Events avoided and cost savings associated with ferric carboxymaltose treatment of iron deficiency in patients with acute heart failure with reduced ejection fraction from the perspective of healthcare payers in Switzerland

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Introduction

- Heart failure (HF) is a significant health problem affecting approximately 15 million patients in Europe alone.[1]
- HF is a leading cause of hospitalisation in Europe, posing an increasing burden on both patients and healthcare systems.[2]
- HF is often accompanied by iron deficiency (ID), with approximately 50% of patients with chronic HF (CHF),[3,4] and up to 80% of patients with acute HF (AHF), experiencing ID.[5,6]
- ID is associated with reduced quality of life[7] as well as greater hospitalisation and mortality risk in patients with HF.[8]
- This highlights a treatment need for patients presenting with acute HF and ID.
- Ferric carboxymaltose (FCM) has been shown by the AFFIRM-AHF trial (NCT02937454) to be effective in patients with ID and AHF with reduced ejection fraction (HFrEF), at reducing hospitalisation for heart failure (HHF) risk and improving quality of life.[9]

Objective

- The objective of this study was to estimate the cost consequence of prescribing FCM for ID treatment in patients previously hospitalised with acute HFrEF, from the healthcare payer's perspective in Switzerland.

Methods

- The financial impact of introducing FCM for ID treatment in patients with HFrEF hospitalised for AHF was determined by use of a de novo cost-offset model over a 5-year time horizon.
- The eligible patient population was derived from hospitalisation for HF (HHF) data for 2012-2015 in Switzerland,[10] with assumed proportions of secondary diagnosis of ID (33.7%) and HFrEF (66.0%) derived from comparable settings.[11,12]
- The eligible patient population was estimated as below:

Hospitalisation for AHF: 21,939[10]

↓

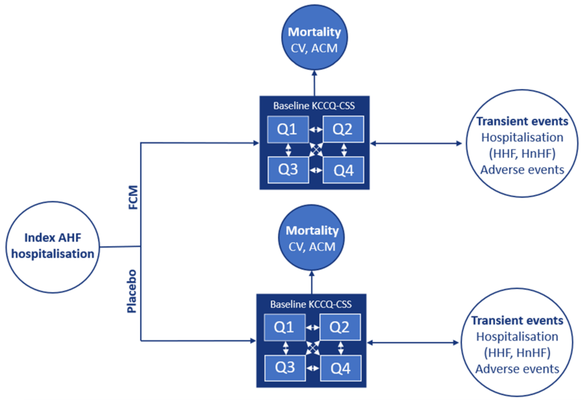
ID: 7,392[11]

↓

HFrEF: 4,879[12]

- The percentage of patients hospitalised for AHF and ID in the base case was assumed to be 33.7%, based on a UK-specific retrospective cohort study.[11], a prospective study in the French setting reported up to 79.4% patients hospitalisedHowever for AHF had ID,[5] therefore a scenario analysis based on this eligible population (11,495) was included.
- Rates of HHF in patients with ID previously hospitalised for AHF and treated with FCM or placebo were obtained from AFFIRM-AHF trial data[9] and modelled using a cohort state-transition Markov model,[13] shown in **figure 1**.
- Association between treatment uptake and events avoided and cost savings was deduced by linear regression.
- Costs were obtained from published literature. HHF mean (SE) cost of CHF13,645 (1364.50) was used.[14] Costs of FCM applied over the first two months totalled CHF379.76. All costs were adjusted to 2020 units.

Figure 1: Cohort state-transition Markov model used to estimate outcomes for patients with HFrEF and ID following an index hospitalisation for acute HF



ACM: all-cause mortality; AHF: acute heart failure; CV: cardiovascular; FCM: ferric carboxymaltose; HHF: hospitalisation for heart failure; HnHF: non-heart failure hospitalisation; KCCQ-CSS: Kansas City Cardiomyopathy Questionnaire – Clinical Summary Score; Q1/2/3/4: quartile 1/2/3/4. Figure derived from McEwan et al, 2021[13]

Results

- 4,879 patients were estimated to have been admitted with HFrEF and ID in Switzerland.
- In the absence of treatment, over five years, these patients were projected to have 5,581 HF-related bed days with an associated cost of CHF15.8 million (**Figure 2a, Figure 3a**).
- Treatment with FCM resulted in a decrease of HF-related bed days (**Figure 2, Table 1**). Over 5 years, a reduction of HF-related 220 bed-days per 1,000 patients was projected, associated with a cost saving of CHF3.0 million, which decreased to CHF2.6 million after accounting for drug acquisition costs (**Table 1, Figure 3b**).
- FCM treatment for all 4,879 patients eligible was predicted to result in a decrease of 1,072 HF-related bed days (**Figure 2b**) and an associated cost saving over 5 years of CHF14.6 million and CHF12.8 million, without and with drug acquisition costs, respectively.
- Retrospective studies may underestimate the number of patients with ID due to ascertainment bias. In a scenario where 79.4% patients hospitalised for AHF had ID[6] and were treated with FCM, hospital bed days were reduced by 2,525 days, corresponding to a cost saving of CHF30.1 million after adjusting for drug acquisition costs (CHF34.4 million unadjusted) over 5 years.

Figure 2: a) HF-related bed days associated with FCM versus placebo b) Total difference in cumulative HF-related bed days

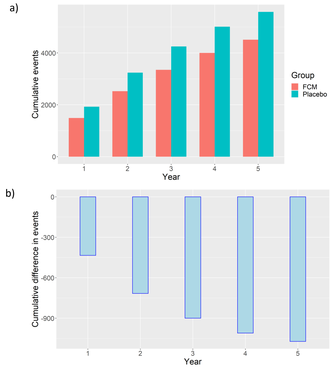
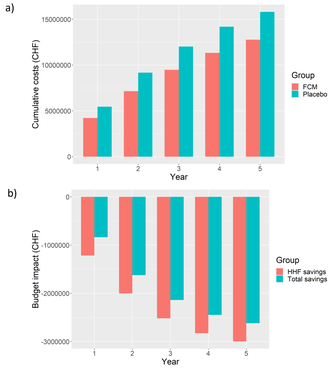


Figure 3: a) Total cost of HF-related bed days associated with FCM versus placebo b) Budget impact associated with FCM versus placebo (per 1,000 patients)



FCM: ferric carboxymaltose; HHF: hospitalisation for heart failure

Table 1: Reduction in HF-related bed days associated with FCM versus placebo

Year	Reduction in HF-related bed days/1,000 patients	Hospitalisation cost savings/1,000 patients	Total cost savings/1,000 patients
Year 1	-89	-CHF1,214,960	-CHF835,199.94
Year 2	-147	-CHF2,002,767	-CHF1,623,007.28
Year 3	-184	-CHF2,516,600	-CHF2,136,839.53
Year 4	-207	-CHF2,825,837	-CHF2,446,077.39
Year 5	-220	-CHF2,996,810	-CHF2,617,049.50

FCM: ferric carboxymaltose; HF: heart failure; CHF: Swiss Francs

Conclusion

Based on the outcomes of the AFFIRM-AHF trial, our results indicate that FCM for ID treatment in HFrEF patients has the potential to decrease HHF burden and provide cost savings to the Swiss healthcare system. Overall, FCM benefits both the healthcare provider and patient by cost saving as well as making a difference to the lives of patients with HFrEF and ID.

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