DOI: 10.7860/JCDR/2021/50660.15732

Case Report

Pathology Section

Cardiac Sarcoidosis in an Adult Male: An Autopsy Finding

RUCHI AGARWAL[1], SURBHI JAIN[2], ANJALI SINDHU[3], KULWANT SINGH[4]

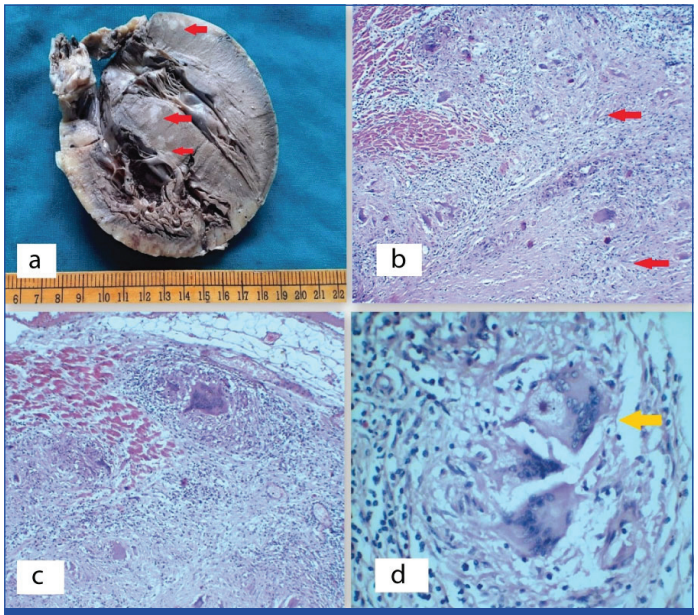
ABSTRACT

Sarcoidosis is an inflammatory disease of unknown cause which results in the formation of non caseating granulomatous lesion. Lung and lymph nodes are most frequently involved, however any organ of the body can be affected. Although, it has been observed that approximately one fourth of cases of sarcoidosis develop cardiac involvement, only 5% show clinical manifestations and most cases are diagnosed in autopsy studies. Here, an uncommon case of cardiac sarcoidosis presented, diagnosed on autopsy. A 68-year-old male was brought dead to the hospital to conduct an autopsy. On dissection, in the coronal cut of the heart specimen, multiple small greyish white nodules were seen in left ventricular wall. Special stains like Ziehl Neelsen (ZN) stain for tubercular bacilli and Periodic Acid Schiff (PAS) stain and Grocott's Methenamine Silver (GMS) stain for fungal aetiology were non contributory. Histopathological examination revealed multiple non caseating granulomas with numerous giant cells rimmed by few scattered lymphocytes along with areas of fibrosis. A diagnosis of granulomatous carditis-sarcoidosis was given. This case report highlights that in all cases revealing non caseating granulomatous inflammation negative for acid fast bacilli and fungus, sarcoidosis should be suspected.

Keywords: Asteroid body, Endomyocardial biopsy, Non caseating granuloma

CASE REPORT

A 68-year-old male was brought dead to the hospital and later his autopsy was conducted to find the cause of death. No significant past history or antemortem investigations were available in the police papers. A specimen of heart weighing 440 gm and measuring 11.0×9.5×7.0 cm was received in the Department of Pathology, Bhagat Phool Singh Government Medical College for Women, Khanpur Kalan, Sonipat, Haryana. On dissecting the specimen of heart, the thickness of right ventricular wall, left ventricular wall and interventricular septum were found to be 0.5, 1.8 and 2.1 cm, respectively. In coronal cut section of heart, multiple small grey white nodules were seen in the left ventricular wall near atrioventricular junction and interventricular septum ranging in diameter from 0.4 to 0.8 cm [Table/Fig-1a]. Microsections examined from grey white areas showed multiple non caseating epithelioid cell granulomas with numerous giant cells rimmed by few scattered lymphocytes along with areas of fibrosis in left atrioventricular junction, left ventricular wall and interventricular septum [Table/Fig-1b,c]. Asteroid body was observed in few giant cells [Table/Fig-1d]. Special stains like ZN stain for tubercular bacilli and PAS stain and GMS stain for fungal aetiology were non contributory. The various differential diagnosis like infective granulomatous myocarditis, hypersensitivity myocarditis, idiopathic granulomatous myocarditis and giant cell myocarditis were ruled out based on specific histopathological features and the final diagnosis of granulomatous carditis-sarcoidosis was given.



[Table/Fig-1]: a) Cut surface of heart showing multiple grey white nodules (red arrow) in the left ventricular wall near atrioventricular junction and interventricular septum; b,c) Microphotograph from left ventricular wall showing large areas of coalescing non caseating epithelioid cell granulomas with multinucleated giant cells (red arrows) (H&E 4X, 10X); d) Microphotograph showing asteroid body (yellow arrow) in a giant cell (H&E, 20X).

DISCUSSION

Sarcoidosis is a systemic inflammatory disease producing granulomas and presenting mainly in younger age group with female predilection. The entity 'cardiac sarcoidosis' was initially recognised by Bernstein M et al., and its clinicopathologic features were first described by Gozo and his associates [1]. Several factors have been suggested to play a role in the pathogenesis of sarcoidosis including infections, genetic factors and environmental agents, yet the aetiology remains unclear. Histopathological patterns observed in cardiac sarcoidosis range from normal looking myocardium to non caseating granulomatous inflammation, myocarditis or even dilated cardiomyopathy. The typical granulomatous pattern produces firm, grey white areas of variable sizes in the left ventricle wall, interventricular septum and papillary muscle. On histopathology, classic granulomas in sarcoidosis are characterised by aggregates of epithelioid histiocytes and multinucleated giant cells without any caseation. They may be present singly or may fuse to form confluent granulomas. Lymphocytes are seen scattered around the granulomas but eosinophils are sparse or absent. These lesions promote a repair process with production of collagen by fibroblasts and loss of the normal architecture and function of the tissues involved [2].

Cardiac involvement in sarcoidosis, as reported by different authors in autopsy studies, occurs in the range of 20-58% of patients and is associated with a poor prognosis [1,3-5]. Involvement of heart in sarcoidosis without any evidence of systemic disease is observed in minor percentage of cases. Wan Muhaizan WM et al., and

Choudhary S and Manjunatha YA reported autopsy cases which showed lesions of sarcoidosis in heart along with lungs and lymph nodes [6,7]. However, in autopsy case reported by Terasaki F et al., isolated cardiac lesions of sarcoidosis were seen while rest of the organs received was unremarkable [8]. Clinical presentation of cardiac sarcoidosis is found only in about 5% of patients and majority of the cases are diagnosed on post-mortem histopathological examination only. Young and middle aged patients are more frequently affected by myocardial sarcoidosis without gender predilection [9]. The various manifestations of cardiac dysfunction in sarcoidosis include arrythmias, atrioventricular block, complete bundle branch block, sudden death, congestive cardiac failure, acute myocardial infarction like syndrome, ventricular aneurysm or recurring pericardial effusions [2].

The clinical diagnosis of sarcoidosis involving heart is challenging because of its varied non specific presenting signs and symptoms and non availability of any confirmatory test. In a known case of sarcoidosis, appearance of new cardiac symptoms is a strong indication of cardiac sarcoidosis. However, in isolated clinical presentation with cardiac symptoms, suspecting the diagnosis of sarcoidosis is difficult. Out of these, left sided heart failure and syncope have been found to be the most common at the time of hospital presentation [10]. Imaging techniques such as the electrocardiogram, echocardiography, Cardiac Magnetic Resonance (CMR) imaging, Positron Emission Tomography (PET) scan and radionuclide scan can prove to be useful in cardiac patients. Among the various cardiac tests, CMR is found to be the most valuable in the diagnosis and prognosis of cardiac sarcoidosis in a general sarcoidosis population in the study conducted by Kouranos V et al., [11]. However, gold standard investigation in diagnosis of cardiac sarcoidosis is Endomyocardial Biopsy (EMB). But the sensitivity of EMB ranges from 20-50% due to patchy distribution of the disease [12]. Hence, a negative biopsy in a known case of sarcoidosis does not exclude the diagnosis of cardiac sarcoidosis [13].

Considering the fatality of the condition, early diagnosis and management of cardiac sarcoidosis is must. Corticosteroids are the mainstay of treatment, while other immunomodulators are second line for patients' who are refractory to corticosteroids [14]. Various steroid sparing agents are also used to minimise the side effects associated with prolonged duration of steroids therapy in patients with cardiac sarcoidosis. These include disease modifying anti-rheumatic drugs like methotrexate and tumor necrosis factor alpha inhibitors like infliximab [15]. In refractory cases, azathioprine and cyclophosphamide have also been used [16]. Additional modalities including pacemaker or defibrillator can be placed in selected patients. Cardiac transplantation should be considered in refractory cases [13].

The various histopathological differential diagnosis of cardiac sarcoidosis includes granulomatous and giant cell lesions of heart. In infective granulomatous lesions like tubercular and fungal myocarditis, necrotising granulomas are seen and causative agent can be identified by special stains like ZN stain for tubercular acid fast bacilli and PAS and GMS stain for fungus. Non caseating granulomas in heart can also be found in idiopathic granulomatous myocarditis however, there is no evidence of similar lesions in any other organ of the body. Giant cell myocarditis is characterised by mixed chronic inflammatory infiltrate including eosinophils, lymphocytes, macrophages, giant cells and necrosis of myocyte without formation of granulomas. In hypersensitivity myocarditis, poorly formed histiocytic lesions and numerous eosinophils infiltrating the cardiac muscle fibers are observed without any formation of giant cells or granuloma.

CONCLUSION(S)

In all cases with finding of non caseating granulomatous inflammation in heart, possibility of sarcoidosis should be suspected. Common aetiologies like tuberculosis, fungal infection and various other types of myocarditis should be ruled out with careful microscopic examination and use of special stains.

REFERENCES

[1] Bernstein M, Konzelmann FW, Sidlick DM. Boeck's sarcoid: Report of a case with visceral involvement. Arch Intern Med. 1929;44:721-34.
[2] Berry GJ, Marboe CC. Heart. In: Stacey E. Mills ed. Sternberg's Diagnostic Surgical Pathology. 6th Edition. China: Wolters Kluwer; 2015. Pp. 1928-2005.
[3] Silverman KJ, Hutchins GM, Buckley BH. Cardiac sarcoid: A clinicopathologic study of 84 unselected patients with systemic sarcoidosis. Circulation. 1978;58:1204-11.
[4] Kim JS, Judson MA, Donnino R, Gold M, Cooper LT, Prystowsky EN, et al. Cardiac sarcoidosis. Am Heart J. 2009;157:09-21.
[5] Tadamura E, Yamamuro M, Kubo S, Kanao S, Saga T, Harada M, et al. Effectiveness of delayed enhanced MRI for identification of cardiac sarcoidosis: Comparison with radionuclide imaging. AJR Am J Roentgenol. 2005;185:110-15.
[6] Wan Muhaizan WM, Swaminathan M, Daud MS. Cardiac sarcoidosis: Two cases with autopsy findings. Malays J Pathol. 2004;26:59-63.
[7] Choudhary S, Manjunatha YA. Cardiac sarcoidosis- A rare case report in autopsy specimen with review of literature. J Evolution Med Dent Sci. 2012;1:504-08.
[8] Terasaki F, Kuwabara H, Takeda Y, Yamauchi Y, Fujita S, Nakamura T, et al. Clinical features and histopathology of cardiac sarcoidosis with refractory heart failure: An autopsy case. Intern Med. 2019;58:3551-55.
[9] Sekhri V, Sanal S, DeLorenzo LJ, Aronow WS, Maguire GP. Cardiac sarcoidosis: A comprehensive review. Arch Med Sci. 2011;7:546-54.
[10] Sharma OP. Diagnosis of cardiac sarcoidosis: An imperfect science, a hesitant art. Chest. 2003;123:18-19.
[11] Kouranos V, Tzelepis GE, Rapti A, Mavrogeni S, Aggeli K, Douskou M, et al. Complementary role of CMR to conventional screening in the diagnosis and prognosis of cardiac sarcoidosis. JACC Cardiovasc Imaging. 2017;10:1437-47.
[12] Valantine H, Mckenna WJ, Nihoyannopoulos P, Mitchell A, Foale RA, Davies MJ, et al. Sarcoidois: A pattern of clinical and morphological presentation. Br Heart J. 1987;57:256- 63.
[13] Valantine HA, Tazelaar HD, Macoviak J, Mullin AV, Hunt SA, Fowler MB, et al. Cardiac sarcoidosis: Response to steroids and transplantation. J Heart Transplant. 1987;6:244-50.
[14] Mankad, P, Mitchell, B, Birnie, D, Kron J. Cardiac sarcoidosis. Curr Cardiol Rep. 2019;21:152.
[15] Nagai S, Yokomatsu T, Tanizawa K, Ikezoe K, Handa T, Ito Y, et al. Treatment with methotrexate and low-dose corticosteroids in sarcoidosis patients with cardiac lesions. Intern Med. 2014;53:427-33.
[16] Birnie DH, Nery PB, Ha AC, Beanlands RSB. Cardiac sarcoidosis. J Am Coll Cardiol. 2016;68:411-21.

PARTICULARS OF CONTRIBUTORS:
1. Professor, Department of Pathology, Bhagat Phool Singh Government Medical College for Women, Khanpur Kalan, Sonipat, Haryana, India.
2. Postgraduate Student, Department of Pathology, Bhagat Phool Singh Government Medical College for Women, Khanpur Kalan, Sonipat, Haryana, India.
3. Demonstrator, Department of Pathology, Bhagat Phool Singh Government Medical College for Women, Khanpur Kalan, Sonipat, Haryana, India.
4. Professor, Department of Pathology, Bhagat Phool Singh Government Medical College for Women, Khanpur Kalan, Sonipat, Haryana, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:
Dr. Anjali Sindhu,
Department of Pathology, Bhagat Phool Singh Government Medical College for Women, Khanpur Kalan, Sonipat, Haryana, India.
E-mail: sindhuanjali.01@gmail.com

PLAGIARISM CHECKING METHODS: [Jain H et al.]
- Plagiarism X-checker: Jun 05, 2021
- Manual Googling: Oct 25, 2021
- iThenticate Software: Nov 23, 2021 (5%)

ETYMOLOGY: Author Origin

AUTHOR DECLARATION:
- Financial or Other Competing Interests: None
- Was informed consent obtained from the subjects involved in the study? Yes
- For any images presented appropriate consent has been obtained from the subjects. Yes

Date of Submission: **Jun 04, 2021**
Date of Peer Review: **Jul 14, 2021**
Date of Acceptance: **Oct 27, 2021**
Date of Publishing: **Dec 01, 2021**