

## Primary Infection by Pericardial Tuberculosis in Immunocompetent Patient

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### Abstract

### Case Report

The high prevalence of pulmonary tuberculosis, which is endemic in some countries, is the main cause of pericardial tuberculosis, a figure that increases even more in immunocompromised patients, but nevertheless the incidence of primary pericardial infection by tuberculosis is low and therefore there are only case reports in literature. The prevalence of pericardial effusion secondary to tuberculosis in immunocompetent patients is low and only case reports have been found, perhaps due to low suspicion, so we intend to provide more evidence to the literature. For diagnosis we have imaging studies, culture, Xpert MTB/RIF system, Adenosine Aminase.

**Keywords:** Infection, Effusion, Pericardial, Tuberculosis, Pericarditis, Immunocompetent.

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## INTRODUCTION

Pericardial tuberculosis (TB) is found in 1-2% of immunocompetent patients with pulmonary tuberculosis in endemic areas, despite these, the suspicion is low in immunocompetent patients, with only case reports [1]. The Human Immunodeficiency Virus has a high prevalence of extrapulmonary tuberculosis, which represents a high prevalence of pericardial tuberculosis. TB is the cause of 70% of cases of pericardial effusion [2]. In 2019, Mexico reported 4,000 new cases of extrapulmonary tuberculosis, commonly between 24-44 age [3]. The most common presentation of pericardial tuberculosis is pericardial effusion (79.5%), clinically compatible with heart failure and/or cardiac tamponade, and presenting as constrictive pericarditis in 2-25%. Pericardiocentesis is the ideal screening and treatment method in patients who present with an effusion >1cm [4].

Pericardial effusion culture is the most widely used diagnostic method with a sensitivity of 53-75 [4]. Xpert MTB/RIF system can detect M. tuberculosis and

simultaneously determine rifampicin resistance, with a sensitivity of 50-97% and specificity of 99.2% [5]. The treatment of TB focuses on the prevention of complications of poor pericardial adaptation, remodeling and healing of the pericardial cavity, including constrictive pericarditis [4].

## CASE PRESENTATION

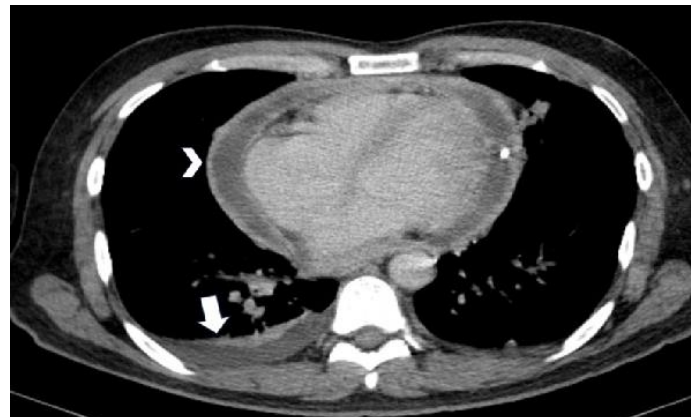
A 45-year-old male with no personal medical history, resident of Acapulco, Guerrero, denies overcrowding, alcoholism, drug addiction, contact with patients suspected of or positive for tuberculosis. He came for evaluation due to tachypnea, orthopnea, chest pain, chills, diaphoresis without hourly predominance and increased abdominal circumference. A simple computed axial tomography of the chest is performed (Image 1), in which a large volume pericardial effusion is observed without hemodynamic compromise. Admission labs: leukocytes 12.1, lymphocytes 1.0, glucose 125 mg/dl, creatinine 0.80, CPK-MB 38, lactic dehydrogenase 509 U/L, anti-HIV antibodies negative, antibodies for hepatitis B and C viruses negative.



**Image 1: Simple chest tomography: axial section of the mediastinum window in which an increase in volume and separation of pericardial sheets suggestive of pericardial effusion is observed at the level of the mediastinum**

Transthoracic echocardiogram reported: left ventricle with concentric remodeling, preserved systolic function with left ventricular ejection fraction of 60% and circumferential pericardial effusion with maximum leaflet separation of 24 mm with no tamponade data.

It was decided to perform evacuative pericardiocentesis with 900 cc drainage, reporting in cytology and cytochemistry: blood-like fluid, 3,500 cells of lymphocyte predominance (66%), pH 8.0, glucose 26 mg/dl, DHL 1144. Culture of bacteria and *M. tuberculosis* and GeneXpert MTB/RIF. With reduction of pericardial fluid volume by control image (Image 2).



**Image 2: Simple tomography of the chest. thorax: axial section mediastinal window control post pericardiocentesis in which a decrease in the separation of pericardial sheets with a decrease in the volume of effusion is observed at the level of the mediastinum pericardial (arrowhead)**

## RESULTS OF STUDIES

Acid-fast bacilli (AFB) smear of 2 samples positive. Genexpert MTB/RIF: positive for tuberculosis without resistance to rifampicin. A diagnosis of tuberculous pericarditis was confirmed, after which treatment was started for 6 months with Dotbal (rifampicin, pyrazinamide, ethambutol and isoniazid) completing 60 doses in 2 months and systemic steroid with prednisone 1 mg/kg/day, and continuing the support phase with Rifampicin and pyrazinamide for 4 months, providing follow-up of the patient, with complete clinical improvement.

## DISCUSSION

Pericardial tuberculosis remains one of the main causes of death and cardiovascular disability in endemic regions of pulmonary tuberculosis in the world, particularly where HIV prevalence is high [4]. TB occurs in only 1-2% of patients without immunocompromise and carries a high mortality rate [6]. Historically, contributors to this high morbidity and mortality included: little progress in our understanding of the immunopathogenesis of the disease, the lack of suspicion in immunocompetent patients as in this case; lack of development of a relatively inexpensive, rapid, accurate and widely available test that can be used at the point of contact in patients with suspected disease, as well as a

lack of training of personnel to perform procedures such as pericardiocentesis. Infection may occur by local extension from the lung, bronchi, adjacent lymph nodes, sternum and by peritoneal seeding [7] however in the case of the patient no other primary site of infection was identified.

The clinical presentation is characterized by chest pain, cough, dyspnea, night sweats, orthopnea, edema and weight loss, physical examination presents with cardiomegaly, pericardial friction rub, fever, tachycardia, paradoxical pulse, hepatomegaly, jugular engorgement and pleural effusion [8].

Diagnostic pericardiocentesis should be considered in all patients with pericardial effusion and the following diagnostic studies should be performed: Direct inoculation of pericardial fluid in double concentration Kirchner liquid culture medium (or equivalent medium), and culture for *M. tuberculosis*. Quantitative polymerase chain reaction (Xpert MTB/RIF) testing for *M. tuberculosis* nucleic acids as performed in our case, in other centres may not be able and limit the approach. Biochemical analyses to distinguish between exudate and transudate (proteins in fluid and serum; LDH in fluid and serum). White blood cell counts and analysis and cytology: a lymphocytic exudate favours tuberculous pericarditis. Indirect tests for tuberculous infection: interferon-gamma (IFN- $\gamma$ ), adenosine deaminase (ADA) or lysozyme assay [9]. Particularly where HIV/AIDS prevalence is high. Although not yet widely available, IFN- $\gamma$  is the only accurate test while ADA tests, used and interpreted in context, remain easily accessible in most laboratories and clinically useful. Diagnostic biopsy: In areas where tuberculosis is endemic, diagnostic biopsy is not required. In areas where tuberculosis is not endemic, diagnostic biopsy is recommended [9].

Treatment of TB is aimed at achieving three goals: eradicating and controlling active *M. tuberculosis*; alleviating cardiac compression and adverse hemodynamic sequelae (tamponade and heart failure); and preventing complications of maladaptive pericardial remodeling and scarring, including constrictive pericarditis [4]. Eradication treatment of TB consists of rifampicin, isoniazid, pyrazinamide, and ethambutol for 2 months, followed by isoniazid and rifampicin (total of 6 months of treatment) [6].

## CONCLUSION

Pericardial tuberculosis is a prevalent entity, and Mexico is an endemic country for pulmonary tuberculosis with a high report of extrapulmonary manifestations. This should always be kept in mind even in immunocompetent patients. The presentation of the previous case highlights the maintenance of this mycobacterium as a differential diagnosis when approaching pericardial effusion despite presenting a 1-2% incidence in the population with a history of

pulmonary tuberculosis without HIV infection. According to the reported cases, treatment should be carried out with the standard 6-month treatment based on rifampicin, isoniazid, pyrazinamide and ethambutol. Currently there are no reports of cases of pericardial tuberculosis and to demonstrate the efficacy of this regimen, this clinical case shows the clinical resolution after a standard regimen with a support phase completing 6 months.

## LITERATURE

- Ramírez-Lapausa, M., Menéndez-Saldaña, A., & Noguerado-Asensio, A. (2015). Tuberculosis extrapulmonar, una revisión. *Revista española de sanidad penitenciaria*, 17(1), 3-11. doi: 10.4321/S1575-06202015000100002. PMID: 25803112.
- Isiguzo, G., Du Bruyn, E., Howlett, P., & Ntsekhe, M. (2020). Diagnosis and management of tuberculous pericarditis: what is new?. *Current cardiology reports*, 22(1), 1-8. doi: 10.1007/s11886-020-1254-1. PMID: 31940097; PMCID: PMC7222865.
- Secretaría de Salud. Distribución de casos nuevos de enfermedad por grupos de edad. Estados Unidos Mexicanos 2019. Población General. México: SSA, 2020. [https://epidemiologia.salud.gob.mx/anuario/2019/morbilidad/nacional/distribucion\\_casos\\_nuevos\\_enfermedad\\_grupo\\_edad.pdf](https://epidemiologia.salud.gob.mx/anuario/2019/morbilidad/nacional/distribucion_casos_nuevos_enfermedad_grupo_edad.pdf)
- Kohli, M., Schiller, I., Dendukuri, N., Dheda, K., Denkinger, C. M., Schumacher, S. G., & Steingart, K. R. (2018). Xpert® MTB/RIF assay for extrapulmonary tuberculosis and rifampicin resistance. *Cochrane Database of Systematic Reviews*, 8(8), CD012768. doi: 10.1002/14651858.CD012768.pub2. Update in: *Cochrane Database Syst Rev*. 2021 Jan 15;1:CD012768. PMID: 30148542; PMCID: PMC6513199.
- Naicker, K., & Ntsekhe, M. (2020). Tuberculous pericardial disease: a focused update on diagnosis, therapy and prevention of complications. *Cardiovascular Diagnosis and Therapy*, 10(2), 289-295. doi: 10.21037/cdt.2019.09.20. PMID: 32420111; PMCID: PMC7225424.
- Fanlo, P., & Tiberio, G. (2007). Tuberculosis extrapulmonar. *Anales del Sistema Sanitario de Navarra*, 30(Supl. 2), 143-162. Recuperado en 24 de marzo de 2024, de [http://scielo.isciii.es/scielo.php?script=sci\\_arttext&pid=S1137-66272007000400011&lng=es&tlng=](http://scielo.isciii.es/scielo.php?script=sci_arttext&pid=S1137-66272007000400011&lng=es&tlng=).
- Adler, Y., Charron, P., Imazio, M., Badano, L., Barón-Esquivias, G., Bogaert, J., ... & ESC Scientific Document Group. (2015). 2015 ESC guidelines for the diagnosis and management of pericardial diseases: the task force for the diagnosis and management of pericardial diseases of the European Society of Cardiology (ESC) endorsed by:

- the European Association for Cardio-Thoracic Surgery (EACTS). *European heart journal*, 36(42), 2921-2964. doi: 10.1093/eurheartj/ehv318. Epub 2015 Aug 29. PMID: 26320112; PMCID: PMC7539677.
8. Uchi, T., Hakuno, D., Fukae, T., Takahashi, M., Takiguchi, S., Li, H. C., ... & Sueyoshi, K. (2019). Armored heart because of Tuberculous constrictive pericarditis. *Circulation: Cardiovascular Imaging*, 12(3), e008726. doi: 10.1161/CIRCIMAGING.118.008726. PMID: 30803258.
9. Jorquera-Román, M., Araya-Cancino, J., Enríquez-Montenegro, J., Obando-Valdés, J., Reyes-Cornejo, F., Gutiérrez, O. B., ... & Rojas, F. R. (2021). Pericarditis tuberculosa: una manifestación extrapulmonar infrecuente de TBC. *Revista médica de Chile*, 149(2), 281-285. doi: 10.4067/s0034-98872021000200281. PMID: 34479275.