Introduction

Leprosy and tuberculosis are two common diseases in India. The prevalence of tuberculosis is estimated to be 4.0 and 16.0 per thousand for bacteriologically and radiologically active tuberculosis cases respectively, while the national prevalence rate of leprosy in India is 0.88/10,000.[1] The concomitant occurrence of both tuberculosis and leprosy in a single individual are not an uncommon clinical condition but is being reported infrequently in literature.

Case Report

A 25-year-old man was admitted with complaints of fever, which was mainly in the evening, of nearly 1-week duration associated with cough, breathlessness, and generalized fatigue. He was on standard multidrug therapy (Rifampicin, Clofazamine, Dapsone) for lepromatous leprosy, for the last 2 years, but he was not very compliant with drug intake. He developed ENL for which he was started on steroids for the last 6 months. He did not have any addictions.

On examination he was sick looking, and had severe pallor, generalized lymph node enlargement, diffuse erythematous lesions, and nodular tender lesions of varying size all over the body. The scalp and oral mucosa were not involved. At the time of admission his temperature was 40°C, blood pressure was 120/70 mm of Hg and pulse rate was 114/m and respiratory rate was 38/m. Respiratory system examination revealed bilateral scattered crepitations and rhonchi. He had a hepatomegaly of 5 cm below the costal margin in the right midclavicular line and splenomegaly of 3 cm.

Investigations revealed Hb 6 g%, total leucocyte count 1000/mm³ (P 85%, L 15%), ESR 130 mm in the first hour, platelet count 3.2 lakhs/mm³, renal and liver function tests within normal limits, MCV 80, MCH 24, MCHC 30, reticulocyte count 3.5%. Peripheral smear showed normocytic normochromic cells with no evidence of hemolysis; WBCs were increased in number with predominance of neutrophils; and platelets were adequate. CRP was 160 mg/l, and slit-skin smear from the ear lobe was tested positive for lepra bacilli, BI 6%, MI 0%. X-ray chest was normal, sputum was positive for AFB, and HIV status was negative.

With the clinical scenario and investigation results the diagnosis of Hansen’s disease, ENL, pulmonary tuberculosis, SIRS was made. He went into hypotension which was corrected with fluid replacement. Spo₂ was maintained at 98%, without supplemental o2. He was started on broad spectrum antibiotics and DOTS CAT I ATT. The treatment for leprosy was continued. Fever subsided in 3 days and he was discharged.

Discussion

The infrequent occurrence of both tuberculosis and leprosy is based on the transmission dynamics of both infections.[2] The higher reproductive rate of *Tubercle bacilli* compared to *Lepra bacilli* and degree of cross immunity within an individual does not allow both infections to occur simultaneously. Chaussinand et al. concluded that the prevalence of leprosy was inversely related to the prevalence of tuberculosis.

There have been sporadic reports of coexistence of tuberculosis and leprosy in the same patients. In 1895, in the early days of medical bacteriology, Hansen noted that tuberculosis was a major cause of death in his leprosy patients in Oslo. Relvich et al. in 1954 strongly argued that most of the cases of tuberculosis were associated with lepromatous leprosy followed by borderline lepromatous leprosy, while the association of tuberculoid form of leprosy with tuberculosis was uncommon.
Kumar et al.\textsuperscript{(3)} reported that tuberculosis may occur through the spectrum of leprosy. The patient in this case report was diagnosed to have lepromatous leprosy 2 years back. The maximum number of cases reported are from the third decade of life with male-to-female ratio of $3:1$.\textsuperscript{(4)} In French Polynesia, Glaziou and co-workers examined the records of more than 1000 leprosy patients who had been in institutions between 1902 and 1991. They found that between 1902 and 1930, before the onset of effective antimicrobial therapy, mortality from tuberculosis in these leprosy patients was 21%. It appeared that more multibacillary patients died of tuberculosis (13%) than pauci-bacillary patients (4%).

The reduction in an effective cell-mediated immune response associated with multibacillary leprosy, coupled with the social impact of the disease, would lead to reactivation of an underlying latent tuberculosis infection, or to superinfection with \textit{M. tuberculosis}. The defect is in toll-like receptor 2 (TLR2), a protein that apparently plays a vital role in triggering host defense mechanisms against microbial invasion. Reduced inducible chemokine ligand-2 (CCL2) combined with a lowered TNF alpha response in lepromatous leprosy may contribute to the unrestricted growth and dissemination of mycobacteria found in the disease.\textsuperscript{(4,5)}

There are reports of triple association of American cutaneous leishmaniasis, lepromatous leprosy, and pulmonary tuberculosis.\textsuperscript{(6)} There are several case reports of coinfection of HIV and leprosy and also coinfection of leprosy, pulmonary tuberculosis, and cutaneous tuberculosis.\textsuperscript{(7)}

The principal means of transmission of both leprosy and tuberculosis is by aerosol spread. The incubation period in leprosy varies from 6 months to 40 years or longer, while in the case of tuberculosis it is only 4 weeks. The duration of gap between the development of leprosy and tuberculosis varied between 2 months and 10–15 years.\textsuperscript{(8)} This patient had noticed skin lesions since the last 2 years. Only few cases have been reported in which tuberculosis was found to predate leprosy.\textsuperscript{(9)}

It is well known that tuberculosis infection can develop with certain risk factors like HIV infection, low socioeconomic status, silicosis, diabetes mellitus, gastrectomy, renal failure, organ transplant.\textsuperscript{(9)} There are also other risk factors such as smoking; rheumatic disorders; and use of low dose immunosuppressive agents or glucocorticoid steroids. In the case of leprosy, corticosteroids are used primarily in the treatment of type I (reversal) reactions and type II reactions and silent neuropa thy. Development of pulmonary tuberculosis after corticosteroid use in leprosy has also been reported.\textsuperscript{(9)} In that particular report the patient was started on steroids for 6 months for erythema nodosum leprosum. Agarwal et al.\textsuperscript{ reported a case of leprosy and tuberculosis coinfection in a patient of renal transplant recipient and who had taken prednisolone, azathioprine, and cyclosporine for more than 9 years.\textsuperscript{(11)} The patient in this case report was on steroids for the last 6 months for erythema nodosum leprosum. He also belongs to a lower socioeconomic strata. These might be the two precipitating events for the development of tuberculosis in this patient.

In leprosy, a majority of the cases reported were of pulmonary tuberculosis; rarely extra-pulmonary tuberculosis\textsuperscript{(12)} has been reported. In one study the predominant presenting symptom was cough with expectoration (100%) and fever (80%). Anemia (75%) and crepitations (60%) were the presenting physical sign mainly. Radiologically bilateral extensive pulmonary lesions were seen in (70%). Sputum for acid fast bacilli was positive in 80% of cases.\textsuperscript{(13)} This particular patient presented with evening rise of temperature, cough, pallor, hepatosplenomegaly, bilateral crepitations. He also developed features of systemic inflammatory response syndrome. He developed hypotension which soon corrected. His sputum AFB was positive.

**Conclusion**

It is important to recognize the presence of tuberculosis in leprosy patients so as to avoid single drug therapy (e.g., Rifampicin,) which may contribute to development of acquired drug resistance and reduced effectiveness of anti-TB treatment.

All effort should be made to rule out latent tuberculosis, before starting steroids in leprosy patients.

**References**

1. Prasad R, Verma SK, Sing R, Hosmane G. Concomitant tuberculosis and leprosy. Lung India 2010;27:19-23.
2. Chaussinand R. Tuberculosis and leprosy-antagonistic illnesses. Int J Lepr 1948;16:431-8.
3. Kumar B, Kaur S, Kataria S, Roy SN. Concomitant occurrence of leprosy and tuberculosis-a clinical, bacteriological and radiological evaluation. Lepr India 1982;54:671-6.
4. Nigam P, Dubey AL, Dayal SG, Goyal BM, Saxena VN, Samuel KC. The association of leprosy and pulmonary tuberculosis. Lepr India 1979;51:65-73.
5. Hasan Z, Jamil B, Zaidi I, Zafar S, Khan AA, Hussain R. Elevated serum CCL2 concomitant with a reduced mycobacterium-induced response leads to disease dissemination in leprosy. Scand J Immunol 2006;63:241-7.
6. Delobel P, Lannoo P, Djossou F, Sainte-Marie D, Pradinaud R. American cutaneous leishmaniasis, lepromatous leprosy, and pulmonary tuberculosis coinfection with down regulation of the T-helper 1 cell response. Clin Infect Dis 2003;37:628-33.
7. Inamadar AC, Sampagav VV. Concomitant occurrence of leprosy, cutaneous tuberculosis and pulmonary tuberculosis—a case
report. Lepr Rev 1994;65:282-4

8. Agnihotri MS, Rastogi S, Agarwal RC. Tuberculosis and leprosy. Indian J Tuberc. 1973;20:136-7.

9. Jick SS, Lieberman ES, Rahman MU, Choi HK. Glucocorticoid use, other associated factors, and the risk of tuberculosis. Arthritis Rheum 2006;55:19-26.

10. Sreeramareddy CT, Menezes RG, Kishore P. Coincident age old infections of mankind – tuberculosis and leprosy: A case report. J Med Case Reports 2007;1:43.

11. Agarwal DK, Mehta AR, Sharma AR, Sural S, Kumar A, Mehta B, et al. Coinfection with leprosy and tuberculosis in a renal transplant recipient. Nephrol Dial Transplant. 2000;15:1720-1.

12. Flanagan PM, McIlwain JC. Tuberculosis of the larynx in a lepromatous patient. J Laryngol Otol 1993;107:845-7.

13. Srilakshmi MA, Amit H, Lal J, Pais N. Concomitant infection with pulmonary tuberculosis and lepromatous leprosy. J Assoc Physicians India 2003;51:528-9.

How to cite this article: Grace M. S. Coinfection of two age old diseases. Indian J Community Med 2011;36:228-30.

Source of Support: Nil, Conflict of Interest: None declared.