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Short Communication

The Role of FDG PET scan in Sarcoidosis

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ABSTRACT

This is a retrospective study to determine the role of FDG-PET {2-[fluorine-18] fluoro-2-deoxy-d-glucose positron emission tomography} scan in sarcoidosis. A total of 15 diagnosed cases of Sarcoidosis were included in this study. FDG-PET scan was done in all patients and its role was studied in detecting the disease activity, additional foci of the disease activity in comparison with the CT scan and monitoring the response to the treatment. Monitoring of all these patients was done using six minute walk test, serum angiotensin converting enzyme levels (Serum ACE), spirometry, and CT thorax. Disease activity was found on FDG-PET scan in all 15 patients. Additional foci of the disease were found in 9 out of 15 patients, which were not detected on CT scan. Follow up FDG PET scan was possible in only 12 patients, 11/12 patients had clinical and functional improvement concordant with FDG PET. 1/12 patient had clinical and functional improvement while FDG PET showed worsening.

Key Words: Sarcoidosis, FDG-PET scan, Serum ACE

INTRODUCTION

Sarcoidosis is a multisystem disease characterized by cellular immunity activity with formation of noncaseating granuloma in various organ systems. The diagnosis is usually based on correlation between the presence of consistent clinical features and histological evidence of noncaseating epithelioid cell granulomas. [1] FDG-PET has been shown to be a very sensitive technique for the assessment of inflammatory activity in sarcoidosis by detecting and quantifying the degree of inflammatory and granulomatous reactions that occur in the lungs and other organ systems of the body. The use of FDG-PET in assessing the extent of disease activity can uncover any extrapulmonary involvement which can be useful for taking biopsy for histopathological evidence of diagnosis, to explain the extrathoracic symptoms of the disease, for modification of the treatment and it also has prognostic value. [2] So though FDG-PET has no routine value it can be of great help in complementing the routinely used techniques.

MATERIALS AND METHODS

This study was conducted at a tertiary hospital in Mumbai. It was a retrospective study and was done after necessary clearance from ethical committee of the institution. 15 diagnosed cases of Sarcoidosis fulfilling the inclusion criteria were selected randomly. Diagnosis of the

Sarcoidosis was made according to the American Thoracic Society (ATS) statement. [1]

Inclusion criteria:

- Age> 18 years
- Patient willing to give valid consent.
- Hemodynamically stable patients.

Exclusion criteria:

- Age< 18years
- Patient not willing to give valid consent.
- Hemodynamically unstable patients.

Based on radiological findings, cases were divided into four types. [3]

Stage I: hilar or mediastinal nodal enlargement only

Stage II: nodal enlargement and parenchymal disease

Stage III: parenchymal disease only

Stage IV: end-stage lung (pulmonary fibrosis)

In this study total number of patients in each stage was 3, 9, 3 and 0 respectively.

FDG-PET scan was done in all patients and its role was studied in detecting the disease activity, additional foci of the disease activity in comparison with the Computed Tomography scan (CT scan) and monitoring the response to the corticosteroids treatment. Monitoring of all these patients was done using six minute walk test, serum angiotens in converting enzyme levels (Serum ACE), spirometry, and CT thorax.

RESULTS

Disease activity was found on FDG-PET scan in all 15 patients.

Additional foci of the disease were found in 9 out of 15 patients, which were not detected on CT scan. Various additional foci were mediastinal and cervical lymph nodes, thyroid, heart, skin, bones etc. Because of this, 2 out of 3 patients with stage 3 sarcoidosis were reclassified as stage 2 sarcoidosis.

Follow up FDG PET scan was possible in 12 patients, 11 out of 12 patients had clinical and functional improvement concordant with FDG PET. 1 out of 12 patients had clinical and functional improvement while FDG PET showed worsening.

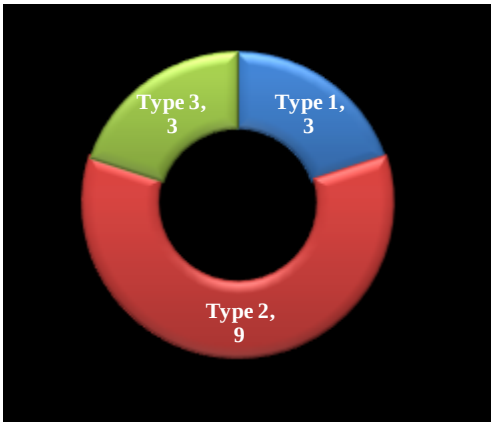

Figure 1: STAGING (Before FDG-PET scan)

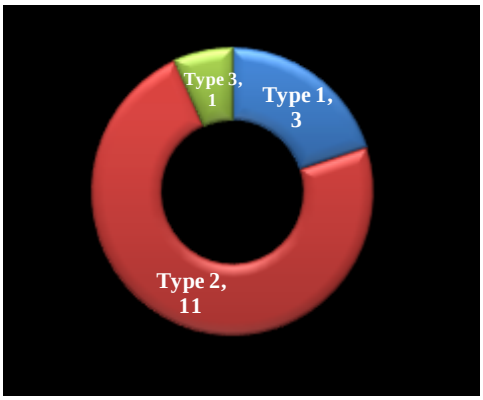

Figure 2: STAGING (After FDG-PET scan)

Figure 3: Additional foci of disease activity

DISCUSSION

Sarcoidosis is a systemic granulomatous disease that primarily affects the lung and lymphatic systems of the body. The diagnosis is established when clinicoradiological findings are supported by histological evidence of noncaseating epithelioid cell granulomas. Granulomas of known causes and local sarcoid reactions must be excluded. It commonly affects young and middle-aged adults and frequently presents with bilateral hilar lymphadenopathy, pulmonary infiltration, and ocular and skin lesions. The liver, spleen, lymph nodes, salivary glands, heart, nervous system, muscles, bones, and other organs may also be involved. Frequently observed immunological features are depression of cutaneous delayed-type hypersensitivity and a heightened helper T cell type 1 (Th1) immune response at sites of disease. Circulating immune complexes, along with signs of B cell hyperactivity, may also be found. [4] It is a systemic disease of unknown etiology with variable presentation, prognosis, and progression. At diagnosis, about 50% of patients are asymptomatic, 25% complain of cough or dyspnea, and 25% have skin lesions (erythema nodosum, lupus pernio) or ocular symptoms (or develop them during the course of the disease). [5] Bilateral hilar adenopathy is the most common radiographic finding. Other characteristic findings include interstitial lung disease, occasional calcification of affected lymph nodes, and pleural effusions and thickening. Computed tomography is more sensitive than radiography in the detection of adenopathy and subtle parenchymal disease.

Treatment of the disease is based upon clinical condition of the patient, stage of the disease, presence of extapulmonary involvement. Corticosteroids are the mainstay of the treatment. One large study by the British Thoracic Society found long-term improved lung function in patients with stage II or III pulmonary disease treated with daily corticosteroid therapy compared with a group treated intermittently with corticosteroids based on symptoms. [6] In patients with mild disease, such as skin lesions, anterior uveitis, or cough, topical steroid therapy may be all that is necessary. In patients with systemic, symptomatic disease, oral corticosteroids are often employed. Systemic therapy is clearly indicated for cardiac disease, neurologic disease, eye disease not responding to topical therapy, and hypercalcemia. The use of systemic therapy in pulmonary and other, extrapulmonary disease is less clear cut, but most physicians feel that progressive symptomatic disease should be treated. Cytoxic agents may be considered in patients requiring high doses of corticosteroids, or showing inadequate response to it. [7]

In our study we found out that FDG-PET scan can be very useful in the diagnosis and management of sarcoidosis. Though it cannot be the investigation of choice, it can be used in conjunction with other radiological investigations to increase the sensitivity of diagnosis. As found in this study, it helps in determining occult sites of the disease activity which can be missed on computed tomography. Proper staging of the disease can be done and proper treatment can be initialized. As presence of disease foci in the heart is an indication for the extended duration of treatment, corticosteroids can be given for an extended duration to prevent future relapses. FDG-PET scan has also shown good sensitivity in monitoring the treatment (11/12 patients had clinical and functional improvement concordant with FDG PET).

CONCLUSION

FDG PET scan can be used as in cases of sarcoidosis to see for disease

activity, additional foci of activity and assessing the response to the treatment. It is utmost important to diagnose potentially fatal condition i.e. cardiac sarcoidosis.

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