Attitudes and Clinical Practice in Heart Failure Among Physicians in Argentina

Actitudes y prácticas clínicas en la insuficiencia cardiaca en médicos de Argentina

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ABSTRACT

Background: It is necessary to identify areas of improvement in the care of heart failure (HF) patients and thus implement educational interventions to optimize quality of care and their clinical outcomes.

Objective: The aim of this study was to evaluate attitudes, knowledge, confidence and care pathways of patients with HF among physicians in Argentina.

Methods: We conducted a cross-sectional study using a self-administered survey to evaluate clinical practice patterns, and attitudes/perceptions regarding the diagnosis, treatment and follow-up of HF patients in the outpatient and inpatient setting. The survey respondents were physicians from 22 centers in Argentina who participated in a comprehensive educational program for the care of HF patients carried out between March and July 2021.

Results: A total of 50 physicians were surveyed; mean age was 41 ± 8 years and 86% were cardiologists. In patients with reduced left ventricular ejection fraction, 24% of the respondents reporting starting with quadruple therapy; 88% chose beta-blockers, 72% dual angiotensin receptor-neprilysin inhibitors, 48% mineralocorticoid receptor antagonists and 34% sodium-glucose cotransporter-2 inhibitors. Fifty percent of the survey respondents answered that they do not reach quadruple therapy. Forty-four percent of physicians reported they felt very uncertain about the diagnosis of HF with preserved ejection fraction, and 46% considered relevant to evaluate the presence of anemia or iron deficiency

Conclusion: There are knowledge gaps in the diagnosis and treatment of HF, especially in the diagnosis of HF with preserved ejection fraction, and in the indication of quadruple therapy. This highlights the need for implementing educational strategies that focus on knowledge, confidence, and care pathways.

Keywords: Heart failure - Quality of care, Ambulatory Care, Ventricular Dysfunction, Argentina

RESUMEN

Introducción: Es necesario identificar áreas de mejora en la atención de los pacientes con insuficiencia cardíaca (IC), para implementar intervenciones educativas con el fin de optimizar la calidad de atención y los resultados clínicos.

Objetivo: Evaluar las actitudes, conocimiento, confianza y formas de atención a pacientes con IC, de médicos de Argentina.

Material y métodos: Estudio de corte transversal a través de una encuesta auto administrada para evaluar los patrones de práctica clínica y las actitudes/percepciones relacionadas con el diagnóstico, tratamiento y seguimiento de pacientes con IC en el ámbito ambulatorio y el hospitalario. Se incluyeron médicos de 22 centros de Argentina que participaron de un programa integral educativo de IC entre marzo y julio de 2021.

Resultados: Se encuestaron 50 médicos, con edad media de 41 (±8) años; el 86% eran cardiólogos. En pacientes con fracción de eyección ventricular izquierda deprimida, el 24% inicia con la terapia cuádruple, y privilegia en un 88% los betabloqueantes, 72% los inhibidores duales de la neprilisina y la angiotensina II, 48% los antagonistas de los receptores mineralocorticoides y en el 34% los inhibidores del cotrasportador sodio glucosa 2. El 50% de los encuestados refiere que no llega a alcanzar la cuádruple terapia. El 44% refiere sentirse muy inseguro con el diagnóstico de IC con fracción de eyección preservada. El 46% de los médicos considera relevante la determinación de anemia o ferropenia.

Conclusión: Se identificaron brechas de conocimiento en el diagnóstico y tratamiento de la IC, especialmente en el diagnóstico de IC con fracción de eyección preservada, y la cuádruple terapia. Esto refuerza la necesidad de implementar estrategias educativas que tengan como foco el conocimiento y seguridad, y las formas de atención.

Palabras clave: Insuficiencia cardíaca - calidad de atención - Atención Ambulatoria - Disfunción Ventricular - Argentina

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INTRODUCTION

Despite important therapeutic advances, the prevalence of heart failure (HF) is still a major healthcare issue (1, 2) and is associated with frequent hospitalizations, high morbidity and mortality rates, and elevated healthcare costs. (3) Furthermore, HF prevalence and burden to the health care system are expected to increase due to population aging and prolonged survival of patients with cardiovascular diseases. (4)

Therefore, the effective diagnosis and treatment based on clinical practice guideline recommendations for HF patients is essential; (5-8) however, translation to clinical practice is suboptimal and many HF patients do not receive adequate treatments or doses. (10-12)

In Argentina, the available information about medical attitudes and opinion regarding diagnostic and therapeutic practices in chronic and decompensated HF comes from the 2005 DIME-IC national survey, which found a wide disparity between most of the strategies used for diagnosis, evaluation and therapy. (13)

Therefore, the aim of this initiative was to obtain updated information on the attitudes, knowledge and care pathways for the contemporary diagnosis and management of HF among physicians in the secondary and tertiary level of care in Argentina.

METHODS

Study design and population

The study had a cross-sectional design. The physicians included represented 22 public and private healthcare centers of the second and third levels of care in Argentina who voluntarily participated in a comprehensive educational program for the care of HF patients carried out between March and July 2021. The aim of the educational intervention was to optimize the diagnosis and treatment of HF patients in the outpatient and inpatient settings, based on a training program in heart failure clinics with a total training load of 30 hours and a final exam.

Development of the survey

A baseline survey was performed in March 2021. The online questionnaire was created, distributed and administered using Google Forms (Mountain View, CA). The link to the questionnaire was submitted via e-mail. When the participants received and clicked on the link, they were automatically directed to the information about the study and the informed consent.

The information collected included demographics, educational background of the participants, their place of practice and the characteristics of the patients they treated. In addition, key areas on attitudes and general and specific clinical practice for the management of HF according to national and international clinical practice guidelines were evaluated.

The online, self-administered survey used several question formats to measure confidence, clinical practice patterns, and attitudes/perceptions regarding the diagnosis, treatment, follow-up, long-term management, and multidisciplinary care of outpatients and inpatients with HF. The 55 questions of the survey were developed based on a review of the literature and on the recommendations of clinical practice guidelines (5-8,14), and expert opinions (supplementary appendix). Self-reported confidence in knowledge and practice decisions was rated on a 5-point scale, where 1 was not at all confident, 2 to 4 somewhat confident and 5 completely confident.

Statistical analysis

Continuous variables were expressed as mean and standard deviation, or median and interquartile range (IQR), according to their distribution. Categorical variables were expressed as numbers and percentages. Data obtained from multiple choice questions were analyzed using descriptive statistics. All the statistical calculations were performed using IBM® SPSS® Statistics 25.0 statistical package (IBM Corp., Armonk, NY, USA).

Ethical considerations

The authors developed the report without the participation of the sponsor of the educational program (AstraZeneca laboratory). We did not obtain approval from the institutional or central review board because our study was designed to examine the perceptions and knowledge of physicians rather than to collect information from patients. The professionals answered the survey for free, and the survey was completely anonymous.

RESULTS

Characteristics of the physicians and healthcare centers

Of the 50 physicians participating in the educational intervention, 100% responded to the requests and completed the survey.

Twenty-four percent of survey respondents worked in the City of Buenos Aires, 21% in Cordoba, 12% in Corrientes, 10% in Buenos Aires, 7% in Chaco and Misiones, 5% in La Pampa, Neuquen and Santa Fe, and the remaining 4% in Mendoza and Tucuman.

Mean age was 4 ± 8 years, with a median time since graduation from medical school of 13 years (IQR 7-20).

Eighty-six percent were cardiologists, 12% were internists, and 2% were endocrinologists. Ninety-two percent worked in a multidisciplinary healthcare center. Thirty-four percent of the professionals worked in a private center or with social security coverage, 14% in the public sector and the remaining 52% in both sectors. All the professionals reported that their diagnostic and therapeutic management was based on clinical practice guidelines.

The median number of total beds available in the center where they worked was 65 (IQR 16-150), with 12 (IQR 8-25) beds dedicated to patients with cardiovascular diseases.

The physicians surveyed saw 8 patients (IQR 4-10) with HF per week on an outpatient basis, and 74% of those dealing with hospitalized patients saw a median of 4 patients (IQR 2-6) with acute HF.

Regarding HF services and availability of resources, 80% of the respondents worked in centers with critical care units, and 28% had HF units. In addition, 59% had a specific a HF clinic, 18% had palliative care services and 12% counted with a hospital day-case unit.

The centers had several specialties available for

consultation: pulmonology (98%), diabetology (98%), nephrology (94%), neurology (92%) and hematology (88%).

The diagnostic tests available in more than 90% of the centers where the physicians surveyed worked were electrocardiogram (ECG), echocardiography, scale, 24-hour Holter monitoring, laboratory tests including troponin (Figure 1), and 60-70% had availability of natriuretic peptides and right and left heart catheterization.

The therapeutic options available in more than 70% of the centers were renal replacement therapies, intravenous iron infusion, implantable cardioverter defibrillators (ICDs) or cardiac resynchronization therapies (CRTs), and percutaneous coronary interventions. Only 10% had heart transplantation capabilities and 15% counted with ventricular assist devices (Figure 1, supplementary material).

Characteristics of the patients with heart failure treated
Among HF patients treated, 40% (IQR 30-60) were 50-70 years old and 43% (IQR 25-60) were > 70 years.

Comorbidities as anemia, iron deficiency and diabetes were common. Most patients had left ventricular ejection fraction (LVEF) < 40% and the most common etiology was ischemic cardiomyopathy, followed by hypertensive heart disease (Table 1).

In terms of medical coverage, 40% (IQR 20-50) counted with the national social security system, 20% (IQR 5-40) had provincial social security coverage and 10% (0-20) prepaid medical insurance.

Diagnosis
The physicians were asked about the signs and symptoms they consider for the diagnosis of HF in daily clinical practice. The most ranked symptoms were paroxysmal nocturnal dyspnea (98%), orthopnea and

Fig. 1. Complementary tests available in the centers.
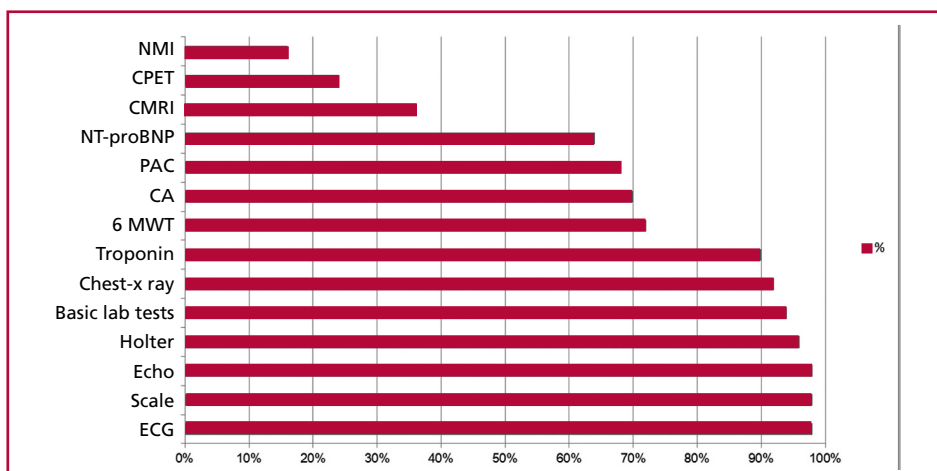
NMI: Nuclear medicine images; CPET: cardiopulmonary exercise testing; CMRI: cardiac magnetic resonance imaging; PAC: pulmonary artery catheter; CA: coronary angiography; 6MWT: 6 minute-walk test; Echo: echocardiography; ECG: electrocardiogram

Table 1. Baseline characteristics of the population with heart failure treated by the physicians surveyed.

	Median (IQR)
Comorbidities	
Anemia	30% (15-50)
Iron deficiency	20% (10-40)
Diabetes	60% (30-80)
Hyperkalemia	10% (5-20)
Chronic kidney failure with creatinine clearance < 60 mL/min/m² or creatinine levels > 1.5 mg/dL	30% (20-50)
LV ejection fraction < 40%	60% (45-75)
Etiology	
Ischemic	50% (40-60)
Hypertensive	20% (10-35)
Valvular heart disease	10% (5-20)
Idiopathic	5% (5-15)
Undetermined	5% (1-10)
Chagas' disease	4% (1-10)
Other	6% (2-10)

the presence of pulmonary rales (both 96%), while heart murmurs (42%) and palpitations (28%) were the least ranked.

The most relevant diagnostic tests were the determination of LVEF and renal function, followed by functional class and etiology of heart disease. Only 46% considered relevant to evaluate the presence of anemia or iron deficiency (Figure 2).

Forty-four percent of physicians reported feeling very uncertain about the diagnosis of HF with preserved ejection fraction (HFpEF) and 24% felt very uncertain about the diagnosis of HF in the patient with comorbidities (Figure 3).

As for hospitalizations, 82% considered very important to find the decompensating factor.

Treatment

When physicians were asked which drugs they prioritized when initiating treatment of patients with HF with reduced LVEF (HFrEF) in the outpatient setting, 88% chose beta-blockers (BBs), 78% angiotensin-converting enzyme (ACE) inhibitors and angiotensin II receptor blockers (ARBs), 72% dual angiotensin receptor-neprilysin inhibitors (ARNIs), 48% mineralocorticoid receptor antagonists (MRAs) and 34% sodium-glucose cotransporter-2 (SGLT2) inhibitors.

The drug combinations preferred at the initiation of treatment were quadruple therapy (BB; SGLT2; MRA and ACE inhibitor/ARB/ARNI) 24%, triple therapy 32%, double therapy 30%, and monotherapy 14%. The classic combination of an ACE inhibitor/ARA II, BB and MRA was the scheme most used.

The median time to reach 50% of the target dose of each drug in a patient with HFrEF with quadruple therapy is 4 weeks (RIC 2-8), and a median of 8 weeks (4-12) for the target dose. Fifty-percent of the survey respondents answered that they do not reach quadruple therapy.

Fifty percent of physicians felt confident to identify patients with indication for cardiovascular rehabilitation; however, only 20% felt confident to indicate cardiac transplantation (Figure 4).

Among hospitalized patients, 84% titrate their medication before hospital discharge and 16% prefer to make modifications on an outpatient basis. The importance of administering hypertonic saline and intravenous iron in patients hospitalized for HF was investigated. Only 12% and 6% of the physicians surveyed considered that the administration of iron and hypertonic saline, respectively, were essential.

As for the signs or methods to assess congestion in patients hospitalized for HF to define hospital discharge, 100% use physical examination, 82% evaluate weight loss and functional class, 62% perform echo-
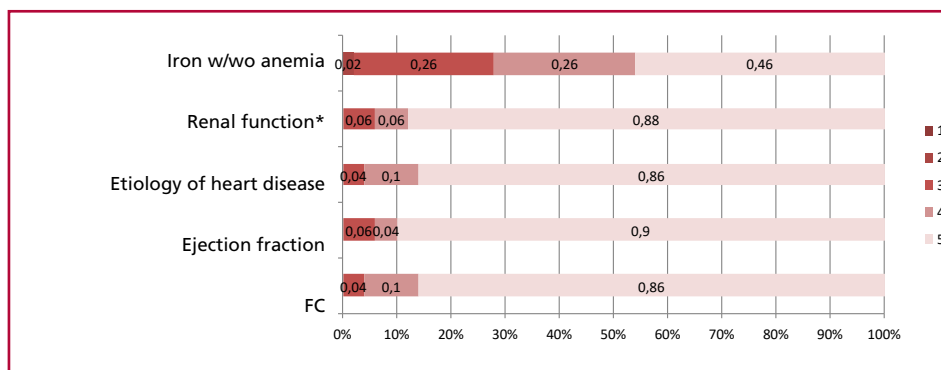

Fig. 2. Relevance of diagnostic practices.

5-point scale: 1 "not relevant at all", and 5 "absolutely essential". w/wo: with or without; FC: functional class
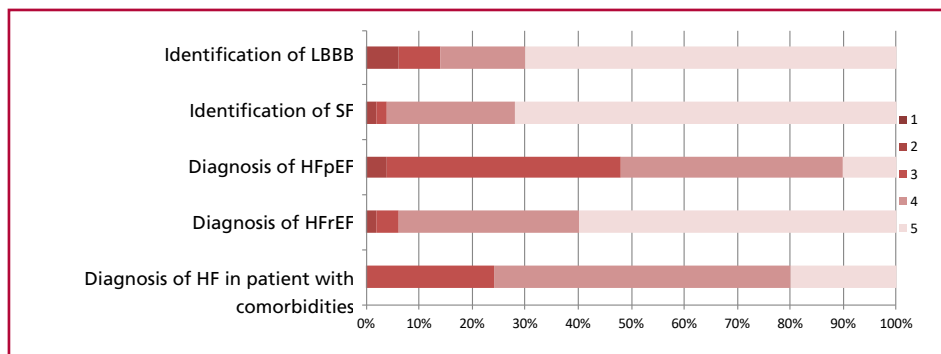*BUN; creatinine; creatinine clearance.

Fig. 3. Certainty and confidence about the diagnosis of HF in the outpatient setting.

5-point scale: 1 "not confident at all in the diagnosis" and 5 "absolutely confident with my diagnosis" HFrEF: heart failure with reduced ejection fraction; HFpEF: heart failure with preserved ejection fraction; AF: atrial fibrillation; LBBB: left bundle branch block.

Fig. 4. Certainty and confidence about identifying of HF patient who may benefit from different treatments
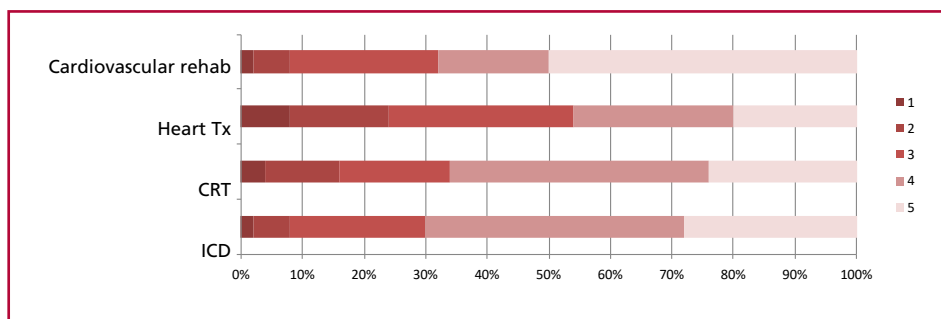
5-point scale: 1 "not confident at all in identifying" and 5 "absolutely confident in identifying". rehab: rehabilitation; TX: transplantation; CRT: cardiac resynchronization therapy; ICD: implantable cardioverter defibrillator.

cardiography, and 42% measure biomarkers or use lung ultrasound.

Follow-up

The survey respondents felt that the median time from the initiation of outpatient treatment to the next follow-up visit was 14 days (IQR 7-15); 18% reported scheduling a second visit within 1 week, 64% within 7-15 days, and the remaining 18% after 15 days. Once treatment for HF was initiated, the median time to monitoring laboratory tests was 15 days (IQR 7-30) and 68% ordered the laboratory tests after 2 weeks.

Median time to repeat echocardiography after initiation of treatment was 3 months (IQR 1-6) and 60% consider that consultation with other specialists is essential.

As for hospital discharge, 74% did not count with a discharge checklist. Most professionals (86%) agreed that it is extremely important to provide general written instructions at the time of hospital discharge. Fifty percent reported scheduling outpatient follow-up appointments within 7 days of hospital discharge, and 34% between 10 and 30 days.

DISCUSSION

Based on this study, we were able to evaluate the attitudes, knowledge, confidence and care pathways regarding the diagnosis, treatment and follow-up of patients with HF in the outpatient and inpatient settings among physicians, mostly cardiologists, in 22 medium complexity centers in Argentina.

Despite the wide availability of evidence-based HF guidelines, and that 100% of the survey respondents reported that their diagnostic and therapeutic decisions were based on these guidelines, we found some gaps between guideline recommendations and real-world practice. These differences were evident in both outpatient and inpatient settings.

There are certain findings worthy of note.

First, in terms of the services of the institutions considered, there was a low rate of HF units, with a considerable absence of palliative care services. HF is a chronic and progressive disease that affects people's quality and quantity of life. (15,16)

The creation of specialized care systems, such as HF units, has improved the management of these patients, as reflected in several meta-analyses. (17-19) For this reason, they have been included as a recommendation in the European Society of Cardiology Guidelines for the treatment of chronic HF more than a decade ago: (20) class I, level of evidence A to reduce hospital admissions, and class IIa, level of evidence B to reduce mortality.

These systems do not require high complexity and could be set up in medium and low complexity centers. Palliative care significantly improves the quality of life of heart failure patients and their families and should therefore be considered from the moment the diagnosis is made and not only in the final stages of the disease, providing patients with active information and promoting their involvement in decision-making.

Second, in terms of disease diagnosis, we noted that most professionals feel confident in the diagnosis of HFrEF but not with HFpEF or comorbidities. Among them, anemia poses the greatest difficulty for its diagnosis, classification, and treatment. The association between anemia and HF is well known but rarely considered in clinical practice; it is sometimes a cause of HF but is usually a consequence of the disease. In the Euro Heart Failure Survey, the estimated prevalence of anemia increased to 33% at a hemoglobin cutoff of 12 g/dL. Anemia significantly affects morbidity and mortality of patients with HF, so its detection and treatment are essential for these patients. (21)

Third, we noted great disparity in terms of indications upon discharge and strict post-discharge follow-up after hospitalization.

After a first hospitalization, the patient enters a vulnerable phase with high risk of readmission, followed by a plateau of false stability which will end in the final period of the disease, in which death is often preceded by recurrent hospitalizations. (22-24) To address this vulnerability, it is essential to act on the patient's transition before and after discharge, integrating organizational measures and improving treatment capable of modifying the disease. We believe that standardizing the recommendations at discharge,

systematic post-discharge monitoring and follow-up guidelines can help the mapped centers to counteract this difficulty. Providing centers with standardized protocols, as a discharge checklist, is a simple measure that can result in a significant impact to improve patients' outcome during this vulnerable phase.

An additional shortcoming was the timely referral of patients to a higher complexity center for the evaluation for a potential heart transplantation. As part of the educational program, we will generate simple roadmaps to help fight against the deficiencies found, facilitating the diagnosis, follow-up, management of comorbidities and diagnostic criteria.

The study has several limitations that should be mentioned. First, the study design was an observational survey that included physicians, mostly cardiologists with extensive experience, and who had graduated from medical school in a range of 7 to 20 years. Secondly, although the professionals surveyed represent more than 20 centers nationwide, they are part of an education and training program, which could represent a bias towards physicians who are more motivated to participate in this type of academic activities. The interpretation of the questions of the survey was left to the discretion of the responding physicians.

In summary, our study highlights an important need for improving the education and confidence among physicians about the clinical diagnosis, investigation, and treatment of HF in the outpatient and inpatient settings. Importantly, targeted HF continuing medical education is required, with a clinical focus on proper clinical diagnosis and the use of diagnostic tests for confirmation, along with knowledge translation of practice guidelines. Preceptorships in specialized HF clinics might inspire further confidence in HF management. (25) Continuing medical education programs will need to be tailored to varying learning needs, including traditional didactic lectures, podcasts, case-based tutorials, and learning programs that incorporate assessments of performance. Multifaceted educational programs and practice audit programs have been shown to improve confidence and clinical performance among health care practitioners. (26)

Based on the information gathered, we believe that, by detecting weak areas, we have found windows of opportunity for improvement. We will carry out the interventions previously proposed and we will conduct the same survey to the professionals after their continuing education during these months to evaluate and measure the impact of the project.

CONCLUSIONS

We obtained updated information on the management of HF among physicians in Argentina. Knowledge gaps were identified in the diagnosis and treatment of HF, especially in the diagnosis of HF with preserved ejection fraction, and indication of quadruple therapy.

The availability of actual information on how patients are managed in our country is a key starting point for improving the early diagnosis and prevention of this disease and the interaction between the three levels of care to obtain standardized treatment and finally reduce the high morbidity and mortality rate of HF patients

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Identification

Age

Years since graduation

Did you complete a residency program in any medical specialty?

Do you base your daily clinical practice on the recommendations of national/international clinical practice guidelines? (Yes/No)

Workplace

1. You work in a
   A. Specialized center
   B. Multidisciplinary center
2. Office and hospital practice
   a. Private practice/social security system
   b. Public center
   c. Both
3. The health center where you work has (please check all the appropriate options)
   a. Hart failure unit or service
   b. Heat failure clinic
   c. Hospital day-case unit/heart failure observation unit
   d. Critical care unit (intensive care unit, coronary care unit)
   e. Heart failure specialist nurse
   f. Palliative care
   g. None of the above
4. Your center has a general ward exclusively dedicated to the treatment of patients with cardiovascular diseases
   a. Yes
   b. No
5. How many beds are available in your center?
   Numeric field
6. How many beds are allocated to patients with cardiovascular diseases in your center?
   Numeric field
7. Regarding the complementary tests for the diagnosis/evaluation and/or management of heart failure patients, your center/clinic counts with (please check all the appropriate options)
   a. Basic laboratory tests
   b. Electrocardiogram
   c. Scale
   d. BNP/NT-proBNP
   e. Cardiac troponin
   f. Chest X-ray
   g. Echocardiography
   h. 24-hour Holter monitoring
   i. Nuclear medicine images
   j. 6-minute walk test
   k. Cardiopulmonary exercise testing
   l. Cardiac magnetic resonance imaging
   m. Coronary angiography
   n. Pulmonary artery catheter
   o. I do not count with...(please enter the corresponding letter) but the test can be rapidly performed in another center.
8. Regarding the different types of therapeutic procedures that patients with heart failure may require, your center/clinic offers
   a. Bolus infusion of furosemide
   b. Continuous infusion of furosemide
   c. Ambulatory inotrope infusion
   d. Hypertonic saline administration

    e. Dialysis/ultrafiltration
    f. Intravenous iron administration
    g. Percutaneous coronary intervention
    h. Heart surgery
    i. Pacemaker/cardiac resynchronization therapy/implantable cardioverter defibrillator
    j. Transcatheter aortic valve implantation/mitraclip
    k. Mechanical circulatory assistance device
    l. Heart transplantation
    m. I do not count with...(please enter the corresponding letter) but the procedure can be rapidly performed in another center.

9. Please, indicate if any of the following consultants are available in your center/office
    a. Hematologist
    b. Nefrologist
    c. Pulmonologist
    d. Diabetologist
    e. Other: please, indicate

The following questions are related with your population of heart failure patients

1. On average, how many heart failure patients do you see per week in your outpatient practice?
    Numeric field
2. On average, how many patients hospitalized for heart failure do you see per week?
    Numeric field

Of your patient population with heart failure, please describe the approximate proportion of the following co-morbidities:
Anemia: ___%
Iron deficiency: ___%
Diabetes:___%
Chronic kidney failure with creatinine clearance < 60 mL/min/m2 or creatinine levels > 1.5 mg/dL: ___%

3. Proportion of heart failure patients in each age range
    a. < 50 years; 50-70 years; >70 years
4. Of your total heart failure patient population, which proportion of patients have an ejection fraction <40%?
5. Distribution of patients by etiology
    a. Ischemic cardiomyopathy
    b. Hypertensive cardiomyopathy
    c. Valvular heart disease
    d. Undetermined
    e. Other
6. Please, indicate the proportion of your patients by medical coverage
    a. Provincial social security
    b. National social security system (PAMI; Incluir Salud)
    c. Prepaid medical inssurance
    d. Without medical coverage

The following survey does not have a correct answer; the aim of the survey is to know your opinion of the management the heart failure patients in the outpatient and inpatient settings.

Management of HF patients in the office (outpatient setting)
In your daily clinical practice in your office, which of the following signs and symptoms do you consider for the diagnosis of heart failure (please check all that you consider appropriate)
    a) Jugular venous pressure > 8 cm
    b) Fatigue
    c) Memory loss
    d) Cardiac murmur
    e) Nicturia

f) Orthopnea
g)   Palpitations
h) Paroxysmal nocturnal dyspnea
i) Pulmonary rales
j) Reduced exercise tolerance
k) Sputum
l) Tachycardia
m) Third heart sound
n) Ankle swelling
o) Abdominal bloating

Based on signs and symptoms you suspect that your patient has heart failure. Do you perform any complementary tests to confirm this diagnosis?
I do not perform any complementary tests; the presence of signs and symptoms consistent with heart failure, the patient's history and comorbidities are enough for the diagnosis.
Chest X-ray
 Electrocardiogram
Lipid panel and glycemia
Laboratory tests to evaluate renal function and electrolytes
Liver panel
Thyroid panel
Echocardiography
Natriuretic peptides
Spirometry
 Coronary angiography
Computed tomography coronary angiography

1. How relevant do you consider the determination of functional class in your patient with a diagnosis of heart failure? On the following scale, please check a value between 1 and 5, where 1 is "not relevant at all" and 5 is "absolutely essential" 1 - 2 - 3 - 3 - 4 - 5
2. How relevant do you consider the determination of ejection fraction in your patient with a diagnosis of heart failure? On the following scale, please check a value between 1 and 5, where 1 is "not relevant at all" and 5 is "absolutely essential" 1 - 2 - 3 - 3 - 4 - 5
3. How relevant do you consider the determination of etiology of the heart disease in your patient with a diagnosis of heart failure? On the following scale, please check a value between 1 and 5, where 1 is "not relevant at all" and 5 is "absolutely essential" 1 - 2 - 3 - 3 - 4 - 5
4. How relevant do you consider the determination of renal function (BUN, creatinine level, creatinine clearance) in your patient with a diagnosis of heart failure? On the following scale, please check a value between 1 and 5, where 1 is "not relevant at all" and 5 is "absolutely essential" 1 - 2 - 3 - 3 - 4 - 5
5. How relevant do you consider the determination of iron deficiency with or without anemia in your patient with a diagnosis of heart failure? On the following scale, please check a value between 1 and 5, where 1 is "not relevant at all" and 5 is "absolutely essential" 1 - 2 - 3 - 3 - 4 - 5
6. How certain/confident do you feel about your diagnosis of heart failure in the setting of a patient with several comorbidities. On the following scale, please check a value between 1 and 5, where 1 is "not confident at all in the diagnosis" and 5 is "absolutely confident with my diagnosis" 1 - 2 - 3 - 3 - 4 - 5
7. How certain/confident do you feel about your diagnosis of heart failure with reduced ejection fraction. On the following scale, please check a value between 1 and 5, where 1 is "not confident at all in the diagnosis" and 5 is "absolutely confident with my diagnosis" 1 - 2 - 3 - 3 - 4 - 5
8. How certain/confident do you feel about your diagnosis of heart failure with preserved ejection fraction. On the following scale, please check a value between 1 and 5, where 1 is "not confident at all in the diagnosis" and 5 is "absolutely confident with my diagnosis" 1 - 2 - 3 - 3 - 4 - 5
9. How certain/confident do you feel about identifying atrial fibrillation. On the following scale, please check a value between 1 and 5, where 1 is "not confident at all in the diagnosis" and 5 is "absolutely confident with my diagnosis" 1 - 2 - 3 - 3 - 4 - 5
10. How certain/confident do you feel about identifying left bundle branch block. On the following scale, please check a value between 1 and 5, where 1 is "not confident at all in the diagnosis" and 5 is "absolutely confident with my diagnosis" 1 - 2 - 3 - 3 - 4 - 5
11. Please indicate which drugs you prioritize when initiating treatment of a patient with reduced ejection fraction (you can check more than one option)

    a. Beta blockers
    b. SGLT2 inhibitors
    c. Mineralocorticoid receptor antoagonists
    d. ACE inhibitors/ARBs
    e. Sacubitril/valsartan
    f. None of the above

12. Describe with a number, the time elapsed from treatment initiation to the next visit: ___days; ___months

13. After initiating treatment for heart failure, when do you monitor laboratory tests? ___days; ___months; ___years

14. After initiating treatment for heart failure, when do you monitor echocardiography? ___days; ___months; ___years

15. How relevant do you consider consultation with other specialists in your patient with a diagnosis of heart failure? On the following scale, please check a value between 1 and 5, where 1 is "not relevant at all" and 5 is "absolutely essential" 1 - 2 - 3 - 3 - 4 - 5

16. Describe with a number the time elapsed until a patient with heart failure and reduced ejection fraction reaches full treatment with quadruple therapy (quadruple therapy refers to beta-blockers; SGLT2 inhibitors; mineralocorticoid receptor antagonists; ACE inhibitors/ARBs/ARNIs)
    a. at any dose: ___days; ___months; ___years
    b. at least 50% dose: ___days; ___months; ___years
    c. with target dose: ___days; ___months; ___years
    d. I do not reach quadruple therapy

17. How certain/confident do you feel about identifying patients requiring an implantable cardioverter defibrillator? On the following scale, please check a value between 1 and 5, where 1 is "not confident at all" and 5 is "absolutely confident" 1 - 2 - 3 - 3 - 4 - 5

18. How certain/confident do you feel about identifying patients requiring cardiac resynchronization therapy? On the following scale, please check a value between 1 and 5, where 1 is "not confident at all" and 5 is "absolutely confident" 1 - 2 - 3 - 3 - 4 - 5

19. How certain/confident do you feel about identifying patients heart transplantation? On the following scale, please check a value between 1 and 5, where 1 is "not confident at all" and 5 is "absolutely confident" 1 - 2 - 3 - 3 - 4 - 5

20. How certain/confident do you feel about identifying patients who may benefit from cardiac rehabilitation? On the following scale, please check a value between 1 and 5, where 1 is "not confident at all" and 5 is "absolutely confident" 1 - 2 - 3 - 3 - 4 - 5

Management of hospitalized HF patients (inpatient setting, hospital day-case unit)

Do you see patients hospitalized for HF:
Yes (go on with the survey) / No (end the survey)

1. In your daily clinical practice with hospitalized patients, which of the following signs and symptoms do you consider for the diagnosis of heart failure (please check all that you consider appropriate)
    a. Jugular venous pressure > 8 cm
    b. Fatigue
    c. Memory loss
    d. Cardiac murmur
    e. Nicturia
    f. Orthopnea
    g. Palpitations
    h. Paroxysmal nocturnal dyspnea
    i. Pulmonary rales
    j. Reduced exercise tolerance
    k. Sputum
    l. Tachycardia
    m. Third heart sound

2. Based on signs and symptoms you suspect that your patient has heart failure. Do you perform any complementary test to confirm this diagnosis?
    a. I do not perform any complementary tests; the presence of signs and symptoms consistent with heart failure, the patient's history and comorbidities are enough for the diagnosis.
    b. Chest X-ray

    c. Electrocardiogram
    d. Lipid panel and glycemia
    e. Laboratory tests to evaluate renal function and electrolytes
    f. Liver panel
    g. Thyroid panel
    h. Echocardiography
    i. Natriuretic peptides
    j. Spirometry
    k. Coronary angiography
    l. Computed tomography coronary angiography

3. How relevant do you consider finding the decompensating factor that caused acute heart failure and led to patient's hospitalization? On the following scale, please check a value between 1 and 5, where 1 is "not relevant at all" and 5 is "absolutely essential" 1 - 2 - 3 - 3 - 4 - 5

4. Check the method(s) you consider appropriate to follow up a patient hospitalized for heart failure.
    a. Physical examination and vital signs
    b. Weight
    c. Renal function and electrolytes
    d. Diuresis output

5. Check the method(s) you consider appropriate to assess congestion in a patient hospitalized for heart failure to define hospital discharge.
    a. Physical examination
    b. Functional class
    c. Echocardiography
    d. Lung ultrasound (comets)
    e. Biomarkers
    f. Weight loss

6. How relevant do you consider hypertonic saline administration in a patient hospitalized for heart failure? On the following scale, please check a value between 1 and 5, where 1 is "not relevant at all" and 5 is "absolutely essential" 1 - 2 - 3 - 3 - 4 - 5

7. How relevant do you consider intravenous iron administration in a patient hospitalized for heart failure? On the following scale, please check a value between 1 and 5, where 1 is "not relevant at all" and 5 is "absolutely essential" 1 - 2 - 3 - 3 - 4 - 5

8. Please check the drug treatment adjustments you make before discharge
    a. Titration of drugs recommended in clinical practice guidelines for the treatment of heart failure.
    b. I add drugs
    c. I reduce drug dose
    d. I prefer to modify drug regimens during outpatient visits

9. Please check the recommendations you give upon discharge.
    a. Dietary sodium restriction
    b. Physical activity
    c. Fluid restriction
    d. Daily weight control
    e. Signs of alarm
    f. Flexible diuretic dosing regimen

10. Please indicate which drugs you prioritize when you discharge a patient with reduced ejection fraction (you can check more than one option)
    a. Beta blockers
    b. SGLT2 inhibitors
    c. Mineralocorticoid receptor antoagonists
    d. ACE inhibitors/ARBs
    e. Sacubitril/valsartan
    f. None of the above

11. Do you have a specific discharge checklist for patients hospitalized for heart failure? Yes/No

12. How relevant do you consider providing general written instructions at the time of hospital discharge? On the following scale, please check a value between 1 and 5, where 1 is "not relevant at all" and 5 is "absolutely essential" 1 - 2 - 3 - 3 - 4 - 5

13. When do you schedule outpatient follow-up appointment after hospital discharge:___days; ___months
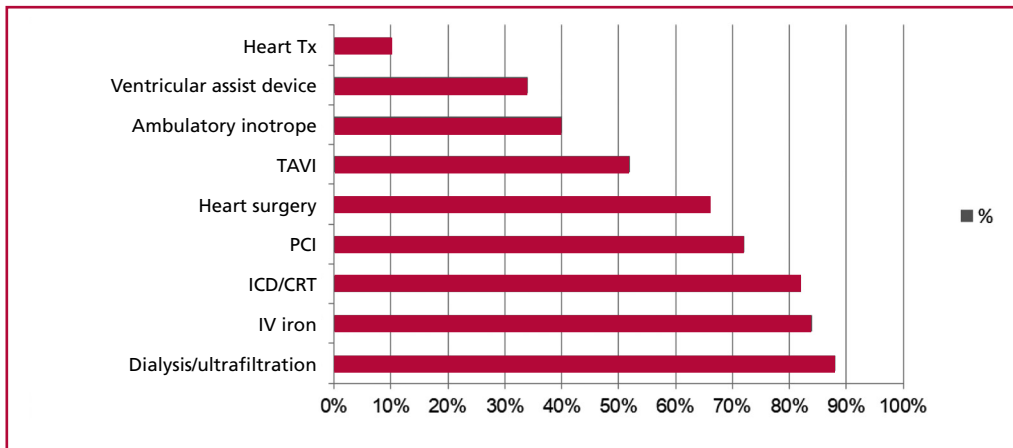
TX: transplantation; TAVI: transcatheter aortic valve implantation; PCI: percutaneous coronary intervention ICD: implantable cardioverter defibrillator. CRT: cardiac resynchronization therapy. IV: intravenous

Fig. 1. Treatments available in the centers