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Severe pericardial effusion etiologies

Etiologías del derrame pericárdico severo

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Palabras clave:
Derrame pericárdico severo, etiología, país en desarrollo.

ABSTRACT

Introduction: The etiology of pericardial effusion is highly variable around the world. The present study describes the clinical features and etiologies of severe pericardial effusion in a series of cases treated at a third-level hospital in Medellín, Colombia. **Material and methods:** Retrospective case series based on clinical records. All patients treated between 2006 and 2018 with severe pericardial effusion requiring intervention for pericardial fluid drainage were included. The exclusion criteria were the absence of more than 50% of the data in the clinical history and the recurrence of the pericardial effusion after its first drainage. Etiology, indications for pericardial drainage and patient comorbidities are described. **Results:** 48 patients were included, 50% men with a mean age of 52.4 years (SD 17.5). Non-infectious etiologies were the most common causes of severe pericardial effusion (66.7%), followed by idiopathic (20.8%) and infectious causes (12.5%), being tuberculosis the most important. The main indication for pericardial drainage was to determine its etiology (58.0%) and the most relevant comorbidity was hypertension (40.0%). **Conclusions:** The main causes of severe pericardial effusion were non-infectious, unlike previous reports from developing countries where infectious diseases are considered the most common. Although, the frequency of idiopathic etiology was lower than that reported in other series, it continues to be a representative number of patients in which the etiology cannot be established.

RESUMEN

Introducción: *La etiología del derrame pericárdico es altamente variable en diferentes regiones del mundo. Este estudio describe las características clínicas y la etiología del derrame pericárdico severo en una serie de casos atendidos en un hospital de tercer nivel de la ciudad de Medellín, Colombia.* ***Material y métodos:*** *Serie de casos retrospectiva basada en registros clínicos. Se incluyeron todos los pacientes atendidos entre 2006 y 2018 que presentaron derrame pericárdico severo y requirieron intervención para extracción del líquido pericárdico. Los criterios de exclusión fueron la ausencia de más de 50% de los datos en la historia clínica. Para el análisis únicamente se tuvo en cuenta el primer derrame pericárdico y no la recurrencia de éste. Se describen etiología, indicación de drenaje y comorbilidades de los pacientes.* ***Resultados:*** *Se incluyeron 48 pacientes, 50% hombres, edad media 52.4 años (DE 17.5). Las etiologías no infecciosas fueron las más frecuentes (66.7%), seguidas por derrames pericárdicos idiopáticos (20.8%) y etiologías infecciosas (12.5%), la mayoría secundarias a tuberculosis. La principal indicación de drenaje fue búsqueda etiológica (58.0%) y la principal comorbilidad fue hipertensión (40.0%).* ***Conclusiones:*** *Las causas no infecciosas fueron las más comunes, contrario a lo reportado en otras series para países en vía de desarrollo donde las causas infecciosas son las más frecuentes. Aunque la etiología idiopática fue inferior a las reportadas en otras series, continúa siendo un número representativo de pacientes en los que no se logra establecer la etiología.*

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INTRODUCTION

Pericardial effusion (PE) is the abnormal accumulation of fluid in the space between the two layers of the pericardium. It is an increasingly common condition, due to the advance in diagnostic images that allow its identification.[1]

Multiple diseases can cause pericardial effusion, however, only in a minority of cases an accurate diagnosis can be made. Recent advances in diagnostic techniques (microbiology, for example) and newer imaging methods, have allowed to establish with greater precision its etiology.[2]

Etiologies imply great variations according to regions, they are not the same in developed countries as in developing countries. In the former, the majority are considered idiopathic or secondary to cancer, whereas in developing countries infectious etiologies, especially tuberculosis, are the main causes and represent

more than a half of the cases.[3] Knowing the local epidemiology is essential for clinical practice, physicians will be more confident regarding which etiologies to asses when facing a severe pericardial effusion and making the correct decision between diagnostic and treatment alternatives. Likewise, it is worth asking if the impact of PE secondary to tuberculosis is as great as it is presumed in affected countries or if there are other etiologies with relevant participation.

Prognosis associated with PE depends on the underlying etiology, however, having PE is a marker of severity and in some cases, leading to an ominous outcome.[4-6] PE, specifically in patients with human immunodeficiency virus (HIV) is associated with low survival, 36% at 6 months and 19% at 1 year; due to the antiretroviral therapy and the timely diagnosis and treatment of the effusion, these statistics have been reduced and the paradigm of the disease has changed.[7]

Although in cases of mild PE, a specific treatment is not recommended other than treating the root cause, adequate clinical and imaging follow-up is essential to prevent progression to severe effusion and cardiac tamponade; the most feared complication and with the highest mortality within the spectrum of the disease.[8,9]

There is no history of local studies that establish the different etiologies of severe PE in Colombia. The aim of this study is to describe the main etiologies and comorbidities at a tertiary care hospital in the city of Medellín.

MATERIAL AND METHODS

Retrospective case series, based on clinical records obtained between November 1st, 2006 and December 31st, 2018 from the emergency and hospitalization service of a highly complex hospital in the city of Medellín, where patients are mostly from the public health sector and rural areas. This hospital has the services of internal medicine, cardiology, infectious diseases, general surgery, cardiovascular surgery and intensive care unit.

The included patients were adults older than 18 years who entered the emergency department or hospitalization. All patients had an imaging diagnosis of PE and, its severity was defined by echocardiographic quantification performed by an echocardiography cardiologist. The exclusion criteria were the absence of more than 50% of the data in the clinical history and the recurrence of the pericardial effusion after its first drainage. All the patients required some intervention for pericardial fluid drainage; percutaneously in 26 patients and with surgery (pericardial window) other 22.

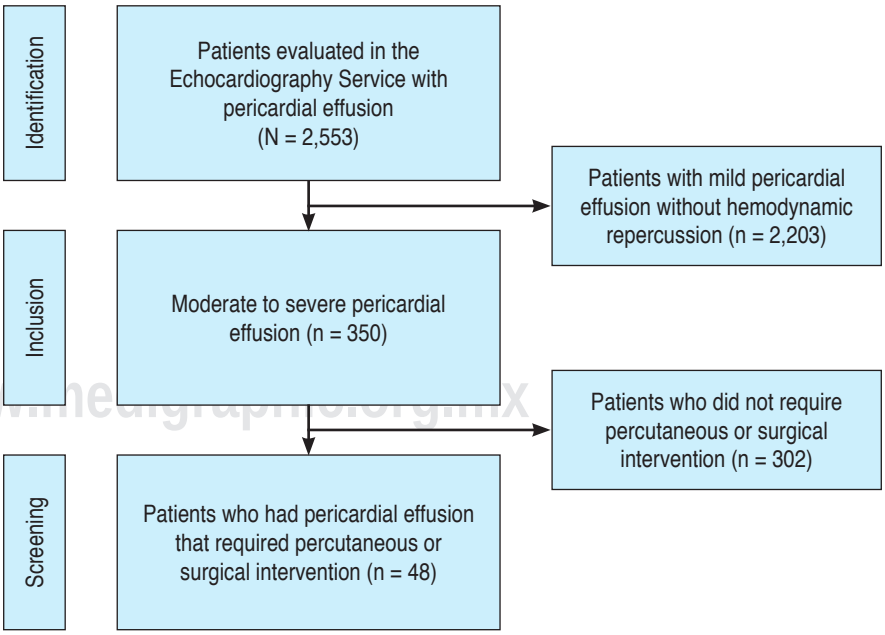

Figure 1:

Flow chart of patient selection.

Table 1: Demographic and clinical characteristics.

Characteristics	Measure %	Number of patients
Men	50.00	24
Age	52.41 ± 17.5 years	48
Comorbidities		
Hypertension	41.00	19
Cancer	31.00	14
Chronic kidney disease	20.00	9
Heart failure	16.00	8
Type 2 diabetes mellitus	14.58	7
Chronic obstructive pulmonary disease	12.50	6
Hypothyroidism	8.33	4
Autoimmune disease	6.25	3
Tuberculosis	6.25	3
HIV	4.17	2
Hyperthyroidism	4.17	2
Substance abuse	2.08	1

HIV = human immunodeficiency virus.

Variables included were patient past medical history, drainage indication, type of drainage intervention and etiology of the PE, if successfully established. Etiologies were classified in two large groups: infectious or non-infectious, with subsequent specific definition by subgroups, according to the 2015 ESC Guidelines for the diagnosis and management of pericardial diseases.[10]

Descriptive analysis was performed with relative and absolute frequencies for the variables studied with the Stata version 12.1 software.

RESULTS

During the study period, 2,553 patients were evaluated for pericardial effusion, 350 compatible with moderate to severe PE; 302 of these patients did not require percutaneous or surgical intervention. The clinical histories of 48 patients with severe pericardial effusion were identified in whom echocardiography and drainage of the pericardial effusion was performed *(Figure 1)*. Of these patients, 50% were men, mean age was 52 ± 17.5 years. The most relevant comorbidities were hypertension (41%), malignancy (31%), chronic kidney disease (20%) and heart failure (16%). Other less frequent were diabetes mellitus, hypothyroidism, HIV infection, tuberculosis, and drug dependence *(Table 1)*.

The main indication for drainage was the need to find an etiology (58%), followed by hemodynamic compromise (23%) and symptoms refractory to medical treatment (19%).

Regarding the etiologies *(Figure 2)*, non-infectious etiologies were the most frequent (66.7%). These included: malignancy (14 cases equivalent to 43.8% of non-infectious causes), postoperative or traumatic (12 cases, 37.5%), chronic kidney disease (2 cases, 6.2%), heart failure (2 cases, 6.2%) and autoimmune disease (2 cases, 6.2%). In 20.8% of the cases, it was not possible to establish a clear underlying cause, therefore, they were established as idiopathic PE or idiopathic pericarditis. Infectious etiologies were the least common (6 cases, 12.5%). Among these, pericardial tuberculosis was the cause in 5 of the 6 cases (83.3%).

DISCUSSION

In this study, we identified that non-infectious etiologies were the most frequent etiologies in patients with severe PE. A significant fraction of these cases were secondary to malignancy, even with a mean age of 50 years, and consequently, patients presented with manifestations of malignant PE. Among the infectious etiologies, the main one was tuberculosis, this is possibly explained because Colombia has an intermediate prevalence for this entity, along with the fact that the institution where this study was carried out is a highly complex center with a large flow of patients presenting with extrapulmonary manifestations of tuberculosis. Pericardial biopsy was required in most patients with pericardial tuberculosis, to optimize the diagnostic performance of the tests used.

According to the published series so far, it is evident that the etiology of PE, especially in moderate to severe cases, varies dramatically when analyzed between developed or developing countries. In the former, most are idiopathic (50%), followed by malignancy

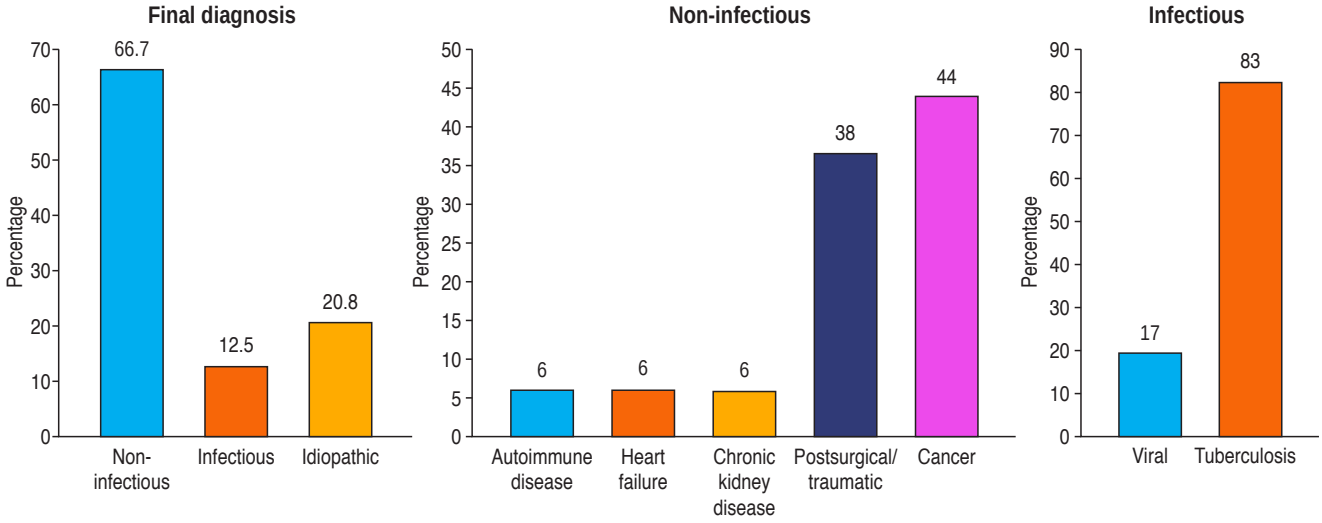

Figure 2: Pericardial effusion etiologies.

(10-25%), pericarditis or infectious (15-30%), iatrogenic (15-20%) and associated with connective tissue diseases (5-15%). In developing countries, more than 60% of the cases are infectious, represented in more than half of the cases by tuberculosis, especially in those regions where this mycobacterium is endemic. It should be noted that HIV infection continues to rise worldwide, increasing the incidence of PE diagnosis related to this condition.[11-15]

Regarding pericarditis with associated pericardial effusion, it is mostly represented by infectious and malignant etiologies with a global distribution of 15-50%, depending on the series reviewed.[11-14] Idiopathic pericarditis, which is presumed to be mostly due to post-viral causes, is the main inflammatory cause of pericardial effusion.[16] The difficulty in diagnosing PE, those considered idiopathic, may be due to the fact that isolating a virus is a complex and difficult task, often requiring a pericardium sample for histological, cytological and/or immunohystological analysis. In the vast majority of cases, clarification of the etiology is not necessary for the management of the patient; furthermore, it would increase costs for the health system and imply invasive and additional procedures or interventions for the patient.[17]

It is important to highlight how progress in the different diagnostic methods (microbiological cultures, polymerase chain reaction, cardiac magnetic resonance imaging) has favored the identification of the underlying cause, making idiopathic etiologies group, to decrease. In this study, idiopathic etiology was 20.8%, while in the world literature it is approximately 50%.[10]

On the other hand, the high ratio of severe pericardial effusion and cardiovascular surgeries should be kept in mind when the patient's postoperative period does not show a favorable evolution. This high prevalence described in the study could be maximized by the fact that the patients were analyzed in a hospital with high-complexity of services such as thoracic and cardiovascular surgery.

Among the study limitations, it is a retrospective study and the research was carried out in a single center, which could disregard other PE etiologies. It should be noted that, in this setting, severe PE drainage procedures are only performed in highly complex hospitals and clinics. On the other hand, the amount of patient data described is not large despite the fact that the medical records reviewed, included more than 10 years, possibly explained by the fact that only patients with severe pericardial effusion with drainage were included, since patients who did not have a study of pericardial fluid were not included. Nevertheless, in Colombia there are no similar reports, as the presented in this study.

CONCLUSIONS

PE is an entity with an important prevalence and associated morbidity and mortality, often with insufficient resources aimed at finding its etiology. In this study, non-infectious causes were the most common, especially those related to traumatic or postsurgical events, making it easier to suspect, timely diagnose, and to intervene. However, infectious (especially pericardial tuberculosis) or idiopathic (possibly post-viral) causes also account for a significant number of cases, a situation that resembles with the reports in world literature. In this study, the idiopathic etiology was lower than that reported in other series, suggesting that an exhaustive and rigorous search has been carried out, which is essential to achieve an adequate diagnostic and therapeutic approach.

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