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Clinical Profile of a Cohort of Heart Failure Patients in Girardot, Colombia

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ABSTRACT

Introduction: Heart failure (HF) stands as the leading cause of hospitalization within cardiovascular diseases and represents a substantial economic burden on the healthcare system. In Colombia, its prevalence is high and escalating. Further information is needed to characterize the signs and symptoms of HF patients, particularly those with preserved and intermediate left ventricular ejection fraction (LVEF). This study aims to delineate the clinical and paraclinical profile of HF patients in an intermediate city of Colombia.

Methods: Observational cross-sectional study using data from medical records of HF patients treated between July 2018 and December 2019 at a hospital in Girardot, Colombia.

Results: 208 patients met inclusion criteria, with 63% being male. The median age ranged from 70 to 79 years. Among them, 82% exhibited preserved or intermediate LVEF. The most common etiology was arterial hypertension (76%), and the most frequently prescribed medications were beta-blockers.

Conclusions: This study discusses the clinical and paraclinical profile in the context of global literature and, predominantly, Latin American literature. It highlights key aspects for the prevention and enhancement of clinical and preventive management of HF, with particular emphasis on the phenotype of preserved and intermediate LVEF.

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ARTÍCULO ORIGINAL

Perfil clínico de una cohorte de pacientes con insuficiencia cardiaca en Girardot, Colombia

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INFORMACIÓN ARTÍCULO

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RESUMEN

Introducción: la insuficiencia cardiaca (IC) constituye la principal causa de hospitalización en las enfermedades cardiovasculares y la mayor carga económica al sistema de salud. En Colombia su prevalencia es alta y creciente. Se requiere más información para caracterizar los signos y síntomas de los pacientes con IC, en especial con fracción de eyección ventricular izquierda (FEVI) preservada e intermedia. El presente estudio describe el perfil clínico y paraclínico de los pacientes con IC en una ciudad intermedia de Colombia.

Métodos: estudio observacional de corte transversal que emplea información de las historias clínicas de pacientes con IC atendidos entre julio de 2018 y diciembre de 2019 en un hospital de Girardot (Colombia).

Resultados: 208 pacientes cumplieron criterios de inclusión, el 63% de ellos son de sexo masculino, la mediana de edad es de 70 a 79 años. El 82% tenía la FEVI preservada o intermedia. La etiología más frecuente fue hipertensión arterial (76%); los medicamentos más usados fueron betabloqueadores.

Conclusiones: se discute el perfil clínico y paraclínico, con base en la literatura mundial y, sobre todo, latinoamericana, y se presentan aspectos fundamentales para la prevención y optimización del manejo clínico y preventivo de la IC, con énfasis en el fenotipo de FEVI preservada e intermedia.

INTRODUCTION

Heart failure (HF) is a multifactorial clinical syndrome in which the heart fails to adequately adapt cardiac output to the body's metabolic demands. It is estimated that there are more than six million patients with a diagnosis of HF in Latin America, with an approximate prevalence of 2.6% (1). In Colombia, the prevalence is similar, with a record of more than one million patients with this diagnosis (2). In recent years, there has been an approximate increase of 121% in admissions to the emergency department for decompensated HF, leading to increased healthcare costs (3).

The most commonly used clinical classification for HF is the one proposed by the New York Heart Association (NYHA), which stratifies severity into four categories based on the patient's physical capacity and the presence of cardiovascular symptoms (4). When combined with the American Heart Association/American College of Cardiology (AHA/ACC) scale from 2001, HF is divided into four stages: Stage A includes patients with risk factors for HF, who are asymptomatic and do not have cardiac damage; Stage B comprises asymptomatic patients with signs of structural cardiac damage; Stage C includes patients with cardiac damage and symptoms, while Stage D represents the terminal phase in which patients do not respond to medical therapy (5). This staging, whether using ACC/AHA or NYHA criteria, helps identify individuals at risk of developing HF based on their associated morbidities and emphasizes the importance of prevention and early detection to prevent progression to symptomatic stages.

However, HF can mimic other conditions, making early diagnosis challenging. In the early stages of the disease, patients may be asymptomatic, complicating early diagnosis. Clinical practice in cardiology often encounters diagnostic paradoxes related to HF presentation. Traditionally, academia teaches that the disease manifests with dyspnea, lower limb edema, and almost invariably, significant morphological and functional cardiac changes such as cardiomegaly on chest X-ray and echocardiogram, reduced left ventricular ejection fraction (LVEF), left ventricular or atrial dilation, ventricular hypertrophy, among others. However, patients frequently go to cardiology clinics referred by primary care physicians or other specialties to identify the cause of dyspnea. Cardiological assessment, including normal X-ray reports and echocardiograms without significant structural changes or reduced LVEF, is performed. Subsequently, the dyspnea in these patients is evaluated by various specialties, such as pulmonology, without finding functional abnormalities that explain it. In conclusion, valuable time is lost without a definitive diagnosis and, therefore, appropriate symptom management. Among the patients at higher risk of experiencing these situations are those with preserved or intermediate LVEF.

At this point, recent guidelines such as those from the European Society of Cardiology (ESC) have established criteria for assessing dyspnea in these patients with the aim of defining the probability of HF with preserved ejection fraction (HFpEF). Some of these criteria involve alterations in structural and functional echocardiographic parameters such as peak early diastolic mitral annular velocity (e'), the E/e' ratio, tricuspid regurgitation velocity, indexed left atrial volume, and indexed left ventricular mass, among others (6). One of the existing methods for assessing the probability that dyspnea is caused by these abnormalities is the H2FPEF Score, which uses six clinical and echocardiographic variables (obesity, hypertension, atrial fibrillation, pulmonary hypertension, age, and filling pressure) to calculate a score ranging from 0 to 9, allowing the classification of these patients into low, moderate, or high probability of HFpEF (7). However, one limitation of this score is the absence of the evaluation of natriuretic peptides and other echocardiographic parameters, which have been shown to help clarify the diagnosis of patients with preserved ejection fraction.

Therefore, recent classifications incorporate concepts beyond the "classic" HF and introduce the concepts of HF with preserved ejection fraction (in patients whose hearts show minimal structural changes) and HF with intermediate ejection fraction (hearts with minor structural changes). This

"gray area" of intermediate ejection fraction remains under discussion: The Guidelines for the Management of Acute and Chronic HF published in 2021 (8) suggest referring to it as "heart failure with mildly reduced ejection fraction" and indicate that treatment may have similar benefits to patients with reduced ejection fraction. In this work, we will continue to refer to this condition as HF with intermediate ejection fraction.

Given this context, it is essential to identify the clinical profile of these patients and particularly consider them in the outpatient setting, where they are more likely to seek care, achieve early disease detection, guide ancillary tests, and accurately classify the patient for initial management, especially in a resource-limited environment.

Furthermore, to guide the therapy and prognosis of these patients with HFpEF and intermediate ejection fraction, phenotypes or phenogroups have been recently proposed (9). Individuals in Phenogroup 1 are characterized by being younger, having a higher prevalence of cigarette smoking, preserved functional class, and less evidence of left ventricular hypertrophy and arterial stiffness. Phenogroup 2 individuals exhibit characteristics of high adrenergic load, left atrial enlargement, concentric remodeling, increased arterial stiffness and vascular resistance, and are more common in older women, among other traits. In this group of patients, the use of adrenergic beta-blockers (e.g., carvedilol and metoprolol, both tartrate and succinate) has been found to be more beneficial. Patients in Phenogroup 3 present features of metabolic dysfunction: obesity, liver abnormalities such as steatosis or fibrosis, dysglycemia, dyslipidemia, concentric hypertrophy, mineralocorticoid alteration with or without renal dysfunction. In therapy, they respond well to the use of mineralocorticoid diuretics such as spironolactone.

Based on the above, the present study aimed to describe and analyze the clinical and paraclinical behavior of patients with HF in an intermediate-sized city in Colombia. The study was conducted at the Society of Specialists of Girardot (SSG), a medium-complexity healthcare institution located in Girardot, Cundinamarca, Colombia. It serves patients from urban and rural areas of Cundinamarca and Tolima in the Magdalena River valley, where cities and towns are located at altitudes ranging from 100 to 800 meters above sea level with an average temperature of 27°C and humidity of at least 70% throughout the year. It is important to mention that in 2016, the SSG recorded 104 cases of HF, predominantly acute decompensation, as evidenced by the most requested services for these patients being emergencies (31%) and hospitalization (42%). Until that time, SSG had only one cardiologist; but in 2017, a new one was incorporated, and technological improvements were made with modern diagnostic equipment. This led to an increase in patient care to 220 cases in 2018 and 2020 and 364 cases in 2019. This growth can be attributed to improved record-keeping, active patient searching, and early disease detection. Additionally, adjustments were made in medical treatment, and stricter follow-up was implemented, as evidenced by the gradual reduction in the percentages of emergency department admissions and hospitalizations over the past three years: outpatient care accounting for 76%, emergency admissions below 15%, and hospitalizations not exceeding 12%.

In this regard, the present study aims to characterize the population with HF presenting to SSG, with the purpose of further adjusting healthcare capacity, early disease detection, alignment with evidence-based care guidelines, reducing hospitalizations, and, above all, improving the care and prognosis of our patients.

PATIENTS AND METHODS

An observational cross-sectional study was conducted using information obtained from the medical records of patients diagnosed with heart failure (HF) who attended outpatient consultations at SSG between July 2018 and December 2019. Non-probabilistic convenience sampling was

employed. Inclusion criteria comprised patients of both sexes who attended the mentioned service during the specified period and were registered in the E-health system, version 4.05, with a diagnosis of HF. Data analysis was performed using the statistical program SPSS version 26, and frequencies and percentages were calculated for qualitative variables, while measures of central tendency and dispersion were obtained for quantitative variables. Bivariate analysis was conducted based on sex and left ventricular ejection fraction (LVEF) was categorized as preserved, intermediate, or reduced following the recommendations of Ponikowski et al. (5). The relationship between New York Heart Association (NYHA) functional class and signs and symptoms, medications used, findings on electrocardiogram (ECG), and plain chest X-ray results was also analyzed. Since not all clinical variables were reported for some patients, subgroup analyses were performed for those with recorded data. These subgroups were related to their NYHA functional class as follows: 1) with signs and symptoms in 108 patients; 2) with medications used in 108 patients; 3) with findings on the electrocardiogram in 77 patients; 4) with plain chest X-ray findings in 14 patients. This article provides a description of 135 patients with an estimation of the probability of HF using the H2FPEF Score and how they relate to diastolic function variables assessed by echocardiography. Percentages are reported without decimals.

RESULTS

Among 208 patients, 63% were male. Figure 1 shows that 94% were aged between 50 and 90 years, with a peak in patients aged 70 to 79. The percentage of women increased from age 30, reaching its maximum between 70 and 79 years. Out of 138 patients with a reported NYHA functional class, 2% were in Class I, 54% in Class II, 41% in Class III, and 4% in class IV. Among these 138, 123 had reported LVEF: 32% with preserved LVEF, 48% with intermediate LVEF, and 20% with reduced LVEF. Patients without a reported LVEF were included in the study based on a prior HF diagnosis without this detail specified in their medical records.

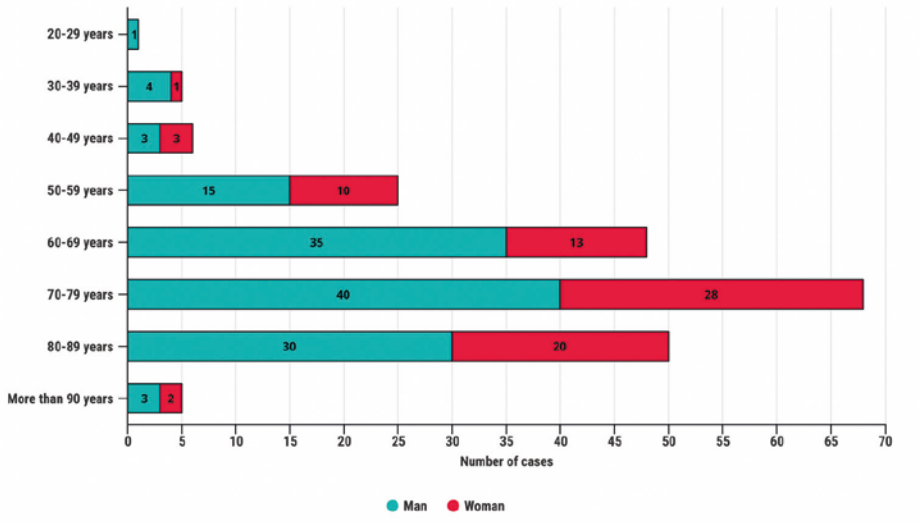

Figure 1. Age and gender frequency in patients of SSG, July 2018 to December 2019. HF is a disease affecting both sexes and all age groups**.**

Source: Authors' own elaboration.

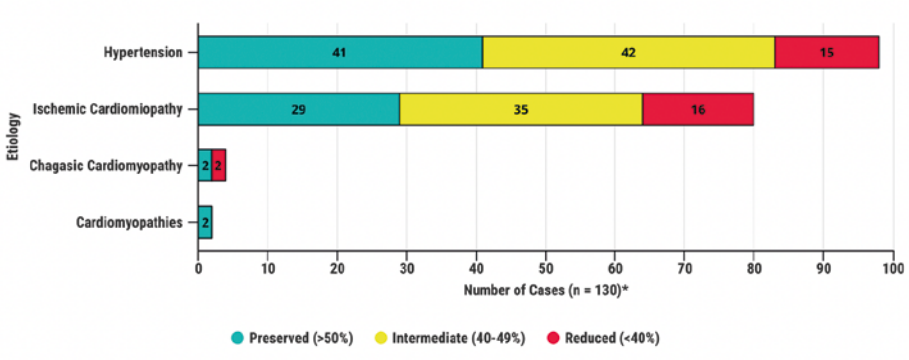

Figure 2. Etiology of HF according to LVEF. Hypertension and ischemia should be prevented and controlled from an early age.

Source: Authors' own elaboration.

In Figure 2, etiologies of HF in patients classified by LVEF are presented. Among these 130 patients, 75% had hypertension (42% with preserved LVEF, 43% intermediate, and 15% reduced), and 62% had ischemic heart disease (36% with preserved LVEF, 44% intermediate, and 20% reduced). Chagas cardiopathy was the next etiological group, with 4 patients (2 with reduced and 2 with preserved LVEF).

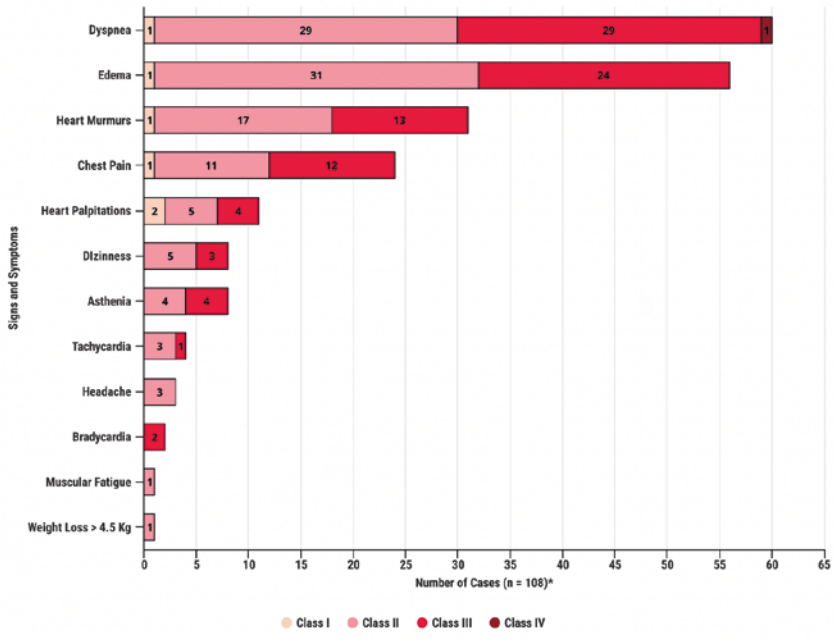

Figure 3. Signs and symptoms related to NYHA functional class. HF is a great mimicker.

Source: Authors' own elaboration.

Figure 3 shows that of the 108 patients with reported signs and symptoms, 56% experienced dyspnea (48% NYHA II, 48% NYHA III, 2% NYHA IV), 52% edema (55% NYHA II, 43% NYHA III), 29% cardiac murmurs (55% NYHA II, 42% NYHA III), and 22% chest pain (46% NYHA II, 50% NYHA III).

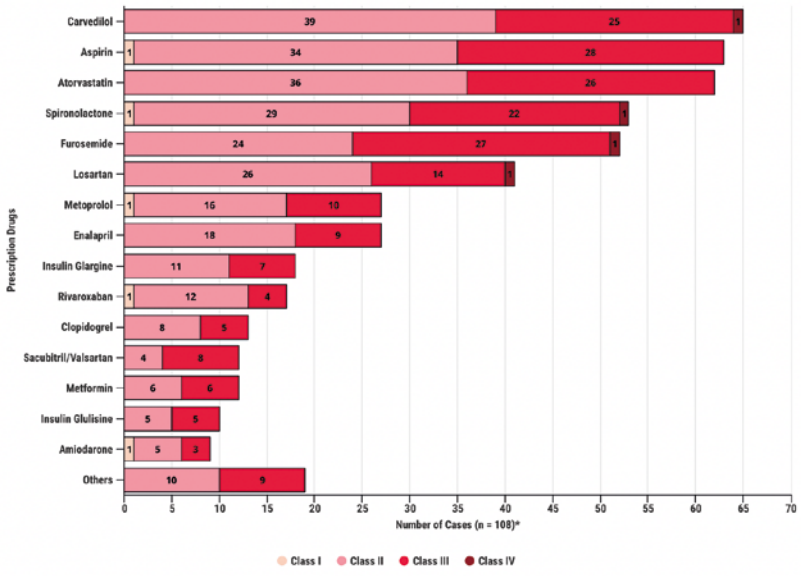

Figure 4. Medications used in patients according to their NYHA functional class. "Other" includes patients receiving ticagrelor, sitagliptin, lovastatin, empagliflozin, apixaban, warfarin, ezetimibe, gemfibrozil, rosuvastatin, dapagliflozin or vildagliptin. *: Number of cases attended in outpatient visit with recorded LVEF.

Source: Authors' own elaboration

Figure 4 highlights that the most commonly used medications in patients, based on their NYHA functional class, are carvedilol (60%), acetylsalicylic acid (58%), and atorvastatin (57%), predominantly in NYHA Class II and to a lesser extent in Class III. Following these are two diuretics: spironolactone (49%) and furosemide (48%), with usage distributed as 55% in NYHA II and 42% in NYHA III for spironolactone, and 46% in NYHA II and 52% in NYHA III for furosemide. Losartan (38%) and metoprolol (25%) are next in decreasing order of use, with losartan more common in NYHA II (63%) and III (34%), and metoprolol similarly used in NYHA II and III. In this subgroup, enalapril is consumed exclusively by NYHA II and III patients, in a proportion similar to metoprolol. Among diabetes medications, insulin glargine is prescribed to 17% of patients, metformin to 11%, and insulin glulisine to 9%. The most used anticoagulant is rivaroxaban (16%), mostly in NYHA II. Clopidogrel is used by 12% of patients; sacubitril/valsartan by 11% (mostly NYHA III), and amiodarone by 8%. Lastly, within the 'Other' category, only 3 patients were taking SGLT2 inhibitors: empagliflozin in two patients (one NYHA II, the other NYHA III) and dapagliflozin in one patient (NYHA III).

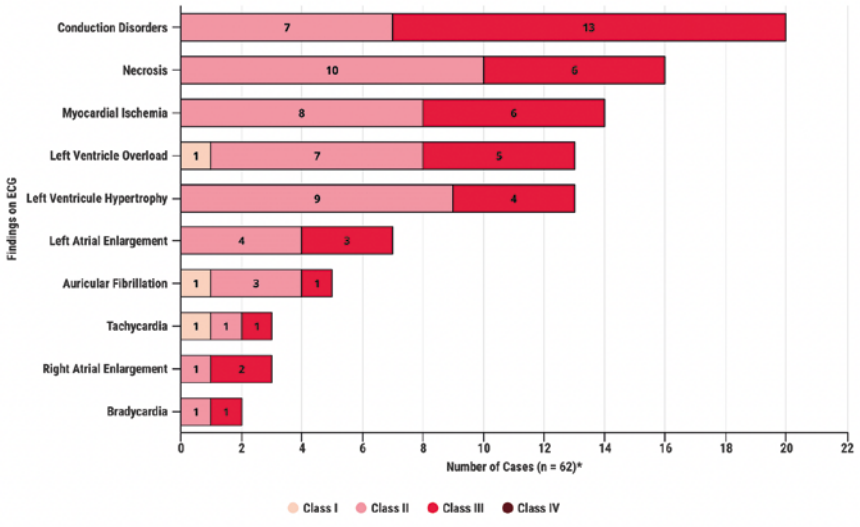

Figure 5. Electrocardiographic findings according to NYHA functional class. We must care for the coronary arteries. *****: Number of cases attended in outpatient visit with both electrocardiographic findings and NYHA classification recorded.

Source: Authors' own elaboration

In the database, 62 patients had reported NYHA class and electrocardiographic data. Of these, 87% had sinus rhythm, 5% pacemaker rhythm, and 8% atrial fibrillation. Figure 5 shows other abnormal electrocardiographic findings. Among these 62 patients, 32% had conduction disorders (including first-degree atrioventricular block, left and right bundle branch blocks), 26% necrosis, 23% ischemia, 21% signs of left ventricular overload, and 21% left ventricular hypertrophy, mostly reported in NYHA II and III patients.

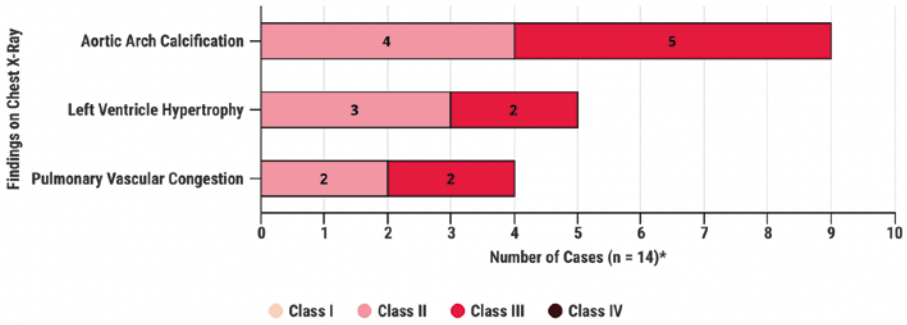

Figure 6. Radiological findings according to NYHA functional class. We should pay more attention to chest radiography. *: Number of cases attended in outpatient visit with both chest X-ray and NYHA classification recorded.

Source: Authors' own elaboration

Of the 14 radiological studies reported for NYHA II and III patients (Figure 6), common findings were aortic arch calcification (64%), left ventricular hypertrophy (36%), and pulmonary vascular congestion (29%).

Table 1. Echocardiographic Measurements of Diastolic Parameters and Estimation of Probability of Heart Failure with Preserved Left Ventricular Ejection Fraction (HFpEF)

	Probability of Heart Failure According to H2FPEF Score		
Diastolic Function Variable	**LOW (n = 22)**	**INTERMEDIATE (n = 107)**	**HIGH (n = 6)**
E wave (cm/s)			
n = 92	18	72	2
Median (IQR)	66 (56 - 79)	63 (52 – 80.5)	84 (48 - 120)
A wave (cm/s)			
n = 92	18	72	2
Median (IQR)	73.5 (54 - 95)	81 (65.5 - 97)	88.5 (82 - 95)
E/A Ratio			
n = 92	18	72	2
Median (IQR)	0.7 (0.66 – 1.66)	0.69 (0.62 – 0.88)	1 (0.52 – 1.48)
Lateral e' (cm)			
n = 43	4	37	2
Median (IQR)	7.25 (5.05 – 8.65)	5.7 (5 – 6.4)	5,85 (4.6 – 7.1)
E/e' Ratio			
n = 43	4	37	2
Mediana (IQR)	8.8 (7.65 – 12.65)	10.6 (9.2 – 12.3)	13.65 (10.4 – 16.9)
Left Atrial Area Index (cm^2)			
n = 94	18	73	3
Normal	3	7	0
Dilated	15	66	3
Pulmonary Artery Systolic Pressure (PASP) (mmHg)			
n = 45	4	38	3
Median (IQR)	30 (20 - 40)	25 (21 - 32)	43 (36 - 55)
Gradient Pressure (GP) (mmHg)			
n = 91	18	70	3
Median (IQR)	3.55 (2.55 – 4.13)	3.3 (2.65 – 4.5)	4.42 (3.63 – 5.9)
Total Pulmonary Resistance			
n = 17	1	15	1
Median (IQR)	57	83 (65 - 93)	86
Left Ventricular Diastolic Time (ms)			
n = 18	1	16	1
Median (IQR)	145	255 (231.5 - 307)	295

Source: own elaboration.

Table 1 presents diastolic measurements and estimates of low, intermediate, or diagnostic probability of HF with preserved LVEF. All patients with HF with intermediate and preserved LVEF met the ESC Clinical Practice Guidelines criteria for structural or functional cardiac alterations (concentric or eccentric ventricular remodeling/hypertrophy, left ventricular dilation, contractile alterations), dilated left atrium, or diastolic dysfunction (prolonged relaxation, pseudonormal pattern, restrictive pattern, evaluated by transmitral flow, tissue Doppler, pulmonary vein Doppler, etc.). Additionally,

supplementary Table 1S reports the characteristics of patients classified into low, intermediate, or high probability groups of HF with preserved LVEF, according to the H2FPEF Score.

DISCUSSION

Heart failure (HF) represents a convergence point for multiple cardiovascular diseases and stands as a significant public health issue, being the leading cause of hospitalization within this category and imposing the greatest economic burden on the healthcare system (10). In this study, we obtained a sample of 208 patients, which we consider to be adequate for Girardot, especially for drawing conclusions when compared to similar studies. For instance, a study conducted in Bucaramanga (11), located in northeastern Colombia, involved 218 patients (a city with five times the population of Girardot), and another study in Bogotá (12) included 550 patients (a city with around 80 times more inhabitants than Girardot).

Figure 1 highlights a typical increase in heart failure (HF) diagnosis with advancing age, with the incidence approximately doubling with each passing decade. This trend is accompanied by a growing prevalence of HF in women, which is attributed to the effects of postmenopausal hormonal changes on the cardiovascular system (10). The study's findings align with those of Anguita et al. (13), indicating that the onset age of HF is rising, with a significant proportion of hospital admissions in the past 40 years comprising patients over 70. These observations emphasize age as a critical predictive factor for patient prognosis.

Regarding the etiology of heart failure (HF), as illustrated in Figure 2, our study aligns with Arcos et al. (3) and Ospina et al. (11), indicating that hypertension and ischemic heart disease are the primary causes of HF in the general population. This finding is also consistent with the background provided by Calvachi et al. (12), Saldarriaga et al. (14), and Segovia et al. (15), who identify hypertension and comorbidities such as type 2 diabetes mellitus as associated risk factors for HF.

In general, patients in our study with preserved left ventricular ejection fraction (LVEF) tend to be older, have a higher proportion of females, and present with obesity, hypertension, and diabetes mellitus compared to those with reduced LVEF. The highest prevalence in our study was seen in HF with intermediate and preserved LVEF, in line with findings in other HF review series (16-17). This finding, expected given our focus on outpatient clients, relates to the phenogroups described in the introduction (9), showing a significant population in phenogroup 2, mostly in NYHA functional class I and II, with AHA/ACC clinical stage C. This can be attributed to an increase in comorbidities associated with the development of diastolic dysfunction, such as myocardial hypertrophy secondary to pressure overload in arterial hypertension and increased longevity in the elderly population. It is crucial to identify the predominant pattern in our population to integrate preventive, curative, and follow-up strategies that enable us to take action and change the prognosis of this disease. Additionally, we found individuals aged 20 to 30 with HF, emphasizing the need to consider it as a possible diagnosis at any age and gender.

It is important to note the presence of significant comorbidities in the observed case series. In the subgroup of patients with reported LVEF (n=169), 34% had diabetes mellitus, 24% had atrial fibrillation, 16% had chronic kidney disease, 16% had chronic obstructive pulmonary disease, and 12% had obesity. It is worth highlighting that these data align with those reported by the Colombian Heart Failure Registry (RECOLFACA) (18), underscoring the validity of our study and the importance of identifying and managing these comorbidities to address HF effectively.

As stated in the introduction, the signs and symptoms typically described for heart failure (HF) are not as specific as textbooks suggest; some are challenging to assess, and their reproducibility among clinicians is poor (5). It is noteworthy that for the most frequently reported signs and

symptoms (Figure 3), there are no differences in prevalence between patients in New York Heart Association (NYHA) functional Class II and III, indicating that they are not reliable on their own for patient classification. Naturally, a comprehensive clinical evaluation of HF patients should always be conducted, as signs and symptoms suggest the diagnosis and allow for monitoring treatment response. Figure 3 shows that the two most frequent symptoms are dyspnea (57%) and edema (51%), in accordance with literature reports (12, 14). These are common manifestations of pulmonary and systemic congestion, progressively worsening with functional class, and they are associated with other findings in our study, such as the high percentage of patients prescribed spironolactone and furosemide (Figure 4), as well as the fact that three of the four most frequent radiological findings are cardiomegaly, left ventricular hypertrophy, and pulmonary venous congestion (Figure 6). Additionally, cardiac murmurs rank third in the frequency of clinical findings (Figure 3). This is a common sign in patients with decompensated HF due to ventricular dilation, but our study also reveals a significant prevalence of valvular dysfunction (Supplementary Figure 1S).

Regarding pharmacological therapy, angiotensin-converting enzyme inhibitors (ACEIs) are commonly regarded as the leading treatment for HF due to their efficacy demonstrated in reducing mortality and hospitalizations, as stated in the ACC guidelines (19). Interestingly, our study found that carvedilol is the predominant drug used in patients in NYHA functional Class II (Figure 4). This can be explained by the comorbidity of arterial hypertension and ischemic heart disease, which would lead to the recommendation of using an antihypertensive with heart rate modulation and anti-anginal effects. When contrasting this finding with the electrocardiographic signs presented in our patients (Figure 5), in which only two cases of sinus bradycardia were evident, we can conclude that its use is safe although, unfortunately, there are no recommendations to use beta-blockers with a strong level of evidence for patients with HF with preserved ejection fraction (20). Nevertheless, the use of these drugs has been evolving since the SENIORS clinical trial, where nebivolol showed a 15% reduction in relative risk of all-cause mortality (21). Another impactful study, involving over 40,000 patients, analyzed the use of beta-blockers in patients with preserved ejection fraction using the Swedish Heart Failure Registry (22). It observed an increase in functional capacity, improvement in echocardiographic parameters, natriuretic peptide levels, and a reduction in all-cause mortality in beta-blocked patients. Our results also align with the Impact HF study, in which stable hospitalized patients initiated carvedilol treatment, leading to increased use of beta-blockers at 60 days after discharge with improved outcomes, including sudden death (23). Based on these findings, it is highly likely that we will soon see recommendations for their use in patients with HF and preserved ejection fraction.

The results show that other frequently used medications in our case series are acetylsalicylic acid (ASA) and atorvastatin (Figure 4), which can be attributed to the comorbidities presented by our patients, particularly ischemic disease, as these medications stabilize atherosclerotic plaques and indirectly reduce ischemia. Our use of ASA partially aligns with another South American study, where the most recommended medications after hospital discharge were, in order, ACEIs, diuretics, digoxin, and ASA (24). As additional information, the use of sacubitril/valsartan, a neprilysin inhibitor and angiotensin receptor blocker (known as ARNI), was infrequent, as the patient group with an indication is those with reduced ejection fraction and it was the smallest, accounting for only 19%. Furthermore, at the time of sampling, the approved indication was related to poor response to ACEIs and ARBs, and the prescription of the drug had to be accompanied by administrative procedures that could affect its formulation and delivery.

Regarding electrocardiographic findings, our results are similar to those of Arias et al. (25), who reported that 76% of patients had a sinus rhythm. We also agree on conduction patterns; the most frequent in the study mentioned was conduction disorder in 14 patients (28%), particularly

left bundle branch block. It is worth highlighting that medical literature suggests that suspicion of structural heart disease should be established in the presence of this alteration. Post-mortem studies have described an association between widespread damage and increased heart weight in patients with left bundle branch block (26). In our sample, the necrosis pattern predominated at 28%. There appears to be a clear association between some characteristics of these patients, such as dyspnea, the predominance of arterial hypertension and ischemic heart disease, and the observed electrocardiographic findings. However, we emphasize that asymptomatic patients without electrocardiographic abnormalities may exist; a normal ECG does not rule out the possibility of HF, and a comprehensive analysis of each case should be performed.

Regarding radiographic findings (Figure 6), aortic sclerosis was identified as the most frequent in the present study, which is expected given the age of the patients (27), as shown in Figure 1. It is also congruent that the second most frequent finding is left ventricular hypertrophy, in which systemic arterial hypertension was the most frequent etiology in the present study (Figure 2). Statistically significant correlations between radiological cardiomegaly grade II or higher (cardiothoracic ratio >0.56) and an increase in the thickness of the interventricular septum and the posterior wall of the left ventricle have been described in similar patients (28). However, cardiomegaly and increased septal thickness are better diagnosed with resonance or echocardiography. This allows us to highlight the utility of chest radiography as a screening method, thanks to its universality, relatively low cost, and availability: primary care physicians can identify, for example, radiological cardiomegaly as an important sign in asymptomatic patients in Class I and refer the patient to a more specialized level for further characterization and treatment.

Finally, regarding echocardiographic findings, transmitral flow with pulsed Doppler, tissue Doppler, E/e' ratio, and pulmonary vein flow were measured, allowing for the assessment of valvular sufficiency, possible atrial dilations based on area and indexed volume, and direction of blood flow, for example, to assess regurgitation velocity. As previously noted, at the time of this study, peptide testing was available but not routinely requested. Currently, given the recommendations of HF guidelines, peptide testing is routinely requested for diagnosis and patient monitoring with heart failure, regardless of the LVEF value, which has improved the ability to clarify that the patient's dyspnea has a cardiac origin. Echocardiography complements clinical diagnosis and findings from ECG and X-rays. With an updated perspective, the data obtained in the supplementary table of the probability of HF according to the H2FPEF Score allow us to conclude that most of our patients had intermediate probability. We could not assert that they had HF with preserved LVEF since we lacked data for a more certain diagnosis. It is clear that, according to current guidelines, patient classification based on probabilities complements studies to improve the diagnostic certainty of preserved LVEF HF in clinical practice.

In conclusion, this study analyzes various aspects that we believe should be taken into account to design a prevention strategy and optimize the clinical and preventive management of HF. We provide evidence that arterial hypertension and ischemic heart disease are the main causes of HF, that the use of beta-blockers can be recommended in these patients, and in general, that we must be aware that patients with preserved and intermediate LVEF exist, who should be studied and managed in detail in relation to the mentioned phenogroups.

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ETHICAL CONSIDERATIONS

For the elaboration of this article, no experimentation was conducted on patients. Clinical and paraclinical evaluations performed on patients strictly followed diagnostic or treatment protocols, and informed consent was obtained for each of them in accordance with Colombian law. The database constructed with patient information respects their privacy. The Committee for Clinical Research Ethics of the Clínica Sociedad de Especialistas de Girardot reviewed and approved the study, as per minutes number 03 dated July 16, 2021.

CONFLICT OF INTEREST

The authors declare that they have no conflicts of interest.

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