World Journal of Pharmaceutical and Life Sciences
WJPLS
www.wjpls.org
SJIF Impact Factor: 7.409

MEDIASTINAL LYMPHADENOPATHY IN SARCOIDOSIS WITH HYPERCALCEMIA: A CASE REPORT

Beevi Fathima[1*] and Dr. Abhirama B. R.[2]

[1]Pharm D. Intern, the Dale View College of Pharmacy and Research Centre, Punalal, Trivandrum, Kerala, India.
[2]Professor, Head of the department, Pharmacy Practice, the Dale View College of Pharmacy and Research Centre, Punalal, Trivandrum, Kerala, India.

***Corresponding Author: Beevi Fathima**
Pharm D. Intern, the Dale View College of Pharmacy and Research Centre, Punalal, Trivandrum, Kerala, India.

Article Received on 18/12/2024 **Article Revised on 08/01/2025** **Article Accepted on 29/01/2025**

ABSTRACT
Sarcoidosis presents as a systemic disease with persistent noncaseating granulomatous inflammation, affecting the lungs in over 90% of cases. A typical symptom of pulmonary sarcoidosis is mediastinal lymphadenopathy, which is crucial for diagnosis and monitoring. Relieving symptoms, preventing or controlling organ damage, and improving the patient's quality of life are the main goals of sarcoidosis care. This case study describes sarcoidosis with mediastinal lymphadenopathy in a 35-year-old male patient with hypercalcemia. He has been experiencing dyspnea and chest pain for the past few days. His initial laboratory testing indicated that he developed hypercalcemia and hypoparathyroidism. Prednisolone 40mg was used to treat sarcoidosis with mediastinal lymphadenopathy and hypercalcemia was treat with intravenous hydration (normal saline). After spending four days in the hospital, the patient was discharged with less calcium in the body and better symptoms. Sarcoidosis may be associated with impaired calcium metabolism. Parathyroid hormone (PTH) levels are expected to be suppressed in sarcoidosis due to increased calcium levels.

KEYWORDS: Sarcoidosis, Mediastinal lymphadenopathy, Hypercalcemia, Hypoparathyroidism.

INTRODUCTION
Sarcoidosis is a disease that causes lung infiltration and hilar lymphadenopathy but has no symptoms. The illness is a fundamental immunological illness, affecting numerous immune system components.[1] Sarcoidosis can strike people of any age or ethnicity. However, compared to the majority of the Caucasian population, Scandinavians and African Americans have a greater risk of the condition. Usually, adults less than 50 years old are the first to develop sarcoidosis. Approximately 70% of instances present when the patient is between the age range of 25 and 40, with women over 50 experiencing a second increase in occurrence.[2] Any possible cause of sarcoidosis must be able to cause all of the different symptoms of the disease as well as the pathological sign of systemic noncaseating granulomas. Furthermore, etiologic agents need to be suitable for immunologic characteristics such as oligoclonal T cell expansions that are consistent with antigen-driven processes and polarized T-helper 1 (Th1) cytokine profiles. The lungs' pattern of cytokine production most closely matches an immune response of the Th1 subtype. Immune response-related genes of the major histocompatibility (MHC) locus are known to increase a person's risk of developing certain diseases.[1][3] Three distinct clinical presentation types exist: nonspecific constitutional symptoms, symptoms associated with particular organ involvement, and asymptomatic sarcoidosis. Patients with sarcoidosis can experience the disease in two different ways. The symptoms of acute sarcoidosis appear suddenly and include bilateral hilar adenopathy, ankle arthritis, erythema nodosum, and fever, myalgia, lethargy, and weight loss are common constitutive symptoms. The emergence of chronic sarcoidosis is stealthy. While constitutional symptoms are far less common than in the acute form, organ-related symptoms such as cough and dyspnea predominate. These symptoms are frequently linked to pulmonary infiltration. 30–53% of patients have respiratory symptoms upon presentation; of these 27–53% have cough, 18–51% have dyspnea, and 9–23% have chest pain.[1][4] Typical imaging findings include bilateral perihilar lymphadenopathy, most commonly mediastinal lymphadenopathy, and peri lymphatic pulmonary nodules, which are primarily found in the upper lobe.[4] About 5% of people experience hypercalcemia, which is less common and usually asymptomatic. A rare but well-known side effect of sarcoidosis is symptomatic hypercalcemia, which manifests as polyuria, dehydration, and altered consciousness.[5] The diagnosis and treatment of

sarcoidosis has been made easier by diagnostic imaging. A chest radiograph can frequently be used to confirm the sarcoidosis. The gold standard for evaluating pulmonary abnormalities and mediastinal lymph nodes is computed tomography (CT). High-resolution computed tomography (HRCT) offers a thorough review of anatomical detail and anomalies of lung structures, and is even more accurate than chest radiography in detecting slight parenchymal involvement.[6] For individuals with symptomatic pulmonary illness, corticosteroids are well established to reverse organ dysfunction and provide rapid symptomatic relief.[1]

A CASE PRESENTATION

A 35-year-old male was admitted to the General Medicine department with a history of high blood pressure recorded on home monitoring. A workup for secondary hypertension revealed hypercalcemia with a calcium level of 17.5 mg/dL. The patient was admitted for further evaluation of the hypercalcemia. On examination, the patient was conscious and oriented. His vital signs upon hospitalization were as follows: blood pressure of 140/100 mmHg. Initial laboratory tests confirmed hypercalcemia with a calcium level of 17.5 mg/dL. The patient was also found to have hypoparathyroidism with a parathyroid hormone (PTH) level of 2.3 pg/mL and a vitamin D3 deficiency with a level of 19.7 ng/mL. Imaging studies included a chest X-ray and CT scan of the neck and chest, which showed a right paratracheal stripe and mediastinal lymphadenopathy. A CT thorax with and without contrast revealed multiple paratracheal, pretracheal, precarinal, subcarinal, and mediastinal lymph nodes, with the largest measuring 40 x 25 mm on the right side, causing slight tracheal deviation to the left. Fibrotic strands were also noted. Additionally, an ill-defined, irregular soft tissue nodule measuring 14 x 11 mm was observed in the posterior basal segment of the right lower lobe. An ultrasound of the neck showed well-defined lobulated hypoechoic lesions with mild vascularity, located inferomedial to the lower pole of the right lobe of the thyroid gland, with suspicious extension of the large lesion into the superior mediastinum. A parathyroid lump or a tumor in a lymph node were among the differential diagnosis. For the treatment of suspected sarcoidosis with mediastinal lymphadenopathy, the patient was given Prednisolone 40 mg. The hypercalcemia was managed with intravenous normal saline. After spending four days in the hospital, the patient showed improvement and was discharged with a follow-up plan.

DISCUSSION

The inflammatory disease sarcoidosis affects the entire body and causes scarring and granuloma formation, which can sometimes lead to irreversible damage to organ function.[2] Young and middle-aged individuals are usually affected, and they often appear with lung infiltration, cutaneous, and eye diseases, as well as bilateral hilar lymphadenopathy.[1] The case presented in this study highlights a 35-year-old male who presented with hypercalcemia, hypoparathyroidism, and mediastinal lymphadenopathy, all of which are significant clinical features in the diagnosis and management of sarcoidosis. Sarcoidosis can involve nearly any organ, but its pathophysiology is most evident in the lungs and lymphatic system. The formation of noncaseating granulomas in these organs triggers the immune response, leading to inflammation and fibrosis, which can progressively impair organ function. The lungs are affected in over 90% of sarcoidosis cases, and mediastinal lymphadenopathy is one of the most common findings on chest imaging, as observed in this patient. The presence of these enlarged lymph nodes can lead to symptoms such as dyspnea, cough, and chest pain, often associated with pulmonary infiltration.[7]

The relationship between sarcoidosis and calcium metabolism is well-documented, with up to 5% of patients exhibiting hypercalcemia.[8] This occurs due to the increased production of 1,25-dihydroxyvitamin D (calcitriol) by activated macrophages within granulomas, which leads to enhanced intestinal calcium absorption and renal reabsorption, resulting in hypercalcemia. Interestingly, the patient in this case also exhibited hypoparathyroidism with suppressed parathyroid hormone (PTH) levels, which is a typical finding in sarcoidosis-related hypercalcemia. In sarcoidosis, PTH is often suppressed due to the negative feedback mechanism caused by elevated calcium levels, which directly inhibit PTH secretion.[9]

The role of corticosteroids, particularly prednisolone, in the management of sarcoidosis is well-established. Corticosteroids serve as the cornerstone of treatment, reducing granulomatous inflammation and improving symptoms. Prednisolone at a dose of 40 mg daily was initiated in this patient, targeting the underlying inflammation and preventing further organ damage. The use of corticosteroids is critical not only for symptom relief but also for preventing irreversible damage to vital organs such as the lungs, heart, and kidneys. However, long-term corticosteroid therapy may be associated with significant side effects, including osteoporosis, diabetes, and hypertension, which necessitate careful monitoring and consideration of adjunct therapies or steroid-sparing agents in chronic cases.[10]

The diagnosis of sarcoidosis is primarily clinical, with imaging studies playing an essential role in identifying characteristic features such as mediastinal lymphadenopathy and lung involvement. Chest X-rays and high-resolution CT scans are invaluable tools in diagnosing and monitoring sarcoidosis. The chest X-ray often shows bilateral hilar lymphadenopathy, while CT scans can reveal more detailed anatomical abnormalities, including lymph node enlargement and parenchymal involvement. In this patient, a CT thorax with contrast revealed extensive mediastinal lymphadenopathy and a small pulmonary nodule, which was consistent with sarcoidosis.[9][11] Additionally, the neck ultrasound

findings raised the possibility of parathyroid involvement, which further complicated the differential diagnosis. However, sarcoidosis remains the most likely diagnosis given the constellation of symptoms, imaging findings, and laboratory results.

The patient's response to treatment was favorable, with improvement in calcium levels and symptom relief following four days of hospitalization. This rapid improvement is typical of corticosteroid therapy in cases of sarcoidosis, particularly when administered early in the disease course. It is important to note that while sarcoidosis can have a good prognosis in many patients, some individuals may experience persistent symptoms or organ dysfunction, particularly when treatment is delayed or inadequate. Chronic sarcoidosis, if not appropriately managed, can lead to irreversible pulmonary fibrosis, restrictive lung disease, or even pulmonary hypertension.[12]

CONCLUSION

This case study highlights the importance of recognizing the clinical and radiological features of sarcoidosis, particularly mediastinal lymphadenopathy and hypercalcemia, in the diagnosis and management of the disease. Sarcoidosis is a complex, multi-organ disease, and its presentation can vary significantly. The patient in this case responded well to corticosteroid therapy, which helped reduce the inflammatory process and improve symptoms. The management of hypercalcemia with intravenous hydration was also crucial in stabilizing the patient. This case underscores the need for a comprehensive diagnostic approach, incorporating clinical evaluation, imaging studies, and laboratory tests, to ensure prompt and effective treatment. Early recognition and intervention are key to preventing long-term complications and improving the patient's quality of life.

REFERENCE

1. Costabel, U. (2001). Sarcoidosis: clinical update. *European respiratory journal*, *18*(32 suppl): 56S-68S.
2. Arkema, E. V., & Cozier, Y. C. (2018). Epidemiology of sarcoidosis: current findings and future directions. *Therapeutic Advances in Chronic Disease*, *9*(11): 227-240.
3. Chen, E. S., & Moller, D. R. (2008). Etiology of sarcoidosis. *Clinics in chest medicine*, *29*(3): 365-377.
4. Sève, P., Pacheco, Y., Durupt, F., Jamilloux, Y., Gerfaud-Valentin, M., Isaac, S., ... & El Jammal, T. (2021). Sarcoidosis: a clinical overview from symptoms to diagnosis. *Cells*, *10*(4): 766.
5. Conron, M., Young, C., & Beynon, H. L. C. (2000). Calcium metabolism in sarcoidosis and its clinical implications. *Rheumatology*, *39*(7): 707-713.
6. Silva, M., Nunes, H., Valeyre, D., & Sverzellati, N. (2015). Imaging of sarcoidosis. *Clinical reviews in allergy & immunology*, *49:* 45-53.
7. Iannuzzi, M. C., Rybicki, B. A., & Teirstein, A. S. (2007). Sarcoidosis. *The New England Journal of Medicine*, *357*(21): 2153-2165.
8. Baughman RP, Valeyre D, Korsten P, Mathioudakis AG, Wuyts WA, Wells A, Rottoli P, Nunes H, Lower EE, Judson MA, Israel-Biet D, Grutters JC, Drent M, Culver DA, Bonella F, Antoniou K, Martone F, Quadder B, Spitzer G, Nagavci B, Tonia T, Rigau D, Ouellette DR. ERS clinical practice guidelines on treatment of sarcoidosis. Eur Respir J., 2021 Dec 16; 58(6): 2004079. doi: 10.1183/13993003.04079-2020. PMID: 34140301.
9. Silva M, Nunes H, Valeyre D, Sverzellati N. Imaging of Sarcoidosis. Clin Rev Allergy Immunol., 2015 Aug; 49(1): 45-53. doi: 10.1007/s12016-015-8478-7. PMID: 25726413.
10. Jeny F, Bouvry D, Freynet O, Soussan M, Brauner M, Planes C, Nunes H, Valeyre D. Management of sarcoidosis in clinical practice. Eur Respir Rev., 2016 Jun; 25(140): 141-50. doi: 10.1183/16000617.0013-2016. PMID: 27246591; PMCID: PMC9487239.
11. Dhagat PK, Singh S, Jain M, Singh SN, Sharma RK. Thoracic Sarcoidosis: Imaging with High Resolution Computed Tomography. J Clin Diagn Res., 2017 Feb; 11(2): TC15-TC18. doi: 10.7860/JCDR/2017/24165.9459. Epub 2017 Feb 1. PMID: 28384959; PMCID: PMC5376893.
12. Sève, P., Pacheco, Y., Durupt, F., Jamilloux, Y., Gerfaud-Valentin, M., Isaac, S., Boussel, L., Calender, A., Androdias, G., Valeyre, D., & El Jammal, T. (2021). Sarcoidosis: A Clinical Overview from Symptoms to Diagnosis. *Cells*, *10*(4): 766. https://doi.org/10.3390/cells10040766