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COUGH AS THE FIRST SYMPTOM OF CHRONIC HEART FAILURE: A CASE REPORT OF A 72-YEAR-OLD WOMAN

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Abstract
Heart failure (HF) is defined as a clinical syndrome characterized by several key symptoms, which may be accompanied by physical signs. The prevalence of HF among adults in developed countries is approximately 1%–2%, and its frequency increases with age. HF is classified into three types: heart failure with preserved ejection fraction (HFpEF), heart failure with mildly reduced ejection fraction (HFmrEF), and heart failure with reduced ejection fraction (HFrEF). The aim of this paper is to present the subtle clinical manifestation and diagnostic process based on the case of a 72-year-old female patient. This is a case-based report. The research method involved the analysis of a clinical case, utilizing the patient's medical records and test results as the primary tools. The diagnostic techniques included a review of the patient's documentation and relevant literature. The first section outlines the pathophysiological basis, symptoms, classification, and treatment of heart failure. The diagnostic pathway of the patient is described, focusing on her initial presentation with mild cough without other clinical symptoms that could indicate the final diagnosis. Echocardiography is one of the key diagnostic methods in chronic heart failure, but chest X-ray imaging can provide valuable clues when determining the etiology of symptoms presented by patients in primary care settings.

Keywords: chronic heart failure, HF, HFrEF, cough, echocardiography

Introduction

Heart failure (HF) is defined as a clinical syndrome characterized by several primary symptoms, such as shortness of breath, ankle swelling, and fatigue. These symptoms may be accompanied by physical signs, including lung crackles and jugular vein distension, indicative of increased central venous pressure. HF results from structural and/or functional abnormalities of the heart, leading to elevated intracardiac pressures and/or insufficient cardiac output [1].

In developed countries, HF affects approximately 1%–2% of the adult population [2]. Its prevalence increases with age, with individuals under 55 years constituting 1% of cases, while those aged over 70 years account for up to 10% [3][4] . After a diagnosis of HF, patients are hospitalized on average once per year [5]. Hospitalization rates have risen more sharply among women, possibly due to a higher prevalence of comorbid conditions.

Patients with diabetes have a 1.5-fold increased risk of HF-related hospitalization compared to the general population. Strong predictors of HF hospitalization include atrial fibrillation (AF), a higher body mass index (BMI), elevated glycated hemoglobin levels (HbA1c), and reduced estimated glomerular filtration rate (eGFR) [6].

Given the aging population and the growing prevalence of comorbidities, the absolute number of HF-related hospitalizations is expected to increase significantly - potentially by as much as 50% over the next 25 years [7].

Heart failure is classified into three main categories:

- Heart failure with preserved ejection fraction (HFpEF),
- Heart failure with mildly reduced ejection fraction (HFmrEF), and
- Heart failure with reduced ejection fraction (HFrEF).

The key characteristics and differentiation between these HF types are summarized in Table 1. According to studies published in the *European Journal of Heart Failure*, HFrEF is the most common form, accounting for 60% of cases in outpatient populations, followed by HFmrEF at 24%, and HFpEF at 16% [8].

Type of Heart Failure (HF)	Criteria
HFrEF	1. Subjective symptoms ± objective signs. 2. LVEF ≤40%
HFmrEF	1. Subjective symptoms ± objective signs. 2. LVEF 41–49%
HFpEF	1. LVEF ≥50% 2. Subjective symptoms ± objective signs. 3. Objective features of structural and/or functional abnormalities indicating the presence of left ventricular diastolic dysfunction.

Table 1. Definitions and Key Differentiation of Heart Failure Types [1].

Symptoms

Congestive heart failure (CHF) is characterized by the heart's inability to pump blood effectively, leading to fluid buildup in tissues and organs. Typical symptoms include dyspnea, especially during exertion or when lying down, reduced exercise tolerance, dry cough, peripheral edema (especially in the lower limbs), and weight gain due to fluid retention [9]. In older adults, these symptoms may present differently. Elderly patients may experience atypical symptoms, such as confusion, memory problems, drowsiness, delirium episodes, irritability, fainting, fatigue, loss of appetite, and decreased activity levels. Additionally, gastrointestinal symptoms, such as nausea, vomiting, constipation, or diarrhea, are more common in this age group and, when combined with loss of appetite, can lead to cachexia [10]. Moreover, older individuals with heart failure often have a higher burden of comorbidities, complicating diagnosis and treatment [11]. Recognizing these age-related differences is crucial for proper diagnosis and effective management of CHF in elderly patients.

Basic Diagnostics

The diagnosis of congestive heart failure (CHF) requires a comprehensive assessment, including a detailed medical history, physical examination, and various diagnostic tests. A key component of the diagnostic process is evaluating symptoms such as dyspnea, fatigue, and edema, alongside identifying risk factors like hypertension or coronary artery disease. A physical exam may reveal signs like jugular venous distension, crackles over the lungs, and peripheral edema [12].

An electrocardiogram (ECG) can help detect arrhythmias, ischemic changes, or left ventricular hypertrophy, which are commonly seen in CHF patients [12]. Chest radiography (X-ray) is used to identify heart enlargement, pulmonary fluid congestion, or pleural effusion [13]. It serves as a basic examination for assessing pulmonary congestion, although interpreting radiological signs such as redistribution of vascular filling and interstitial edema can sometimes be uncertain and subjective, with variability in observations based on the experience of the interpreter [13]. Echocardiography is a crucial diagnostic tool that evaluates heart structure and function, including ejection fraction, wall motion abnormalities, and valve function [14]. Laboratory tests, such as measuring brain natriuretic peptide (BNP) or its N-terminal fragment (NT-proBNP), are elevated in CHF patients and help assess the severity of heart failure [15].

In selected cases, additional imaging techniques such as cardiac magnetic resonance imaging (MRI) or computed tomography (CT) may be employed to provide more detailed anatomical and functional information. A comprehensive approach that combines clinical evaluation with these diagnostic tools is essential for accurate CHF diagnosis and appropriate therapeutic strategies [16].

Treatment

Managing HFrEF involves a holistic approach that includes dietary modifications, lifestyle changes, and pharmacologic therapy. Sodium intake is typically restricted to 2–3 g/day, with fluid intake limited to 1.5–2 L/day in cases of significant fluid retention, especially in NYHA class III–IV patients. Weight monitoring is crucial, as a weight gain of over 2 kg within three days may indicate fluid overload, while weight loss is recommended for obese patients. Alcohol consumption should be minimized, and smoking cessation is essential. Vaccinations against influenza, pneumococcus, and COVID-19 are strongly encouraged [17][18]. Patients should engage in moderate physical activity and recognize the importance of tailored exercise programs when stable. Avoiding medications that exacerbate heart failure, such as NSAIDs, certain antiarrhythmics, and specific diabetes medications, is critical. Addressing depression, managing comorbidities like sleep apnea, and avoiding high altitudes or extreme climates during travel are additional considerations [19].

The 2022 American College of Cardiology (ACC) guidelines for the management of Heart Failure with Reduced Ejection Fraction (HFrEF) advocate for a comprehensive treatment approach aimed at reducing morbidity and mortality. First-line therapy now includes Angiotensin Receptor-Neprilysin Inhibitors (ARNIs), which are recommended due to their ability to reduce hospitalizations and improve survival. Beta-blockers are essential for controlling heart rate, reducing myocardial oxygen demand, and improving survival. Mineralocorticoid Receptor Antagonists (MRAs) help reduce adverse cardiac remodeling and lower mortality risk. Sodium-Glucose Cotransporter-2 Inhibitors (SGLT2i) have become a staple in guideline-directed medical therapy, as they significantly reduce the risk of cardiovascular death and heart failure-related hospitalizations [20][21]].

Clinical Case Report

A 72-year-old woman with a medical history of hypertension and type 2 diabetes presented to her primary care physician with complaints of a persistent cough. Approximately one month prior, she had an upper respiratory tract infection that occurred without fever. The patient has not smoked for three years, having quit 25 years ago. Since the infection, the patient has reported a lingering cough, but the severity of the symptoms does not seem to correlate with the time of day or body position. She denies any other symptoms.

Upon physical examination, auscultation revealed symmetrical vesicular breath sounds with basal crackles on the right side. Heart rate was regular at around 90 beats per minute, with no peripheral edema or other abnormalities detected. Additionally, her blood pressure was 158/100 mmHg, and her oxygen saturation was 96%. The patient was referred for a chest X-ray. The imaging (Figure 1) showed opacities in both diaphragmatic angles and an increased lung parenchymal marking, with no focal lesions. The heart silhouette was noted to be enlarged in the horizontal dimension, and there were signs of congested hilum.

Fig. 1 Chest X-ray of a 72-year-old patient, A-P projection.

Given the signs of pulmonary congestion and suspicion of heart failure, the patient was urgently referred to a cardiology outpatient clinic. An echocardiogram revealed left ventricular hypertrophy and left atrial enlargement, with an ejection fraction (LVEF) of approximately 18%. Based on the diagnosis of Heart Failure with Reduced Ejection Fraction (HFrEF), the following treatment regimen was prescribed: bisoprolol (2,5 mg), torasemide (10 mg), eplerenone (25 mg), ramipril (10 mg), dapagliflozin (10 mg), and metformin (850 mg). The patient was also referred to a cardiology ward for further diagnostics and treatment evaluation.

Summary and Conclusions

Echocardiography is one of the key diagnostic methods used in the diagnosis of chronic heart failure. However, a chest X-ray can provide helpful clues in determining the etiology of the symptoms presented by patients in primary care settings. Additionally, laboratory tests, including the measurement of B-type natriuretic peptide (BNP) and its N-terminal fragment (NT-proBNP), are valuable in assessing the severity of heart failure.

Due to the nonspecific nature of symptoms in older adults, an expanded diagnostic approach, including laboratory and imaging tests, helps establish a clear diagnosis. In elderly individuals, the presence of multiple comorbidities further complicates the primary diagnosis, which is an important factor given the aging population.

With age, the risk of developing heart failure (HF) increases[3][4]. In Western and other developed countries, the main causes are coronary artery disease (CAD) and hypertension [2]. Early and accurate diagnosis enables timely treatment initiation, which has a clearly positive impact on improving the patient's quality of life, reducing the risk of rehospitalization due to exacerbations, and lowering mortality. The cornerstone of treatment is pharmacological therapy, which should be used in conjunction with non-pharmacological methods before considering treatment with implantable devices [22]. The choice of appropriate pharmacotherapy depends on the patient's clinical presentation and the medications they are already taking [23].

Statement of the author's contribution

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