Clinical, Laboratory and Imaging Profile of Patients with Sarcoidosis - A Tertiary Care Hospital Based Study

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ABSTRACT

BACKGROUND

Sarcoidosis is a multisystem disorder of unknown aetiology and an under reported disease in India. The reason is the similarity to tuberculosis and lack of facilities to perform invasive tests compounded by lack of awareness among physicians and pathologists. Diagnosis is established on the basis of clinicoradiological features supported by histopathological evidence of non-caseating granulomas. We wanted to determine the clinical, laboratory and imaging profile of sarcoidosis patients.

METHODS

This study included 54 patients [new (17) and old (37) cases] of sarcoidosis who presented in the Department of Medicine and Chest & TB, Dayanand Medical College and Hospital, Ludhiana, over a period of one and half years.

RESULTS

Males comprised 51.85% of the patients. Before coming to our clinic, 14.81% patients had been misdiagnosed to have TB. Predominant symptoms were cough (n=34, 62.96%) and fever (n=22, 44.74%) followed by breathlessness (n= 15, 27.78%), chest pain (n=5, 9.26). Pulmonary function testing showed restriction with impaired diffusion in 80% patients. The most common radiological feature was bilaterally symmetrical hilar lymphadenopathy (stage I disease). Transbronchial lung biopsy (TBLB) had a very high diagnostic yield (60.87%).

CONCLUSIONS

Sarcoidosis has clinical, laboratory and radiological manifestations which vary worldwide according to race. In developing country with high prevalence of TB like India, sarcoidosis is often misdiagnosed as TB. Hence, patients having hilar lymphadenopathy with or without pulmonary infiltrates should be investigated for sarcoidosis.

KEYWORDS

Sarcoidosis, Tuberculosis, Hilar Lymphadenopathy, Transbronchial Lung Biopsy (TBLB), TBNA (Transbronchial Needle Aspiration), Non Caseating Granulomas

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BACKGROUND

Sarcoidosis is a chronic multisystemic disorder of unknown aetiology, most commonly affecting young adults and presenting most frequently with bilateral hilar lymphadenopathy, pulmonary infiltrates, and skin or eye lesions and characterized by noncaseating granulomas, that primarily affects the lungs. The initial description of sarcoidosis is credited to an English physician, Jonathon Hutchinson, who in 1877, described a patient whose hands and feet had multiple, raised, purplish cutaneous patches. It was Caesar Boeck, who described a case of cutaneous lesions in 1899 resembling Hutchinson's report and was first to use the term sarkoid because he felt that the lesions resembled sarcoma, but were benign.[1,2,3]

Sarcoidosis affects people of all racial and ethnic groups and occur in all ages, although it develops before the age of 50 years, with incidence peaking at 20 to 39 years. The incidence of sarcoidosis varies widely through the world probably because of differences in environmental exposures, surveillance methods and predisposing HLA alleles and genetic factors. The highest annual incidence of sarcoidosis has been observed in northern European countries (5 to 40 cases per 100,000 people). A preponderance of cases of sarcoidosis in females is consistent across racial and ethnic groups. The true burden of sarcoidosis in India is not clearly known as reliable epidemiological data are not available. It has been estimated that sarcoidosis constituted 10 to 12 cases/1,000 new registrations annually at a Respiratory Unit at Kolkata and 61.2/100,000 new cases seen at the Vallabhbhai Patel Chest Institute, Delhi.[4,5,6]

The development and accumulation of non-caseating granulomas constitute the fundamental abnormality in sarcoidosis. Granulomas are compact, centrally organized collections of macrophages and epithelioid cells encircled by lymphocytes. A cardinal feature of sarcoidosis is the presence of CD4+ T cells that interact with antigen presenting cells to initiate the formation and maintenance of granulomas. The oligoclonal αβ T-cell repertoire observed in sarcoidosis suggests that the triggering antigens favour progressive accumulation and activation of selective T-cell clones. These activated CD4+ cells differentiate into type 1 helper T (Th1)-like cells and secrete predominantly interleukin-2 and interferon-γ, augment macrophage TNF-α production, and amplify the local cellular immune response.[7]

Pulmonary involvement is, by far the commonest, and has been reported in about 90 per cent of the patients. Patients may complain of cough which may be non-productive, dyspnoea, chest pain, haemoptysis, clubbing and chest signs are present in only 20 per cent of patients. Airway hyperactivity has been reported in up to 20% of patients. Cutaneous involvement occurs in about 11 to 34% of patients which includes include erythema nodosum, lupus pernio, plaques, maculopapular lesions, subcutaneous nodules, changes in old scars, alopecia, and hypo and hyperpigmented areas. Sarcoidosis skin lesions seldom produce itching or pain and they do not never ulcerate. Ocular involvement may occur in 4 to 27 per cent of patients with sarcoidosis. Acute or chronic uveitis is the most common ocular manifestations followed by conjunctival follicles, lacrimal gland enlargement, kerato-conjunctivitis sicca, dacryocystitis, and retinal vasculitis. Hypercalcaemia and hypercalciuria are often encountered in patients with sarcoidosis which can result in nephrocalcinosis, nephrolithiasis, and renal failure.[8,9]

The gastrointestinal tract is involved in less than 1% patients with sarcoidosis. Although granulomas may be found in 50 to 80% of liver biopsy specimens, palpable hepatomegaly has been observed in 8 to 43% patients. Hepatic involvement rarely causes portal hypertension, and hepatic failure.[10]

Cardiac involvement has seldom been systematically studied in Indian patient and myocardial involvement has been reported in about 5% of patients with sarcoidosis, ranges from benign arrhythmias or high degree heart block to sudden death. Endomyocardial biopsy is useful in demonstrating granulomas and confirming the diagnosis of cardiac sarcoidosis. Clinical evidence of the involvement of the nervous system occurs in 0.3 to 13% of patients. Cranial nerve involvement, particularly facial palsy and hypothalamic and pituitary lesions, are common; space-occupying mass lesions, and peripheral neuropathy, have also been reported.[11,12]

The chest radiographs reveal abnormalities in more than 90% of the patients at presentation. The characteristic radiological finding in patients with pulmonary sarcoidosis is bilateral hilar lymphadenopathy. Pulmonary sarcoidosis is staged by the traditional radiographic criteria as follows:

Stage 0 - Normal chest radiograph;
Stage I - Bilateral hilar lymphadenopathy without parenchymal infiltrates
Stage II - Bilateral hilar lymphadenopathy with parenchymal infiltrates
Stage III - Parenchymal infiltrates without hilar lymphadenopathy
Stage IV - Pulmonary fibrosis and fibrocystic changes.

In the western literature, most of the patients had stage I disease, while most of the Indian patients with sarcoidosis presented with stage II disease. In Indian patients the chest radiographs may look startling, but patients may manifest minimal symptoms termed as clinicoradiological dissociation.[8,13]

Computerised tomographic scan (CT scan) of the chest is not routinely required for diagnostic evaluation or follow-up of patients with sarcoidosis, it is useful in detecting enlarged lymph nodes or parenchymal infiltrates that are not evident on the conventional chest radiograph and is therefore more useful in patients with atypical or uncommon manifestations. Characteristic features of sarcoidosis on CT scan include central bronchovascular thickening and nodularity, miliary nodules, thickening of interlobular septae, luminal irregularity, ground-glass attenuation, architectural distortion, conglomerate masses, honeycombing and cystic

destruction, alveolar consolidation, parenchymal and pleural nodules.[14]

Tuberculin skin test is often negative in nearly two-thirds of the patients with sarcoidosis. Haematological abnormalities include anaemia, leucopenia, lymphopenia, eosinophilia, and monocytosis among others.[15,16,]

Kveim test though rarely performed nowadays is a skin test used to detect sarcoidosis, where part of a spleen from a patient with known sarcoidosis is injected into the skin of a patient suspected to have the disease. If non caseating granulomas are found (4-6 weeks later), the test is positive.

Hypercalcaemia has been reported to occur in 2 to 63% of patients with sarcoidosis and hypercalciuria is three times more common than hypercalcaemia.[17,18] In a large Indian study hyperuricaemia was observed in 41% of the patients, tested. All the patients with hyperuricaemia had stage II disease.

Liver involvement in sarcoidosis is usually silent but patient may present with cholestatic syndrome characterized by pruritis, jaundice, Hepatic failure and portal hypertension may develop.[8]

Serum angiotensin-converting enzyme (SACE) is increased in 30 to 80% of patients with sarcoidosis and may be a surrogate marker of total granuloma burden. However, SACE may be normal in patients with active disease.[19,20]

Abnormalities in pulmonary function tests (PFTs) are present in 20% of patients with radiographic stage I sarcoidosis and in 40 to 80% of patients with parenchymal infiltrates stages II, III, or IV.[21-25] A restrictive defect with reduced lung volumes (e.g., vital capacity (VC) and total lung capacity (TLC)) is characteristic. Even when chest radiographs are normal, forced vital capacity (FVC) or DLCO is reduced in 15 to 25% and 25 to 50% of patients, respectively.[25-30] The diffusing capacity for carbon monoxide (DLCO) is the most sensitive of the PFT parameters[20] but the degree of impairment is less severe in sarcoidosis than in IPF.[17,18]

Flexible fibreoptic bronchoscopic (FOB) techniques such as trans-bronchial lung biopsy (TBLB), endobronchial biopsy, transbronchial needle aspiration (TBNA) and bronchoalveolar lavage (BAL) have been found to be useful for procuring tissue for the confirmation of a diagnosis of sarcoidosis. Bronchoscopic appearances of sarcoidosis include nodules, plaques, erythema and cobble stone appearance. TBLB has a high diagnostic yield because the lesions of sarcoidosis are distributed along the bronchovascular bundle.[31-35]

METHODS

The study was approved by the institutional ethics committee. This study included all 54 new (17) and old (37) cases of sarcoidosis presented in the inpatient and outpatient Department of Medicine and Chest & TB, Dayanand Medical College and Hospital, Ludhiana over the period of one and half year.

Inclusion Criteria

- Male or female ≥18 years of age.
- Diagnosed cases of sarcoidosis on basis of clinical (fever, fatigue, malaise, weight loss) and/ characteristic radiological (b/L symmetrical hilar lymphadenopathy) /histopathological features (noncaseating granuloma).

A written informed consent taken from all the consenting patients. A predesigned proforma used to record the detailed history, laboratory and imaging reports of all cases with sarcoidosis. A specific note made of history of occupational exposure and treatment with antitubercular drugs.

Laboratory Evaluation

Lab evaluation done wherever possible, including baseline haemogram, ESR, serum creatinine, Na^{+}, K^{+}, Ca^{+2}, uric acid, glutamic oxaloacetic transaminase, glutamic pyruvic transaminase, alkaline phosphate and angiotensin converting enzymes levels, EKG, CXR-PA view, Transbronchial needle aspiration biopsy (TBNA), Transbronchial lung biopsy (TBLB), Endobronchial biopsy, CECT/HRCT chest, pulmonary function test (PFT), MRI brain and 2D Echocardiography was done where possible or required. Descriptive data collected and presented in the form of tables and diagrams and analyzed by using appropriate statistical techniques.

RESULTS

A total of 54, new (37) and old (17) cases of sarcoidosis included. Maximum number of patients were in the age group of 36-45 years (n=16, 29.63%) with mean age of presentation of 46.77 years (SD=11.17). Of the 54 patients, there were 28 males (51.85%), and 26 females (48.15%), showing slight male preponderance (p=<0.785). Predominant symptoms with which these patients presented was cough (n=34, 62.96%) and fever (n=22, 44.74%) followed by breathlessness (n= 15, 27.78%), chest pain (n=5, 9.26), weight loss/Loss of appetite/pain abdomen (n=3, 5.56 each group). Among the other clinical presentations were skin lesions (n=2, 3.70%) and parotid enlargement (n=1, 1.85%).

In our series 8 out of 54 (14.81%) had received antitubercular drugs at some stage of the illness for a duration varying from 2 months to 6 months without any symptomatic relief and none given history of occupational exposure. Majority of patients were non-smokers (n=50, 92.59%) and only 4 (7.40%) patients were alcoholic.

Hb was below 13 g/dL in 78.6% (n=22) male patients i.e. they were anaemic (WHO criteria). Hb was below 13 g/dL in 61.5% (n=16) female patients i.e. they were anaemic (WHO criteria). Only 4 (7.8%) patients showed eosinophilia and in remaining 47 (87.04%) showed normal count with mean of 3.00, SD= 2.72 and p value of 0.00072. SGOT was more than 50 U/L in 29.63% patients (n=16,

SD=30.56, mean =51.54) with range of 12 -145 and p value of 0.00609. SGPT was more than 50 U/L in 33.33% (n=18, SD=27.92, mean=51.04) with range of 5 -120 and p value of 0.00745. Alkaline phosphatase was above 140 u/L in 10 (18.51%) patients and within 2-140 u/L in 44 (81.48%) patients with mean value of 119.83, SD =53.66, range of 10-323 u/L and p value of 0.00061. Creatinine was beyond 1.2 mg/dL in 2 (3.71%) of patient and within 0.2-1.2 in 52 (96.29%) patients with mean value of 1.51, SD=1.83, range 0.5-10.10 mg/dL and p value of 0.0750. About 22 (40.74%) patients had hyponatremia i.e. serum sodium was below 136 mmol/L. In remaining 28 (51.85) patients it was within normal limits. Hypokalaemia (K^+ <3.5) was found in 13 (24.07%) of patients. About 3 (5.55%) patients had k^+ above 5.0 (hyperkalaemia) and remaining 38 (64.47%) patients k^+ was within normal limits with range of 0.31-5.9, SD-0.82 and p value of <0.001.

ACE levels were increased in 38 (70.37%) patients with mean of 85.05, SD =44.50 and range of 21 -207 ug/L with p value of 0.00609. Serum uric acid was found to be above 7.4 mg/dL in 18 (40.90%) patients and 26 (59.90%) showed value below 7.4 mg /dL. Mean serum uric acid was 6.70, range of 2.6-10.3, SD =1.82 and p value of 0.09674. Hypercalcemia was found in 17 (31.48%, mean =10.44) with SD of 1.74 and range of 6.9 to 15.7 mg/dL. All patients in our study were Mantoux negative. Erythrocyte sedimentation rate (ESR) was raised in 31 patients (57.41%). The mean value of ESR was 33.07 mm in 1st hour with range 4 to 90 mm in 1st hour. Only one patient showed RBBB in ECG without any symptoms. Spirometry was done in 5 cases and the restrictive pattern was seen in 4 cases whereas in 1 number of cases it was obstructive. In rest the values of spirometry were normal.

In 31 (57.40%) out of total 54 patients the confirmation of diagnosis of sarcoidosis was based on demonstration of non-caseating granuloma in the tissue biopsy obtained from different sites. Out of 54 cases majority 31 (79.48%) undergone fibreoptic bronchoscopy guided transbronchial lung biopsy and endobronchial biopsy. Out of 31 patients, in 23 patients diagnosis was confirmed by characteristic histopathology i.e. 14 (60.87%) patients had evidence of non-caseating granuloma in biopsy obtained by TBLB, 11 (47.82%) by EBB and 2 (8.69%) by TBNA.

On bronchoscopy majority i.e. 33 (61.11%) patients showed normal bronchial tree morphology, 11 (20.37%) were having erythematous plus granular pattern, 8 (14.81%) were erythematous and 3 (20.37) showed granular pattern. TBNA was done in four patients only. in 2 (50%) patient it showed non-caseating granuloma and in rest 2 (50%) results were inconclusive. TBLB was taken in 17 patients, out of which 14 (82.35%) were having typical noncaseating epitheloid granuloma and histopathology was inconclusive in 3 (17.65%) patients. Endobronchial biopsy was taken in 11 patients, out of which 11 (86.46%) were having typical noncaseating epitheloid granuloma and histopathology was inconclusive in 2 (13.64%) patients.

Slit Lamp examination was available in 53 patients. Evidence of uveitis was found In 8 (15.09%) with p value of 0.0004 of patients without visual abnormality**.** Cervical lymph node gave positive diagnosis in 2 (patients, skin lesions were positive in 2, Liver biopsy were positive in 2, vocal nodule in 1 and in 1 patient diagnosed by Biopsy from mediastinal mass. In remaining 23 (42.59%), sarcoidosis was diagnosis of exclusion based upon compatible clinical, biochemical and radiological Parameters because most of them refused invasive diagnostic procedures. Comparison of present study with cumulative data from other Indian studies and western studies.[8]

	Present Study	Other Indian Studies	Western Studies
	(n = 54)	(n = 409)	(n = 8137)
Females	48.15	43-71	57-61
Under 40 years	33.33	25-66	70-86
Thoracic involvement	62.96	61-97	88-99
Ocular involvement	15.09	08-40	4-27
Erythema nodosum	-	02-20	11-34
Parotid enlargement	1.85	03-15	0.5-6
Neurological involvement	1.85	01-11	0.3-9
Fever	40.74	35-54	–
Constitutional symptoms	14.8	14-57	–
Arthralgias/Arthritis[11]	1.85	18-35	40
Cardiac involvement	1.85	0-12	03
Peripheral lymphadenopathy	3.70	19-42	8-27
Hepatomegaly	3.70	14-42	12
Splenomegaly	3.70	02-27	0.3-10
Radiologic Stage at Presentation			
0	5.55	01-03	4-13
I	58.82	45-62	58-65
II	41.18	30-34	22-31
III	0.00	07-18	7-13
Mantoux Negative	100	59-97	55-70
Hypercalcaemia	31.48	18-40	0.7-18

Table 1. Clinical Profile, Laboratory Characteristics and Radiological Findings in Indian Patients

Radiological Profile

Majority of patients had stage I disease. About 3 patients (5.56%) had normal chest skiagram, 41 patients (74.5%) had stage 1 disease, 30 patients (55.56%) had stage II disease, 21 (38.89%) patients had stage III and no patient had stage I V disease according to International staging system (De Remee et al).

CECT/HRCT Chest

CT scan of chest was available in 34 cases. Mediastinal lymphadenopathy was present all 34 patients and in 50% patients, parenchymal and pleural based nodules were present. About 32% patients showed central bronchovascular thickening, nodularity and 1% of patients showed alveolar consolidation and honeycombing.

2D-ECHO done in two patients for evaluation of breathlessness was uneventful. 2D-MRI done in one patient during follow up which showed cavernous sinus thrombosis.

DISCUSSION

In our study out of 54 patients, there were 28 males (51.85%), and 26 females (48.15%) with p value of <0.79 (not statistically significant). In west, Henke et al[36] in a population based epidemiological study showed female predilection for sarcoidosis.[37] In Indian context there is lot of

difference in sex predilection for sarcoidosis in various studies conducted throughout India. Kumar et al[38] in retrospective study of 146 patients of sarcoidosis reported that there were 85 (58.2%) females.

In our study maximum number of patients were in the age group of 36-45 years (n=16, 29.63%) with mean age of presentation of 46.77 years (SD=11.17). In contrast to west majority of patient in our study presented in 4th decade of life with mean age of 46 years which is similar to the study by Kumar et al, in which 70% of patients were above 40 years of age at time of presentation in a series of 146 biopsy proven case from north India.

In our series predominant symptoms with which these patients presented was cough (n=34, 62.96%) and fever (n=22, 44.74%) followed by breathlessness (n= 15, 27.78%), chest pain (n=5, 9.26%), weight loss/Loss of appetite/pain abdomen (n=3, 5.56%). Among the other clinical presentations were skin lesions (n=2, 3.70%) and parotid enlargement (n=1, 1.85%). Only 3.70% patient presented with skin lesion in our study which was quite different from other Indian and western series. In north India, Kumar et al reported skin lesions in 10.3% of patients and in USA, Baughman et al[39] found skin lesions in 15.3% patients. The difference in result may be because of the fact that we conducted study in Department of Chest and Internal Medicine so patient with predominant skin involvement might had been missed. In terms of precomorbid conditions 9 (16.67%) patient were diabetic, 2 (3.70%) asthmatic and hypertension was found in 2 (3.70%) of patients in our series. Rosha et al[40] also reported diabetes mellitus in 8% and hypertension in 17% patients. Similar observation has been made by Sharma et al[16] but significance is unclear. In our study we found that in our series 8 (14.81%) had received antitubercular drugs at some stage of the illness for a duration varying from 2 months to 6 months without any symptomatic relief. Similar observation was made by Kumar et al where 29.5% patients had been misdiagnosed of having tuberculosis. All denied occupational and organic dust exposure. Family history of sarcoidosis was not seen in any of our patient in our study. Family history had been reported in India by Kumar et al and Sharma et al in one and six families respectively.[16] Sarcoidosis appears to occur more frequently in non-smokers. This inverse relationship between sarcoidosis and smoking, had been observed in our study also, where majority of patients were non-smokers (n=40, 88.89%). Similar observations had been made by Kumar et al and Brennan et al.[19] showing inverse relationship between smoking and sarcoidosis.

In our study physical examination revealed peripheral lymphadenopathy in 2 (3.70%) patients (both cervical LAP) which was strikingly low percentage as compared to 45% of patients reported by Sharma et al.[8] Cumulative data from western studies showed peripheral lymphadenopathy in 8 to 27% of patients.[8]

In our study bilateral non-tender and symmetrical Parotid enlargement was seen in 1 patient (1.85%). Similar observation was made by Rosha et al and was reported in 11% of patients by Sharma et al[16] in a series of biopsy proven cases of sarcoidosis from North India.

On clinical examination 3 (5.55%) patients had crepitations on auscultation of chest. However Kumar et al reported crepitations in 49.5% of patients.

Neurological involvement varies from 1 to 11% patient according to cumulative data from various Indian studies and in western studies varies from 0.3 to 9% as reported by Sharma et al.[8] In our study 1 (1.8%) patient showed lower motor neuron type facial nerve palsy along with involvement of 3rd, 4th and 6th cranial nerves during course of illness.

In our study we reported that 78.6% male and 61.5% of female were anaemic according to WHO criteria for anaemia. Sharma et al also reported anaemia in 27% of patient of sarcoidosis without any male to female differentiation.[8]

Gupta et al also studied the presence and pattern of haematological abnormalities in 30 patients with sarcoidosis in India and reported 15 men (mean age 40.4 $\pm$ 10.15 years) and equal number of women (mean age 38.6 $\pm$ 12.14 years) in the study group. Haematological abnormalities were present in 11 (36.66%) of the patients. Four cases (13.33%, all females) were found to have anaemia. Though both studies showed anaemia in patients of sarcoidosis but in our series 38 (70.3%) patients were anaemic which was strikingly different from other studies mentioned. It may be attributed to high cut of value taken for Indian population in our series and need further evaluation.

In our study total leucocyte counts and differential leucocytic counts were within normal limits in majority of the patients 37 (68.52%). Leucocytosis seen in 15 (27.78%) patients. Leucopenia was found in 2 (3.70% leucopenia) patients. Sharma et al reported similar findings though leucocytosis was reported in only 7% as compared to 27.78% in our study. And leucopenia was comparable with both studies. Eosinophilia was seen in 4 (7.41%) patients which was similar to observation made by Sharma et al and 3 (5.55%) patient showed thrombocytopenia at time of presentation which was rarely observed in sarcoidosis.[8]

In our study erythrocyte sedimentation rate (ESR) was raised in 31 (57.41%) patients. The mean value of ESR was 32 mm in 1st hour with range 4 to 90 mm in 1st hour. Similar observation were made by Gupta et al in study of haematological abnormalities in patients of sarcoidosis. Rosha et al also reported raised ESR in 28% patients of sarcoidosis. In our study high percentage of patients with increased ESR can be attributed to high prevalence of anaemia in our study population.

We found that SGOT was >50 U/L in 29.63% (n=16, SD=30.56, mean=51.54) with range of 12-145. SGPT was >50 U/L in 33.33% (n=18, SD=27.92, mean=51.04) with range of 5 -120. Alkaline phosphatase was >140 U/L 18.51% (n=10, SD=53.66, mean=18.51) with range 10-323. Sharma et al also reported increased SGOT and SGPT levels in 15% and 19% of the patients respectively. ALP was raised in 33% of patients.[8] Buaghman et al reported increased SGOT, SGPT and ALP levels in >10% of patients.

Serum calcium values was increased in 17 (31.48%) patients and mean value was 10.44 mg% (SD =1.74, range 6.9 - 15.7). Kumar et al also reported hypercalcemia in 21.2% patients. We recorded hypercalcemia more frequently but cumulative data from five major series from India shows that hypercalcemia in 18 to 40% of patients.[8] We reported hyperuricaemia in 18 patients (33.33%, S.D.= 1.74, mean=6.70) with range of 2.6-10.3 mg/dL. Sharma et al[8] also reported hyperuricemia in 41% patients which was quite similar to our results and rarely reported in other studies and need further evaluation as limited data available in this regard.

The tuberculin skin test (TST) is one test used in distinguishing between sarcoidosis and tuberculosis. It has been shown that a negative TST is highly sensitive for sarcoidosis. In our study Mantoux test was negative in all patients. Smith et al concluded that the tuberculin skin test in sarcoid patients has a high specificity but a poor sensitivity for tuberculosis. As such, while a negative TST in the general population is a sensitive test for sarcoidosis, a positive TST among sarcoidosis patients is a specific test for indicating tuberculosis. A positive TST in a patient suspected to suffer from sarcoidosis should therefore be an absolute indication for a thorough work-up for tuberculosis. A positive TST in a patient suspected to suffer from sarcoidosis should therefore be evaluated for tuberculosis. Kumar et al also reported negative Mantoux test in all patients.

We reported that ACE levels were increased in 38 (70.37%) patients with mean value of 80.8 IU (SD=44.50, range 21-207) with p value of 0.00609 (statistical significant). Our results matches with study by Sharma et al in north India where increased ACE levels found in 30 to 80% of patients. Elevated level of ACE level also observed by Kumar et al in 57.5% patients.

Slit lamp examination was available in 53 patients but Evidence of uveitis was found in 8 (15.09%) patients only, which was comparable with study by Sharma et al which reported ocular involvement in 17% patients and 4-27% patients in western data.[8]

Abnormalities in pulmonary function tests (PFTs) are present in 20% of patients with radiographic stage I sarcoidosis and in 40 to 80% of patients with parenchymal infiltrates (stages II, III, or IV). A restrictive defect with reduced lung volumes (e.g., vital capacity (VC) and total lung capacity (TLC)) is characteristic. The diffusing capacity for carbon monoxide (DLCO) is the most sensitive of the PFT parameters. Spirometry was available in only 5 cases in our study and the restrictive pattern was seen in 4 patients whereas in 1 patient showed obstructive pattern. Though spirometry was available in 5 patients, 58.9% showed restrictive and 17.8% showed obstructive pattern. The results were comparable with observation made by Kumar et al.

In 31 (57.40%) out of 54 (total) patients the confirmation of diagnosis of sarcoidosis was based on demonstration of non-caseating granuloma in the tissue biopsy obtained from different sites. Out of 54 cases majority 31 (79.48%) undergone fiberoptic bronchoscopy guided, Transbronchial lung biopsy, Transbronchial lymph node aspiration and Endobronchial lung biopsy. Bronchoscopic appearances in sarcoidosis include erythema, nodules, plaques and cobblestoning of bronchial mucosa. The prevalence of abnormal bronchial mucosa in sarcoidosis has been reported to vary from 33% to 70% in different studies. Torrington et al reported that both black and white patients with sarcoidosis had abnormal mucosa in approximately half of the patients. Kumar et al found bronchial mucosa involvement in the form of erythema in 6.1%, plaques in 3.8% and nodules in 12.2%.

Bronchoscopy revealed that majority i.e. 11 (35.48%) patients showed Erythematous plus granular morphology, 8 (25.80%) were having erythematous pattern, 3 (9.67%) were granular mucosa and remaining 9 (29.03%) were normal which were comparable with above study in view of that about 35.4% patient in our study showed granularity (nodularity). In our study in 23 patients diagnosis was confirmed by characteristic histopathology i. e. 14 (60.87%) patients evidence of non-caseating granuloma in biopsy obtained by TBLB, 11 (47.82%) by EBB and 2 (8.69%) by TBNA. Depending mainly on the experience of the clinician, the diagnostic yield of TBLB ranges from 40% to more than 90%. Gupta et al reported the diagnostic yield of TBLB to be 76% whereas Shorr et al reported the same to be 59 percent. Such a high sensitivity of TBLB could be explained by the perilymphatic distribution of the granulomas.

Cervical lymph node gave positive diagnosis in 2 patients, skin lesions were positive in 2, liver biopsy were positive in 2, vocal nodule in 1 and in 1 patient diagnosed by biopsy from mediastinal mass. In remaining 23 (42.59%), sarcoidosis was diagnosis of exclusion based upon compatible clinical, biochemical and radiological parameters because most of them refused invasive diagnostic procedures.

Chest radiograph were classified according to International staging system (Remee et al). Majority of patients had stage I disease according to according to finding of CXR PA view. About (5.56%) patients had normal chest skiagram, 41 patients (74.5%) had stage 1 disease, 30 patients (55.56%) had stage II disease, 21 (38.89%) patients had stage III and only no patient had stage I V disease which matches results of many studies in our country. Similar finding had been reported by Kumar et al and Rosha et al. however in contrast, Sharma et al[8] reported stage II as most common finding.

CT chest was available in 34 cases. Mediastinal lymphadenopathy was present all 34 patients and in 50% patients, parenchymal and pleural based nodules were present. About 32% patients showed central bronchovascular thickening, nodularity and 1% of patients showed alveolar consolidation and honey combing. Kumar et al reported enlarged intrathoracic lymph nodes in 139 (97.2%) and Parenchymal involvement in 104 (72.7%) patients. Honey-combing was present in 14 (9.8%) and pleural involvement was seen in 7 (4.9%) patients. So, in terms of mediastinal LAP and parenchymal involvement as predominant finding, results in our study were comparable.

2D-MRI done in one patient during follow up which showed cavernous sinus thrombosis.

Prior to diagnosis, 8 patients (41.81%) had received full course of antitubercular treatment. Majority of new and old patients were prescribed prednisolone according to weight for variable period of time from six months to one year and NSAIDs for constitutional features. Only 21 patients turned up for follow up on OPD basis. Almost all patients showed considerable clinical and radiological recovery. Patient with skin and lymph node lesions showed complete recovery. One patient developed cavernous sinus thrombosis and one developed steroid induced diabetes mellitus on follow up.

CONCLUSIONS

Sarcoidosis has clinical, laboratory and radiological manifestations which vary worldwide according to race. In a developing country with high prevalence of TB like India, sarcoidosis is often misdiagnosed as TB. Hence, patients having hilar lymphadenopathy with or without pulmonary infiltrates should be investigated for sarcoidosis.

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