Pharmacological treatment patterns in heart failure: a population based cohort study

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Abstract

Background: Although the efficacy and safety of existing therapies of heart failure (HF) have been demonstrated in clinical trials in the last 35 years, little is known about the treatment patterns of HF in clinical practice, especially in France.
Objectives: To describe the treatment initiation patterns and the subsequent treatment changes among HF patients, in the first year following an incident hospitalisation for HF, in a French real-world setting.
Methods: We included in a cohort all patients aged over 40, with an incident hospitalisation for HF between January 1, 2008 and December 31, 2013, from the EGB, the 1/97 permanent random sample of the French nationwide claims database. We excluded all patients who died during the index hospitalization or who had a period of at least 3 consecutive months with no healthcare dispensing recorded. For each of HF drugs (Beta Blockers (BB), angiotensin-converting enzyme inhibitors (ACEI), angiotensin receptor blockers (ARBs), aldosterone antagonists (AA), diuretics, digoxin or ivabradine) exposure and drug changes were assessed quarterly during the first year following the initial hospitalisation.
Results: Between 2008 and 2013, 7,387 patients from the EGB were included in the cohort study. The mean age at baseline was 77.7 years (±12.0 years) and 51.6% were women. Between 20% and 40% of patients did not receive any HF treatment in the follow-up. Among those treated, the majority remained treated during the first year of follow-up with the same treatment initiated within the first quarter after hospital discharge. Around 60% had diuretics, one third had BB or ACEI, 10% had ARB or AA, 7% had digoxin, 2% had ivabradine. The most frequent combination was BB/ACE/ARB. The main change occurred between the first and the second quarter and concerned 47.6% of the untreated patients; by the second quarter, 21.4% initiated a BB/ACEI/ARB combination, 9.1% a diuretic, 7.2% a BB and 4.7% a BB/ACEI/ARB/AA combination.
Conclusion: This study provides precious information on treatment patterns after an initial hospital admission for heart failure at a time when new treatments for heart failure are emerging.

Declaration of Interest Statement

No conflict of interest to disclose

Background

➢ **Heart Failure (HF)** remains a major health problem with
  - 1-2% prevalence in the adult population
  - 50% mortality within 5 years of diagnostic
  - health expenditure of around 2% of the European total health-care budget
    despite the existence of therapies, whose efficacy and safety have been demonstrated in clinical trials in the last 35 years.
➢ To date, little is known about the **treatment patterns of HF in clinical practice**

Objectives

➢ To describe the **treatment initiation patterns** and the **subsequent treatment changes** among HF patients, in the first year following an incident hospitalization for HF, in a French real-world setting

Methods

➢ **Study design**
  - Cohort of **HF patients with an incident hospitalization** for HF between 01/01/2008 and 31/12/2013.

➢ **Data source**
  - EGB ("Échantillon généraliste des bénéficiaires"), the 1/97 permanent random sample of the **French nationwide claims database** SNDS.

➢ **Study population**
  - Patients ≥ 40 years with
    – incident HF hospitalization HF between 01/01/2008 and 31/12/2013;
    – 1-year lookback period before hospital discharge date (i.e. index date);
    – 1-year follow-up;
  - Were excluded all patients who
    – died during the index hospitalization;
    – had a period of at least 3 consecutive months with no healthcare dispensing recorded.

➢ **Treatment exposure**
  - **HF Drugs**
    – Beta Blockers (BB), Angiotensin-Converting Enzyme Inhibitors (ACEI), Angiotensin Receptor Blockers (ARBs), Aldosterone Antagonists (AA), digoxin, ivabradine, diuretics (loop or thiazide diuretics) and calcium channel blockers (CCB).
  - **Treatment dispensed within the 90 days following hospital discharge**
  - **Treatment changes in the 1 year of follow-up**
    – assessed quarterly using the Proportion of Days Covered (PDC)
    – for the following combinations:
      ⬦ No HFrEF treatment;
      ⬦ Diuretics alone;
      ⬦ BB alone;
      ⬦ BB/ACEI/ARB (*i.e.* BB+ACEI or BB+ARB or ACEI or ARB or ACEI+ARB or BB+ACEI+ARB);
      ⬦ BB/ACEI/ARB/AA (*i.e.* BB+ACEI+AA or BB+ARB+AA or ACEI+AA or ARB+AA or ACEI+AA+ARB+ or BB+AA or AA alone);
      ⬦ Any combination with digoxin or ivabradine.
➢ **Data analysis**
  - Descriptive analysis;
  - Stratified by age used as proxy for the type of HF (40-65 years for HFrEF, ≥75 years for HFpEF).

Results

➢ **Description of baseline characteristics (Table 1)**
  - 7 387 patients met the inclusion criteria
    – mean age 77.7 years (±12.0 years)
      ⬦ 68.5% were ≥75 years,
      ⬦ 15.5% were]40; 65 years];
    – 51.6% were female;
    – The most frequent cardiovascular conditions were high blood pressure, atrial fibrillation and ischemic heart disease.

Table 1. Description of patient baseline and index hospitalization characteristics

	[40;65 [years n = 1,147	≥75 years n = 5,059	Cohort n = 7,387
Comorbidities, n (%)			
High blood pressure	857 (74.7)	4,498 (88.9)	6,372 (86.3)
Ischemic heart disease	454 (39.6)	1,558 (30.8)	2,488 (33.7)
Cardiac rhythm disorders	204 (17.8)	1,012 (20.0)	1,438 (19.5)
Valvulopathy	179 (15.6)	928 (18.3)	1,317 (17.8)
Atrial fibrillation	285 (24.8)	2,268 (44.8)	2,994 (40.5)
Dilated cardiomyopathy	230 (20.1)	272 (5.4)	644 (8.7)
Dyslipidemia	456 (39.8)	2,035 (40.2)	3,112 (42.1)
Stroke	73 (6.4)	465 (9.2)	634 (8.6)
Diabetes	335 (29.2)	1,288 (25.5)	2,055 (27.8)
Chronic respiratory disease (asthma or COPD)	336 (29.3)	1,348 (26.6)	2,076 (28.1)
Cancer	115 (10.0)	686 (13.6)	971 (13.1)
Chronic renal failure	126 (11.0)	771 (15.2)	1,061 (14.4)
Within the 12 months of pre-index period			
Median number (± SD) of office visit per patient	9.0 [5.0;15.0]	13.0 [8.0;19.0]	12.0 [8.0;18.0]
≥ 1 visit at the general practitioner, n (%)	1,084 (94.5)	4,920 (97.3)	7,138 (96.6)
≥ 1visit at the cardiologist, n (%)	280 (24.4)	1,497 (29.6)	2,150 (29.1)
Median number [IQR] of hospitalizations per patient	2.0 [1.0;3.0]	2.0 [1.0;3.0]	2.0 [1.0;3.0]
Median number [IQR] of distinct medications (level 3 of the ATC code)	15.0 [9.0;20.0]	17.0 [13.0;22.0]	17.0 [12.0;22.0]
During index hospitalization			
Median [IQR] length of stay	7.0 [3.0;11.0]	8.0 [5.0;14.0]	8.0 [4.0;14.0]
≥ 1 medical procedure performed during the stay, n (%)			
BNP dosage	164 (14.3)	796 (15.7)	1,140 (15.4)
Echocardiography	265 (23.1)	612 (12.1)	1,100 (14.9)
Cardiac implantable devices	25 (2.2)	28 (0.6)	61 (0.8)
Cardiac rehabilitation	18 (1.6)	28 (0.6)	62 (0.8)
Heart transplant	0 (0.0)	0 (0.0)	0 (0.0)
Type of hospitalization discharge, n (%)			
Home	887 (77.3)	3,749 (74.1)	5,546 (75.1)
Internal or interinstitutional transfer	259 (22.6)	1,308 (25.9)	1,838 (24.9)
Unknown	1 (0.1)	2 (0.0)	3 (0.0)

SD: Standard Deviation; COPD: Chronic Obstructive Pulmonary Disease; IQR: Interquartile Range; BNP: Brain Natriuretic Peptide

➢ **Description of HF treatment patterns**
  - **Treatment after hospital discharge**
    – 71.9% had diuretic, 42.2% BB, 40.8% ACEI, 12.9% ARB, 14.4% AA, 10.1% digoxin and 2.6% ivabradine.
  - **During the 1 year of follow-up (Figure 1)**
    – 24.4% of patients died;
    – 20% were not exposed to any HF treatment;
    – 48.3% to 43.2% had diuretics, one third had BB or ACEI, 9% had ARB or AA, 6% had digoxin and 2% had ivabradine;
    – The main change occurred between the first and the second quarter for 53.1% of the initially untreated patients.
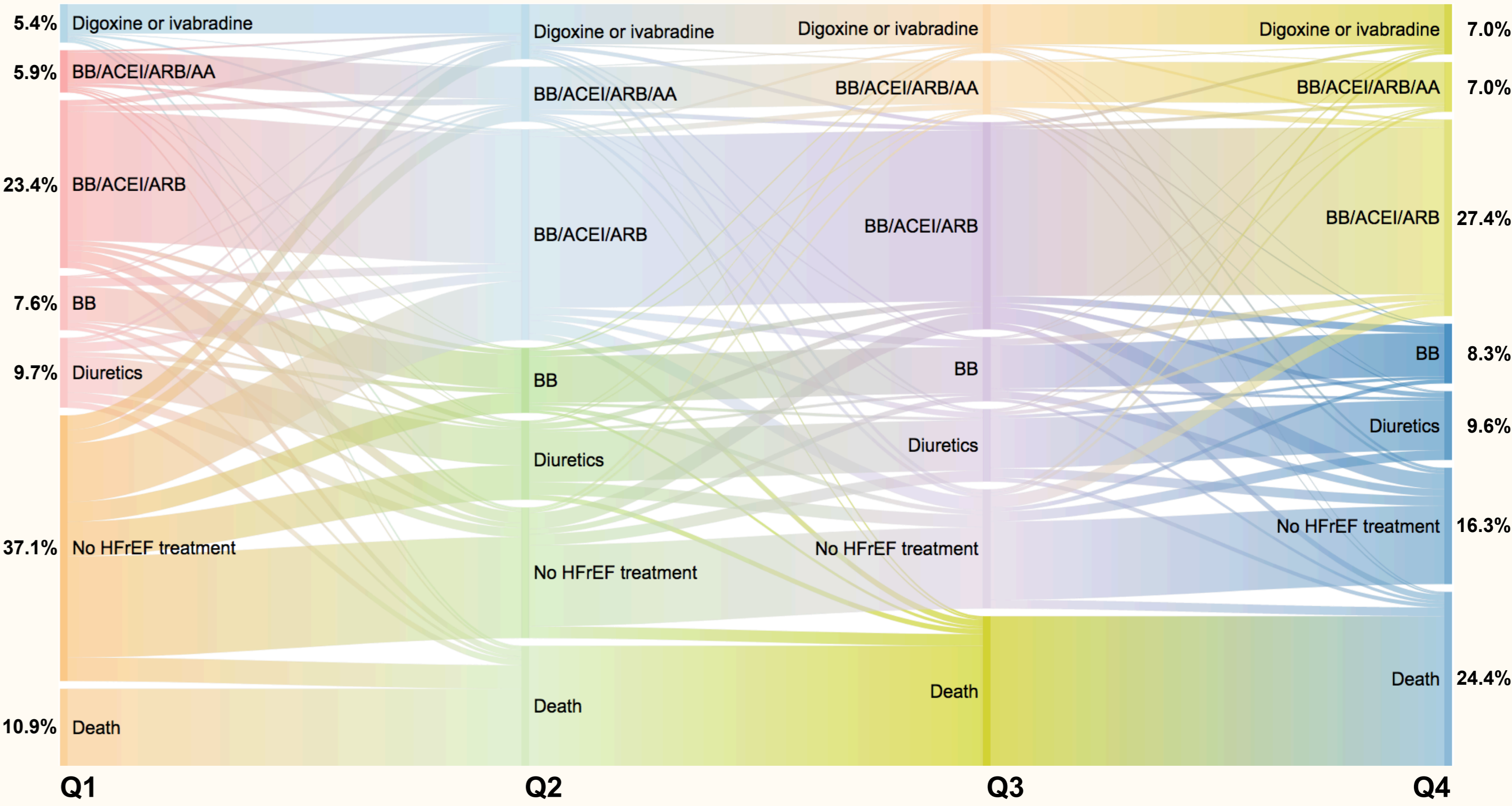

Figure 1. Sankey diagram representing modification of Heart Failure treatment over the 4 quarters of the follow-up

Conclusion

- **This study provides valuable information on treatment patterns after an initial hospital admission for heart failure.**
- **Results may be used as baseline for the study of the medicinal interventions and the risk of re-hospitalisation or death from heart failure, at a time when new treatments for heart failure are emerging.**