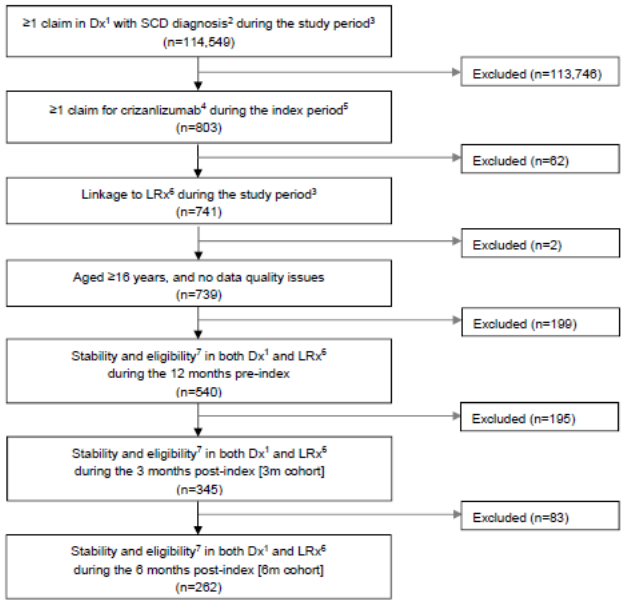
Inclusion criteria

- At least 1 claim in IQVIA Patient Centric Medical Claims Database (Dx) with SCD diagnosis (ICD-10 D57.xx, except D57.3) within the study period;
- At least 1 claim for administration of crizanlizumab within the index period. Index date was the date of first administration;
- At least 1 claim with HCPCs for crizanlizumab (J0791) OR with at least one claim for an unspecified biologic (J3590) on the same day as a claim for SCD (ICD-10 D57.xx, except D57.3) OR with at least one claim with HCPCs C9053;
- At least 16 years of age on the index date;
- Linkage to the IQVIA Longitudinal Prescription Database (LRx) within the study period;
- Stability and eligibility in Dx during the 12 months prior to the index date;
- Stability and eligibility in LRx during the 12 months prior to the index date

Exclusion criteria

- None

Participant Flow



[1] Dx=IQVIA Patient Centric Medical Claims database
[2] SCD diagnosis=ICD-10 D57.xx, except D57.3
[3] Study period=01 November 2018 – 30 April 2021
[4] Crizanlizumab=J0791 (crizanlizumab) OR C9053 (crizanlizumab) OR J3590 (unspecified biologic) on the same day as claim for SCD (ICD-10 D57.xx, except D57.3)
[5] Index period=01 November 2019 – 31 January 2021
[6] LRx=IQVIA Longitudinal Prescription Claims database
[7] Stability and eligibility=In Dx: At least 1 outpatient visit during the specified period AND provider stability during the specified period; In LRx: At least 1 prescription claim during the specified period AND pharmacy stability (inclusion of data from pharmacies that consistently report data monthly) during the specified period

Baseline Characteristics

	Overall					
	Age Group 16-34		Age Group 35-54		Age Group 55+	
	N=308		N=189		N=43	
	N / Q1	% / Q3	N / Q1	% / Q3	N / Q1	% / Q3
Age (years)						
Mean	26.40		42.80		62.67	
SD	4.86		5.68		6.77	
Median	27		42		61	
IQR (Q1/Q3)	22	30	38	47	58	65
Sex (n,%)						
Male	123	39.94 %	63	33.33 %	10	23.26 %
Female	185	60.06 %	126	66.67 %	33	76.74 %
Geographic Region (n,%)						
Northeast	52	16.88 %	24	12.70 %	2	4.65 %
Midwest	38	12.34 %	26	13.76 %	10	23.26 %
South	180	58.44 %	114	60.32 %	27	62.79 %
West	38	12.34 %	25	13.23 %	4	9.30 %
Unknown	0	0.00 %	0	0.00 %	0	0.00 %
Insurance type on index claim (n,%)[1]						
Commercial	147	47.73 %	91	48.15 %	23	53.49 %
Medicaid	117	37.99 %	46	24.34 %	4	9.30 %
Medicare	43	13.96 %	52	27.51 %	16	37.21 %
Unknown Insurance	1	0.32 %	0	0.00 %	0	0.00 %
Charlson comorbidity index (CCI)						
Mean	0.93		1.47		2.91	
SD	1.23		1.82		2.51	
Median	1		1		3	
IQR (Q1, Q3)	0	1	0	2	1	4
0	145	47.08 %	77	40.74 %	8	18.60 %
1	91	29.55 %	42	22.22 %	5	11.63 %
2+	72	23.38 %	70	37.04 %	30	69.77 %
Comorbidities (n, %)						
Alcohol/Drug Abuse	85	27.60 %	58	30.69 %	5	11.63 %
Asthma	87	28.25 %	29	15.34 %	5	11.63 %
Cardiac Arrhythmia	43	13.96 %	31	16.40 %	10	23.26 %
Cardiac Valvular Disease	19	6.17 %	11	5.82 %	8	18.60 %
Cerebrovascular Disease	20	6.49 %	13	6.88 %	2	4.65 %
Chronic Kidney Disease	10	3.25 %	15	7.94 %	12	27.91 %
Chronic Pain/Fibromyalgia	192	62.34 %	124	65.61 %	22	51.16 %
Congestive Heart Failure	6	1.95 %	21	11.11 %	9	20.93 %

	Overall					
	Age Group 16-34		Age Group 35-54		Age Group 55+	
	N=308		N=189		N=43	
	N / Q1	% / Q3	N / Q1	% / Q3	N / Q1	% / Q3
COPD	10	3.25 %	9	4.76 %	7	16.28 %
Dementia/Alzheimer's	2	0.65 %	1	0.53 %	0	0.00 %
Depression	66	21.43 %	37	19.58 %	3	6.98 %
Diabetes Mellitus	7	2.27 %	19	10.05 %	12	27.91 %
Dyslipidemia	10	3.25 %	13	6.88 %	10	23.26 %
Epilepsy/Seizure Disorder	7	2.27 %	6	3.17 %	1	2.33 %
Hepatitis	5	1.62 %	12	6.35 %	0	0.00 %
HIV/AIDS	0	0.00 %	1	0.53 %	0	0.00 %
Hypertension	44	14.29 %	72	38.10 %	28	65.12 %
Liver/GB/Pancreatic Disease	47	15.26 %	31	16.40 %	8	18.60 %
Myocardial Infarction/CAD	6	1.95 %	11	5.82 %	8	18.60 %
Osteoarthritis	161	52.27 %	97	51.32 %	22	51.16 %
Paralysis	7	2.27 %	4	2.12 %	2	4.65 %
Peptic Ulcer	2	0.65 %	2	1.06 %	3	6.98 %
Peripheral Vascular Disease	13	4.22 %	13	6.88 %	10	23.26 %
Renal failure/Dialysis	2	0.65 %	9	4.76 %	5	11.63 %
Rheumatologic Disease	8	2.60 %	8	4.23 %	2	4.65 %
Schizophrenia	2	0.65 %	2	1.06 %	0	0.00 %
Sleep Disorders	39	12.66 %	37	19.58 %	12	27.91 %
Smoking	16	5.19 %	16	8.47 %	6	13.95 %
Thyroid Disease	4	1.30 %	10	5.29 %	8	18.60 %
History of additional SCD-related comorbidities associated with organ damage (n, %)						
Acute chest syndrome (ACS)	93	30.19 %	33	17.46 %	8	18.60 %
Acute kidney injury (AKI)	26	8.44 %	32	16.93 %	12	27.91 %
CNS complications	0	0.00 %	0	0.00 %	0	0.00 %
Hepatic sequestration	4	1.30 %	4	2.12 %	0	0.00 %
Priapism	17	5.52 %	6	3.17 %	0	0.00 %
Pulmonary hypertension	18	5.84 %	27	14.29 %	9	20.93 %
Splenic sequestration	5	1.62 %	5	2.65 %	0	0.00 %
Stroke	15	4.87 %	9	4.76 %	0	0.00 %
History of SCD treatment, 12 months pre-index (n, %)[2]						
Pre-index use of hydroxyurea	197	63.96 %	94	49.74 %	14	32.56 %
Pre-index use of L-glutamine	44	14.29 %	25	13.23 %	2	4.65 %
Pre-index use of voxelotor[2]	1	0.32 %	2	1.06 %	1	2.33 %
SCD genotype, 12 months pre-index (n, %)						
Hb S trait	10	3.25 %	11	5.82 %	3	6.98 %
Hb SC	167	54.22 %	91	48.15 %	16	37.21 %
Hb SD or Hb SE	79	25.65 %	44	23.28 %	7	16.28 %
Hb SS	306	99.35 %	184	97.35 %	40	93.02 %
Sickle cell thalassemia[3]	60	19.48 %	48	25.40 %	7	16.28 %

[1] When multiple payer types were observed, the following hierarchy was used: Medicare, Commercial, Medicaid, Cash, Unspecified. When commercially-anaged Medicaid was observed, the Medicaid designation was assigned.
[2] For the data sources used in this study, data for voxelotor appeared at least in part to be blocked by the manufacturer.
[3] Includes beta zero, beta plus, and unspecified sickle cell thalassemia.

Primary Outcome Result(s)

The primary objective of this study was to describe the demographic and clinical characteristics of patients with SCD initiating crizanlizumab in a real-world setting

Refer to Baseline Characteristics for the results

Secondary Outcome Result(s)

	3m cohort								6m cohort							
	Ages 16+		Age Group 16-34		Age Group 35-54		Age Group 55+		Ages 16+		Age Group 16-34		Age Group 35-54		Age Group 55+	
	N=345		N=191		N=123		N=31		N=282		N=140		N=96		N=26	
	N / Q1	% / Q3	N / Q1	% / Q3	N / Q1	% / Q3	N / Q1	% / Q3	N / Q1	% / Q3	N / Q1	% / Q3	N / Q1	% / Q3	N / Q1	% / Q3
Hydroxyurea use																
Pre-index																
Pre-index use of hydroxyurea	135	39.13 %	80	41.88 %	46	37.40 %	9	29.03 %	130	49.62 %	79	56.43 %	43	44.79 %	8	30.77 %
Post-index																
Patients with ≥1 post-index claim hydroxyurea while on crizanlizumab (n/%)	103	29.86 %	62	32.46 %	35	28.46 %	6	19.35 %	92	35.11 %	54	38.57 %	32	33.33 %	6	23.08 %
Number of post-index hydroxyurea claims while on crizanlizumab																
Mean	1.59		1.53		1.69		1.67		2.23		1.98		2.66		2.17	
SD	0.75		0.69		0.83		0.82		1.35		1.12		1.66		0.98	
Median	1		1		1		1.5		2		2		2		2.5	
IQR (Q1/Q3)	1	2	1	2	1	2	1	2	1	3	1	3	1.5	3	1	3
L-glutamine use																
Pre-index																
Pre-index use of L-glutamine	22	6.38 %	10	5.24 %	10	8.13 %	2	6.45 %	25	9.54 %	14	10.00 %	9	9.38 %	2	7.69 %
Post-index																
Patients with ≥1 post-index claim L-glutamine while on crizanlizumab (n/%)	14	4.06 %	7	3.66 %	5	4.07 %	2	6.45 %	14	5.34 %	7	5.00 %	5	5.21 %	2	7.69 %
Number of post-index L-glutamine claims while on crizanlizumab																
Mean	1.79		1.57		1.80		2.50		1.93		1.43		2.40		2.50	
SD	0.97		0.98		1.10		0.71		1.44		0.79		2.19		0.71	
Median	1		1		1		2.5		1		1		1		2.5	
IQR (Q1/Q3)	1	3	1	3	1	3	2	3	1	3	1	2	1	3	2	3
Voxelotor use[1]																
Pre-index																
Pre-index use of voxelotor	0	0.00 %	0	0.00 %	0	0.00 %	0	0.00 %	2	0.76 %	1	0.71 %	0	0.00 %	1	3.85 %
Post-index																
Patients with ≥1 post-index claim voxelotor while on crizanlizumab (n/%)	0	0.00 %	0	0.00 %	0	0.00 %	0	0.00 %	1	0.38 %	1	0.71 %	0	0.00 %	0	0.00 %
Number of post-index voxelotor claims while on crizanlizumab																
Mean			-		-		-		1.00		1.00		-		-	
SD			-		-		-				-		-		-	
Median			-		-		-		1		1		-		-	
IQR (Q1/Q3)			-	-	-	-	-	-	1	1	1	1	-	-	-	-

Safety Results
Not applicable.

Other Relevant Findings
Not applicable.

Conclusion
Results from this analysis suggest that most patients initiating crizanlizumab are 16-34 years of age and received hydroxyurea prior to crizanlizumab. Hydroxyurea use seems to have decreased post initiation of crizanlizumab. These real-world results suggest that 66% of patients who receive crizanlizumab receive at least 4 doses within 6-months, patients receiving multiple doses appear to have a reduction in gap-days with each subsequent dose, and that of those who discontinue treatment, 31% restart crizanlizumab within the 6-months post index, respectively.

Date of Clinical Study Report
26 January, 2022