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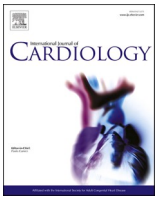

Expert recommendations for the management of iron deficiency in patients with heart failure in Asia

David Kheng Leng Sim [a,*,1], Sanjay Mittal [b,1], Jian Zhang [c,1], Chung-Lieh Hung [d,m,1], Wan Ahmad Wan Azman [e,1], Jin-Oh Choi [f,1], Teerapat Yingchoncharoen [g,1], Aileen Cynthia F. De Lara [h,1], Hiroshi Ito [i,1], Tariq Ashraf [j,1], Kai-Hang Yiu [k,1], Rungroj Krittayaphong [l,1]

[a] *Department of Cardiology, National Heart Centre Singapore, Singapore*
[b] *Department of Clinical and Preventive Cardiology, Heart Institute, Mendanta – The Medicity, India*
[c] *Heart Failure Centre, Fuwai Hospital, China*
[d] *Institute of Biomedical Sciences, MacKay Medical College, New Taipei, Taiwan*
[e] *Department of Medicine, University Malaya Medical Centre, Malaysia*
[f] *Division of Cardiology, Department of Medicine, Heart Vascular Stroke Institute, Samsung Medical Center, Sungkyunkwan University School of Medicine, Republic of Korea*
[g] *Faculty of Medicine, Ramathibodi Hospital, Mahidol University, Thailand*
[h] *Department of Medical Education and Research, Faculty of Medicine and Surgery, University of Santo Tomas, Philippines*
[i] *Department of General Internal Medicine, Kawasaki Medical School, Japan*
[j] *National Institute of Cardiovascular Disease, Pakistan*
[k] *Division of Cardiology, Department of Medicine, The University of Hong Kong Shenzhen Hospital, China*
[l] *Division of Cardiology, Department of Medicine, Siriraj Hospital, Mahidol University, Thailand*
[m] *Division of Cardiology, Department of Medicine, MacKay Memorial Hospital, Taipei, Taiwan*

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ABSTRACT

Background: Iron deficiency is a common comorbidity in heart failure (HF) and is independently associated with a worse quality-of-life and exercise capacity, as well as increased risk of hospitalization, regardless of anemia status. Although international guidelines have provided recommendations for the management of iron deficiency in patients with HF, guidelines in Asia are less established, and practical use of guidelines for management of iron deficiency is limited in the region.

Methods: A panel comprising cardiologists from China, Hong Kong, India, Japan, Malaysia, Pakistan, Philippines, Singapore, South Korea, Taiwan, and Thailand convened to share insights and provide guidance for the optimal management of iron deficiency in patients with HF, tailored for the Asian community.

Results: Expert opinions were provided for the screening, diagnosis, treatment and monitoring of iron deficiency in patients with HF. It was recommended that all patients with HF with reduced ejection fraction should be screened for iron deficiency, and iron-deficient patients should be treated with intravenous iron. Monitoring of iron levels in patients with HF should be carried out once or twice yearly. Barriers to the management of iron deficiency in patients with HF in the region include low awareness of iron deficiency amongst general physicians, lack of reimbursement for screening and treatment, and lack of proper facilities for administration of intravenous iron.

Conclusions: These recommendations provide a structured approach to the management of iron deficiency in patients with HF in Asia.

Abbreviations: AE, adverse event; APSC, Asian Pacific Society of Cardiology; CI, confidence interval; CV, cardiovascular; EQ-5D, EuroQol-5 Dimension Questionnaire; ESC, European Society of Cardiology; FCM, ferric carboxymaltose; Hb, hemoglobin; HF, heart failure; HFpEF, heart failure with preserved ejection fraction; HFrEF, heart failure with reduced ejection fraction; ISC, iron sucrose; IV, intravenous; KCCQ, Kansas City Cardiomyopathy Questionnaire; LVEF, left ventricular ejection fraction; MLHFQ, Minnesota Living with Heart Failure Questionnaire; NYHA, New York Heart Association; OR, odds ratio; PGA, patient global assessment; QoL, quality-of-life; RR, rate ratio; TSAT, transferrin saturation; VO_2, oxygen consumption; 6MWT, 6-min walk test.

* Corresponding author at: National Heart Centre Singapore, 5 Hospital Dr, 169609, Singapore.
E-mail address: david.sim@singhealth.com.sg (D.K.L. Sim).

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1. Introduction

Iron deficiency is a common comorbidity in heart failure (HF), with a prevalence of up to 55% in chronic HF, and up to 83% in acute decompensated HF [1]. It is an independent predictor of poorer prognostic outcomes in HF and is associated with a worse quality-of-life (QoL) and exercise capacity, as well as increased risk of hospitalization, regardless of anemia status [2–6].

International guidelines for treating HF, such as the American Heart Association /American College of Cardiology/Heart Failure Society of America 2022 guidelines [7], European Society of Cardiology (ESC) 2021 guidelines and 2023 update [8,9], and the Asian Pacific Society of Cardiology (APSC) consensus statements [10] have provided recommendations for the management of iron deficiency in HF, but local guidelines in Asia are not as well-established, and practical use of guidelines for management of iron deficiency is limited in the region. The procedures for management of iron deficiency are not standardized across Asia and there is a paucity of clinical data [11], leading to inadequate awareness and treatment of this condition. Hence, a group of experts in Asia convened to discuss clinical gaps, and to provide recommendations to general physicians and cardiologists regarding the screening, treatment, and monitoring of iron deficiency in patients with HF to optimize clinical outcomes in the region.

2. Methods

A panel comprising cardiologists from China, Hong Kong, India, Japan, Malaysia, Pakistan, Philippines, Singapore, South Korea, Taiwan, and Thailand convened to share insights and provide guidance for the optimal management of iron deficiency in patients with HF, tailored for the Asian community. A PubMed search was conducted for available scientific data and literature (including meta-analyses, reviews, as well as global and Asia-Pacific specific clinical trials published from 2007 to 2022 pertaining to treatment of iron deficiency in HF), which were then reviewed and discussed in detail. Expert recommendations were agreed upon by the panel through multiple online and offline communications.

3. Results and expert recommendations

Based on recommendations from the expert panel and global guidelines, an algorithm for the management of iron deficiency in patients with HF in Asia for use in clinical practice was developed (Fig. 1).

3.1. Screening and diagnosis

The disease burden of iron deficiency amongst patients with HF in Asia is high, with the prevalence ranging from 53%–76% [12–17], which is higher than that in Europe [2,3,18]. In a multi-ethnic Southeast Asian population, patients with HF ($n = 751$) had 3.5 times higher odds of iron deficiency than community-based controls ($n = 601$) [15]. Notably, the prevalence of iron deficiency in participants with or without HF was highest amongst Indian participants compared with Malay or Chinese participants (in patients with HF: 81.6% vs 62.9% vs 58.1%, $p = 0.001$; in participants without HF: 60.5% vs 58.9% vs 30.8%, $p < 0.001$) [15], indicating that racial differences may be a predictor of iron deficiency in patients with HF. Although iron deficiency is a marker of severity in HF, which is associated with worsening QoL and a higher risk of hospitalization and mortality [3–6], screening for iron deficiency is performed in <50% of patients with HF due to lack of awareness, as well as the out-of-pocket costs involved. In a Taiwanese cohort ($N = 3612$), less than one-fifth of patients with HF with reduced ejection fraction (HFrEF) had a complete iron panel done at baseline [19]. Moreover, many physicians only screen for iron deficiency in the context of anemia or chronic kidney disease in patients with HF, which is reimbursed by the government in select countries, even though clinical trials have shown that intravenous (IV) iron is effective in iron-deficient patients with HF, regardless of anemia status [20–23]. Hence, the under-screening and under-diagnosis of iron deficiency in patients with HF in Asia represent a pressing unmet need. Asian patients with acute decompensated HF manifest a more aggressive disease phenotype and at a younger age than patients from other regions [24], highlighting the critical need for detailed screening, such as for iron deficiency, in this population [24].

Iron deficiency in HF has been consistently defined as serum ferritin <100 ng/mL, or serum ferritin 100–299 ng/mL with transferrin saturation (TSAT) <20% in clinical trials [20–23,25] and international guidelines [7,8,10]. A study in the United Kingdom showed that TSAT <20% and serum iron ≤13 μmol/L, but not ferritin levels, were independently associated with greater all-cause and cardiovascular (CV) mortality in a univariable model [26].This diagnostic criteria has been validated in a Japanese cohort ($N = 763$) [27], but further research across larger populations in other Asian countries is required to apply this diagnostic criteria to clinical practice. Currently, the diagnostic criteria for iron deficiency are not well-established in Asian HF guidelines [28–33], resulting in physicians utilizing parameters that are not clinically validated, such as using serum iron levels to diagnose iron deficiency.

3.1.1. Expert opinion

All patients with HF in Asia should have an iron panel carried out to screen for iron deficiency, regardless of their hemoglobin (Hb) levels and renal function, as iron deficiency is an independent and strong predictor of outcomes in HF, and an important target for therapy [6].

Screening is simple and feasible, and iron deficiency should be defined as serum ferritin <100 ng/mL, or 100–299 ng/mL and TSAT <20% [20–23,25]. Use of serum iron as a diagnostic marker requires further validation in clinical trials for HF and should not be used to diagnose iron deficiency in HF. Healthcare professionals (including biochemists and pathologists who perform the tests) should be educated on the reference ranges for ferritin and TSAT levels recommended for the diagnosis of iron deficiency, so as to better identify patients with HF who are iron deficient. Inclusion of recommendations within country-specific guidelines for HF for the specific timing and setting for screening may further help to improve current screening rates for iron deficiency. Routine screening for iron deficiency in both inpatient and outpatient settings should be incorporated in hospital protocols regarding management of HF. Reimbursement and policies for implementation of screening can be explored at a national level. Since national health insurance in some countries covers screening of iron deficiency only in the context of anemia, some clinicians screen for iron deficiency only if the patient's Hb levels are ≤15 g/dL (as IV iron therapy is not recommended in patients with Hb >15 g/dL) [34]; however, screening should ideally be performed independently of anemia status.

3.2. Treatment

IV iron is recommended for the treatment of iron deficiency in patients with HF; it is well tolerated, improves patient outcomes such as exercise capacity, QoL, and New York Heart Association functional class [20–23,25,35,36], and prevents recurrent HF hospitalizations in symptomatic iron-deficient patients with HF with left ventricular ejection fraction (LVEF) <45–50% (Table 1) [20–23,25,35–38]. There is no evidence for the benefit of oral iron in iron-deficient patients with HF. The IRONOUT-HF trial failed to show significant improvement in exercise capacity or QoL with the use of oral iron (ferric) polysaccharide compared with placebo in this patient population [39], and its use was associated with increased risk of gastrointestinal side effects. The lack of benefit could be partially attributed to the poorer absorption compared with IV formulations, particularly in the context of HF where the thickness of the gut wall is increased [40].

Different IV iron formulations are available with distinct pharmacokinetic and pharmacodynamic properties that lead to unique

pharmacologic and safety profiles [41]; hence, in the absence of data, different iron products cannot be deemed clinically equivalent to each other. IV iron products evaluated for the treatment of iron deficiency in the setting of HF include ferric carboxymaltose (FCM), iron sucrose and ferric derisomaltose, with IV FCM having the most clinical evidence [37,42]. In the AFFIRM-AHF study [23], which was performed in iron-deficient patients with decompensated HF with LVEF ≤50% who had been admitted to hospital, IV FCM did not achieve a statistically significant reduction of the primary composite endpoint of HF hospitalizations and CV death compared with placebo, although a trend towards reduction with the use of IV FCM was observed (rate ratio [RR] 0.79, 95% confidence interval [CI]: 0.62–1.01; $p = 0.059$) [23]. This reduction was driven mainly by the statistically significant reduction in HF hospitalizations (RR 0.74, 95% CI: 0.58–0.94; $p = 0.013$) [23]. For IV ferric derisomaltose, the most recent randomized trial (the IRONMAN study), wherein a majority of the patients recruited were outpatients without recent hospitalization for HF, also narrowly missed statistical significance in reduction of the primary composite endpoint of recurrent HF hospitalizations and CV death when compared with standard care (RR 0.82, 95% CI: 0.66–1.02; $p = 0.070$) [37]. Recent meta-analyses have included these trials to evaluate clinical outcomes with the use of IV iron [43–47]. In a meta-analysis of 10 studies ($N = 3373$) by Graham et al, use of IV iron resulted in an improvement in the composite outcome of recurrent HF hospitalizations and CV death (RR 0.75; 95%

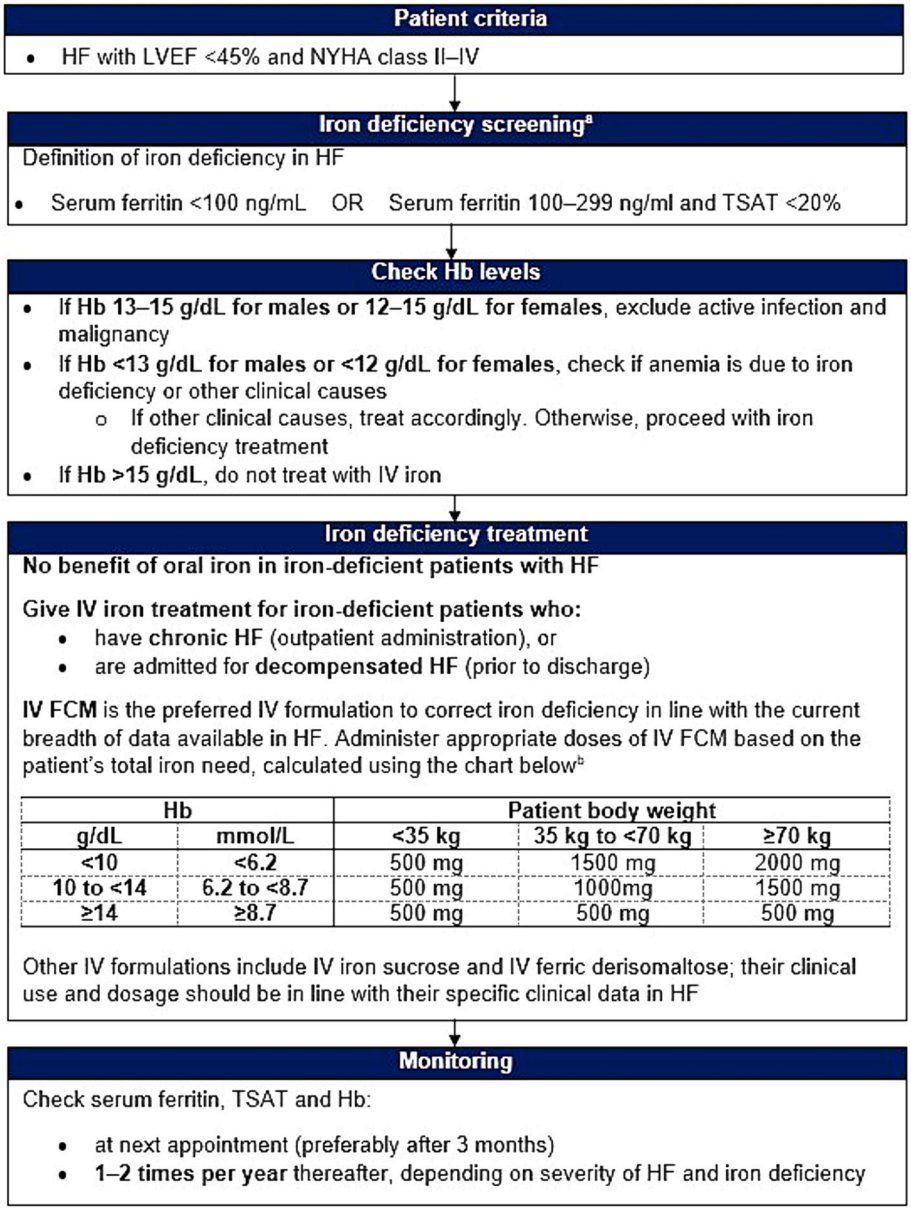

Fig. 1. Proposed algorithm for management of iron deficiency in patients with heart failure in Asia. [a] In countries where screening for iron deficiency is reimbursed only in the context of anemia, clinicians typically screen for iron deficiency only if the patient's Hb levels are lower than 15 g/dL; however, iron deficiency in HF should ideally be screened regardless of Hb levels.

[b] Dosing information obtained from Singapore's Ferinject package insert: dosing is similar in China, Hong Kong, India, Malaysia, Taiwan, and Thailand; administration differs in Pakistan, Japan, and South Korea. Please refer to the country-specific package insert or prescribing information for appropriate dosing information. Doses specified are applicable to IV FCM only. A single administration should not exceed 15 mg iron/kg body weight for IV injection or 20 mg iron/kg body weight for IV infusion, and 1000 mg of iron.

FCM, ferric carboxymaltose; Hb, hemoglobin; HF, heart failure; IV, intravenous; LVEF, left ventricular ejection fraction; NYHA, New York Heart Association; TSAT, transferrin saturation.

Table 1
Summary of selected clinical trials of intravenous iron in patients with heart failure.

	IV iron sucrose			IV FCM					IV ferric derisomaltose
	Toblli et al. [35]	FERRIC-HF [25]	IRON-HF [36]	FAIR-HF [22]	CONFIRM-HF [20]	EFFECT-HF [21]	AFFIRM-AHF [23]	HEART-FID [38]	IRONMAN [37]
Year	2007	2008	2013	2009	2015	2017	2020	2023	2022
Sample size	40	35	18	459	304	172	1108	3065	1137
Efficacy	Significantly improved LVEF, MLHFQ score, and 6MWT	Significantly improved peak VO_2/kg, NYHA class (at Week 18), PGA (from Week 1), and fatigue score (at Week 18)	Increment in functional capacity (increment in peak VO_2)	Significantly improved PGA, NYHA class, 6MWT, EQ-5D, KCCQ score (all from Week 4)	Significantly improved 6MWT (from Week 24), PGA (from Week 12), NYHA class (from Week 24), fatigue score (from Week 12), improved KCCQ and EQ-5D, reduced hospitalization for worsening HF[a]	Favorable effect on peak VO_2, significant improvement in PGA (from Week 12) and NYHA functional class (from Week 6)	21% risk reduction in the combined endpoint of total HF hospitalization and CV death,[b] trend towards reduction of hospitalization, no difference in CV death between FCM and placebo	No statistical difference in hierarchical composite of death within 12 months after randomization, hospitalizations for HF within 12 months after randomization, or change in 6-min walk distance from baseline to 6 months	18% risk reduction of primary composite endpoint of recurrent hospitalizations for HF and CV death,[b] improvements in MLHFQ score and 6MWT
Safety	Not reported	Generally well-tolerated							

CV, cardiovascular; EQ-5D, EuroQol-5 Dimension Questionnaire; FCM, ferric carboxymaltose; HF, heart failure; IV, intravenous; KCCQ, Kansas City Cardiomyopathy Questionnaire; LVEF, left ventricular ejection fraction; MLHFQ, Minnesota Living with Heart Failure Questionnaire; NYHA, New York Heart Association; PGA, patient global assessment; VO_2, oxygen consumption; 6MWT, 6-min walk test.
[a] Post-hoc analysis. [b] Narrowly missed statistical significance.

CI: 0.61–0.93; $p < 0.01$), as well as for recurrent HF hospitalizations (RR 0.67; 95% CI: 0.47–0.97; $p = 0.03$), but no difference was observed for CV or all-cause mortality [43]. These findings were supported by other meta-analyses [44,46,47]. In contrast, in the HEART-FID trial ($N = 3065$), no apparent difference was observed between FCM and placebo with respect to the hierarchical composite of death, HF hospitalizations, and 6-min walk distance (unmatched win ratio 1.10; 99% CI: 0.99–1.23) [38]. The lack of benefit in reducing HF hospitalizations that was previously observed in the meta-analyses and clinical trials could be partially attributed to the lower-risk patient population enrolled in the HEART-FID trial (only ambulatory patients enrolled), compared with the IRONMAN trial (15% of patients enrolled were hospitalized) and the AFFIRM-AHF trial (all enrolled patients were hospitalized) [38]. Data on the role of IV iron in patients with HF with preserved ejection fraction (HFpEF), as well as longer-term studies on chronic HF patients are awaited (Table 2) [48–50].

Clinical trials on the use of IV iron in HF have mainly been conducted in Western populations, and data on the use in Asian patients are scarce. The large-scale AFFIRM-AHF and IRONMAN cohorts included 4.3% and 5.8% Asians, respectively, and the data for the individual races within these cohorts are unavailable [23,37]. These studies were mainly conducted in Western countries [37], with only the AFFIRM-AHF trial having a Singapore site; IV FCM was found to be effective in the overall population and country-specific data are currently unavailable [23]. There were no Asian patients in other trials such as FAIR-HF and CONFIRM-HF, as these were mainly conducted in Europe and South America [20,51]. A single-center randomized controlled study in Malaysian patients who were treated with IV iron isomaltoside versus oral iron for 12 months ($N = 65$) reported an improvement in the proportion of patients achieving iron repletion (IV iron: 90.9% vs oral iron: 56.2%) and a larger increase in 6-min walk time (6MWT) from baseline (IV iron: 42.98% vs oral iron: 8.61%) [52]. A pilot study in Southeast Asian patients hospitalized with acute decompensated HF and iron deficiency ($N = 50$) reported a non-significant difference in 6MWT distance (adjusted mean difference: 0.9 m; 95% CI: −30.2–32.0; $p = 0.607$) and no difference in QoL in patients who recevied either IV FCM or placebo; however, the negative results may be due to the study's small sample size and short follow-up duration of 12 weeks [11]. A longer follow-up duration may be required to observe a larger benefit, given that IV FCM significantly improved 6MWT only after 24 weeks of IV FCM use in the CONFIRM-HF trial [20].

Clinical data have shown that IV iron is generally well tolerated in patients with HF, even in the small percentage of Asian patients included in pivotal trials and smaller independent studies [11,20,22,23]. In a meta-analysis of five studies which provided adverse event (AE) data, similar proportion of patients reported at least one AE (IV iron: 62.9%;

Table 2
Summary of ongoing clinical trials of intravenous iron in patients with heart failure.

Studies	FAIR-HF2 [48]	PREFER-HF [49]	FAIR-HFpEF [50]
Phase	4	3	2
Patient population	Chronic HFrEF	HFpEF	HFpEF
Enrollment	1200	72	200
Iron compound	FCM	FCM	FCM
Comparator	Placebo	Placebo, oral ferroglycine sulfate, oral sucrosomial iron	Placebo
Primary endpoint	Composite rate of recurrent HF hospitalizations and CV deaths for a minimum average follow-up of 2 years	Change in 6MWT after 24 weeks	Change in 6MWT after 52 weeks

CV, cardiovascular; FCM, ferric carboxymaltose; HF, heart failure; HFpEF, heart failure with preserved ejection fraction; HFrEF, heart failure with reduced ejection fraction;6MWT, 6-min walk test.

control: 63.6%) and the number of AEs reported were similar across both groups (odds ratio [OR] 0.98; 95% CI: 0.79–1.22; $p = 0.50$) [42]. Moreover, the incidence of serious AEs was significantly lower in the IV iron group than the control group (OR 0.77; 95% CI: 0.63–0.96; $p = 0.0175$) as was the incidence of premature discontinuation of study medication (OR 0.70; 95% CI: 0.52–0.94; $p = 0.0172$) [42]. Although the use of IV iron has raised concerns about hypersensitivity reactions and infections, no increased risk has been observed in clinical trials and meta analyses [37,42,46]. IV iron should be used with caution in patients with acute or chronic infections, and discontinued in patients with ongoing bacteremia [53]. Hypophosphatemia has been observed with the use of IV FCM in patients receiving more frequent doses or higher cumulative doses [54,55], although only transient lowering of phosphate levels was reported between patients who received IV FCM and those who received placebo in the AFFIRM-AHF trial [23].

IV iron supplementation is recommended by ESC 2023 HF guidelines update in symptomatic iron-deficient patients with HFrEF (LVEF ≤40%) or HF with mildly reduced ejection fraction (HFmrEF; LVEF 41–49%) to alleviate HF symptoms and improve quality-of-life (Class I, Level A); either IV FCM or ferric derisomaltose can be used to reduce the risk of HF hospitalization (Class IIa, Level A) [9], based on efficacy data from prospective clinical trials and meta analyses [9]. However, the guidelines mentioned that most of the evidence is from patients with LVEF ≤45% [9]. The APSC 2023 consensus recommended the use of IV FCM in iron-deficient patients with HFrEF (moderate level of evidence), whereas the Korean Society of Heart Failure 2023 guidelines recommend IV iron supplementation in iron-deficient patients with LVEF<50% who were recently hospitalized for acute HF (Class IIa, Level B) [10,56]. IV FCM has been shown to be highly cost-effective across healthcare systems in Europe and USA, driven by reduced healthcare costs due to decreased HF hospitalizations and better health status of patients with HF, which offsets the treatment costs [57]. The use of IV FCM was also found to be cost-effective compared with placebo for patients with chronic HF and iron-deficiency anemia under the Korean healthcare system [58]. To our knowledge, this is the only cost-effectiveness trial conducted in Asia for IV iron in patients with HF.

Many Asian guidelines do not provide any guidance or provide unclear recommendations on the management of iron deficiency in HF [28–33], with only a few recommending treatment with IV iron [10,30,33,56,59], even though FCM, iron sucrose, and ferric derisomaltose are available in most countries in Asia. Although the HF Council of Thailand recommends IV iron treatment for iron deficiency in HF, the use of IV iron in this setting is still uncommon [59]. Nanosimilars of these IV iron products are also available in some countries in Asia [60]. Datasets have shown that due to the complex nanocolloidal structure of the molecules, there are physicochemical differences between IV iron products and their nanosimilars, resulting in differential iron release; this is also highly dependent on the manufacturing process [60]. This may result in altered pharmacological and clinical properties compared with the original molecules, including variable dosages and efficacy, as well as safety [61–64]. Thus, in the absence of clinical data, it would be difficult to ascertain therapeutic equivalence of such molecules before they can be used regularly in clinical practice [65].

Many general cardiologists and physicians in Asia do not use IV iron due to lack of awareness, unfamiliarity with IV iron, lack of reimbursement, or proper facilities to administer IV therapy; a notable proportion of Asian patients with HF are still being treated with oral iron, which has been shown to be ineffective in clinical trials [39]. For example, in a prospective multicenter study in Korea ($N = 461$), only 0.2% of acute HF patients with anemia and iron deficiency received IV iron, while 13.2% were treated with oral iron [17].

3.2.1. Expert opinion

All symptomatic patients with HF with LVEF <45% and iron deficiency should receive treatment with IV iron for improvement of QoL and clinical outcomes; oral iron should not be used due to its lack of efficacy in patients with HF. Based on the ESC 2023 update, either IV FCM or ferric derisomaltose can be used to reduce the risk of HF hospitalization in symptomatic patients with HFrEF or HFmrEF, whereas IV FCM is the preferred IV formulation in the APSC 2023 consensus, due to the magnitude of data available for IV FCM [9,10]. Other IV iron products with distinct pharmacological properties have also been effective in improving exercise capacity and QoL.

The expert group believes that these recommendations will help improve scientific awareness on the necessity and cost effectiveness of IV iron for treatment of iron deficiency in HF. Although cost-effectiveness analyses have been conducted in South Korea for FCM use in iron deficiency anemia associated with HF [58], further studies focused on the health economic outcomes of treating iron deficiency set in the local context may improve eventual access to therapies in the region. As clinical trials evaluating the use of IV iron were carried out in a predominantly Western population, larger clinical studies with longer follow-up duration in Asian countries should be conducted to confirm the benefit of IV versus oral iron in Asian patients with HF. Subgroup analyses of major clinical trials, such as the AFFIRM-AHF and IRONMAN trials, may also help confirm this benefit. Cardiologists and general physicians should encourage iron-deficient patients with HF to enroll in ongoing clinical trials for IV iron products (Table 2), and to treat their patients for this condition.

3.3. Administration of IV iron

IV iron can be administered in an inpatient or outpatient setting. Inpatient administration is justified and often reimbursed since patients admitted for acute decompensated HF have a high risk of rehospitalization, which is reduced by the use of IV iron [23]; patients can be monitored in a controlled environment during these infusion procedures. Outpatient administration for chronic HF patients is cost-efficient, but in Asia, challenges include the lack of awareness amongst doctors on the management of iron deficiency, a lack of a dedicated outpatient facility to administer IV iron and monitor patients post-treatment, and limited insurance coverage.

3.3.1. Expert opinion

Administration of IV iron is effective in an inpatient or outpatient setting; IV iron should not be replaced with oral iron due to the lack of clinical benefit. In the clinical setting of each country, the optimal administration should be based on availability of facilities and trained manpower to ensure timely and appropriate IV iron administration for patients with chronic HF.

Increasing outpatient infusion facilities for patients who require an IV infusion for a short duration will allow for a simple, straightforward IV iron administration process, as most patients with chronic HF require only 1–2 doses annually. To allow for efficient allocation of resources, such outpatient infusion facilities may be set up within an outpatient HF clinic, or as a joint facility with antibiotic infusion centers, blood transfusion centers, or daycare facilities; these additions are currently being implemented in some countries in Asia.

3.4. Post-treatment monitoring

The ESC 2021 HF guidelines recommend for periodic screening of iron status in patients with HF (Class I, Level C) [8]. Practical guidelines in Europe recommend checking ferritin and TSAT levels in patients with HF treated for iron deficiency at their next scheduled visit (approximately after 3 months), and once or twice per year thereafter, depending on the severity of HF and iron deficiency [34]. In Asia, routine monitoring of iron status is not commonly carried out due to a lack of awareness and cost of screening.

3.4.1. Expert opinion

Ferritin, TSAT, and Hb levels should be checked at the next

scheduled visit after treatment of iron deficiency, preferably after 3 months.

Periodic monitoring of iron deficiency should be carried out every 6 months or annually for all patients with HF.

4. Conclusion

Through the insights shared by the expert panel, this set of expert recommendations provides guidance for the management of iron deficiency in patients with HF in Asia. Furthermore, it increases awareness amongst cardiologists, as well as general internal medicine physicians, who manage many patients with HF and play a major role in screening and treating comorbidities in HF. Treatment of iron deficiency in HF helps prevent recurrent hospitalizations due to worsening HF, whilst also improving patient QoL; thus, appropriate treatment with IV iron will help optimize clinical outcomes and reach treatment goals for patients with HF in the region.

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CRediT authorship contribution statement

David Kheng Leng Sim: Writing – review & editing, Supervision, Conceptualization. **Sanjay Mittal:** Writing – review & editing, Conceptualization. **Jian Zhang:** Writing – review & editing, Conceptualization. **Chung-Lieh Hung:** Writing – review & editing, Conceptualization. **Wan Ahmad Wan Azman:** Writing – review & editing, Conceptualization. **Jin-Oh Choi:** Writing – review & editing, Conceptualization. **Teerapat Yingchoncharoen:** Writing – review & editing, Conceptualization. **Aileen Cynthia F. De Lara:** Writing – review & editing, Conceptualization. **Hiroshi Ito:** Writing – review & editing, Conceptualization. **Tariq Ashraf:** Writing – review & editing, Conceptualization. **Kai-Hang Yiu:** Writing – review & editing, Conceptualization. **Rungroj Krittayaphong:** Writing – review & editing, Conceptualization.

Conflicts of interest

David Kheng Leng Sim has received an honorarium from CSL Vifor for participation in an advisory board meeting.

Sanjay Mittal has received an honorarium from CSL Vifor for participation in an advisory board meeting.

Zhang Jian has received an honorarium from CSL Vifor for participation in an advisory board meeting.

Chung-Lieh Hung has received an honorarium from CSL Vifor for participation in an advisory board meeting.

Wan Ahmad Wan Azman has received an honorarium from CSL Vifor for participation in an advisory board meeting.

Jin-Oh Choi has received an honorarium from CSL Vifor for participation in an advisory board meeting.

Teerapat Yingchoncharoen has received an honorarium from CSL Vifor for participation in an advisory board meeting.

Aileen Cynthia F. De Lara has received an honorarium from CSL Vifor for participation in an advisory board meeting.

Hiroshi Ito has received an honorarium from CSL Vifor for participation in an advisory board meeting.

Tariq Ashraf has no conflicts of interest to declare.

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