Original Article

Pericarditis. Series of 84 Consecutive Cases

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Objective

To identify differential clinical, laboratory, and echocardiographic characteristics in persons with diagnosed idiopathic and secondary pericarditis.

Methods

From January 1999 to December 2001, 84 patients with clinically and echocardiographically diagnosed pericarditis were identified in a heart clinic. These patients were analyzed according to age, sex, anthropometric measurements, body habitus, casual blood pressure (BP), signs and symptoms, morbid history, medicines and complications. The individuals were divided into 2 groups: group A comprised 61 patients with known causes of pericarditis and group B comprised 23 patients with idiopathic causes. The groups were compared with chi-square test. P≤0.05 was considered statistically significant.

Results

The population of these 2 groups was similar in age, sex, anthropometric measures, body habitus, and casual BP. In group B (idiopathic), 23 (100%) cases were diagnosed between April and August versus 24 (39.4%) in the same period for group A (P<0.01). Twenty-three (100%) group B patients received anti-influenza vaccine versus none in group A. Breathlessness (P=0.02) and swelling (P=0.01) were more frequent in group A, but fatigue was more common in group B (P=0.01). For treatment, non-steroidal anti-inflammatory drugs (NSAID) were prescribed to 5 (8.2%) patients in group A and 19 (82.6%) in group B (P=0.01).

Conclusion

In this series, patients labeled as having idiopathic pericarditis who had previously taken the influenza vaccine had seasonal distribution, a lower prevalence of previous disease, less exuberant signs and symptoms, and clinical regression with NSAID use.

Key words

pericarditis, idiopathic pericarditis, influenza, anti-influenza vaccine

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Acute pericarditis is a syndrome characterized by pericardial inflammation and clinical manifestations like thoracic pain, pericardial friction, and electrocardiographic and echocardiographic abnormalities [1]. The clinical history frequently reveals thoracic pain and dyspnea [2]. Pericardial friction, when present, is a pathognomonic signal of acute pericarditis. Fever, muscle pain, weakness, fatigue, and prostration may already be present [3].

All causes of acute pericarditis can evolve to pericardial effusion. Signs of pericardial effusion can range from minimal to no clinical symptoms to compression leading to symptoms of cardiac tamponade [1] (fig. 1).

Several diseases can evolve in the pericardium. The main causes of pericarditis are infections, myocardial infarction (MI), heart failure (HF), renal failure, cancer, and systemic and metabolic diseases [2].

The viral and idiopathic causes are often confused. The clinical findings do not always distinguish the viral and idiopathic forms, and, probably, many cases of idiopathic pericarditis are unrecognized viral infections. In general, it is not productive to try to isolate or identify the potential virus for this disease [4].

Acute idiopathic pericarditis, in general, is a self-limiting disease lasting 1 to 3 weeks with the potential for complications like myocarditis, cardiac tamponade, and late constrictive pericarditis [5].

Methods

From January 1999 to December 2001, 1.656 patients from a heart clinic sought treatment for suspected or diagnosed cardiologic disease. In this period, 84 patients had clinically and echocardiographically diagnosed pericarditis. Of this population, 61 (Group A) had known causes for the disease; on the other hand, 23 (Group B) individuals did not have an explanation for the disease and therefore were labeled as idiopathic. Because of this high incidence of idiopathic pericarditis compared with that in previous years, the authors reevaluated data on anamnesis, clinical examinations, and complementary examinations to clarify the causes.

Of these patients, known causes of pericarditis like infections, myocardial infarction, heart failure, cancer, renal failure, and other systemic and metabolic diseases were considered and investigated through clinical history and/or specific complementary examinations.

The effusion was identified by visualization of spaces around the heart free of echoes, which increased through the level of visceral and parietal pericardial separation, being restricted to the posterior wall where mild effusion was present and around the entire heart where the most significant effusion occurred [6].

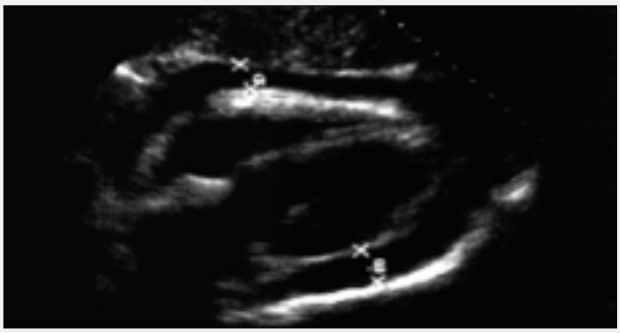

Fig. 1 - A large pericardial effusion visualized with echocardiography.

The statistical analysis was performed for age, sex, smoking, casual blood pressure based on the VI Report of the JNC classification [7], and body mass index was measured (BMI) in kg/m^2. Normal BMI was considered to be from 18.5 to 24.9 kg/m^2, overweight from 25.0 to 29.9 kg/m^2, obesity level I from 30 to 34.9 kg/m^2, obesity level II from 35.0 to 39.9 kg/m^2, and morbid obesity above 40 kg/m^2 [8]. Also considered were the month of the diagnosis, signs and symptoms, morbid past, medicines, previous vaccinations and complications of the disease. Specific viral serologic measures were not obtained; in our center, this diagnostic tool is not available.

The groups were compared with chi-square test, with P≤0.05 being considered significant.

Results

The population in the 2 groups was similar for age, sex, anthropometric measures, body habitus, and casual BP. Of the 84 individuals, 64 (76.2%) were 60 years old or more, 50 (59.5%) were women, 56 (66.7%) had BMI ≥ 25 kg/m^2, 11 (13.1%) were smokers, and 47 (56.0%) had casual BP ≥ 140/90 mmHg (tab. I).

The clinical manifestations occurred, predominantly, for up to 3 weeks in both groups [38 (62.3%) in group A versus 16 (69.5%) in group B]. Ten (16.4%) group A patients were asymptomatic compared with 2 (8.7%) in group B. In 23 (100%) group B patients, the diagnoses were made between April and August compared with 24 (39.4%) at the same time in group A (P<0.01) (fig. 2) (tab. II).

Twenty-three (100%) group B patients were vaccinated against the influenza virus previously and in the same year of the pericarditis versus none on group A. Dyspnea (P=0.02) and swelling (P=0.01) were more frequent in group A, while fatigue was more commonly reported in group B (P=0.01) (tab. III). More group A patients took diuretics (P=0.04) and angiotensin-converting enzyme inhibitors/angiotensin II receptor antagonists (ACE/ARA II) (P=0.01) compared with group B patients (tab IV). Analysis of comorbid conditions showed that ischemic cardiopathy was more frequent in group A (19 cases) compared with only 2 cases in group B (P=0.03) (tab. V). Heart failure was the main cause of pericarditis in group A, occurring in 27 (44.3%) patients versus none in group B (P=0.01) (tab. VI). With regard to therapeutics, non-steroidal anti-inflammatory drugs (NSAID) were prescribed to 5 (8.2%) patients in group A and 19 (82.6%) in group B (P=0.01) (tab. VII). On follow-up, 17 (73.9%) patients in group B did not have any complications, but 3 (13.0%) developed heart failure (P=0.05) and 3 (13.0%) respiratory infection. In group A, 31 (50.8%) did not have any complications; 20 (32.8%) evolved to HF. Of the other 14 (16.4%) patients in group A with complications, 5 (8.2%) required cardiac surgery.

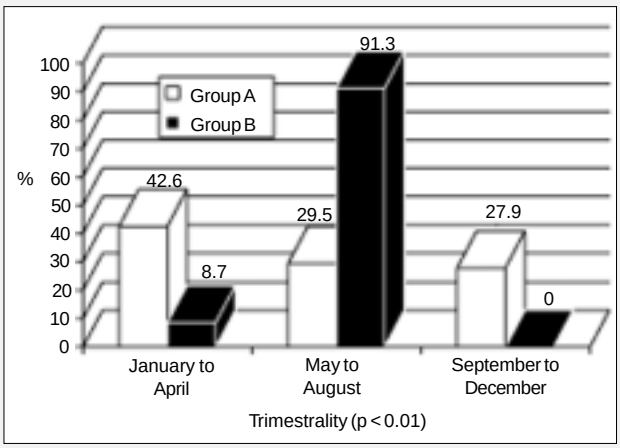

Fig. 2 - Group distribution by period of the diagnosis (seasonality).

Table I - Population characteristics for groups A and B

	Condition	Group A (61)	Group B (23)	Total
Age	Less than 40 years old	3 (4.9%)	1 (4.3%)	4 (4.8%)
	40 a 59 years old	13 (21.3%)	3 (13.0%)	16 (19.0%)
	60 years old or more	45 (73.8%)	19 (82.6%)	64 (76.2%)
Sex	Female	34 (55.7%)	16 (69.6%)	50 (59.5%)
	Male	27 (44.3%)	7 (30.4%)	34 (40.5%)
	Normal	20 (32.8%)	8 (34.8%)	28 (33.3%)
BMI	Overweight	14 (22.9%)	4 (17.3%)	18 (21.4%)
	Obesity	22 (36.1%)	9 (39.1%)	31 (36.9%)
	Severe obesity	5 (8.2%)	2 (8.6%)	7 (8.4%)
Smoking	Yes	9 (14.8%)	2 (8.7%)	11 (13.1%)
	Excellent	4 (6.6%)	1 (4.3%)	5 (6.0%)
	Normal	14 (23.0%)	2 (8.7%)	16 (19.0%)
	Normal High	11 (18.0%)	5 (21.7%)	16 (19.0%)
Casual BP	Hipertension stage 1	9 (14.8%)	3 (13.0%)	12 (14.3%)
	Hipertension stage 2	4 (6.6%)	5 (21.7%)	9 (10.7%)
	Hipertension stage 3	10 (16.4%)	2 (8.7%)	12 (14.3%)
	Systolic hypertension	9 (14.8%)	5 (21.7%)	14 (16.7%)

Discussion

The Coxsackie B virus, Echo type 8, mumps virus, influenza, mononucleosis virus, poliomyelitis virus, zoster, and the hepatitis vaccine are some of main causal agents of acute pericarditis [9].

Meester et al [10], Streifler et al [11], and Desson et al [12] reported, consecutively, 2, 1, and 1 cases of acute pericarditis after anti-influenza vaccine administration. In these cases, the diagnosis was confirmed by serologic, electrocardiographic, and echocardiographic means.

Zanettini et al [13,14] reported on a series of cases of pericarditis after influenza vaccination at the XII and XIII Congress of Cardiology of the Rio Grande do Sul.

The incidence of influenza increases during the winter, leading to massive vaccination during the autumn and winter months. The immunity provided by vaccination varies from 60 to 90%, being lower in the elderly and persons with compromised immune systems [15].

During influenza infection, the incubation period depends on the viral dose and the immunology host stage [16]. It is known that the target population in vaccination campaigns is composed, in large part, of the elderly and those with comorbidities.

Table II - Classification by month of diagnosis

Month Diagnosed	Group A	Group B	Total
January	9 (14.8%)	-	9 (10.7%)
February	4 (6.6%)	-	4 (4.8%)
March	7 (11.5%)	-	7 (8.3%)
April	6 (9.8%)	2 (8.7%)	8 (9.5%)
May	2 (3.3%)	11 (47.8%)	13 (15.5%)
June	2 (3.3%)	6 (26.1%)	8 (9.5%)
July	5 (8.2%)	2 (8.7%)	7 (8.3%)
August	9 (14.8%)	2 (8.7%)	11 (13.1%)
September	4 (6.6%)	-	4 (4.8%)
October	5 (8.2%)	-	5 (6.0%)
November	7 (11.5%)	-	7 (8.3%)
December	1 (1.6%)	-	1 (1.2%)
Total	61	23	84

* $p < 0.01$. Comparison of groups A and B by pericarditis cases between April and August.

The vaccine is not indicated for persons who are allergic to egg protein or some other component of the vaccine and have symptomatic acute fever. The adverse effects of the vaccine as

Table III - Group classification by signs and symptoms

Signs and Symptoms	Group A	Group B	p	Total
Dyspnea	30 (49.2%)	5 (21.7%)	0.02	35 (42.2%)
Fatigue	12 (19.7%)	14 (60.9%)	0.01	26 (31.0%)
Precordial / retrosternal	17 (27.9%)	5 (21.7%)	-	22 (26.2%)
Swelling	17 (27.9%)	-	0.01	17 (20.2%)
Cough	11 (18.0%)	5 (21.7%)	-	16 (19.0%)
Palpitations	11 (18.0%)	2 (8.7%)	-	13 (15.5%)
Non symptomatic	11 (18.0%)	2 (8.7%)	-	13 (15.5%)
Muscle pain	3 (4.9%)	4 (17.4%)	-	7 (8.3%)
Fever	3 (4.9%)	2 (8.7%)	-	5 (6.0%)
Pericardial friction	1 (1.6%)	-	-	1 (1.2%)
Syncope / pre-syncope	5 (8.2%)	-	-	5 (6.0%)
Total	61	23	-	84

Obs.: Multiple answer questions.

Table IV - Group classification by drugs being used by patients in the groups before of the pericarditis diagnosis

Drugs being used	Group A	Group B	p	Total
ACE / ARA II	31 (50.8%)	4 (18.2%)	0.01	35 (42.2%)
Digital	20 (32.8%)	4 (18.2%)	-	24 (28.9%)
Diuretics	18 (29.5%)	2 (9.1%)	0.04	20 (24.1%)
Antiarrhythmics	14 (23.0%)	5 (22.7%)	-	19 (22.9%)
Antiplatelet	14 (23.0%)	4 (18.2%)	-	18 (21.7%)
Nitrates	12 (19.7%)	1 (4.5%)	-	13 (15.7%)
Beta-blocker	6 (9.8%)	6 (27.3%)	-	12 (14.5%)
Hormonal replacement	6 (9.8%)	6 (27.3%)	-	12 (14.5%)
Calcium channel blocker	7 (11.55)	4 (18.2%)	-	11 (13.3%)
Anti-diabetics	7 (11.5%)	2 (9.1%)	-	9 (10.8%)
Lipid-lowering agents	4 (6.6%)	4 (18.2%)	-	8 (9.6%)
None	6 (9.8%)	1 (4.5%)	-	7 (8.4%)
Anticoagulants	6 (9.8%)	-	-	6 (7.2%)
NSAI	-	1 (4.5%)	-	1 (1.2%)
Steroids	1 (1.6%)	-	-	1 (1.2%)
Methyldopa	1 (1.6%)	-	-	1 (1.2%)
Other	9 (14.8%)	2 (9.1%)	-	11 (13.3%)
Total	61	23	-	84

Obs.: Multiple answer questions.

Table V - Group classification by morbid past

Morbid past	Group A	Group B	p	Total
Mitral valvopathy	25 (41.0%)	13 (56.5%)	-	38 (45.2%)
Hypertensive cardiopathy	19 (31.1%)	8 (34.8%)	-	27 (32.1%)
Other valvopathy	20 (32.8%)	6 (26.1%)	-	26 (31.0%)
Ischemic cardiopathy	19 (31.1%)	2 (8.7%)	0.03	21 (25.0%)
Arrhythmia	13 (21.3%)	7 (30.4%)	-	20 (23.8%)
Hypercholesterolemia	9 (14.8%)	6 (26.1%)	-	15 (17.9%)
Cancer	11 (18.0%)	-	-	11 (13.1%)
Hypertension	8 (13.1%)	3 (13.0%)	-	11 (13.1%)
Hypothyroidism	8 (13.1%)	1 (4.3%)	-	9 (10.7%)
Heart failure	7 (11.5%)	-	-	7 (8.3%)
Cardiomyopathy	7 (11.5%)	-	-	7 (8.3%)
Chronic obstructive pulmonary disease	4 (6.6%)	3 (13.0%)	-	7 (8.3%)
Myocardial infarction	5 (8.2%)	1 (4.3%)	-	6 (7.1%)
Diabetes	5 (8.2%)	-	-	5 (6.0%)
None	2 (3.3%)	2 (8.7%)	-	4 (4.8%)
Myocardial revascularization	2 (3.3%)	-	-	2 (2.4%)
Renal failure	1 (1.6%)	-	-	1 (1.2%)
Other heart surgeries	1 (1.6%)	-	-	1 (1.2%)
Marfan´s syndrome	1 (1.6%)	-	-	1 (1.2%)
Congenital cardiopathy	1 (1.6%)	-	-	1 (1.2%)
Other	5 (8.2%)	8 (34.8%)	-	13 (15.5%)
Total	61	23	-	84

Obs.: Multiple answer questions.

Table VI - Pericardial effusion causes

Causes	Group A	Group B	p
Heart failure	27 (44.3%)	-	0.01
Cancer	11 (18.0%)	-	-
After cardiac surgery	8 (13.1%)	-	-
Ischemic cardiopathy	7 (11.5%)	-	-
Hypothyroidism	7 (11.5%)	-	-
Valvopathy	5 (8.2%)	-	-
Cardiomyopathy	4 (6.6%)	-	-
Hypertensive cardiopathy	4 (6.6%)	-	-
Viral	2 (3.3%)	-	-
Collagenous disease	1 (1.6%)	-	-
Idiopathic	1 (1.6%)	23 (100%)	0.01
After myocardial infarction	1 (1.6%)	-	-
Total	61	23	84

Obs.: Multiple answer questions.

Table VII - Group classification by drugs prescribed before the diagnosis of pericarditis

Prescribed Drugs	Group A	Group B	p	Total
Piroxicam SL	5 (8.2%)	19 (90.5%)	0.01	24 (29.3%)
Other NSAI	1 (1.6%)	-	-	1 (1.2%)
Steroids	2 (3.3%)	1 (4.8%)	-	3 (3.7%)
ACE / ARA II	12 (19.7%)	5 (23.8%)	-	17 (20.7%)
Antiarrhythmics	11 (18.0%)	5 (23.8%)	-	16 (19.5%)
Digoxin	13 (21.3%)	1 (4.8%)	-	14 (17.1%)
Diuretics	11 (18.0%)	1 (4.8%)	-	12 (14.6%)
Antibiotics	5 (8.2%)	3 (14.3%)	-	8 (9.8%)
Nitrates	8 (13.1%)	-	-	8 (9.8%)
Antiplatelet	7 (11.5%)	-	-	7 (8.5%)
Beta-blocker	6 (9.8%)	-	-	6 (7.3%)
Calcium channel blockers	3 (4.9%)	-	-	3 (3.7%)
Hormonal replacement therapy	3 (4.9%)	-	-	3 (3.7%)
Lipid-lowering agents	1 (1.6%)	-	-	1 (1.2%)
Anti-diabetics	1 (1.6%)	-	-	1 (1.2%)
Other	1 (1.6%)	-	-	1 (1.2%)
None	13 (21.3%)	-	-	13 (15.9%)
Total	61	23	-	84

Obs.: Multiple answer question.

described by the laboratories include pain, rush, local swelling, low fever, malaise, muscle pain, anaphylactic and hypersensitivity reactions such as asthma and Guillain Barré syndrome [16].

The literature teaches that idiopathic pericarditis treatment is determined by clinical manifestations. When pericardial pain is present, NSAID should be used. When evaluation of a large effusion or cardiac tamponade is performed, pericardiocentesis is indicated associated or not with pericardioscopy with an epicardial biopsy. Specific antivirals are indicated for treating viral or idiopathic pericarditis in persons with compromised immunity [17].

Analysis of the group B population showed that the patients were mainly elderly, with controlled heart disease in which the basic disease was not related to pericarditis. In group B, 13 (56.5%) patients had mitral valvopathy, 1 (4.3%) previous myocardial infarction, and 1 (4.3%) hypothyroidism; all, however, were under specific treatment and their base disease was compensated (tab V).

The clinical findings, in group B, were predominantly mild, benign, and prodromics of viral disease; three individuals, however, required hospitalization due to heart failure.

All group B individuals received anti-influenza vaccine in the same year and before the onset of pericarditis; all either took the initiative to be vaccinated or the vaccination was indicated by external sources. The vaccines were provided by renowned laboratories.

The diagnosis of pericarditis in group B was seasonal and coincided with the period for influenza vaccination.

Concluding, the patients in this study were predominantly elderly women with body mass indexes and blood pressures above normal. The individuals said to have idiopathic pericarditis had compensated heart failure, had previously received an influenza vaccination, and were diagnosed seasonally. These patients had prodromic viral signs and symptoms and experienced clinical regression after taking NSAIDs. They also demonstrated the possibility of developing heart failure as a complication. The persons with secondary pericarditis were diagnosed during all months of the year, had known causes of pericarditis, signs and symptoms related to the base disease with regression of symptoms after the implementation of specific medication.

This study, being a series of cases, does not have sufficient power to establish a cause-effect relation between pericarditis and anti-influenza vaccine. However, in view of the annual vaccination of millions of people, specific delineated epidemiological studies are necessary to investigate this condition.

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