Healthcare Resource Utilization and Associated Costs in Patients With Transthyretin Cardiac Amyloidosis Versus Patients With Non-Amyloid Heart Failure

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Poster: EE378

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OBJECTIVE

- **To describe and compare inpatient length of stay, days hospitalized, emergency department (ED) visits, and healthcare costs for transthyretin amyloid cardiomyopathy (ATTR-CM) and non-amyloid heart failure (HF) cohorts**

INTRODUCTION

- ATTR-CM, a progressive disease caused by the destabilization of transthyretin and aggregation of amyloid fibrils in the heart, is an increasingly recognized cause of HF, with a higher prevalence in patients aged > 60 years[1–4]
- The combination of HF caused by ATTR-CM and comorbidities in this patient population results in a substantial burden of illness on individuals, as well as a burden on healthcare systems[2,4]

METHODS

- This retrospective, observational cohort study used data from Optum's de-identified Clinformatics® Data Mart Database (CDM; January 2016 through September 2023)
- Adult patients with ATTR-CM were identified based on presence of HF and/or cardiomyopathy occurring within 2 years of first ATTR diagnosis (excluding light-chain amyloidosis) and were followed up for ≥ 12 months after first HF/CM diagnosis
- Baseline demographics with a 1-year look-back period from index, and procedures of interest with a 1-year look-forward period from index, were assessed
- Patients with ATTR-CM were matched 1:1 to patients with non-amyloid HF using propensity score matching
- Healthcare resource utilization was analyzed using all-cause and cardiovascular (CV)-related ED visit and hospitalization metrics
- CV-related hospitalizations were defined as inpatient admissions in which the patient received at least one CV diagnosis at or during the hospital admission period
- Cost (2024 US dollars) metrics were derived based on values reported within the Optum CDM and reflect the costs incurred at the time of the event
- Baseline demographics and study outcomes were assessed using descriptive statistics, including mean, standard deviation (SD), median, and 95% confidence interval (CI) for continuous variables, and number and proportion for categorical variables
- Hospitalizations and cost outcomes were compared between the ATTR-CM cohort and the matched non-amyloid HF cohort using two-tailed t-tests and Mann–Whitney U tests; statistical significance was defined as a two-sided $p < 0.05$
- All statistical analyses were performed using Python software version 3.9.7 (Python Software Foundation, Wilmington, DE, USA)

RESULTS

- A total of 4966 patients with ATTR-CM and 861 507 patients with general HF were identified
- After matching, each cohort included 4571 patients; demographics were well balanced between matched cohorts (**Table 1**)

TABLE 1: Baseline Demographics in Matched Cohorts

	ATTR-CM (n = 4571)	Non-Amyloid HF (n = 4571)
Age, years, mean (SD)	75.3 (9.1)	75.5 (8.8)
Sex, male, n (%)	2570 (56.2)	2562 (56.0)
Race, n (%)		
Asian	88 (1.9)	93 (2.0)
Black	1023 (22.4)	729 (15.9)
White	2949 (64.5)	3306 (72.3)
Unknown/unspecified	511 (11.2)	443 (9.7)
Ethnicity, n (%)		
Hispanic	365 (8.0)	408 (8.9)
Non-Hispanic	2243 (49.1)	2162 (47.3)
Unknown/unspecified	1963 (42.9)	2001 (43.8)
Index diagnosis year, n (%)		
2018	990 (21.7)	1006 (22.0)
2019	1151 (25.2)	1146 (25.1)
2020	1241 (27.1)	1235 (27.0)
2021	1189 (26.0)	1184 (25.9)
Follow-up time, years, mean (SD)	2.9 (1.1)	3.0 (1.2)

CONCLUSIONS

- **This study suggests that patients with ATTR-CM have more frequent hospitalizations and ED visits as well as longer lengths of stay in hospitals when compared with patients with non-amyloid HF**
- **As such, patients with ATTR-CM may have higher annual hospitalization and ED visit costs, which suggests that a greater financial burden may be experienced by these patients and on the healthcare system compared with patients with non-amyloid HF**
- **These findings demonstrate a possible incremental burden of disease among patients with ATTR-CM relative to patients with non-amyloid HF, particularly in relation to hospitalizations, which may be beneficially affected by newer therapies**

RESULTS (continued)

- Of these patients, 3440 (75.3%) with ATTR-CM and 2991 (65.4%) with non-amyloid HF had ≥ 1 CV-related hospitalization during follow-up
- The ATTR-CM cohort had more total CV-related hospitalizations than the non-amyloid HF cohort (11 170 vs 8085 hospitalizations); 71.5% of the ATTR-CM cohort and 60.8% of the non-amyloid HF cohort experienced > 1 CV-related hospitalization
- Patients with ATTR-CM had a longer length of stay per CV-related hospitalization (mean: 8.0 days) than the non-amyloid HF cohort (mean: 7.5 days) ($p < 0.001$) (**Figure 1**)
- The ATTR-CM cohort had a numerically higher rate of CV-related hospitalizations of > 4 days than the non-amyloid HF cohort (75.4% vs 70.5%) (**Figure 2**)

FIGURE 1: CV-Related Hospitalizations in Matched Cohorts, Mean (SD)

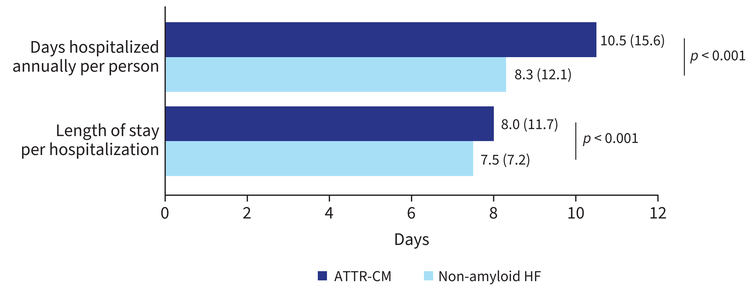
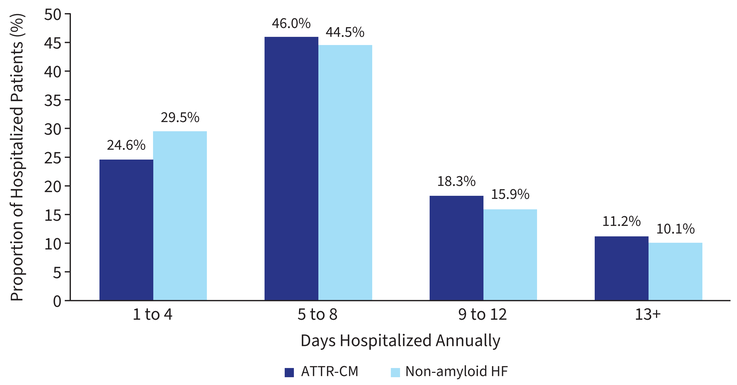


FIGURE 2: CV-Related Days of Hospitalization in Matched Cohorts



- Annual CV-related hospitalization costs per patient (mean) were higher in the ATTR-CM cohort ($46 669) than in the non-amyloid HF cohort ($39 253) ($p < 0.001$)
- Compared with the non-amyloid HF cohort, the ATTR-CM cohort had a numerically higher rate of annual CV-related hospitalization costs exceeding $40 000 (39.8% vs 31.7%) (**Figure 3**)
- Total all-cause ED visits per patient ($p = 0.003$) and annual all-cause ED costs per patient ($p < 0.001$) for visits not leading to hospitalization were significantly higher in the ATTR-CM cohort than in the non-amyloid HF cohort (**Table 2**)
- Compared with the non-amyloid HF cohort, the ATTR-CM cohort had a numerically higher annual rate of 5 or more all-cause ED visits per patient for visits not leading to hospitalization (28.3% vs 23.6%) (**Figure 4**)

FIGURE 3: Mean Annual CV-Related Hospitalization Costs Per Patient

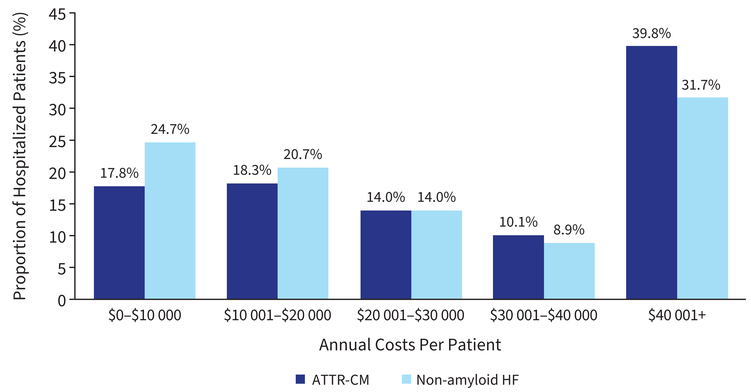
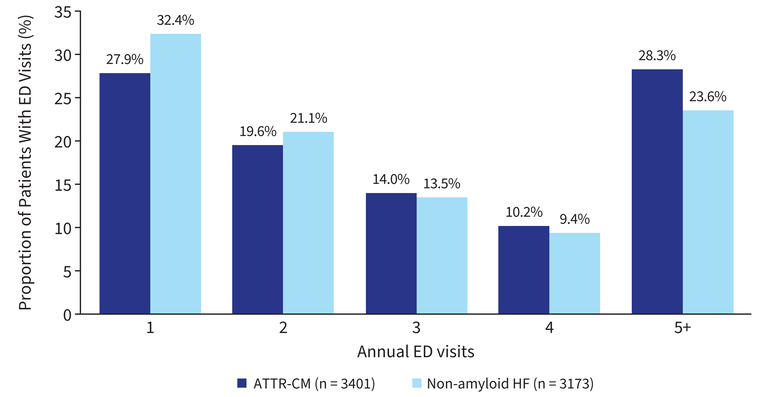


TABLE 2: All-Cause and CV-Related ED Visits Not Leading to Hospitalization in Matched Cohorts

	ATTR-CM	Non-Amyloid HF	*P*-Value
Patients with an all-cause ED visit, n	3401	3173	–
Follow-up length, years, mean (SD)	2.96 (1.12)	3.02 (1.2)	0.022
All-cause ED visits per patient (95% CI)	4.2 (3.97, 4.39)	3.7 (3.51, 3.88)	0.003
Length of stay per ED visit, days, mean (SD)	1.22 (0.84)	1.19 (0.81)	0.201
ED visits – days admitted annually per patient, mean (SD)	1.93 (3.18)	1.64 (2.63)	< 0.001
Total ED visit cost per admission, USD, mean (SD)	3925.2 (4860.16)	3870.13 (4188.25)	0.849
Annual ED cost per patient, USD, mean (SD)	6238.70 (12 464.4)	5230.15 (8059.27)	< 0.001

FIGURE 4: Annual All-Cause ED Visits Per Patient for Visits Not Leading to Hospitalization



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FUNDING: This study was sponsored by BridgeBio Pharma, Inc., San Francisco, CA, USA.

ABBREVIATIONS: ATTR-CM, transthyretin amyloid cardiomyopathy; CI, confidence interval; CV, cardiovascular; ED, emergency department; HF, heart failure; SD, standard deviation; USD, US dollars.

ACKNOWLEDGMENTS: Under the guidance of the authors, medical writing assistance was provided by Holden Young, PharmD, MBA, of Oxford PharmaGenesis, Inc., and was funded by BridgeBio Pharma, Inc. Editorial support and critical review were provided by Shweta Rane, PhD, BCMAS, CMPP, of BridgeBio Pharma, Inc.

DISCLOSURES: JLG is a researcher for BridgeBio Pharma, Inc., National Heart, Lung, and Blood Institute (R01HL160892), Pfizer, and Texas Health Resources Clinical Scholars, and is a consultant, advisor, and speaker for AstraZeneca, BridgeBio Pharma, Inc., Intellia Therapeutics, Lumanity, Novo Nordisk, Pfizer, Tenax Therapeutics, and Ultromics. **AM** is a researcher for Attralus, Cytokinetics, Ionis Pharmaceuticals, and Pfizer, and is a consultant, advisor, and speaker for Akros, Alexion, Alnylam Pharmaceuticals, AstraZeneca, Attralus, BioMarin, BridgeBio Pharma, Inc., Bristol Myers Squibb, Cytokinetics, Haya Therapeutics, Ionis Pharmaceuticals, Lexicon, Pfizer, Prothena Biosciences, and Tenaya Therapeutics. **RW** is a consultant, advisor, and speaker for Alnylam Pharmaceuticals, Amgen, AstraZeneca, Boehringer Ingelheim, BridgeBio Pharma, Inc., Bristol Myers Squibb, Cytokinetics, Eli Lilly, Lexicon, MyoKardia, and Novartis. **J-FT**, **HF**, **LH**, and **MU** are employees and stockholders of BridgeBio Pharma, Inc. **MU** is a stockholder of Pfizer, Inc. **MA**, **CB**, **RR**, and **MSS** are employees of Definitive Healthcare. **SD** has participated in advisory boards (uncompensated) for BridgeBio Pharma, Inc., and Pfizer, has received grants from Pfizer, and has no consultancy fees to disclose. **JN-N** has acted as a researcher for Alnylam Pharmaceuticals, AstraZeneca, BridgeBio Pharma, Inc., and Pfizer.

PRESENTED AT: THE INTERNATIONAL SOCIETY FOR PHARMACOECONOMICS AND OUTCOMES RESEARCH MEETING, MAY 13–16, 2025; MONTREAL, QC, CANADA