Baseline Characteristics of Patients with Non-Dialysis-Dependent Chronic Kidney Disease with and without Anemia: A Report from the Retrospective Cohort from DISCOVER CKD

PO0486

Eric Wittbrodt [1], Juan-Jesus Carrero[2], Glen James[3], Steven Fishbane[4], Supriya Kumar[1], Roberto Pecoits-Filho[5,6], Juan Jose Garcia Sanchez[3], Carol Pollock [7], James Sloand[1], Katarina Hedman[8], David C. Wheeler[9]

[1]AstraZeneca, Gaithersburg, MD, US; [2]Department of Medical Epidemiology and Biostatistics, Karolinska Institutet, Stockholm, Sweden; [3]AstraZeneca, Cambridge, UK; [4]Division of Nephrology, Zucker School of Medicine at Hofstra/Northwell, New York, NY, US; [5]School of Medicine, Pontifical Catholic University of Parana, Curitiba, Brazil; [6]Arbor Research Collaborative for Health, Ann Arbor, MI, US; [7]Kolling Institute, Royal North Shore Hospital, University of Sydney, Sydney, NSW, Australia; [8]AstraZeneca, Gothenburg, Sweden; [9]Department of Renal Medicine, University College London, London, UK

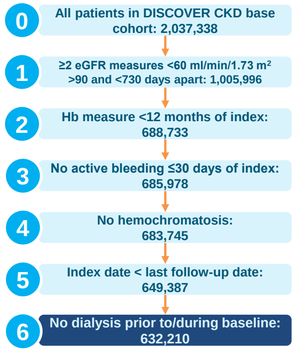
Background and Objectives

- DISCOVER CKD is an international observational cohort study of patients with chronic kidney disease (CKD), aiming to provide real-world insights to improve understanding of the epidemiology and the determinants of clinical and patient-reported outcomes in CKD.
- Anemia is a frequent complication of CKD, especially as kidney function declines, and is associated with adverse clinical outcomes and reduced quality of life.[1]
- Anemia may be treated with erythropoiesis-stimulating agents (ESAs).[2]
- This analysis describes baseline demographics, comorbidities, and medication use of patients with non-dialysis dependent (NDD) CKD with and without anemia from a large cohort of patients in DISCOVER CKD.

Methods

- Data were extracted from the TriNetX health research network (US data), Japan Medical Data Vision (JMDV), the UK Clinical Practice Research Datalink (CPRD), and US integrated Limited Claims and Electronic Health Records database (LCED).
- Patients were aged ≥18 years with ≥2 estimated glomerular filtration rate (eGFR) measures <60 mL/min/1.73 m^2 >90 days apart between January 2008 and March 2020 (Figure 1). The index (baseline) date was the first hemoglobin (Hb) measure (regardless of value) or an anemia therapy (iron, ESA, or blood transfusion) prescription after the second eGFR measure.
- Exclusion criteria included: <1-year registration/medical history prior to index, active bleeding, a Hb value (only) within 30 days from transfusion or bleeding event and no Hb measure within a year after CKD diagnosis. Anemia was defined as <12 g/dl (females), <13 g/dl (males) as per World Health Organization (WHO) criteria.
- Baseline characteristics were summarized and stratified by the presence of anemia.
- LCED data are presented separately to TriNetX+JMDV+CPRD data as data privacy restrictions prevented merging of data.

Figure 1. Patient Attrition

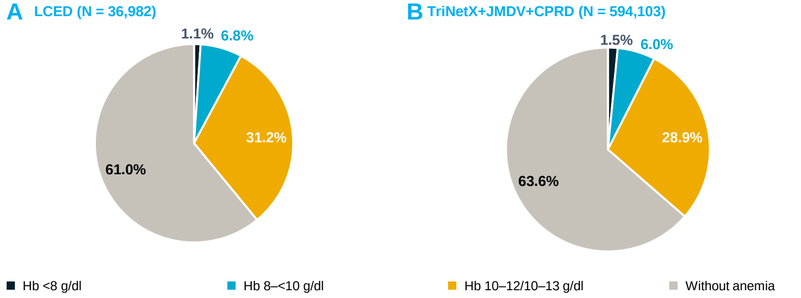


eGFR, estimated glomerular filtration rate; Hb, hemoglobin.

Results

- Among patients in the LCED and the TriNetX+JMDV+CPRD cohorts, 39.1% and 36.4%, respectively, had anemia at baseline (Figure 2).
  - There were relatively few patients in the most severe anemia group (Hb <8 g/dl).
  - There were more female than male patients in all subgroups.
- Comorbidities and complications at baseline were more common in the patients with anemia, with some comorbidities and/or complications increasing in frequency as Hb levels declined, particularly acute kidney injury (AKI) (Figure 3).
- Mean Hb values declined with increasing CKD severity (Figure 4).
- The use of medication to treat anemia at baseline was low across all Hb cohorts and patients with Hb levels <8 g/dl were the most likely to have received blood transfusions (Figure 5).

Figure 2. Patient Characteristics by Hb Strata

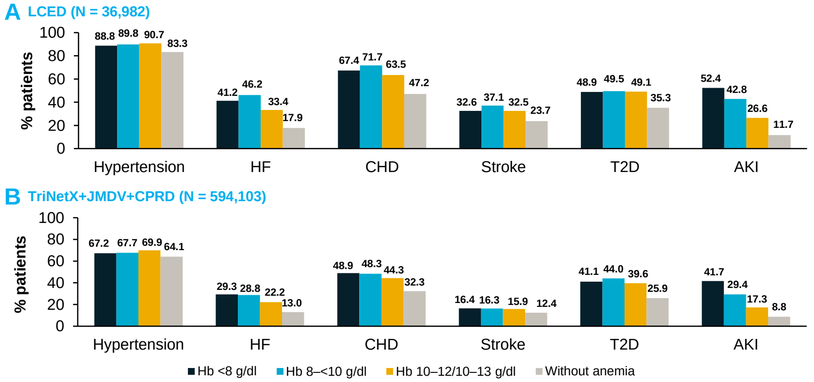


	Patients with Anemia by Severity			Patients without Anemia
Hb, g/dl	<8	8–<10	10–12/ 10–13	
N	393	2,509	11,540	22,540
Mean (SD) age, yrs	71.3 (15.2)	73.5 (14.0)	73.7 (13.1)	69.5 (13.3)
Female, %	59.5	62.9	53.7	59.8
Mean (SD) BMI, kg/m^2	28.4 (7.8)	29.3 (8.2)	29.6 (7.6)	30.3 (7.1)
Median (IQR) eGFR, ml/min/ 1.73 m^2	45.0 (32.0–54.0)	47.0 (35.0–55.0)	50.0 (40.2–57.0)	54.0 (48.0–58.0)
Mean (SD) Hb, g/dl	7.2 (0.7)	9.2 (0.5)	11.5 (0.8)	14.0 (1.2)

	Patients with Anemia by Severity			Patients without Anemia
	< 8	8–<10	10–12/ 10–13	
N	9,132	35,326	171,807	377,838
Mean (SD) age, yrs	64.3 (16.0)	67.2 (15.4)	69.2 (14.1)	66.8 (13.4)
Female, %	57.1	61.4	53.2	60.8
Mean (SD) BMI, kg/m^2	27.9 (6.0)	28.1 (6.0)	28.6 (5.9)	29.0 (5.5)
Median (IQR) eGFR, ml/min/ 1.73 m^2	40.0 (21.1–54.9)	41.9 (25.0–54.1)	49.1 (37.1–56.5)	54.3 (47.2–58.4)
Mean (SD) Hb, g/dl	7.0 (0.8)	9.2 (0.6)	11.5 (0.8)	14.1 (1.2)

BMI, body mass index; eGFR, estimated glomerular filtration rate, Hb, hemoglobin; IQR, interquartile range; SD, standard deviation; yrs, years.

Figure 3. Comorbidities by Hb Strata



AKI, acute kidney injury; CHD, coronary heart disease; HF, heart failure; T2D, type 2 diabetes.

Acknowledgments

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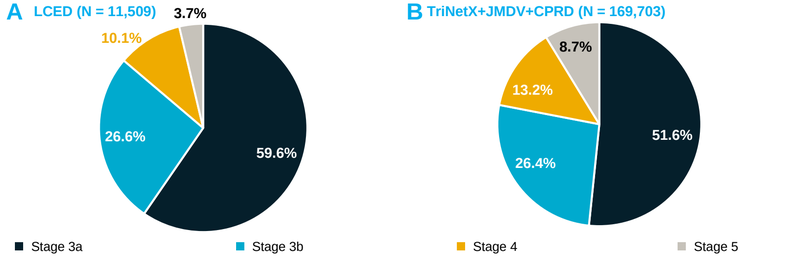
References

1. Thomas R, et al. *Prim Care.* 2008;35:329–44.
2. KDIGO. *Kidney Int Suppl (2011).* 2012;2:299–310.

Figure 4. Characteristics of Patients with Anemia by CKD Stage

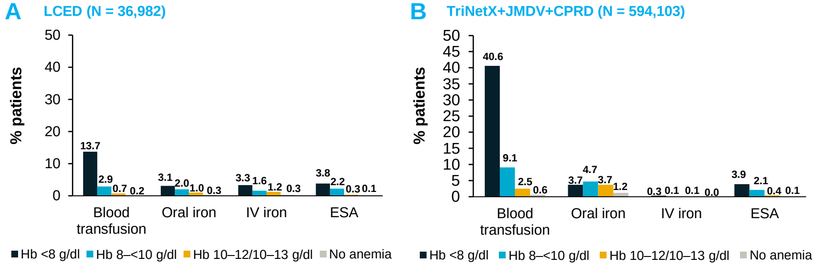


	Patients with Anemia by CKD Stage			
	CKD Stage 3a	CKD Stage 3b	CKD Stage 4	CKD Stage 5
N	6,857	3,058	1,164	430
Mean (SD) age, years	74.1 (12.4)	76.6 (12.0)	74.2 (13.8)	65.3 (15.6)
Female, %	55.6	60.8	57.5	51.2
Mean (SD) BMI, kg/m^2	29.4 (7.6)	29.6 (7.6)	29.6 (7.8)	30.4 (8.6)
Median (IQR) eGFR, ml/min/ 1.73 m^2	53.0 (49.0–57.0)	39.0 (34.0–42.0)	24.0 (20.0–28.0)	10.0 (7.0–14.0)
Mean (SD) Hb, g/dl	11.1 (1.2)	10.9 (1.3)	10.5 (1.4)	10.1 (1.6)

	Patients with Anemia by CKD Stage			
	CKD Stage 3a	CKD Stage 3b	CKD Stage 4	CKD Stage 5
N	87,665	44,823	22,465	14,840
Mean (SD) age, years	69.7 (13.4)	71.2 (13.7)	69.0 (15.0)	60.0 (15.9)
Female, %	57.7	55.3	54.9	47.2
Mean (SD) BMI, kg/m^2	28.5 (5.8)	28.5 (5.9)	28.6 (5.8)	28.3 (5.7)
Median (IQR) eGFR, ml/min/ 1.73 m^2	53.5 (49.0–56.8)	38.3 (34.0–42.1)	23.4 (19.0–27.2)	8.2 (5.5–11.7)
Mean (SD) Hb, g/dl	11.2 (1.3)	10.9 (1.4)	10.4 (1.5)	10.2 (1.6)

BMI, body mass index; eGFR, estimated glomerular filtration rate; Hb, hemoglobin; IQR, interquartile range; SD, standard deviation; yrs, years.

Figure 5. Medications by Hb Strata



ESA, erythropoiesis-stimulating agent; Hb, hemoglobin; IV, intravenous.

Conclusion

- In this study population, patients with anemia tended to have more severe CKD and an increased comorbidity and complication burden compared with those without anemia; this was particularly evident for an increase in prevalence of AKI with increased anemia severity.
- Regardless of recognized associations with adverse reactions such as infections and allosensitization, blood transfusions were the most common treatments received by patients with anemia, especially among those with Hb levels <8 g/dl.
- Overall, few patients were treated for anemia, suggesting a lack of available and appropriate therapies; notably, use of oral iron therapy may have been under-reported.

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