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Pericardial effusion in pregnant patients

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The authors declare no competing interests.

ABSTRACT

Introduction: Pericardial effusions are infrequent in pregnant patients, but its presence has been seen in some isolated cases without hemodynamic involvement. Therefore, neither outcome nor treatment of these cases are described.
Objectives: To characterize pregnant patients with pericardial effusion, according to clinical, epidemiological and laboratory variables and determine the recovery time from post-delivery pericardial effusion.
Method: A prospective descriptive observational study was carried out with 15 pregnant women with pericardial effusion, diagnosed by transthoracic echocardiogram, intentionally selected from a population of 256 pregnant women who were treated at the Hospital Universitario Gineco-Obstétrico Mariana Grajales in the city of Santa Clara (Villa Clara, Cuba) during the period from July 2018 to March 2019.
Results: Of the 256 patients, only 15 (5.9%) presented pericardial effusion. Eighty percent of these effusions were found in patients with pre-eclampsia. A total of 66.7% were aged between 20 and 29 years and 73.3% were white. Effusions were predominantly mild (66.7%) and never severe, and the affected patients also had chronic high blood pressure (40%), obesity (20%) and collagen disease (13.3%). In 86.7% of cases the pericardial effusion resolved in the first 15 days postpartum.
Conclusions: Pericardial effusion was more frequently found in patients with pre-eclampsia, chronic arterial hypertension, proteinuria, hypoproteinemia and hipoalbuminemia, and in most cases resolved within the first 15 days postpartum.
Keywords: Pericardial effusion, Pregnancy, Echocardiography

Derrame pericárdico en pacientes embarazadas

RESUMEN

Introducción: El derrame pericárdico en la paciente embarazada es infrecuente, pero se ha visto su presencia en algunos casos aislados sin repercusión hemodinámica, por lo que no se describe la evolución y la conducta a seguir en esta pacientes.
Objetivos: Caracterizar a la paciente embarazada con derrame pericárdico, según variables clínicas, epidemiológicas y de laboratorio; y determinar el tiempo de evolución del derrame pericárdico posterior al parto.
Método: Se realizó un estudio observacional descriptivo prospectivo con 15 embarazadas con diagnóstico de derrame pericárdico, definido por ecocardiograma transtorácico, seleccionadas de forma intencional de una población de 256 muje-

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Authors' contribution
YER y MER: Idea and design of the research, raw data collection and analysis, as well as final report confection.
LMH: Information search, data analysis as well as final report review.
IQV y ROPR: Design of the research as well as helping in the final report confection.
All authors critically reviewed the manuscript and approved the final report.

res en estado de gravidez, que fueron atendidas en el Hospital Universitario Gineco-Obstétrico Mariana Grajales de la ciudad de Santa Clara (Villa Clara, Cuba) durante el período de julio 2018 a marzo 2019.
Resultados: De las 256 pacientes, solo 15 (5,9%) presentaron derrame pericárdico. El 80% de estos derrames fue encontrado en pacientes con preeclampsia. El 66,7% tenía entre 20 y 29 años de edad, y el 73,3%, color blanco de piel. El derrame fue predominantemente leve (66,7%) y nunca grave, y las pacientes afectadas tenían, además, hipertensión arterial crónica (40%), obesidad (20%) y enfermedad del colágeno (13,3%). En el 86,7% de los casos el derrame pericárdico desapareció en los primeros 15 días posparto.
Conclusiones: El derrame pericárdico fue encontrado con más frecuencia en pacientes con preeclampsia, hipertensión arterial crónica, obesidad, proteinuria, hipoproteinemia e hipoalbuminemia; y desapareció, en la mayoría de los casos, en los primeros 15 días posparto.
Palabras clave: Derrame pericárdico, Embarazo, Ecocardiograma

INTRODUCTION

The normal pericardial sac contains 10-50 ml of pericardial fluid, resulting from a plasma ultrafiltrate that acts as a lubricant between the layers of this organ[1]. Any pathological process usually causes inflammation, with the possibility of causing also an increased fluid production at that level. There is a semiquantitative assessment of pericardial effusion by echocardiogram that defines it as: mild (< 10 mm), moderate (10-20 mm) or severe (> 20 mm). This assessment has also proven useful in estimating the risk of complications and their cause. A significant number of patients with pericardial effusion remain asymptomatic and its diagnosis is a finding from an X-ray or echocardiogram performed due to other reasons[1-3].

In developed countries many cases of pericardial effusion are considered idiopathic (up to a 50%), other common causes are: cancer (10-25%), infections (15-30%), iatrogenesis (15-20%) and diseases connective tissue (5-15%); while in developing countries, where tuberculosis is an endemic disease, it may be the predominant cause (> 60%)[3].

There is no evidence that pregnancy is susceptible to pericardial diseases. However, many pregnant women develop a minimal to moderate asymptomatic pericardial effusion during the third trimester, although cardiac compression is uncommon. Asymptomatic constriction becomes manifest in pregnancy due to increased circulating blood volume and most pericardial diseases are treated in the same manner as in non-pregnant women[4,5].

Pre-eclampsia-eclampsia syndrome, on the other hand, is a common obstetric complication, which has repercussions in the whole organism and it can also have repercussions in the fetus. Pericardial effusion caused by severe pre-eclampsia is a rare disorder, there are therefore few published cases. Trout *et al.*[6] report two cases of pregnant patients with no history of high blood pressure, complicated by severe pre-eclampsia and Martin's class II Hellp syndrome, who had pericardial effusion without tamponade. In addition, this same author comments that in 25% of patients with severe pre-eclampsia a small pericardial effusion can be found.

In the authors' experience during clinical practice and the exchange with other professionals, it has been observed that in some pregnant patients there is a pericardial effusion that varies in size, especially those with a diagnosis of aggravated pre-eclampsia, and neither the evolution nor the clinical and epidemiological factors associated with this disease are known, which is why this research was designed, with the objective of characterizing the pregnant patient with pericardial effusion according to clinical, epidemiological and laboratory variables, as well as determining the recovery time of pericardial effusion after delivery.

METHOD

A descriptive, prospective, observational, research was conducted at the *Hospital Universitario Gineco-Obstétrico Mariana Grajales* in the city of Santa Clara (Villa Clara, Cuba), during the period from July 2018 to March 2019.

Population and sample

The study population consisted of 256 pregnant

women, without previous structural heart disease, treated at the Consultation for Heart Disease and Pregnancy, and those admitted with a diagnosis of aggravated pre-eclampsia at the aforementioned hospital. The purposively selected sample consisted of the 15 pregnant women who were diagnosed with pericardial effusion after meeting the inclusion criteria.

Inclusion and exclusion criteria

All the patients with the aforementioned diagnosis expressed their willingness to take part in the study and signed the informed consent form. In order to be included, they should undergo all the necessary studies (blood tests and echocardiograms) before and after delivery.

To exclude the patients with a history of pericarditis (with or without effusion), before or during pregnancy was initially considered, but none of them fulfilled this condition.

Research description

All pregnant women who were referred to this Consultation for Heart Disease and Pregnancy, and those who were admitted to the aforementioned hospital with a diagnosis of aggravated pre-eclampsia, underwent transthoracic echocardiogram in the second and third trimesters of pregnancy searching pericardial effusion. The patients with a confirmed diagnosis underwent the necessary blood complementary tests to fulfill the objectives proposed in the research; in addition, they underwent follow-up echocardiograms until the end of their pregnancy and after delivery.

Variables

Clinical-epidemiological variables such as: age, gestational age, risk factors, personal pathological history of pre-eclampsia in previous pregnancies or any other disease; as well as laboratory variables, specifically quantification of plasma proteins and albumin in blood and proteins in urine were analyzed.

In the echocardiogram, in addition to the usual analysis of cardiac structures, emphasis was placed on pericardial effusion in those patients who presented it. It was classified as mild, moderate and severe according to the recommendations of the European Society of Cardiology guidelines for the diagnosis and treatment of pericardial diseases[3]; compression on the right cardiac chambers was evaluated and its duration after delivery was determined.

RESULTS

A transthoracic echocardiogram was performed to 256 pregnant women, of whom 223 did not present aggravated pre-eclampsia and only three of them had asymptomatic pericardial effusion (1.34%). In 12 (36.4%) of the remaining 33 (who did have pre-eclampsia) pericardial effusion was found.

This effusion predominated in women between 20 and 29 years old (66.7%) as well as in white women (73.3%) (**Table 1**). The diagnosis of most patients was made after 30 weeks of pregnancy (**Figure 1**). Only one was diagnosed earlier and it was not associated to pre-eclampsia. In two of them echocardiogram before 30 weeks of pregnancy was normal, but pericardial effusion was found at 32.2 and 34.4 weeks of pregnancy, respectively, both with a diagnosis of pre-eclampsia.

Table 1. Distribution of the pregnant patients with pericardial effusions according to age and skin color.

Age (years)	Skin color				Total	
	White		Black			
	Nº	%*	Nº	%*	Nº	%**
Less than 20	-	-	1	100	1	6.6
20 – 29	8	80.0	2	20.0	10	66.7
30 – 39	3	75.0	1	25.0	4	26.7
Total	11	73.3	4	26.6	15	100

Percentages calculated based on the total of: *row, **column.
Source: Individual medical records.

In those with a diagnosis of aggravated pre-eclampsia, high blood pressure was the risk factor most frequently associated to pericardial effusion, followed by obesity (**Figura 2**). Collagen diseases, overweight and tobacco smoking were present in 13.3% of patients with aggravated pre-eclampsia and pericardial effusion. In pregnant patients without pre-eclampsia obesity was the most frequent risk factor.

There were differences regarding the quantification of total protein and albumin in blood, as well as of protein in urine, since in patients without pre-eclampsia all these variables were normal, unlike those who did have this diagnosis as a pregnancy complication (**Table 2**): in 50% normal proteinuria figures were found, while only 33.3% and 16.7% had normal plasma concentrations of total protein and albumin, respectively.

None of the patients had severe pericardial effusion or hemodynamic involvements. A 66.7% of the patients with aggravated pre-eclampsia had mild pericardial effusion. The same percentage was found in those without pre-eclampsia (**Table 3**).

All patients underwent echocardiogram 15 days after delivery. Pericardial effusion had disappeared in 86.7% of them. One patient with aggravated pre-eclampsia, systemic lupus erythematosus and antiphospholipid syndrome maintained echocardiographic signs of effusion after two weeks; which were not found in the study performed 30 days before; and in another one, the effusion (mild) persisted beyond two months after delivery with no apparent cause.

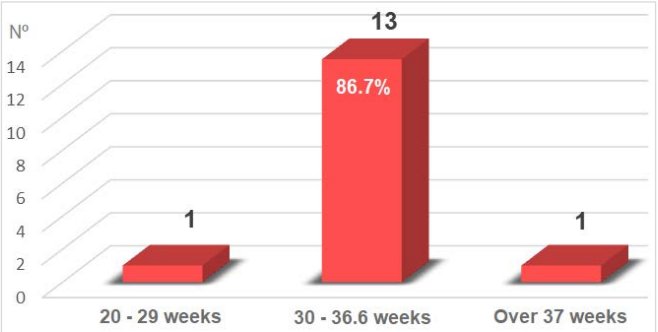

Figure 1. Pregnancy age at the moment of the diagnosis of pericardial effusion by echocardiogram (n=15).

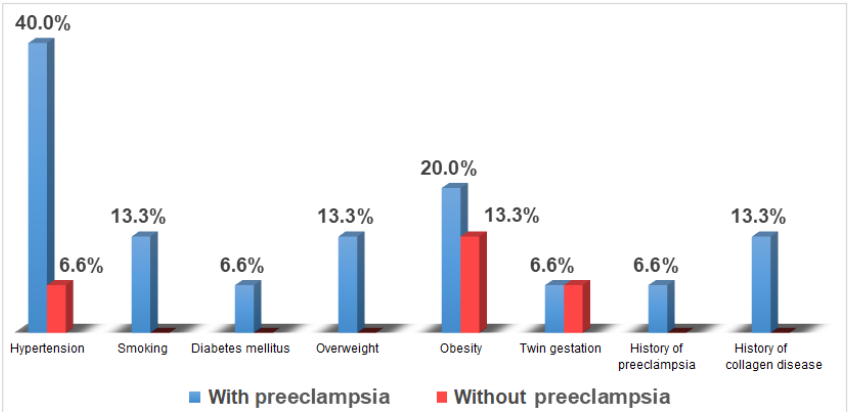

Figure 2. Risk factors present in pregnant patients with a diagnosis of pericardial effusions (n=15).

Table 2. Quantification of total proteins and albumin in blood, and proteinuria in the pregnant patients with pericardial effusions.

Variable	With pre-eclampsia (n=12)		Without pre-eclampsia (n=3)	
	Nº	%	Nº	%
Total proteins in blood				
≥ de 60 mg/dl	4	33.3	3	100
50 – 59 mg/dl	6	50.0	-	-
< 50 mg/dl	2	16.7	-	-
Albumin in blood				
≥ de 40 mg/dl	2	16.7	3	100
39 – 30 g/dl	9	75.0	-	-
< 30 mg/dl	1	8.3	-	-
Proteins in urine				
300 – 999 mg/dl	6	50.0	3	100
1.0 – 1.9 g/dl	2	16.7	-	-
2.0 – 3.0 g/dl	2	16.7	-	-
> 3 g/dl	2	16.7	-	-

DISCUSSION

Mild pericardial effusion without hemodynamic impairment predominated in this study. Some authors describe that, in a group of patients, there may be a minimal to moderate

Table 3. Extent of pericardial effusion according to the existence or not of pre-eclampsia.

Derrame pericárdico	Con preeclampsia (n=12)		Sin preeclampsia (n=3)	
	Nº	%	Nº	%
Mild	8	66.7	2	66.7
Moderate	4	33.3	1	33.3

asymptomatic effusion especially during the third trimester of pregnancy[4,5]. In the study by Franco-Hernandez *et al.*[11] approximately 25% of patients with severe pre-eclampsia presented mild pericardial effusion without hemodynamic involvement. In this study the diagnosis was made after 30 weeks of pregnancy in most of patients, and the laboratory tests were negative for other pregnancy-associated diseases −including collagen diseases−.

Our results coincide with those of several publications[7-10] describing that pericardial effusions in pregnant women are much more frequent in the third trimester of pregnancy. Only two patients were found with a negative echocardiogram before 30 weeks of pregnancy who subsequently presented effusion and they had a diagnosis of pre-eclampsia.

Regardless of the existence or not of pre-eclampsia, the most frequently found risk factors were obesity and high blood pressure; a result that coincides with that described by Franco-Hernández *et al.*[11].

The patients with pericardial effusion who did not have a diagnosis of pre-eclampsia or other pregnancy-associated disease did not have symptoms or signs of other diseases ether that could explain the cause of the effusion; in addition, they had normal values of total protein, albumin in plasma and protein in urine. However, in those with aggravated pre-eclampsia, there was a decrease −albeit slight− in total protein and serum albumin in most patients, and proteinuria was positive. These results also coincide with those of other published studies[10-12].

As mentioned in the results none of the patients had severe pericardial effusion or hemodynamic involvement. In all cases the effusion was mild or moderate; for this reason, no treatment was imposed in any case, only clinical and echocardiographic follow-up was carried out and no invasive procedure was required, as happened in the cases published by Salas Quiroz *et al.*[10], which required pericardiocentesis.

The effusion persisted only in two patients at 15 days postpartum, and only one maintained it beyond two months, so studies were carried out to detect other diseases and the presence of systemic lupus erythematosus was demonstrated. Although colchicine is a drug that could be used during breastfeeding, it is reserved for selected cases, which is why it was not used in this study where there were no patients with severe pericardial effusion.

CONCLUSIONS

Mild or moderate pericardial effusion was more frequently found in patients with acute pre-eclampsia, chronic high blood pressure, obesity, proteinuria, hypoproteinemia and hypoalbuminemia; and in most cases resolved within the first 15 days postpartum.

RECOMMENDATIONS

If the pericardial effusion persists beyond two months or longer after delivery, new studies should be carried out in order to dismiss other causes that might perpetuate it.

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