Archives of Cardiology and Cardiovascular Diseases

ISSN: 2638-4744

Volume 1, Issue 2, 2018, PP: 32-42

Pharmacologic Pericarditis

Jose Gabriel Charria[1]*, Ricardo Criales[2], Ivette Gonzalez[2], Natalia Martinez[2], Diego Severiche[2]

[1]*Palermo Clinic. Bogota, Colombia.

[2]university of La Sabana, University of La Sabana Clinic. Chia, Colombia.

jose.charria@gmail.com

***Corresponding Author:** Jose Gabriel Charrina, Address Kilometer 21 North Highway — Way to La Caro, Chía Cundinamarca.*

Abstract

The pericardial disease is one of the most frequent causes of illness within the one that affects the heart, the inflammation process that happens in the pericardium can cause different clinical manifestations that can affect the well being of the patient who is affected.

In some cases different drugs used to treat conditions can have adverse reactions that compromises the pericardial sack by the production of inflammation, this condition is known as pharmacologic pericarditis.

In the present chapter epidemiological data, physio pathological mechanisms, clinical manifestations, diagnostic approach and treatment are driven, also data taken by different sources is presented. Is important to notice that there is a lack of evidence regarding the subject of matter so some of the information that is presented on the chapter was taken from case reports and series reports.

There is a need of having more research so many others conclusion and findings can be extrapolated so recommendations can be given further.

Keywords: *Pharmacological, pericarditis, drugs adverse reactions, pericardial diseases.*

Introduction

Pericardial diseases can affect a variety of patients that are affected by systemic diseases or diseases that only affects the heart [1], its clinical manifestations can be more relevant beside the sex, age, socio-economic characteristics. Some descriptions reveal that the condition is frequent in the presence of viral infections such as Coxsackie virus infection but the infection etiology is not the only cause. [2]

Pharmacologic pericarditis is a condition that can be seen in different diseases treatments and is a consequence of an adverse reaction that can be explained by different mechanisms, the data that exist within the international literature of pharmacologic pericarditis is poor so is important to have research about the topic and to have reviews that present clear information regarding the condition. [3]

In this chapter some definitions, epidemiological data, physio pathological approach, clinical presentation and diagnose approach, treatment and prognosis related to the pharmacological pericarditis are presented.

In general terms it can be said that the evidence and information of pharmacological pericarditis is poor, some of each is driven by case reports that have been published around the globe. Pharmacological pericarditis is a rare condition that can affect anyone who receive drugs or medications to treat any disease so when is appropriate is a condition that have to be taken into account when the clinical suspicious arrive.

The clinical manifestations of pharmacological pericarditis do not differ from the ones that are presented in any other form of pericarditis, is important to notice that this condition is considered as an adverse event that can be caused by different drugs and that the physio pathological explanation related to its appearance it's variated and is related to the mechanism of actions of the drugs and medications. [4]

The diagnosis process related to the condition have the influence of some basic approach as electrocardiography and echocardiography but also from some more advanced techniques such as magnetic resonance and pericardial biopsy [5], there is also some information related to the way of how this condition can be treated and which is the prognosis of it.

During the next subheadings of this review the definitions and terms of the pharmacologic pericarditis will be addressed, epidemiological data, clinical presentation, etiology and physio pathology, diagnosis approach, management and prognosis as well.

Materials and Methods

We perform a narrative review regarding the importance of acute pericarditis with some information regarding it frequency of presentation, clinical manifestations, diagnosis methods, treatment approach and prognosis.

A more detail review regarding the pharmacologic pericarditis was done.

Results and Discussions

Pharmacologic pericarditis

Definition

The pericardium is defined by a serous membrane composed by two layers, parietal and visceral pericardium, it has a strong relation with the heart muscle and can be affects as al the tissues and vital organs by different types of conditions such as traumatic, infectious, metabolic and others such as systemic conditions like systemic lupus erythematosus. Without taking into account the mechanism of production of the inflammation, the contact with any of those agents with the pericardial membrane can produce an inflammatory response that can generate an acute pericarditis; in some articles and literature there are explanations of how this can happen. [6]

Pharmacologic pericarditis is a condition that appears after the contact with a drug or medication to treat any disease or symptom, it is considered as an adverse event or as a negative pleiotropic event [7]. In general terms any medication can cause pericardial inflammation but there are some that have a strong relationship because it's direct effect within the heart and pericardium. A pleiotropic effect is described as a condition that appears after the exposure to a drug and it's not related to its mechanism of action and can happen as a condition that was not expected to happen within a treatment, it can be a positive pleiotropic event such as the appearance of hair within the minoxidil treatment for arterial hypertension or as a negative pleiotropic event such as pharmacologic pericarditis.

The appearance of the condition can be after a unique exposure to the drug or after the chronic use of it, the mechanism to predict which patient will be affected in an acute or chronic form it hasn't been dilapidated to date, each patient can be affected because of intrinsic effects not related to the pharmacological action of the drug but as an idiosyncratic relationship. The main evidence that exist until date in the global literature is the one that has been described in case reports and series reports. It's important to notice that there exist multiple mechanisms form which the pericardial involvement can be seen after the exposure to a specific drug but there is one unique condition that can be driven as a pathognomonic characteristic of the condition and that is the history to drug exposure and in theory the resolution of the condition after the stop of drug use which is the main management premise. [7]

During the next subheading of this review some epidemiological issues will be addressed.

Epidemiology

Pharmacologic pericarditis is one of the multiple causes of pericarditis that has been described, up to date this specific condition do not have a well established data regarding its prevalence or incidence. [8]

In general terms and form data around the globe, the pericarditis in almost all cases doesn't have a clear cause, some data reveals that 87% of the patients whom suffer this condition will not have a triggering cause. So it diagnosis and identification can fall on sub registers and many patients can be sent home without notice of the presence of the condition. The main cause of the condition are the infection by viral agents such as Coxsackie virus a and b, echo virus, adenovirus, parvovirus B19. Other causes are related such as the post infarction causes which contributes with approximately 5 — 25% of the cases, chronic kidney disease on dialytic therapy 5 — 13%, neoplastic causes, autoimmune disease such as lupus erythematosus and rheumatoid arthritis 3 — 5% and bacterial and mycobacterial infections 1 -2%. [9]

Also is important to take into account that some data driven by some registers shows that the data scarce, it is however estimated that 0,1% of the income emergency room admissions are due to pericarditis and only 5% of the causes are presented clinically with chest pain. [10, 11]

When the pharmacological pericarditis is suspected, the epidemiological data is more confusing and scarce; it is believed that pharmacological pericarditis contributes with 1% of all causes of pericarditis. So is important to generate data that can be used to have more information regarding its frequency of appearance, its prevalence and incidence so a more structured diagnosis and management approaches can be implemented. [12]

The drugs or pharmacological agents that are more related with the appearance of the condition are procainamide, anticoagulant therapy, penicillin, hydralazine, anti tuberculosis drugs, biological therapy, phenytoin related and other anticoagulants agents, anti psychotics drugs. However the exact frequency data lacks; and in general terms any drug can cause the appearance of adverse effects and pharmacological pericarditis can be one of them. [13]

More research and registers are needed to generate information that can be used for research purpose or only for clinical approximation.

During the next subheading of this review the clinical presentation of pharmacologic pericarditis will be addressed.

Clinical Presentation

The pericardial compromise is due to an inflammation process and also to the production of abnormal amount of pericardial fluid. The characteristics of the fluid and its retention can cause a variety of symptoms and signs that are seen in patients who are affected.

The main clinical presentation is the chest pain, pericardial rubbing and electrocardiographic alterations. Among the typical symptoms mentioned above, chest pain is the main manifestation of acute pericarditis, which is described as a retrosternal and/or located on the left precordium [14], this pain is severe in intensity measurements and radiates to the neck, shoulders or dorsal region, in some times it can mimic an acute coronary syndrome by which is important to take into account the patient history and risk factors associated. Also it has been described that the pain also have neuritic characteristics such as the increase with deep inspiration and with positional changes such left lateral decubitus and with the supine position. Also a characteristic sign it has been described semiologically and is called the "Moorish praying" which consist of a decrease of the pain intensity with sitting and genupectoral positions. [15]

During the clinical examination is important to search the pericardial rub, which it has been described as a pathognomonic finding, its related with cardiac movements during atrial and ventricular systole and rapid ventricular filling; when the pericardial friction has a single component it can be confused with mitral or tricuspid systolic murmur. [16, 17, 18, 19]

In advanced stages of the disease and when the inflammation process and fluid production is elevated a cardiac tamponade can be seen with all the clinical and hemodynamically manifestations that occurs during this condition so is important when the clinical suspicious arrives the approximation and management have to be done in a urgent fashion so the mortality and morbidity driven can be affected. [20, 21, 22]

Beside the clinical manifestations that can be seen with the cardiac or pericardial compromise, is also important to search other clinical manifestations such as fever, joint edema or pain, dyspnea, chills and other symptoms and signs that can lead to think an association of the pericardial affection with other systemic or specific condition. Is relevant that the clinical manifestation of pharmacologic pericarditis do not differ from the clinical presentation of other forms of pericarditis. [23]

During the next subheading of this review the etiology and physio pathology of pharmacologic pericarditis will be addressed.

Etiology and Physio Pathology

Within the various causes of pericardial involment and its manifestation as acute pericarditis the pharmacologic pericarditis will be mentioned, the pericardium compromise due to pharmacological agent's is not frequent but is an important cause to take into account at the time of diagnosis approximation in patients with systemic and chronic diseases that need management with various agents.

There exist in global literature some reports and papers that describe the relationship and appearance of pericarditis after drug exposure, the onset can differ in clinical presentation regarding the time, sometimes the manifestation can occur rapidly and sometimes it can happen after days or weeks of exposure. This led to think that the physiopatological mechanism are variated, in the next part of the chapter, the mechanisms will be addressed making a relationship between the etiology and physio pathology.

Some drugs that have been described are going to be evaluated.

Antitumoral drugs. Antitumoral drugs, which have been related in case reports are associated with development of acute pericarditis. Anthracyclines, which are used for handling solid tumors and blood borne, are key players in the single use, or as part of adjutant, curative or palliative for different malignancies regimes; these are derived from the bacteria Streptomycin peucetius, and doxorubicin, daunorubicin and epirubicin are some of them. [24]

Different studies have demonstrated that these agents are associated with cardio toxicity, which has its appearance immediately after a single dose of the drug or after complete a week of treatment. [25] The different anomalies that have been described are characterized by cardiac electrophysiological changes, pericarditis and myocarditis syndrome and/or left ventricular failure. [26]

The mechanisms of myocarditis pericarditis syndrome are multi factorial, within the reports the role of free radicals is described, since the quinone of doxorubicin is reduced semiquinone form by cytochrome P450 reductase, this metabolite is rapidly oxidized to form original quinone, creating superoxide anions, which generate hydrogen peroxide that have toxic effects. [27]

Management patients with doxorubicin decreases levels of glutathione peroxidase by action of the same drug. Glutathione peroxidase is the enzyme that in contrast to superoxide dismutase and catalase has the ability to counteract the activity of free radicals at cardiac level, but is inhibited by the same toxic effect of the drug which enhanced free radicals on the heart and produce the aforementioned deleterious effects. [28] The other two mechanisms described for cardiac toxicity and development of the complications described, are based on calcium depletion on sarcoplasmic reticula and formation of pro inflammatory cytokines, such as histamine, alpha tumor necrosis factor and interleukin 2. [29]

Moreover, it is important to mention analogue anti neoplastic pyrimidine, cytarabine, which is essential for the management of acute myeloid leukemia chemotherapy. Xian et al. Report a case of a patient of 25 years with newly diagnosed acute myeloid leukemia, in whom management cytarabine was initiated; during the first cycle of chemotherapy, the patient developed mild precordial chest pain improving with the administration of ibuprofen. During the second phase, a new episode of chest pain was documented it was severe and associated with a fever, pericardial friction with auscultation and electrocardiographic changes that were suggestive of acute pericarditis. [30] After a third round of chemotherapy, the dose of cytarabine was reduced and management with dexamethasone was initiated as a preventive fashion. With this, a comparison it can be made with respect of time of onset of symptoms of acute pericarditis; which have appeared almost immediately after administration; so the cause can be identified as a triggering factor for symptoms that have correlation with drug use and dose, on the other hand are of different type anti tumoral drugs that have no are evident changes with respect to the presentation of typical acute pericarditis.

5 Amino Salicylic Acid. Among the literary descriptions of drug pericarditis, it has been given an important role to drugs used for the management of ulcerative colitis and Crohn's disease; in them, the most outstanding group, is the 5 amino salicylic acid (5- ASA). This drug has been described in several research works, which is the active component of sulfasalazine and mesalazine. These drugs have their main action on the inhibition of arachidonic acid and cyclooxygenase, and there are used to reduce the production of inflammatory mediators and attenuate the inflammatory response generated by the aforementioned diseases.

The described development of pericardial inflammation produced by 5-ASA is not described accurately, but there are theories highly concordant and that can explain clinical presentation: direct toxic effect on myocardium and pericardium, an allergic reaction mediated by immunoglobulin E, mediated hypersensitivity reaction cell or a humoral antibody response. [31]

Sulfasalazine. Studies by Habal and Greenberg showed a pericarditis development in a patient with chronic use of sulfasalazine for rheumatoid arthritis. Increased doses and corresponding effects on pericardium with the development of acute pericarditis appeared two weeks after a dosage increase was conducted. [32]

The mechanism associated with clinical development of acute pericarditis is based on a hypersensitivity reaction and is classified as a drug allergic reaction, whereby the medicine should be discontinued immediately. Another case reported by Özcan et all, show a 47-year-old patient that came with chronic management with methotrexate and corticosteroids and has recent onset of sulfasalazine, develops lupus like syndrome induced by drugs and concomitantly chest pain associated to palpitations and pericardial effusion compatible with pericarditis. [33]

Other cases reports similar findings, development of pericarditis associated with sulfasalazine, are evident in one case report by Serge at al. In a patient treated with said drug for 16 years, in whom increased dosage of 1g to 3g each day, with development within a few weeks. [34] It is possible with these cases to claim that the cardio toxicity and the subsequent development of pericarditis associated with sulfasalazine is explained with an increase in dose of the drug.

Given these cases, it is necessary to mention the research conducted French pharmacovigilance network, which is based on reviewing reports of adverse reactions in patients using 5-ASA during 2 years, they found 8 cases of pericarditis and 4 cases of myocarditis. [35] Subsequently a review of all cases reported by secondary toxicity of 5 -ASA from 1984 to 2011 revealed 16 cases of pericarditis.

With this is considered important to note that the development of acute pericarditis with use of high doses of sulfasalazine can be produced, although not usual, but is frequent in the management of patients with ulcerative colitis and Chron disease.

Mesalazine. It is considered important to mention two case reports that have been reported regarding the management with mesalazine; The first one documented the development of acute pericarditis in a 20-year-old patient with a history of 4 years of ulcerative proctitis. Management with oral and topical mesalazine was started, with an adequate response, but it the patient attend because of two weeks of chest pain, myalgias, arthralgias and palpitations. He received symptomatic management and drugs for daily use were suspended, with clinical monitoring and improvement of the clinical picture. At discharge, he resumes the use of medications, including mesalazine and re- admits for the same clinical presentation after. It was finally determined that the patient was suffering from mesalazine-induced pericarditis. [36]

In the second place, an 18-year- old patient with Chron disease was mentioned with treatment with mesalazine, who presents a clinical picture of severe retrosternal pain that was irradiated to the left arm. On admission to the hospital, diagnosis of pericarditis was made due to electrocardiographic changes, increase in cardiac enzymes, positive c reactive protein and changes in cardiovascular magnetic resonance with the presence of gadolinium uptake at the late phase and edema at the pericardial level. [37]

The physiopatological association of the two cases presented above is based on a hypersensitivity reaction mediated with humoral function, and formation of antibodies against mesalazine; which cause inflammation in the pericardium by cross reaction. In both cases, an increase in the eosinophils count was observed and in one of the two cases, the cardiac biopsy evidenced eosinophilic infiltration. [38]

What supports the theory of the reaction of hypersensitivity regarding the use of mesalazine specifically. It is important to mention that within the case reports, it has been seen that the beginning of the clinical pictures where approximately 2 to 6 weeks after the beginning of the treatment with mesalazine, but the literature has reported very early beginnings, within the first 48 hours, and late, mentioning the onset of clinical symptoms two years after the start of treatment. [39]

The development of the clinical picture has always had typical symptoms and signs, which have been described previously with respect to the presentation of pericarditis; and these have disappeared with the suspension of the drug, with complete remission of the picture after the complete suspension, but cases have been described in the literature, whereby restarting the management with mesalazine or changing the route of administration can trigger the clinical picture reactivation. [40]

Antipsychotics. Last but not least, mention will be made of the association of use of an anti psychotic

medication regarding the presentation of acute pericarditis; which is clozapine. This anti psychotic antagonist of the dopaminergic receptors at the level of the central nervous system has presented fewer side effects with respect to extra pyramidal symptoms, as can be presented by others from the same group.

Within the expected side effects, orthostatic hypo tension and tachycardia have been described, without generating an imminent risk for the patient life; but a review of the literature by Wehmeier et al. [41], reported 6 cases of pericarditis related to the use of clozapine. The physiopatological association of this cases are not well described by the literature, but some authors, describes how in the clinical presentation of a patient with recent use of clozapine, a picture of acute pericarditis is presented, with a significant increase in c reactive protein, fibrinogen and hemogram with high eosinophilic count; in addition to rapidly progressive cardiac deterioration with a 600 cc pericardial effusion confirmed by ultrasound that requires pericardial fluid drainage and strict surveillance due to gradual increase of the pericardial fluid after drainage thereof. With these stipulated para clinical parameters, it can be inferred that the mechanism of development of the clinical presentation is based on a hypersensitivity reaction, in addition to activation of the humoral immune system due to an increase in c reactive protein. [42]

As it was presented there exist some reports that tries to confirm the linkage between the etiology, physio pathology and clinical presentation of drug induced pericarditis; this is important because as the knowledge of the relationships between those elements, the understanding of the condition can arise and a more realistic guided interventions can be defined to treat the condition from the diagnosis point of view but more important from the management point of view.

During the next subheading of this review the diagnosis approach will be addressed.

Diagnosis Approach

The diagnostic methods in acute pericarditis are different and varied, first of all there is an important thing and it is the clinical approximation with a complete medical history and physical examination where the symptoms and signs of the condition need to be taken into account always. Additionally, other things need to be done when the approximation process is done this ones are things that can guide the diagnosis process to find where is the cause of the problem situated, this includes a complete blood count, c reactive protein and globular sedimentation rate measurements, troponin evaluation and thoracic x rays. Also there exist electrocardiographic findings that can suggest the presence of the pathology its cardiac compromise this method are the most easy to perform because its availability and easily interpretation however the findings aren't specific and can predispose to mistake during the diagnosis process. Some other approximations are those related with images findings and here the echocardiography techniques and tomography techniques take place. [43]

In the diagnostic methods of acute pericarditis appears as a gold standard the use of echocardiography and pericardial ultrasound, which identifies the existence of pericardial fluid and edema of the layers surrounding the pericardium, however the presence of pericardial effusion not always confirms the disease because it can appear in other pathologies and not necessary those that affect directly the pericardium. [44]

It is well-known that the focus of this discussion focuses on pericarditis secondary to medication use, and as emphasized three groups of drugs are mentioned below, the diagnostic methods that supported the final diagnosis will be the withdrawal of medication and the clinical outcome after stop the drug exposure.

First, it has been reported that 80% of patients [45] may be accompanied by changes in the electrocardiogram, which hint at ST segment elevation in most leads except aVR and V1 also appearance of negative T waves, five days after the acute clinical presentation; but it is important to mention that the two findings together have not been documented in drug pericarditis, because if changes are evident together, the diagnosis would focus more on ischemic heart disease. Likewise, different studies have documented atypical ECG changes, which are not related to changes of ST types mentioned above but to unspecific findings. [46]

Secondly, it is important to mention laboratory tests which have been demonstrated in various cases that supported the diagnosis. Hemogram, in most literature it has shown increase in eosinophils [47], unchanged in neutrophils, platelets or red line; which supports

theories of pathophysiology of the disease, which is caused by a hypersensitivity reaction and activation of the immune humoral system; other inflammation markers such a c reactive protein may be increased. [48, 49, 50]

Troponin, it may be a parameter that guides the diagnosis to other clinical suspicion, but case reports have shown increased in the same at 3 times the value provided by the laboratory itself as increased creatine kinase.

So, with the above and reviewing multiple case reports, there is no pathognomonic laboratory that can test the direct relationship between the use of certain medications and drug development pericarditis. All case reports have shown that the final diagnosis has been generated by trial and success; the suspension of the drug and close monitoring of clinical and patient improvement.

All patients have undergone relapse stage clinical continue with the chronic use of the drug in question, but the diagnosis was achieved by clinical suspicion derived by the health group.

During the next subheading of this review the management approach will be addressed.

Management Approach

In the review of the scientific literature, no randomized clinical studies, systematic reviews or meta-analyzes on the treatment of drug-induced pericarditis were found. For this reason, the available evidence is based on the report of cases with different agents, the recommendations made by international guidelines and the choices made by the authors. However, all the articles reviewed agree that the pillar of treatment is the discontinuation of the offending drug observing evident clinical results in the first days after cessation of drug administration even during the first 7 days. [51, 52]

However, the use of corticosteroids has also been described in cases in which pericarditis has been cause by mesalamine, mesalazine, Doxorubicin, daunorubicin, Carbine and Ipilimumab emphasizing that no randomized clinical trials, case series, or observational studies comparing outcomes were found after corticosteroid treatment versus withholding. For this reason, the decision falls on the patient's clinical condition and the physician's expertise without forgetting the possible adverse effects and the lack of evidence of a clinical benefit. [53]

It is also important to bear in mind that the use of corticosteroids was only reported with the aforementioned medications, and that in each case prednisolone or methylprednisolone short schemes were used from low doses to a dose of even 1 gram of methylprednisolone. [54, 55, 56] The use of metamizole has also been proposed in the case of Mesalazine-Induced Pericarditis.

It should be mentioned that in a case of hydrochlorothiazide-induced pericarditis, the patient was managed with aspirin for symptomatic management. However, this was only described in the previously mentioned case and its use should be avoided or use with caution since, the use of anti-inflammatories has not been reported extensively and most cases resolve only with the withdrawal of the causative agent. In addition to the above, there is a risk that this group of drugs in cases in which pericarditis is accompanied by myocarditis, may increase myocardial inflammation and therefore necrosis which may increase mortality. [57, 58]

In the cases that the symptoms persist despite discontinuing the causative agent, other possible etiologies of pericarditis should be investigated. Additionally, if signs of cardiac tamponade are found, the pericardiocentesis or pericardial window should be considered, which will depend on the patient's condition, the extent of the effusion and other findings or associated complications such as constrictive pericarditis. It should be taken into account that in these patients there is concern that the use of anticoagulants may favor an increase in the effusion, although the European guidelines of cardiology for pericarditis reported a study of 500 patients in which the use of anticoagulants did not increase the risk of cardiac tamponade. [52, 53]

As mentioned throughout the chapter, there is still a need for clinical evidence drawn from clinical studies or case series for the management of these patients to help guide the clinician in the decision-making of this particular an interesting topic.

During the next subheading of this review the prognosis of pharmacologic pericarditis will be addressed.

Prognosis

There is also gaps in knowledge regarding the prognosis of pharmacological pericarditis, some

of the data is extrapolated from the other causes of pericarditis, here we present some information regarding the prognosis of the disease.

In general terms the prognosis of pharmacological pericarditis is good his due to that in theory the condition can be solved when the related drug is interrupted, however sometimes the condition can progress and complications may appear such a cardiac tamponade by an excessive fluid accumulation in which case if the patient is not operated promptly more severe consequences can appear such as death. [59]

There are some factors that can be associated with an adverse outcome and are related with the basal condition, also the age of patient and if the inflammation resolves after stop the drug exposure. Some things can be done to control and minimize the risk of adverse outcome and is the strict monitoring and control process after the diagnosis is made, strategies' such as follows up echocardiography and specialized evaluations can be related with a better outcome.

The adequate symptoms management and the strictly follow up are factors associated with good outcomes during the management of the condition. Is also important to take into account the risk evaluation when some medication that has an association described however and due to the gaps in knowledge regarding the physiopatological mechanisms of disease onset to mention that potentially any drug can produce acute pericarditis.

Conclusions

Pharmacologic pericarditis is a condition that is related to drug exposure, it's an inflammation of the pericardial sack where fluid can be produced concomitantly and its onset is varied.

It frequency hasn't been identified due to is a rare disease that can be present at any time during the pharmacologic exposure.

The clinical manifestations of pharmacologic pericarditis are the same that happen in any other form of acute pericarditis, the course of the illness is varied in time also its severity and clinical presentation.

The most reliable thing that happens during the pharmacologic pericarditis is the instauration of the disease after a drug exposure, some inflammatory and immune mechanisms have been described during its onset and course.

The diagnosis approximation is done with clinical findings, markers of inflammatory disease, electrocardiographically approaches and finally with imagen technics.

The management of the condition depends on of its clinical manifestations and severity, in general terms the most important intervention is drug withdrawal.

The prognosis of the disease is adequate when the diagnosis is done in a promptly manner.

There is a lack of evidence regarding the condition that's why is important to enhance medical research in the matter and is important to write about this rare condition.

Acknowledgments

We thank our families for all the support and time that was permitted to us during the preparation of this manuscript.

References

[1] Klein AL, Abbara S, Agler DA, et al. American Society of Echocardiography clinical recommendations for multi modality cardio vascular imaging of patients with pericardial disease: endorsed by the Society for Cardiovascular Magnetic Resonance and Society of Cardiovascular Computed Tomography. J Am Soc Echocardiogr. 2013;26:965- 1012. doi: 10.1016/j.echo.2013.06.0.23.

[2] Imazio M, Spodick DH, Rubato A, et al. Controversial issues in the management of pericardial diseases. Circulation. 2010;121:916–28. doi: 10.1161/circulation aha.108.844753.

[3] Neruda Adler, Philippe Charron, Massimo Imazio, et al. Guía ESC 2015 sobre el diagnóstico y tratamiento de las enfermedades del pericardia Grupo de Trabajo de la Societal Europea de Cardiología (ESC) para el diagnóstico y tratamiento de las enfermedades del pericardia Avalada por: The European Association for Cardio-Thoracic Surgery (EACTS). Rev Esp Cardio. 2015;68:1068-74. doi.org/10.1016/j.recesp.2015.11.002.

[4] Imazio M. Pericarditis: Pathophysiology, Diagnosis, and Management. Curr Infect Dis Rep. 2011 Aug;13(4):308-16. doi: 10.1007/s11908-011-0189-5.

[5] Imazio M, Spodick DH, Rubato A, et al. Diagnostic issues in the clinical management of pericarditis. Int J Clin Pract. 2010 Sep;64(10):1384-92. doi: 10.1111/j.1742-1241.2009.02178.x.

[6] Imazio M. Evaluation and management of pericarditis. Expert Rev Cardiac Ther. 2011 Sep;9(9):1221-33. Doi : 10.1586/erc.11.111.

[7] Mai sch B, Seferovi ´c PM, Risti ´c AD, Erbel R, et al. Task Force on the Diagnosis and Management of Pericardial Diseases of the European Society of Cardiology. Guidelines on the diagnosis and management of pericardial diseases executive summary. Eur Heart J. 2004;25:587–610. doi: 10.1016/j.ehj.2004.02.002.

[8] Imazio M, Cecchi E, Michelin B, et al. Pericarditis versus viral or idiopathic acute pericarditis. Heart. 2008;94:498–501. doi: 10.1136/hrt. 2006 .104067.

[9] Leites A, Mendez D, Brandon N. Pericarditis Aguda en el Adulto. Biomedical 2014, 9 (3):64 – 73. ISSN: 1510-9747.

[10] Imazio M. Contemporary management of pericardial diseases. Curr Opin Cardio. 2012;27:308–17. doi: 10.1097/hci.ob013e32 83524fbe.

[11] Imazio M, Rubato A, Trinchero R, Adler Y. Diagnosis and management of pericardial diseases. Nat. Rev. Cardio. 2009;6:743–751. doi: 10.1038/nrcadio.2009.185.

[12] LeWinter MM. Clinical practice. Acute pericarditis. N Engl J Med. 2014;371: 2410–6. doi: 10.156/ NEJMcp1404070.

[13] Leites A, Mendez D, Brandon N. Pericarditis Aguda en el Adulto. Biomedical 2014;9(3): 64 – 73. ISSN: 1510-9747.

[14] Imazio M, Gaita F. Diagnosis and treatment of pericarditis. Heart. 2015;101:1159– 68. doi: 10.1136/heartjnl-2014-306362.

[15] Ruiz Garcia E, Ruiz Garcia M, Vela Colmenero RM, et al. Pericarditis Aguda. Med fam Andal. 2017;2:186-195.

[16] Sclerotic PM, Rustic AD, Maksimović R, et al. Pericardial syndromes: an update after the ESC guidelines 2004. Heart Fail Rev 2013;18:255-66. doi: 10.1007/s10741-012-9335-x.

[17] Imazio M, Rubato A, Trinchero R, Adler Y. Diagnosis and management of pericardial diseases. Nat. Rev. Cardio. 2009;6:743–751. doi: 10.1038/nrcadio.2009.185.

[18] Imazio M, Spodick DH, Rubato A et al. Controversial issues in the management of pericardial diseases. Circulation. 2010;121:916–928. doi: 10.1161/ circulation aha.108.844753.

[19] Imazio M, Rubato A, Derosa FG et al. Aetiological diagnosis in acute and recurrent pericarditis: when and how. J. Cardiac. Med. 2009;10: 217–230. doi: 10.2459/jch.0b013e328322f9b1.

[20] Imazio M, Cecchi E, Michelin B et al. Indicators of poor prognosis of acute pericarditis. Circulation. 2007;115:2739–2744. doi: 10.1161/circulation aha.107.761064.

[21] Roy CL, Minor MA, Brookhart MA et al. Does this patient with a pericardial effusion have cardiac tamponade. JAMA. 2007;297: 1810–1818. doi: 10.1001/jama.197.16.1810.

[22] Imazio M, Trinchero R. Triage and management of acute pericarditis. Int. J. Cardio. 2007;118:286–294. doi: 10.1016/j.icard.2006.07.100.

[23] Edwardson DW, Narendrula R, Chewchuk S, et al. Role of Drug Metabolism in the Cytotoxicity and Clinical Efficacy of Anthracyclines. Current Drug Metabolism. 2015;16(6):412-426. doi:10.2 174/138920021688815091511203 9.

[24] Pai VB, Nahata MC. Cardiotoxicity of chemotherapeutic agents: incidence, treatment and prevention Drug Saf. 2000. Apr; 22(4) :263-302. PMDI: 10789823.

[25] Lenaz L, Page JA. Cardiotoxicity of Aureomycin and related anthracyclines. Cancer Treat Rev 1976;3: 111-20.

[26] Doroshow J, Locker G, Myers C. Enzymatic defenses of the mouse heart against reactive oxygen metabolites: alterations produced by doxorubicin. J Clin Invest.   ;1980; 65:128–35. doi: 10.1172/JCI109642.

[27] Olson R, Muslin P, Brenner D. Et al. Doxorubicin cardio toxicity may be caused by its metabolite, doxorubicinol. Proc Natl Acad Sci USA . 1988;85:3585–9. PMID: 2897122.

[28] Takemura G, Fujiwara H Prog. Doxorubicin-induced cardiomyopathy from the cardio toxic mechanisms to management. Cardiac Dis. 2007 Mar-Apr; 49(5):330-52. doi: 10.1016/j.pcad .2006.10.002.

[29] Yang X, Liu W, Lyons A, et al. Pericarditis associated with carbine therapy for acute myelocytic leukemia: a case report. Eur J Clin Pharmacy. 2018 Feb;74(2):181-182. doi: 10.1007/s00228-017-2355-7.

[30] Habal FM, Green berg GR. Treatment of ulcerative colitis with oral 5-aminosalicylic acid including patients with adverse reactions to sulfasalazine. Am J Gastroenterology. 1988;83:15-9. PMID: 289 2391

[31] Özcan HIZ, Elif Gulch, Yasemin ÖZKAN, et al. Pleuropericarditis Associated with Sulphasalazine in a Case of Rheumatoid Arthritis: A Drug-Induced Lupus-Like Syndrome. Arch Rheum 2011; 26(3): 248 – 253. doi: 10.5152/tjr. 2011.039.

[32] Perrot S1, Aslangul E, Szwebel T. Sulfasalazine-induced pericarditis in a patient with ulcerative colitis without recurrence when switching to mesalazine. Int J Colo rectal Dis. 2007 Sep;22(9):1119-21. Epub 2007 Apr 18. doi: 10.1007/s00384-007-0310-2.

[33] Brown G. 5-Aminosalicylic Acid–Associated Myocarditis and Pericarditis: A Narrative Review. Can J Hosp Pharm. 2016 Nov-Dec; 69(6): 466–472. PMID: 28123193. doi: 10.4212/ cjhp.v6 9i6 . 1610.

[34] Bernardo S, Fernandez SR, Araújo-Correia L. Mesalamine-induced myoperi- carditis — A case report. Rev Esp Enferm Dig 2016;108(11):753-756. doi: 10.17235/reed.2016.4016/2015.

[35] MicheleSorleto, Stefanie Dürrwald, and Marcus Wiemer. Mesalazine-Induced Pericarditis in a Patient with a Recent Diagnosis of Crohn's Disease: Apropos of a Case. Case Reports in Cardiology Volume 2015, Article ID& nbsp;728310, doi: 10.1155/2015/728310.

[36] Abu-Hijleh M, Evans S, Aswad B. Pleuropericarditis in a patient with in amatory bowel disease: A case presentation and review of the lit- erasure. Lung 2010;188(6):505-10. doi: 10.1007/ s00408-010-9259-y.

[37] Bernal-Sprekelsen JC, De las Marinas MD, Salvador A, et al. Recur- rent pericarditis in a patient with ulcerative proctitis due to mesalazine suppositories. Int J Colo rectal Dis 2010;25(9):1143-4. doi: 10.1007/ s00384-010-0921-x.

[38] Rehear PM, Heiser P, Schmidt H. Myocarditis, pericarditis and cardiomyopathy in patients treated with clozapine. J Clin Pharm Ther 2005; 30: 91-6. doi: 10.1111/j.1365-2710.2004.006161.x.

[39] Markov J, Momcilov-Popin T, Mitotic D, et al. Clozapine-induced pericarditis. Afr J Psychiatry (Johannesbg). 2011 Jul;14(3):236-8. doi: 10.4314/ajpsy.v14i3.7.

[40] Imazio M, Spodick DH, Rubato A et al. Controversial issues in the management of pericardial diseases. Circulation. 2010;121:916–928. doi: 10.1161/ circulation aha.108.844753.

[41] Les mes Lora C, Pous A. Pericarditis Aguda. Urgencias en Atencion Primaria. www.jano.es/ ficheros/sumarios/1/63/1440/44/1v63n1440 a13034161pdf001.pdf.

[42] Markov J, Momcilov-Popin T, Mitotic D, et al. Clozapine-induced pericarditis. Afr J Psychiatry (Johannesbg). 2011 Jul; 14(3):236-8. doi: 10.4314/ajpsy.v14i3.7.

[43] Neruda Adler, Philippe Charron, Massimo Imazio, et al. Guía ESC 2015 sobre el diagnóstico y tratamiento de las enfermedades del pericardia Grupo de Trabajo de la Societal Europea de Cardiología (ESC) para el diagnóstico y tratamiento de las enfermedades del pericardia Avalada por: The European Association for Cardio-Thoracic Surgery (EACTS). Rev Esp Cardio. 2015;68:1068-74. doi.org/10.1016/j.recesp.2015.11.002.

[44] Davey P, Halloo D. Drug induced chest pain—rare but important. Postgraduate Medical Journal. 2000;76(897):420-422.doi:10.1136/pmj.76.897.420.

[45] Songbook Yun, Nicole D. Vincelette, Iyad Man sour, Dana Hariri, and Sara Motamed, "Late Onset Ipilimumab-Induced Pericarditis and Pericardial Effusion: A Rare but Life Threatening Complication," Case Reports in Ontological Medicine, vol. 2015, Article ID 794842, 5 pages, 2015. doi: 10.1155/2015/794842.

[46] Toughie Mahfood Haddad, Muhammad Sarfraz Nawaz, et al. "Probable Hydrochlorothiazide-Induced Pericarditis: First Case Reported," Case Reports in Medicine, vol. 2015, Article ID 319086, 3 pages, 2015. doi: 10.1155/2015/319086.

[47] Imazio M, Cecchi E, Michelin B, et al., "Pericarditis versus viral or idiopathic acute pericarditis," Heart. 2008;94 (4):498–501. doi: 10.1136/hrt.2006.104067.

[48] Imazio M, Rubato A, Maestroni S, Cumetti D, Belli R, Trinchero R, Adler Y. Risk of constrictive pericarditis after acute pericarditis. Circulation. 2011;124:1270–5. doi: 10.1161/circulation aha.111.018580.

Citation: **Jose Gabriel Charrina, Ricardo Criales, Yvette Gonzalez, Natalia Martinez, Diego Severiche**. *Pharmacologic Pericarditis. Archives of Cardiology and Cardiovascular Diseases. 2018; 1(2): 32-42.*