Onset of Cardiomyopathy and Cardiovascular Disease–Related Burden in Friedreich Ataxia: Real-World Data From Medical Claims

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Background and Objective

- Friedreich ataxia (FA) is a rare genetic, progressive, neurodegenerative condition leading to impaired muscle coordination and other systemic complications[1-3]
- Published data suggest that a common cause of death in patients with FA is cardiomyopathy progressing to heart failure[4-6]
- Available data on progression of FA to cardiomyopathy and heart failure are limited; to our knowledge, no reports have been published on the broader burden of cardiovascular disease (CVD) based on real-world data from medical claims in the United States (US)
- The objective of this study was to quantify the onset of cardiomyopathy and evaluate the broader CVD-related burden in a broad range of patients with FA based on real-world data from US medical claims

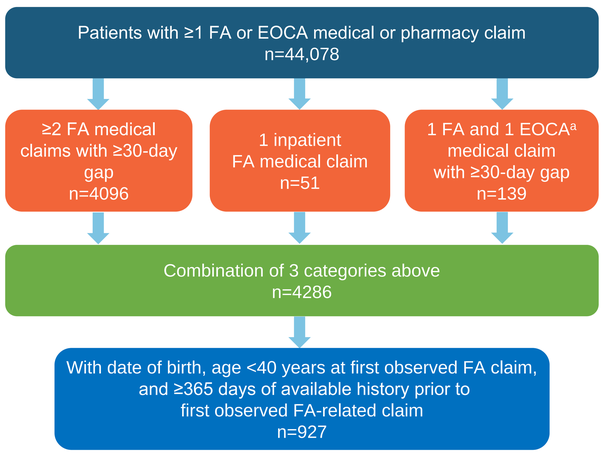
Conclusions

- These data demonstrate that patient burden related to progressive cardiomyopathy begins at an early age and that other cardiac diseases, particularly arrhythmias and heart valve disorders, may begin 2 to 11 years prior to cardiomyopathy, with CVD onset as early as 7 years of age in the youngest patients
- Data are limited for older populations and those with Medicare, but this study provides previously unavailable data on the onset of cardiomyopathy and CVD in patients with FA based on real-world data from US medical claims

Methods

- We conducted a retrospective study based on US nationwide, multipayer, deidentified medical and pharmacy claims from Komodo Health linked to mortality data from October 2015 to March 2024
- Entry into the study cohort required ≥2 medical claims for FA (*International Statistical Classification of Diseases, Tenth Revision, Clinical Modification [ICD-10-CM]* diagnosis code G11.11) separated by ≥30 days, or ≥1 inpatient claim for FA, or 1 FA claim and ≥1 claim for early-onset cerebellar ataxia (ICD-10-CM code G11.1) separated by ≥30 days (**Figure 1**)
  - All patients were also required to have ≥1 year of claims history prior to their first FA-related claim to assign their date of diagnosis (index date)
- We stratified the cohort based on age at FA diagnosis: 0 to 7, 8 to 14, 15 to 24, and 25 to 39 years
- We evaluated the median age at first encounter as a composite endpoint for cardiomyopathy, heart failure, or death (CM/HF/death), with or without cardiomegaly, and incidence of any CVD-related healthcare encounters

Figure 1. Cohort Design



[a] When *ICD-10-CM* was introduced, the FA-specific diagnosis code that was available in *ICD-9-CM* was merged into the broader category of EOCA. However, in October 2020, a stand-alone diagnosis code specifically for FA was reinstated. The purpose of this category is to retain patients in the cohort who may have had FA-specific claims before or after this period from 2015 to 2020.

Results

- The cohort included 927 patients with FA based on medical claims
- The median (interquartile range) age at FA diagnosis was 4 (2-6), 11 (10-13), 19 (16-22), and 32 (28-35) years in patients aged 0 to 7, 8 to 14, 15 to 24, and 25 to 39 years at diagnosis, respectively (**Table 1**)

Table 1. Patient Characteristics

Characteristic	Age at FA diagnosis			
	0-7 years (n=129)	8-14 years (n=225)	15-24 years (n=261)	25-39 years (n=312)
Age, years				
Mean (SD)	4.1 (2.0)	11.3 (1.8)	19.0 (2.9)	31.7 (4.4)
Median (IQR) [range]	4.0 (2.0-6.0) [1.0-7.0]	11.0 (10.0-13.0) [8.0-14.0]	19.0 (16.0-22.0) [15.0-24.0]	32.0 (28.0-35.3) [25.0-39.0]
Male, n (%)	66 (51)	119 (53)	149 (57)	165 (53)
Race and ethnicity, n (%)				
White	53 (69)	101 (67)	136 (67)	158 (63)
Hispanic or Latino	9 (12)	23 (15)	22 (11)	39 (15)
Black or African American	7 (9.1)	8 (5.3)	10 (4.9)	25 (9.9)
Asian or Pacific Islander	2 (2.6)	5 (3.3)	6 (2.9)	4 (1.6)
Other	1 (1.3)	8 (5.3)	12 (5.9)	12 (4.8)
Unreported	57 (44.2)	80 (35.6)	75 (28.7)	74 (23.7)

- Median age at first encounter for CM/HF/death was 9.8, 15.4, 26.4, and 44.8 years in patients aged 0 to 7, 8 to 14, 15 to 24, and 25 to 39 years at diagnosis, respectively (**Figure 2**)
  - Signs of cardiomyopathy occurred 1 to 3 years earlier when cardiomegaly was included in the composite measure (**Figure 3**)
- Burden related to encounters for any CVD started at age 7, 12.6, 20.7, and 33.7 years in patients aged 0 to 7, 8 to 14, 15 to 24, and 25 to 39 years at diagnosis, respectively (**Figure 4**)
  - Other cardiac disorders included in CVD may begin 2 to 11 years prior to cardiomyopathy
- Other common cardiovascular complications included arrhythmias, rhythm disorders, and heart valve disorders (**Figure 5**)

Figure 2. Age at Onset of CM/HF/Death

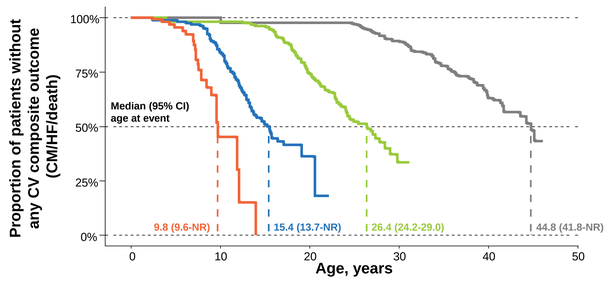


Figure 3. Age at Onset of Cardiomegaly/CM/HF/Death

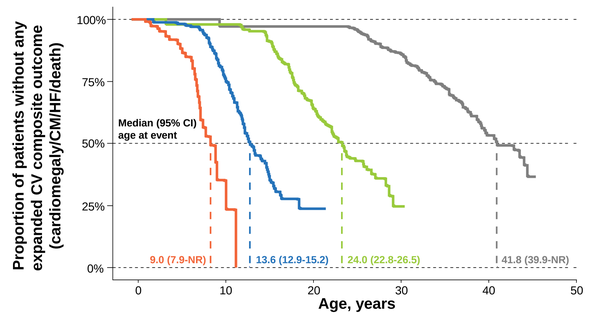


Figure 4. Age at Onset of Any CVD-Related Medical Encounter

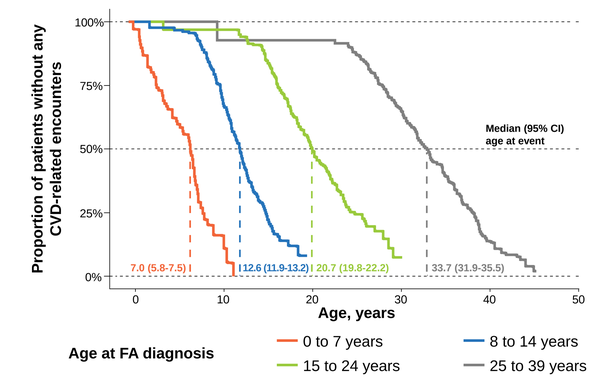
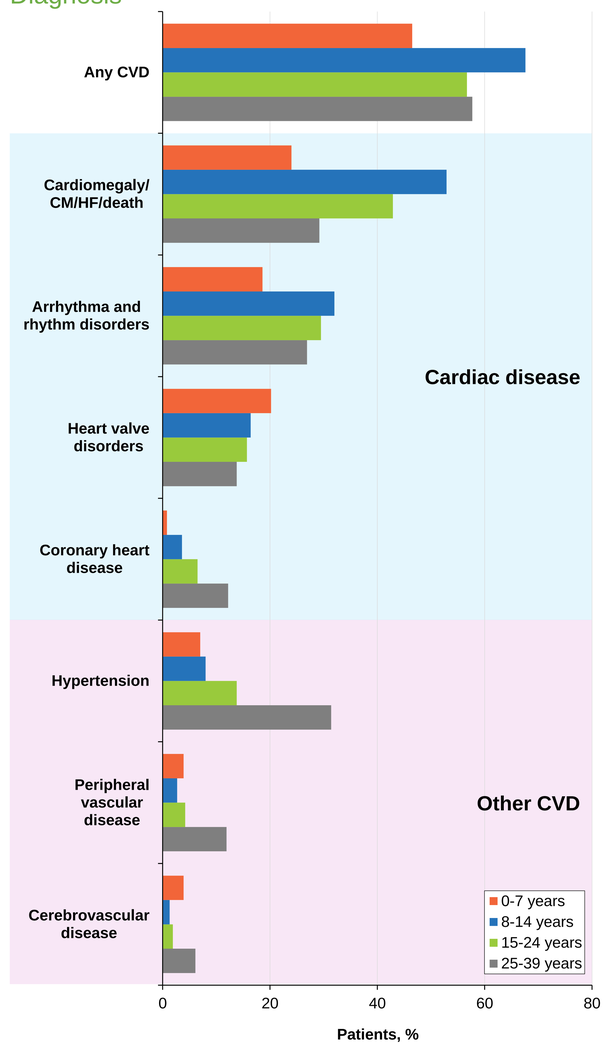


Figure 5. Proportion of Patients With Listed CVD-Related Medical Encounters by Age at FA Diagnosis



Abbreviations: CM = cardiomyopathy; CVD = cardiovascular disease; EOCA = early-onset cerebellar ataxia; FA = Friedreich ataxia; HF = heart failure; *ICD-9-CM = International Classification of Diseases, Ninth Revision, Clinical Modification*; *ICD-10-CM = International Classification of Diseases, Tenth Revision, Clinical Modification*; IQR = interquartile range; NR = not reached; SD = standard deviation; US = United States.

References 1. Dürr A, et al. *N Engl J Med*. 1996;335(16):1169-1175. 2. Delatycki MB, et al. *J Med Genet*. 2000;37(1):1-8. 3. Pandolfo M. *J Neurol*. 2009;256(suppl 1):3-8. 4. Pousset F, et al. *JAMA Neurol*. 2015;72(11):1334-1341. 5. Payne RM and Wagner GR. *J Child Neurol*. 2012;27(9):1179-1186. 6. Payne RM. *J Am Coll Cardiol Basic Trans Science*. 2022;7(12):1267-1283. Disclosures Sheng-Han Kuo has nothing to disclose. Boyang Bian, Sarah M. England, James McKay, and Robin L. Avila are employees of and may hold stock in Biogen. Daniel Gomes and Tony Wang are employees of Voxanalytica. Susan Perlman has received grant funding from Reata Pharmaceuticals; Reata was acquired by Biogen in 2023. Acknowledgments This study was funded by Biogen, Inc. Medical writing and editorial support for the preparation of this poster was provided by Qing Yun Chong, PhD, CMPP, of Nucleus Global; funding was provided by Biogen.