CHARACTERIZATION OF COSTS AND PATIENTS WITH INCIDENT HEART FAILURE (HF) INCURRING THE HIGHEST HEALTHCARE COSTS FROM SECONDARY CARE: A RETROSPECTIVE, POPULATION-BASED COHORT STUDY IN SWEDEN

PCV28

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BACKGROUND

- Heart failure (HF) represents a major public health challenge globally. The worldwide prevalence of HF is estimated to be as high as 26 million and is more frequent with increasing age (prevalence rates of HF ≥10% in the elderly, >70 years).[1,2,3]
- Despite of treatment advances in HF, it is associated with a high risk of hospitalisation and poor prognosis[3] which leads to higher healthcare resource consumption and consequently place a considerable burden on healthcare systems.[4,5]

OBJECTIVE

- The objective of this retrospective study was to identify the healthcare costs from secondary care (HCsc) of newly diagnosed patients with HF and to analyse the characteristics of patients in highest decile of cost in Sweden.

METHODS

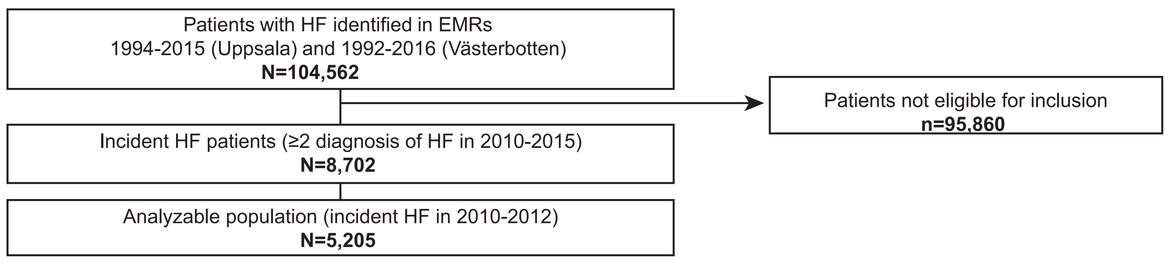
- This retrospective study was conducted using patient-level-data collected from Electronic Medical Records (EMRs) and National Patient Registry (NPR) from Uppsala and Västerbotten counties.
- EMRs and NPR were used to identify adult patients with incident HF recorded between 2010 and 2012 with a look-back period to 01/01/2005 (to ensure there was no HF diagnosis before the identification period) and at least two HF diagnoses until the end of study period i.e. 31/03/2015.
- The index date was defined as the date of the first HF diagnosis during the analysis period.
- Patients were followed until 31/03/2015, transfer out or death, whichever occurred first.
- All costs are presented in euros (€), based on the historical exchange rate in January 2015 (1 SEK = €0.105).
- A logistic regression was used to analyse variables at baseline that correlate with patients on the highest decile of cost (secondary care costs per patient) during first year of follow-up after HF diagnosis.

RESULTS

Patient Flow

- Of 104,562 identified patients, 8,702 patients had at least two HF diagnoses during the analysis period and no HF diagnoses during the look-back period to ensure the incident HF.
- The current analysis includes 5,205 patients that had their first HF diagnosis from secondary care between 2010 and 2012 (**Figure 1**).

Figure 1. Patient Flow



Patient demographics and clinical characteristics

- Patients had a mean age of 76.8 years; more than one-quarter (27.8%) were aged 85 years or more; and 53.8% were men (**Table 1**)
- Hypertension (51.5%), atrial fibrillation (AF; 30.6%) and ischemic heart disease (IHD; defined as angina or myocardial infarction [23.0%]) were the most common underlying cardiac disorders observed during the 5-year period before the first HF diagnosis (**Table 1**).

Table 1. Demographic and clinical characteristics of incident HF patients at baseline

Characteristic	Overall population (N=5,202)	10% most expensive patients (n=520)
Mean age at HF diagnosis, years (SD)	76.8 (12.3)	70.4 (12.8)
Sex, n (%)		
Women	2,405 (46.2)	204 (39.2)
Men	2,800 (53.8)	316 (60.8)
HF phenotype, n (%)		
HFrEF (LVEF <50%)	1,167 (22.4)	206 (39.6)
HFpEF (LVEF ≥50%)	652 (12.5)	116 (22.3)
Unknown LVEF	3,368 (64.7)	198 (38.1)
Mean CCI[a,b] (SD)	1.8 (2.2)	2.5 (2.5)
Comorbidities, n (%)[b,c]		
Hypertension	2,679 (51.5)	280 (53.8)
Atrial fibrillation	1,593 (30.6)	132 (25.4)
IHD (angina or MI)	1,198 (23.0)	153 (29.4)
Diabetes	952 (18.3)	125 (24.0)
Cancer	739 (14.2)	84 (16.2)
Dyslipidemia	676 (13.0)	96 (18.5)
Cerebrovascular disease	660 (12.7)	70 (13.5)
Anemia	645 (12.4)	97 (18.7)

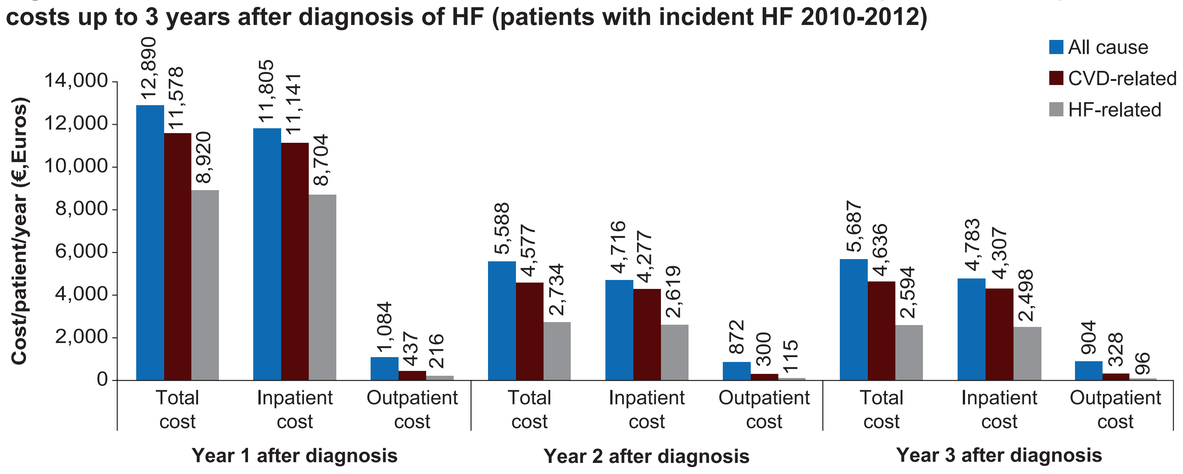
[a]includes patients with a CCI of zero (i.e. no comorbidities). [b]Comorbidities and underlying cardiac diseases 0–5 years before the index date. [c]Comorbidities and underlying cardiac diseases occurring in ≥10% of the overall population.

Abbreviations: CCI, Charlson comorbidity index; HF, heart failure; HFpEF, heart failure with preserved ejection fraction; HFrEF, heart failure with reduced ejection fraction; IHD, ischemic heart disease; LVEF, left ventricular ejection fraction; MI, myocardial infarction; SD, standard deviation

Healthcare costs

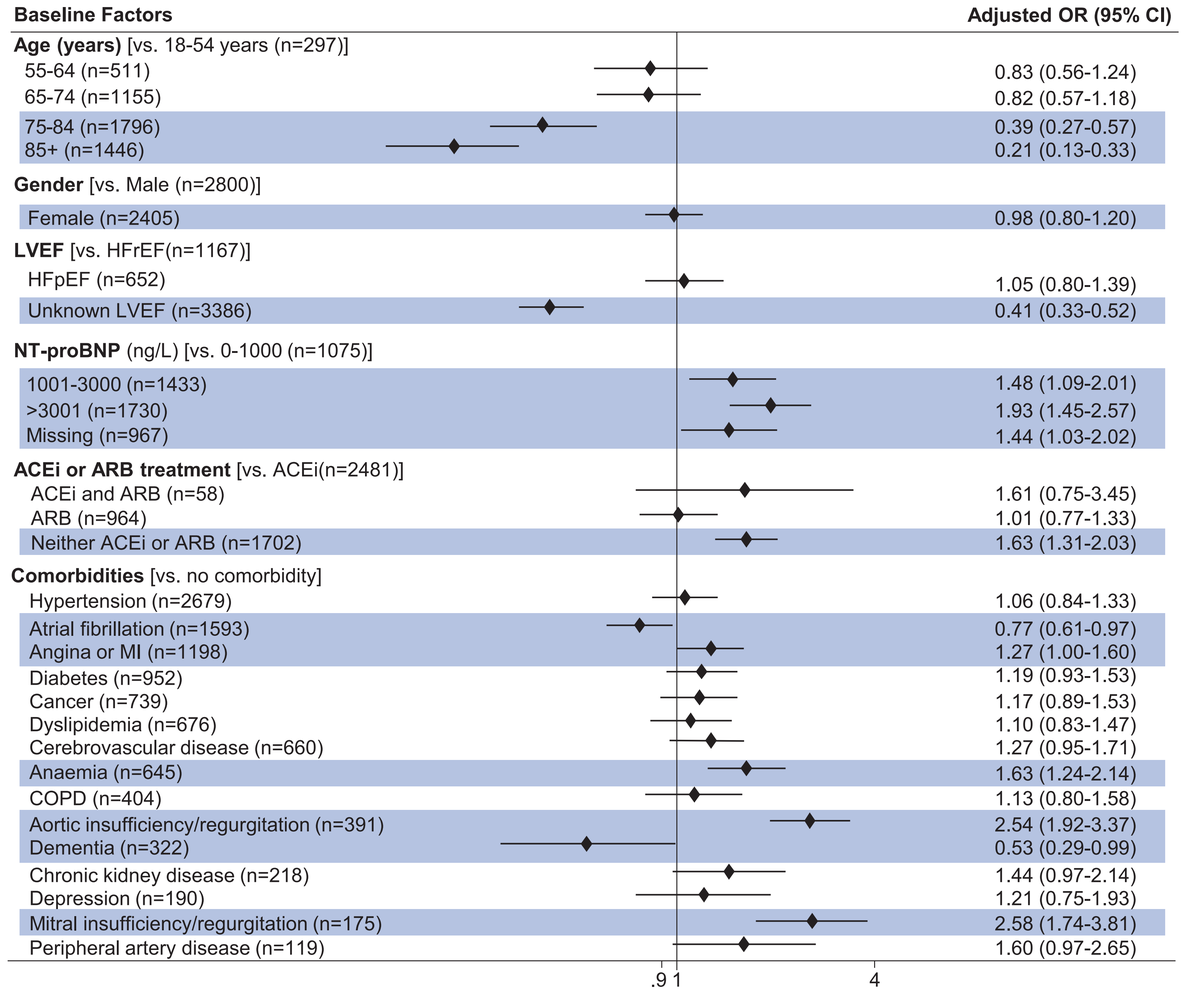
- In the first year after first HF-diagnosis, total all-cause HCsc were €12,890/patient/year.
  - Approximately 90% (€11,578) of the total cost was associated with CVD of which the highest proportion of cost (77%; €8,920) was associated specifically with HF.
  - Inpatient costs represented 91.5% (€11,805) of total cost and out of these 94% (€11,141) were CVD-related, from which 78% (€8,704) were related to HF in particular.
- Total and inpatient all-cause costs decreased by more than half in Year 2 after HF diagnosis, to €5,588/patient/year and €4,716/patient/year, respectively, and to €5,687/patient/year and €4,738/patient/year, respectively in year 3 after diagnosis (**Figure 2**).
- Of the total patient population, 10% (n=520) incurred almost 40% of total HCsc per patient during the first year of follow-up.
- Results from a logistic regression model on the highest decile of cost (i.e. 10% most expensive patients) are presented in **Figure 3**.
- Baseline factors with significant impact (adjusted Odds Ratio (OR) [95% CI]) on costs included: age (reference category [rc]: 18-54 years, 75-84 years (0.39 [0.27-0.57]) and 85+ years (0.21 [0.13-0.33]); Unknown LVEF (rc: HFrEF (0.41 [0.33-0.52]); AF (0.77 [0.61-0.97]); and dementia (0.53 [0.29-0.99]), which contribute to higher likelihood of decrease in cost while NT-proBNP levels (ng/L) (rc: 0-1000, 1001-3000 (1.48 [1.09-2.01]), >3001 (1.93 [1.45-2.57]); no ACEi/ARB treatment (rc: ACEi treatment, 1.63 [1.31-2.03]); anaemia (1.63 [1.24-2.14]); aortic regurgitation (2.54 [1.92-3.37]); and mitral insufficiency (2.58 [1.74-3.81]) significantly contributed to likelihood of increase in cost (**Figure 3**).

Figure 2. All-cause, cardiovascular disease-related and HF-related total, inpatient and outpatient costs up to 3 years after diagnosis of HF (patients with incident HF 2010-2012)



Note: Number of patients: year 1, n=5,205; year 2, n=3,327; year 3, n=1,714. Abbreviations: CVD, Cardiovascular disease; HF, Heart failure

Figure 3. Logistic regression on 10% most expensive patients to identify baseline variables which impact the costs during first year after index HF diagnosis



Note: OR adjusted for age group, sex, HF phenotype, comorbidities, NT-pro-BNP level and HF treatment at baseline
Abbreviations: ACEI, angiotensin-converting enzyme inhibitor; ARB, angiotensin receptor blocker; CI, Confidence interval; COPD, Chronic obstructive pulmonary disease; HF, heart failure; HFpEF, heart failure with preserved ejection fraction; HFrEF, heart failure with reduced ejection fraction; LVEF, left ventricular ejection fraction; MI,myocardial infarction; NT-pro-BNP, N-terminal pro-B-type natriuretic peptide; OR, odds ratio

LIMITATIONS

- Large proportion of patients without information on LVEF may have introduced some level of bias. It could be assumed that echocardiograms have only been performed in patients with more severe HF signs and symptoms. Therefore, the two HF phenotypes subgroups may not be fully representative of the overall cohort.

CONCLUSIONS

- Patients newly diagnosed with HF incur high healthcare costs from secondary care, mainly driven by inpatient costs.
- In the regression model, patients above 75 years are less often associated with the highest costs in the first year following diagnosis. Baseline factors associated with higher costs were comorbidities such as anaemia, aortic regurgitation, mitral insufficiency, higher NTproBNP levels and patients not on standard treatment with ACEi/ARB treatment. Further research to understand the reasons behind these factors would be required.
- Understanding the cost drivers and profile of high cost groups of patients with HF is important from both healthcare systems and payer perspective.

References

1. Ponikowski P, Anker SD, AlHabib KF. ESC HF. 2014;4–25.
2. Ponikowiski P, Voors, AA, Anker SD. Eur Heart J. 2016;37:2129–2200
3. McMurray JJ, Adamopoulos s, Anker SD, et al. Eur Heart J. 2012;33:1787–1847
4. Stålhammar J, Stern L, Linder R, et al. J Med Econ. 2014;17:43–51.
5. Stålhammar J, Stern L, Linder R, et al. J Med Econ. 2012;15:938–946

Disclosures

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AF Fonseca, R. Lahoz, R. Studer, and F. Calado are employees of Novartis Pharma AG, Basel, Switzerland and M. Costa-Scharplatz is an employee of Novartis Sweden AB, Sweden.
Data extraction and analysis were conducted by A. Castelo-Branco, S. Johansson, V. Heller and M. Törnblom of IQVIA, Sweden, commissioned to conduct the study on behalf of Novartis Pharma AG, and have ongoing consulting and research relationships with Novartis Pharma AG.
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