INTRODUCTION

The amyloidoses are a group of rare protein-folding disorders characterized by extracellular tissue deposition of misfolded and aggregated autologous proteins as β-sheet sheet fibrils. The amyloidosis of light chain (AL) and transthyretin (ATTR) amyloidosis. Patients with systemic amyloidosis frequently require hospital care.

OBJECTIVE

To understand patient characteristics, economic cost, and clinical outcomes associated with systemic amyloidosis treated in U.S. hospitals.

METHODS

Study Design and Data Source

Retrospective, cohort study using 2014-2016 data from Premier Perspective™ Database. Co-vering over 45 million hospital discharges and includes data on complete clinical coding, hospital cost, and patient billing data from more than 600 hospitals throughout the United States of 5,500 total hospitals.

Study Population

Hospitalized patients aged ≥18 years were identified during calendar years 2014-2016 if they had: ≥1 inpatient claim consistent with systemic amyloidosis (International Classification of Diseases, Ninth Revision. Clinical Modification [ICD-9-CM] code 277.30 or 277.39; International Classification of Diseases, Tenth Revision. Clinical Modification [ICD-10-CM] code E85.4, E85.8, or E85.9x in any diagnosis field; and in patients with multiple qualifying hospitalizations, the first hospitalization was included.

Study Measures

Patient demographics and clinical characteristics: Demographics (age, gender, race); payment source (Medicare, Medicaid, commercial, or other); concomitant conditions [Charlson Comorbidity Index (CCI), multiple myeloma (MM), monoclonal gamopathy of undetermined significance (MGUS)]; Hospital characteristics: Admission type (elective vs. non-elective); region (Northeast, Midwest, West, South); bed size (0-199, 200-499, 500+); hospital type (teaching vs. non-teaching); and location (urban vs. rural); Economic cost and clinical outcomes: Hospitalization costs (in 2016 US$), length of stay (LOS), intensive care unit (ICU) utilization, and mortality.

Statistical Analysis

Means, standard deviations (SD), and relative frequencies and percentages for continuous and categorical data, respectively, were reported. Data transformations and statistical analyses were performed using SAS® version 9.4.

RESULTS

The overall study sample was made up of 7,533 hospitalized patients with a diagnosis consistent with systemic amyloidosis.

Patient demographics and clinical characteristics cont-tinued: The mean (SD) CCI was 3.2 (2.1), and 10.6% had a code for MM and 2.6% for MGUS. Among patients with cardiac involvement, 74.6% had congestive heart failure.

Hospital characteristics (Figure 2a-c): 90.1% of patients had a non-elective (e.g. urgent or emergent) hospital admission, with majority (75.9%) being referred by their physician. Admissions to hospitals from all regions of the U.S. were represented. 48.2% of hospitals had a bed size between 200-499 beds. 93.3% of admissions were to hospitals in urban settings; 51.9% of hospitals were teaching hospitals.

Economic costs and clinical outcomes (Table 2): The mean (SD) total hospitalization cost was $18,110.70 (25,245.78), with a mean (SD) LOS of 7.4 (9.9) days. During the hospital stay, 30.7% of patients were admitted to the ICU, with a mean (SD) ICU LOS of 4.1 (5.4) days. In-hospital mortality was 6.7%.

Figure 1. Patient attrition diagram for identifying hospitalized patients.

1,722 unique patients with a diagnosis of amyloidosis (ICD-9-CM 277.30 or 277.39; ICD-10-CM E85.8x, E85.4x, E85.3x between 01/01/2014 – 12/31/2016). 174 excluded (11 had other amyloidosis, 157 chronic inflammatory disease, 6 were <18 years old on admission).

Table 1. Comorbidities and disease manifestations

Table 2. Hospital utilization and cost

CONCLUSION

• Disease burden and hospital costs associated with AL or ATTR amyloidosis are high.
• Based on hospital discharge records, almost 60% of patients had cardiac and/or renal disease.
• Mean hospitalization costs were >$18,000 per patient and many patients were admitted to ICU.
• New therapies aimed at improving organ response have the potential to extend survival, reduce disease burden, and yield substantial cost savings.

• Limitations

• Systemic amyloidosis was identified using coded data, not clinical records, leading to errors because codes are primarily applied to support billing, not research.
• Privacy restrictions that permit the use of coded data explicitly prevented us from seeking additional data on patients, so pathology, laboratory, or other clinical notes could not be used.

REFERENCES


Table 1: Comorbidities and disease manifestations

Table 2: Hospital utilization and cost

Figure 1: Patient attrition diagram for identifying hospitalized patients.

Figure 2a: Selected Patient Characteristics: Age

Figure 2b: Selected Patient Characteristics: Race

Figure 2c: Selected Hospital Characteristics: Primary Payer Type

Figure 3a: Selected Hospital Characteristics: Hospital Region

Figure 3b: Selected Hospital Characteristics: Bed Size

Figure 3c: Selected Hospital Characteristics: Hospital Location