



Toxoplasma Pericarditis in an Immunocompetent Child- A Rare Case Report

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Authors' contributions

This work was carried out in collaboration among all authors. Author PP wrote the manuscript. Authors NM and SK edited and gave their final inputs in writing the manuscript. The final manuscript was approved by all the authors.

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Case Report

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ABSTRACT

Toxoplasmosis is a parasitic infection caused by the protozoan, *Toxoplasma gondii* which is an obligate intracellular parasite. Among all the parasites known to cause myocarditis or pericarditis, the most commonly found is Chaga's Disease or American Trypanosomiasis. Several other parasites including *T. gondii* can affect the heart in immunocompromised patients. Individuals with intact immunity largely remain asymptomatic. Only 22 cases of Toxoplasma Pericarditis have been reported worldwide.

Although, CNS and Ocular Toxoplasmosis cases have been reported from Indian subcontinent, there is a lack of literature on cardiac involvement by Toxoplasma. Here, we present a case of a 11 yr old immunocompetent child with Toxoplasma Pericarditis, the first case to be reported from India. An echocardiography confirmed diagnosis of pericardial effusion for which pericardiocentesis was done and sent to our department for cytological evaluation. Fluid was exudative with pericardial fluid to serum protein ratio of 0.7. Gram stain, AFB stain and CB NAAT of pericardial fluid were negative. Cytology revealed neutrophils and macrophages showing presence of intracellular organisms resembling tachyzoites of *Toxoplasma* species on the Giemsa stained smear. These tachyzoites were crescent shaped with one pointed end and the other rounded end and a central nuclei.

A final diagnosis of Toxoplasma Pericarditis was made based on microscopy findings. *T. gondii* serological tests were also done which showed positivity for IgG with strong avidity.

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Thus, our case report represents an important differential that should be considered by all the clinicians in cases of acute pericarditis, especially in difficult cases where no other cause can be identified.

Keywords: *Toxoplasma*; *pericarditis*; *cytology*; *immunocompetent*; *child*.

1. INTRODUCTION

Toxoplasma gondii is an obligate intracellular parasite. In worldwide serological surveys, 3% to 80% of healthy adults have been found to be exposed to this parasite. Infection is asymptomatic in 80% to 90% of non-pregnant, immunocompetent individuals and usually causes a mild disease in the remaining individuals [1].

In India, a seroprevalence rate of 22.4% (8.8-37.3%) has been reported in women of child bearing age while the true incidence rate of toxoplasmosis estimated by IgM positivity is very low (1.43%) [2].

One of the final host of *T. gondii* are domestic cats which belong to family of Felidae. Humans become infected mainly by ingesting uncooked raw meat containing viable tissue cysts of the parasite or by ingesting food or water contaminated with the faeces of infected cats [1,3].

In otherwise healthy immunocompetent individuals, the immune system makes the rapidly multiplying tachyzoites disappear from blood and form tissue cysts containing the resting form of this parasite- bradyzoites. These cysts are found most commonly in the skeletal muscles, cardiac muscle and neural tissue [1,3]. These cysts persist in the body for years and may get reactivated if the patient becomes immunosuppressed due to any cause.

Cardiac involvement due to *Toxoplasma* parasite may be caused directly or indirectly with infection manifesting as myocarditis, pericarditis or pancarditis. Thus, it has become crucial for clinicians to keep parasitic infections such as *T. gondii* in the differential diagnosis of myocardial and pericardial disease.

2. CASE PRESENTATION

An 11 year old, previously healthy, boy was brought with history of fever, epigastric pain and bodyache for last 6 days and cough for last 2 days. There was no history of trauma, easy bruisability or Tuberculosis contact. On examination child was febrile but

hemodynamically stable. There was no throat congestion, lymphadenopathy, rash, joint pain or swelling. Abdominal examination did not reveal any tenderness or organomegaly. However cardiovascular system examination revealed muffled heart sounds without any evidence of cardiac tamponade. Rest of the systemic examination was normal. Chest x ray showed cardiomegaly (cardiothoracic ratio 67%) with globular heart shadow with normal lung fields. An echocardiography confirmed diagnosis of pericardial effusion. Pericardiocentesis was done and a grossly haemorrhagic fluid was aspirated. Fluid was exudative with pericardial fluid to serum protein ratio of 0.7. Gram stain, AFB stain and CB NAAT of the fluid were negative. Fluid was sent to pathology for a detailed cytological evaluation. Complete blood count (Hemoglobin 11.2 gm%, total leucocyte and platelet count 9900 and 4.6 lac/mm³ respectively) liver function test and renal function test were normal. ANA, ANCA, Troponin I and HIV serology were negative and ultrasound Abdomen was normal. Cytology showed mixed population of inflammatory cells comprising of neutrophils and macrophages along with few lymphocytes and occasional plasma cells. Some of the neutrophils and macrophages showed presence of intracellular organisms resembling tachyzoites of *T. gondii* species on the Giemsa stained smear. These tachyzoites were crescent shaped with one pointed end and the other rounded end and a central nuclei (Figs. 1 and 2). The tachyzoites were not visualised in the Pap stained smears. Occasional granulomas comprising of epithelioid cells were also seen.

Hence, based on the microscopy findings, a final diagnosis of *Toxoplasma* Pericarditis was given. Based on the cytopathology report, toxoplasma serology was sent that revealed negative IgM (0.25 AI) and positive IgG (36.35 IU/ml) with high avidity (68.14%). An ophthalmological evaluation did not show any evidence of chorioretinitis. Based on the cytopathology and serology reports, diagnosis of reactivation of Toxoplasmosis with Pericarditis was made and child was started on Sulfadiazine and Pyrimethamine along with folinic acid. He responded well with complete resolution of Pericardial effusion in 2 weeks.

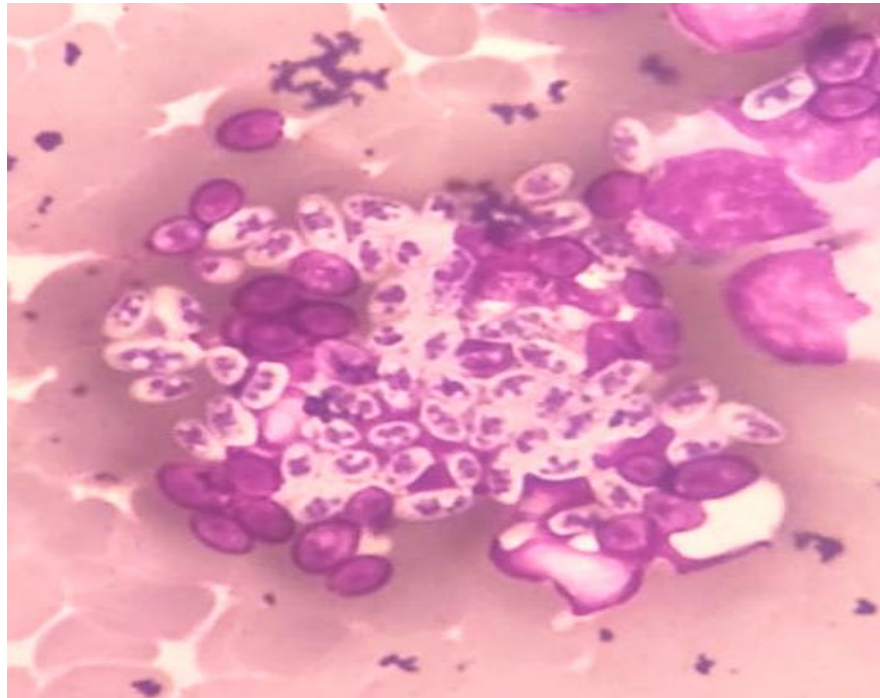


Fig. 1. Giemsa stained smear from pericardial fluid showing tachyzoites of *Toxoplasma gondii* with surrounding inflammatory cells (100x)

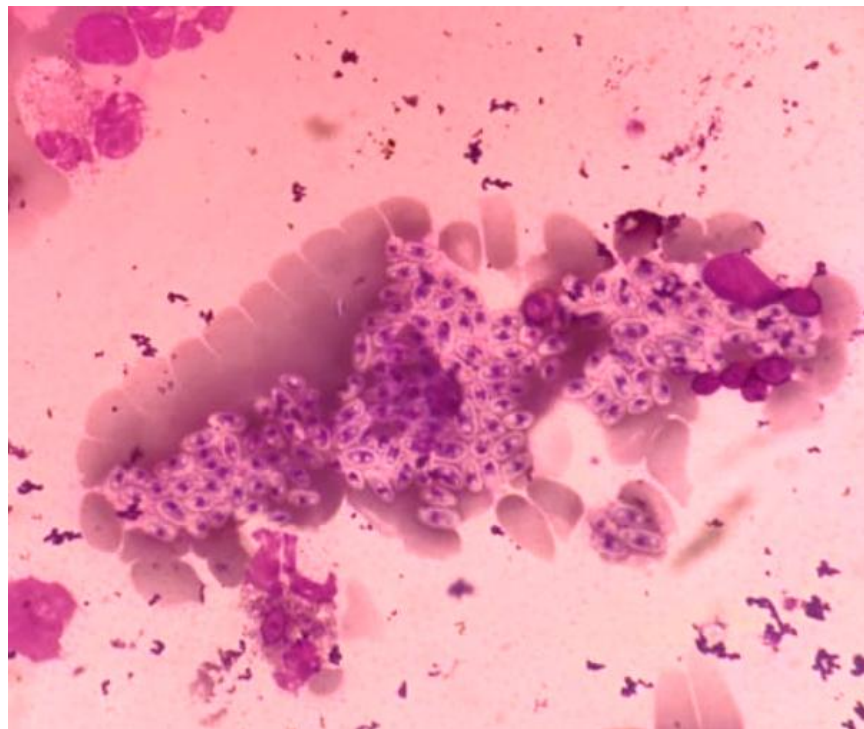


Fig. 2. Giemsa stained smear from pericardial fluid showing numerous intracellular crescent shaped tachyzoites of *Toxoplasma gondii* with central nuclei (40x)

3. DISCUSSION

Acute Pericarditis has a wide list of etiological classification including infectious agents like viral, tubercular, bacterial as well as non infectious causes which could be neoplastic, drug induced or collagen vascular disorders. Parasitic infections are comparatively rare and include Trypanosomiasis more commonly, as well as several other parasites like *Toxoplasma gondii*, *Entamoeba histolytica*, etc. [4].

In India, the seroprevalence for Toxoplasmosis has been found to be high in Southern India as compared to the Northern regions. However, incidence of Toxoplasmosis remains low in all parts of the country [2]. Our patient belonged to Northern region and represents the first case of Toxoplasma Pericarditis to be reported from India.

Only 22 cases of Toxoplasma Pericarditis have been reported worldwide. Even though, Toxoplasmosis manifestations are common in immunocompromised individuals such as patients with AIDS or malignancy, 15 of the reported cases did not have any immunosuppressive disorder same as our case [5]. Due to rarity of parasitic pericarditis, more common etiology like Tuberculosis is considered. In our patient too, fluid was sent for AFB stain and CB-NAAT to rule out the possibility of Tubercular etiology. However, both the tests were negative for Tuberculosis.

Moreover, out of the 22 reported cases of Toxoplasma Pericarditis, pericardiocentesis was performed in 8 cases. Out of the 8 cases, majority i.e. 6 cases showed haemorrhagic pericardial fluid similar to our case [5]. Hence, even though infectious causes predominantly lead to exudative, purulent fluid, a diagnosis of infectious etiology should still be considered when dealing with haemorrhagic fluids. This especially holds true for Tubercular cases or even parasites like *T. gondii*.

Clinical features at the onset of pericarditis usually include fever, dyspnea and chest pain [5]. Our case had predominantly fever and epigastric pain as a result of pericardial irritation. Cardiovascular system examination and Chest X Ray findings confirmed Pericardial effusion.

Detection of *T. gondii* in air-dried, Wright-Giemsa stained slides after centrifugation of CSF or any other body fluids is a rapid and technically simple

method. Demonstration of tachyzoites which is the active form of Toxoplasma in smears prepared from pericardial fluid established the diagnosis of Toxoplasma infection in our patient [6,7].

Fixation by air drying in Giemsa stained smears results in cellular swelling. As a result, the nuclear details are lost but the cytoplasmic and background details are better appreciated than in Pap stained smears. Thus, to demonstrate intracellular parasites, Giemsa is preferred over Pap stain [8]. In our case, only the Giemsa stained smears showed presence of tachyzoites.

In a study done by Eapen M et al. to evaluate the histopathological features observed in Toxoplasmic lymphadenopathy, they found that presence of microgranulomas (collection of epithelioid cells with less than 25 nuclei) was one of the most important microscopic clue with high sensitivity and specificity for Toxoplasmosis [9]. Our case showed a similar picture in the pericardial fluid.

Majority of the reported cases of Toxoplasma Pericarditis were proven by serological testing for IgG and IgM antibodies. IgG antibodies appear early, peak within 6 months of infection, and remain detectable for life. A negative IgG antibody test rules out any prior or recent infection of an immunocompetent host [10]. To determine the approximate time of infection, IgM antibodies are also tested. If IgG is positive but IgM antibodies are negative, it indicates that the infection occurred more than 1 year back. IgG avidity test is done to measure the antibody binding force and differentiate between acute and chronic phases of Toxoplasmosis. If IgG avidity test is low, it indicates an acute infection, whereas a high IgG avidity is indicative of infection in its chronic phase [11]. Serological report of our patient revealed a negative test for IgM and a positive test for IgG along with high IgG avidity. Thus, this concluded the reactivation of Toxoplasmosis with pericarditis in our patient.

In immunocompetent host, reactivation of Toxoplasmosis is extremely uncommon. The cell mediated immune response, principally comprising of CD 8+ T cells provides protective immunity against the parasite. This immune response is hampered in immunocompromised hosts resulting in Disseminated Toxoplasmosis [12]. Till date, no case of reactivation of Toxoplasma presenting as pericarditis in an otherwise healthy individual has been reported.

According to CDC, treatment for Toxoplasmosis is not necessary in immunocompetent individuals who are asymptomatic or have mild symptoms [13]. In symptomatic individuals, a combination drug therapy of Pyrimethamine and Sulfadiazine is recommended along with Folinic acid. Duration of treatment varies from 3-4 weeks to even, lifetime in patients with AIDS [13]. Our patient showed clinical recovery within a week of Anti-Toxoplasma therapy.

4. CONCLUSION

Acquired toxoplasma infection is not an uncommon entity. The clinical picture varies markedly from an asymptomatic infection in majority to a potentially fatal disseminated infection in immunosuppressed individuals [1,3]. However, Isolated Pericarditis in the absence of any evidence of myocarditis is an uncommon manifestation of this parasitic infection. In immunocompetent individuals, it is even more rare [5].

This case report of a healthy 11 year old boy having reactivation of a remote Toxoplasma infection with Pericarditis suggests that parasitic infections should always be considered as differential diagnosis of Pericarditis with unknown etiology. The general conception of Toxoplasmosis manifesting only in immunocompromised hosts is misleading. Since there is a specific treatment available for *T. gondii*, it should be taken into account by the clinicians in acute pericarditis or myocarditis cases [4]. This will ultimately help in improving the patients' condition and prognosis. Such tropical parasitic infections should be kept in mind whenever a definitive cause for acute pericarditis cannot be ascertained.

CONSENT

As per international standard or university standard, patients' written consent has been collected and preserved by the authors.

ETHICAL APPROVAL

It is not applicable.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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