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Case Series Article

Challenging Scenario in the Treatment Paradigm for Patient with Pulmonary Tuberculosis in Systemic Sclerosis Associated Interstitial Lung Disease – Case Series

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Abstract:
Systemic sclerosis (SSc) is a connective tissue disease marked by immune irregularities, vasculopathy, and excessive collagen production, leading to fibrosis of the skin and internal organs. While SSc can affect multiple organs and systems, lung involvement, particularly interstitial lung disease (ILD), is the primary cause of mortality in this condition. We present here an interesting case of a patient with pulmonary tuberculosis with systemic sclerosis-associated interstitial lung disease.
Keywords: Systemic Sclerosis; Interstitial Lung Disease; Tuberculosis.

Introduction

Systemic sclerosis (SSc), also known as scleroderma, is a rare autoimmune disease characterized by progressive fibrosis and thickening of connective tissue throughout the body [1, 2]. Although the exact cause of SSc remains unclear, several factors are believed to contribute to its development. Studies have identified specific human leukocyte antigen (HLA) alleles that are associated with an increased risk of SSc. These include DRB1*1104, DQA1*0501, and DQB1*0301. These genetic markers suggest a potential role of the immune system in SSc pathogenesis [3-5]. Research suggests that environmental factors may interact with genetic susceptibility to trigger autoimmune responses. Potential triggers include exposure to specific infectious agents such as cytomegalovirus (CMV), Epstein-Barr virus (EBV), and parvovirus B19. Additionally, occupational inhalation of silica dust, organic solvents (toluene, xylene, and trichloroethylene), and polyvinyl chloride may be associated with an increased risk. Cigarette smoking did not appear to be a contributing factor [6].

Pulmonary complications are the primary cause of death in SSc patients. Common manifestations include interstitial lung disease (ILD) and pulmonary arterial hypertension (PAH). Other potential pulmonary involvements include pleuritis, obstructive airway disease, aspiration pneumonia, pulmonary hemorrhage, and cryptogenic organizing pneumonia. Notably, compromised immune function, often associated with SSc or the use of immunosuppressive therapy, can increase the risk of tuberculosis (TB) infection, posing a significant challenge in patient management.

Case:

A 45-year-old female homemaker, a resident of Warangal, presented with shortness of breath, productive cough, fever, appetite loss, and weight loss for two months. She had been diagnosed with systemic sclerosis according to the ACR-EULAR Criterion for Systemic Sclerosis for 9 years and stopped treatment for one month due to economic constraints. She had a history of taking Oral Steroids, Hydroxychloroquine, and Tacrolimus as part of the treatment for Systemic Sclerosis. She had a history of skin thickening proximal to the metacarpophalangeal joints of the bilateral upper limbs, difficulty swallowing, and tightening of the skin around the mouth. no history of chest pain or hemoptysis. There was no history of allergy, exposure to pets, biomass fuel exposure, chronic respiratory illness, or connective tissue disorders in the family.

On examination, the patient was moderately built and nourished, had mask-like facies, pinched-nose-pursed lips, perioral thickening of the skin, and sclerodactyly (Figure 1). The patient did not have pallor, cyanosis, clubbing, or lymphadenopathy. Bilateral Pedal oedema++. SPO_2-89% at Room air Pulse was 96/min and BP was 100/70 mmHg. Respiratory examination revealed fine bilateral infrascapular crackles.

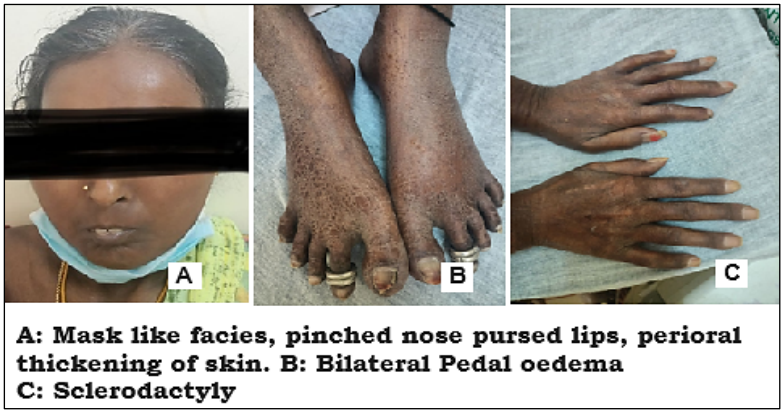

Figure 1: Shows the patient's clinical presentation

Blood investigations revealed anemia with Hb-9g/dl, slightly deranged liver enzymes (SGOT-65 IU/L, SGPT-70 IU/L Serum. ALP-160 IU/L), viral markers negative, Thyroid profile shows Hypothyroidism. Serum Electrolytes were normal Sputum AFB positive and Gene Expert-MTB Detected Medium, Rifampicin Resistance not detected. Sputum Culture showed no pathogenic organisms.

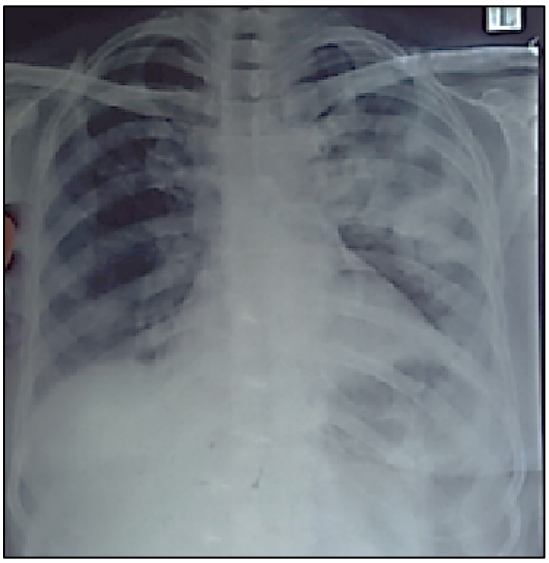

Figure 2: Chest X-ray shows left midzone cavity with consolidation with a left blunting of CP angle.

CT Chest showed Subsegmental areas of airspace opacification with air bronchograms and areas of cavitation noted involving the posterior segment of the right upper lobe, left upper lobe superior lingular segment, and superior, medial basal segments of the right lower lobe with perifocal discrete and confluent centrilobular nodules with tree in bud opacification. Subpleural reticular densities with smooth inter and intralobular septal thickening interspersed with patchy and confluent areas of ground glass opacities involving both lungs showing apicobasal gradient with early traction bronchiectasis and no macrocystic honeycombing suggestive of ILD - NSIP pattern, Dialatation of thoracic esophagus, Cardiomegaly with minimal pericardial effusion. Main Pulmonary Artery-29.4mm, Right-21.1mm.left-20.6mm with pruning of peripheral subsegmental branches of both pulmonary arteries. Few noncalcified lymph nodes in the pretracheal prevascular, subcarinal region largest measuring 8mm in the precarinal region (figure 3).

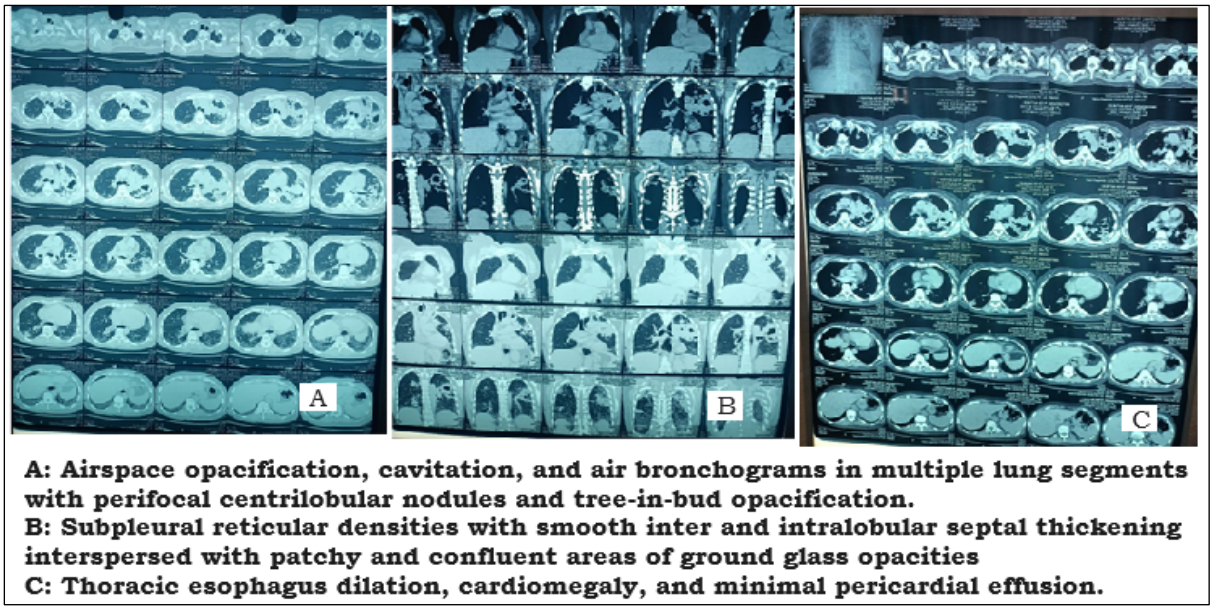

Figure 3: Computerized tomography scan of the patient

ECG shows left atrial enlargement, and right ventricular hypertrophy (figure 4). 2DEcho suggestive of Grade 1 Diastolic dysfunction, Trivial TR, Severe PAH {RVSP=64mmHg}.

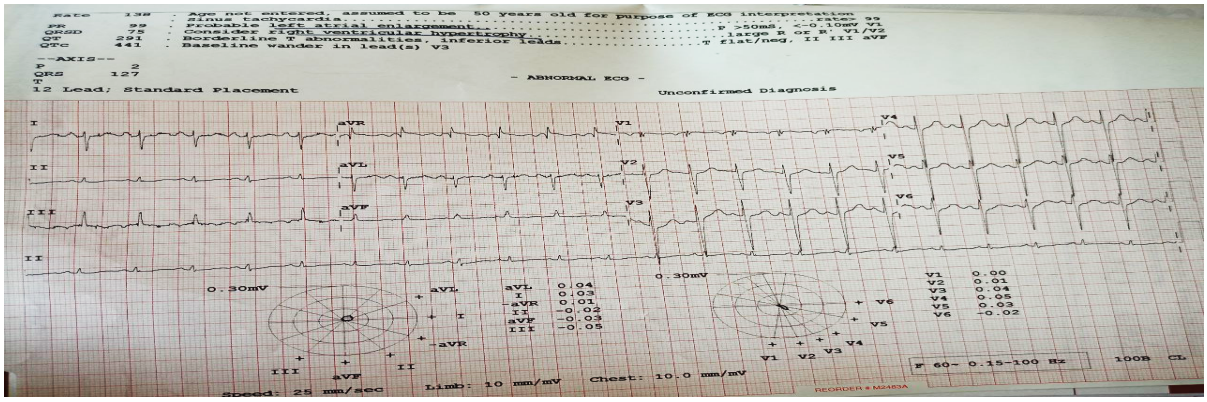

Figure 4: ECG findings of the patient

Treatment: The patient was initiated on Antitubercular Treatment Isoniazid (75 mg), Rifampicin (150 mg), Pyrazinamide (400mg), and Ethambutol (275mg) according to weight band (3pills/day). Immunosuppressants were kept on hold according to Rheumatologist advice. PAH is treated with PDE Inhibitors and Diuretics. The patient tolerated ATT well and had no history of ADR. The patient's vitals improved. Steroids were reinitiated as it was a case of progressive SSC-related ILD. The patient is advised to follow up in Rheumatology OPD for re-initiation of immunosuppressants.

Discussion

Interstitial lung disease manifests as bibasilar pulmonary fibrosis and is notably more prevalent and severe in patients with diffuse cutaneous systemic sclerosis, African Americans, males, and individuals with anti–topoisomerase I antibodies [7]. Clinically significant interstitial lung disease is present in approximately 50% of systemic sclerosis cases, although the condition may remain asymptomatic. Postmortem examinations revealed interstitial lung disease in approximately 80% of patients with systemic sclerosis. Interstitial lung disease usually manifests within the first 4–5 years after a diagnosis of systemic sclerosis [8]. While nonspecific interstitial pneumonitis is more prevalent than usual interstitial pneumonia, a mixed pattern was also observed. Symptoms include dyspnea, fatigue, and a non-productive cough later in the disease course. SSc-ILD is diagnosed by combining the presence of clinical symptoms, physical examination, pulmonary function tests, and radiological findings. The patient can be asymptomatic in the early stage and complain of dyspnea on effort, unproductive cough, and chest discomfort. In physical examination, “velcro” crackles can be found in auscultation [9].

Pulmonary function testing (PFT) typically reveals a restrictive pattern, characterized by decreased lung volumes and a lower FEV1/FVC ratio. Diffusing capacity for carbon monoxide (DLCO) may be

diminished secondary to underlying pulmonary vascular disease [10]. HRCT demonstrates high sensitivity, particularly in early disease stages, revealing increased subpleural lung attenuation in the bilateral posterior basal regions. Ground-glass opacities may suggest alveolitis, potentially progressing to honeycombing, traction bronchiectasis, and thickened interlobular septa. A frequent complication, presenting with a spectrum ranging from asymptomatic to severe cases accompanied by right heart failure [8].

Progressive Systemic Sclerosis-ILD was defined as manifesting at least two of the following three criteria during follow-up in patients with Systemic Sclerosis-ILD: worsening dyspnea or cough; a ≥5% absolute decline in FVC or a ≥10% absolute decline in DLCO adjusted for hemoglobin; or radiographic progression on chest CT scan as visually assessed [11]. The committee provides the following recommendations for the treatment of patients with Systemic Sclerosis-ILD: 1) Mycophenolate should be used; 2) Additional research should be conducted to determine the safety and effectiveness of pirfenidone and the combination of pirfenidone and mycophenolate; and 3) Cyclophosphamide, rituximab, tocilizumab, nintedanib, and the combination of nintedanib and mycophenolate should be used. Patients with systemic sclerosis-ILD have a dysfunctional immune system, making them susceptible to environmental stimuli such as bacterial or viral infections and pollutants, which can produce disease symptoms even in minute amounts. When pulmonary TB is present, it presents a significant therapeutic challenge for ILD associated with systemic sclerosis [12].

Conclusion

In ILD associated with systemic sclerosis, diagnosing and treating pulmonary TB is particularly difficult as the patient requires immunosuppressive medication, although the disease will eventually develop. Therefore, a risk-benefit analysis must be performed, and the treatment plan must be suitable and workable.

References

1. Ferreli C, Gasparini G, Parodi A, Cozzani E, Rongioletti F, Atzori L. Cutaneous Manifestations of Scleroderma and Scleroderma-Like Disorders: A Comprehensive Review. Clin Rev Allergy Immunol. 2017 Dec;53(3):306-336.
2. Del Rio AP, Sachetto Z, Sampaio-Barros PD, Marques-Neto JF, Londe AC, Bertolo MB. HLA markers for poor prognosis in systemic sclerosis Brazilian patients. Dis Markers. 2013 ;35(2):73-8.
3. Lambert NC, Distler O, Müller-Ladner U, Tylee TS, Furst DE, Nelson JL. HLA-DQA1*0501 is associated with diffuse systemic sclerosis in Caucasian men. Arthritis Rheum. 2000; 43:2005–10.
4. Radstake TRDJ, Gorlova O, Rueda B, et al. Genome-wide association study of systemic sclerosis identifies CD247 as a new susceptibility locus. Nature Genetics. 2010; 42:426–29.
5. Zhou X, Lee JE, Arnett FC, et al. HLA-DPB1 and DPB2 are genetic loci for systemic sclerosis: a genome-wide association study in Koreans with replication in North Americans. Arthritis and Rheumatism. 2009;60(12):3807–14.
6. Truchetet ME, Brembilla NC, Chizzolini C. Current Concepts on the Pathogenesis of Systemic Sclerosis. Clin Rev Allergy Immunol. 2023 Jun;64(3):262-283.
7. Perelas A, Silver RM, Arrossi AV, Highland KB. Systemic sclerosis-associated interstitial lung disease. Lancet Respir Med. 2020 Mar; 8 (3):304-320.
8. Adigun R, Goyal A, Hariz A. Systemic Sclerosis (Scleroderma) [Updated 2024 Apr 5]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 Jan-. Available from: https://www.ncbi.nlm.nih.gov/books/NBK430875/ [Assessed on Feb 20th 2024]
9. Hassoun PM. Lung involvement in systemic sclerosis. Presse Med. 2011;40(1 Pt 2):e3-e17.
10. Ranu H, Wilde M, Madden B. Pulmonary function tests. Ulster Med J. 2011 May;80(2): 84-90.
11. Cottin V, Brown KK. Interstitial lung disease associated with systemic sclerosis (SSc-ILD). Respir Res. 2019 Jan 18;20(1):13.
12. Nihtyanova SI, Denton CP. Pathogenesis of systemic sclerosis-associated interstitial lung disease. J Scleroderma Relat Disord. 2020 Mar; 5(2 Suppl):6-16.