The Chameleon of Diseases: Sarcoidosis

Introduction

Sarcoidosis is a multi-organ inflammatory disease created by the formation of granulomas.[1] When it comes to granulomas there is a never ending war between the concealed antigens and a methodized troop of lymphocytes and macrophages.[2] The lungs and lymphatic system are most commonly affected. Pulmonary symptoms range from no symptoms to exertional dyspnea, a cough, and rarely, lung or other organ failure. Researchers have come to understand that sarcoidosis is created because of an atypical immune response. It involves inflammation that develops microscopic clusters of cells in various organs throughout the body.[3] If too many granulomas group together in or near an organ, it will affect the organ function, which will begin the symptoms of sarcoidosis. [1] A diagnosis is usually suspected due to pulmonary involvement and is confirmed by a chest x-ray, computed tomography scan, or biopsy. Sarcoidosis is thought of as a chameleon due to the way it disguises itself and blends in with other organs and tissue.

The Cause

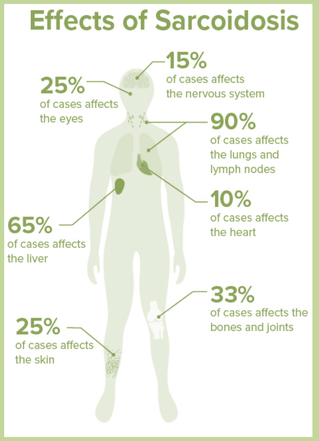
There may be several things that cause sarcoidosis, but the exact origin is unknown. It is believed that this disease forms when the immune system reacts to a substance in the environment. Viruses, dust, chemicals, or even your own body tissue may trigger sarcoidosis.[3] When the immune system identifies something harmful, it delivers specialized cells to the affected organs. Those cells issue a release of chemicals that produce inflammation surrounding the foreign substance to confine and destroy them. When this inflammation remains, it leads to the formation of granulomas. If untreated, it can lead to irreversible scarring in the lungs, making it challenging to breathe.

Clinical Presentation

Signs and symptoms of sarcoidosis will differ depending on the organs that are affected. It will usually appear very gradual and symptoms can last for years. In other cases, symptoms may develop abruptly and pass just as quickly. Many people can live with sarcoidosis and have no symptoms at all.

The general, beginning symptoms will include:

- fatigue
- weight loss
- joint pain
- swollen lymph nodes.[4]



When the lungs are affected it can cause:

- chest pain
- shortness of breath
- dry cough
- wheezing

The skin is another problem area:

- red rash
  - -shins
  - -ankles
- sores
  - -nose
  - -cheeks
  - -ears.[2]

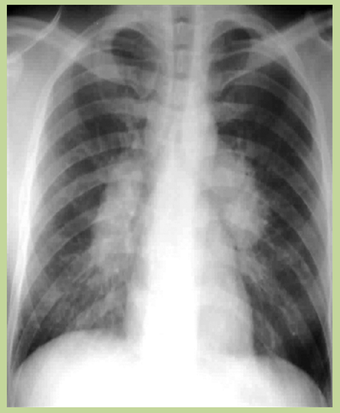
Sarcoidosis can also affect the eyes:

- blurred vision
- sensitivity to light
- pain
- itching or burning

If a patient is presenting with chest pain, dyspnea, fainting, arrythmias, or rapid heartbeat they may have cardiac sarcoidosis.

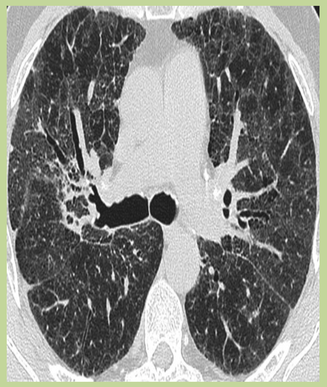
Chest x-rays are the most effective way to determine the complexity of the disease, being that nearly 90% of sarcoidosis patients experience lung complications.[5]

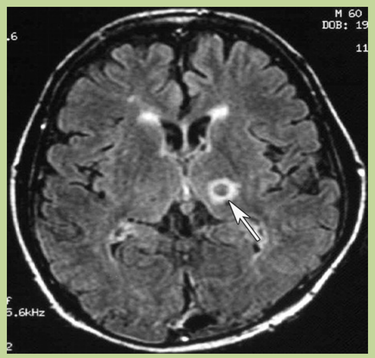
Radiographic Features



Chest Radiographs- Imaging plays an eminent part in the evaluation of a sarcoidosis diagnosis and outcome. Chest radiography helps anticipate the feasibility of impromptu remission and if the stage is linked to a high mortality.[5] When the radiologist reads the images, they identify the frequency at presentation and spontaneous resolution of the granulomas in order to diagnose the stage of sarcoidosis. The only major downfall to this type of imaging is the rapidly changing lung function and the reading reproducibility rate. Monitoring the disease and how the body is reacting to treatment becomes quite difficult due to these inconsistencies.

Computed Tomography - When chest radiographs give a deficient read or if a more detailed image is required, we turn to computed tomography (CT). A chest CT can give a much more accurate diagnosis, but is not needed for every sarcoidosis patient. On occasion physicians discover these pulmonary infiltrates while scanning a patient for a separate lung or chest condition. The use of high-resolution CT is very effective when finding micronodules with peri lymphatic distribution, bilateral perihilar opacities, and when there are fibrotic changes. Parabronchial opacities are the result of a viral bronchitis that is followed by focal streaky opacity in the lower lobes.[4]





Magnetic Resonance Imaging- Patients with sarcoidosis and musculoskeletal concerns typically require magnetic resonance imaging. With MRI we are able to detect any marrow or soft-tissue lesions that are concealed or undetected on radiographs. Magnetic resonance imaging looks for signs of sarcoidosis commonly in the spinal cord, heart, brain, and bones. If a patient has a large-bone lesion it may coincide with osseous metastases, and almost all lesions recognized are vague in appearance.[8]

Biopsy- One of the most common organs affected by sarcoidosis is the lungs. Typically, if an X-ray or CT scan has exposed an abnormality and pulmonary sarcoidosis is anticipated, a lung biopsy will be suggested. There are several methods to obtain lung tissue, but the most commonly used is the transbronchial biopsy.[9] In order to visualize the inside of the lungs, a bronchoscope is used. Another method is a lung needle biopsy, which is often guided by a CT scan for the doctor or radiologist to accurately identify the tissue. This is done by making a small cut on the side of the chest and inserting the biopsy needed into the precise lung tissue.

The Stages

In sarcoidosis, staging is a way to specify the position and location of granulomas in the lymph nodes, lungs or both – and the exact structure of the disease.[7] The stages are a simple way for physicians to group the patients. It does not represent the severity of the disease.

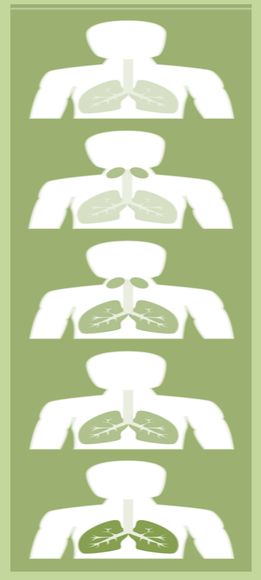
NO SARCOIDOSIS
Patient presents with abnormal x-ray. No sign of granulomas. → Stage 0

LYMPHADENOPATHY
Granulomas are only present lymph nodes. → Stage 1

LYMPHADENOPATHY & PULMONARY INFILTRATES
Sarcoidosis is present in the lymph nodes and lung tissue. → Stage 2

PULMONARY INFILTRATES
Granulomas are only present in lung tissue. → Stage 3

PULMONARY FIBROSIS
Scarring in the lung tissue, indicating irreversible damage. → Stage 4



Treatment & Prognosis

Although, there is no cure for sarcoidosis, there are different treatment options and medications that can help alleviate symptoms such as :

ORGAN FUNCTION

- Corticosteroids: Cortisone & Prednisone
  - Anti-inflammatory properties
  - Side effects- weight gain, mood swings, bone loss
- Methotrexate & Azathioprine
  - Reduces inflammation

SKIN SORES OR LESIONS

- Hydroxychloroquine
  - Treats elevated blood-calcium levels
- Antimalarial drugs
  - Manages high levels of calcium in blood, and skin symptoms

Pulmonary Rehabilitation

- Lung function test
  - Measures amount and speed of air
  - Teaches breathing techniques & exercises the lungs

Complications

Sarcoidosis patients frequently encounter elevated levels of calcium in their blood and consequently a withheld release of parathyroid hormone (PTH). When vitamin D metabolites and low calcium levels are observed, PTH is distributed by small glands found in the neck.[9] This hormone is in charge of regulating the ionized calcium levels and fluid in the blood. If left untreated, elevated levels of calcium in the urine can lead to potentially serious problems such as:

- Hypercalciuria
- Osteoporosis
- Kidney & pancreatic complications

The eyes can also be greatly affected by sarcoidosis and cause long-term complications such as cataract formation and glaucoma. Cataracts appear from the result of steroid treatment or inflammation,[9] and surgery is typically the suggested treatment. When there is heightened pressure within the eye, it may issue gradual loss of sight or absolute blindness.

Acknowledgements

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