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## Tubercle and Lung Disease

### Trend of HIV infection in patients with pulmonary tuberculosis in South India

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**SUMMARY.** *Setting:* Tuberculosis is life threatening, transmissible and pandemic especially among millions of HIV infected persons. In developing countries like India where HIV infection is becoming prevalent and where tuberculosis infection has long been endemic, its incidence is increasing.

*Objective:* The aim of the study was to find out the trend of HIV infection in patients with pulmonary tuberculosis in south India.

*Design:* HIV seropositivity was assessed in 1430 radiologically and/or bacteriologically confirmed pulmonary tuberculosis patients attending major tuberculosis institutions in Madras by the AIDS Cell, Institute of Microbiology, Madras Medical College, Madras from January 1991 to May 1993.

*Results:* HIV seropositivity was found to rise significantly from 0.77% in 1991 to 3.4% in 1993 ( $P < 0.05$ ). 22 (91.67%) of a total of 24 HIV seropositive pulmonary tuberculosis patients had pulmonary cavities and 21 patients (87.5%) had bacteriological confirmation of tuberculosis.

*Conclusion:* The findings of this prospective study suggest that pulmonary tuberculosis patients with HIV infection are in an early phase of immunosuppression. This study reveals the rising trend of HIV infection; all persons with tuberculosis should therefore be questioned about the risk factors for HIV infection and urged to have an HIV test.

**RÉSUMÉ.** *Cadre:* La tuberculose met en danger la vie des malades, est transmissible et pandémique, surtout parmi les millions de personnes infectées par le VIH. Dans les pays en développement comme l'Inde où l'infection VIH a une prévalence croissante et où la tuberculose est endémique depuis longtemps, l'incidence de la tuberculose s'intensifie.

*Objet:* L'objet de l'étude était de découvrir la tendance de l'infection VIH chez des malades atteints d'une tuberculose pulmonaire en Inde du sud.

*Schéma:* La séropositivité VIH a été analysée par la cellule SIDA, Institut de Microbiologie, Madras Medical College, chez 1430 malades atteints d'une tuberculose pulmonaire confirmée par radiologie et/ou bactériologie, consultant les services principaux de tuberculose à Madras de janvier 1991 à mai 1993.

*Résultats:* Il a été observé que la séropositivité VIH a augmenté de façon significative : de 0,77% en 1991 à 3,4% en 1993 ( $P < 0,05$ ). Sur un total de 24 malades atteints d'une tuberculose pulmonaire et VIH-positifs, 22 (91,67%) avaient des cavités pulmonaires et 21 (87,5%) ont montré une confirmation bactériologique de tuberculose.

*Conclusion:* Les résultats de cette étude prospective suggèrent que les malades atteints d'une tuberculose pulmonaire et séropositifs sont dans une phase précoce d'immunosuppression. Cette étude montre la tendance croissante de l'infection VIH et la nécessité que toute personne atteinte d'une tuberculose soit interrogée sur les facteurs de risque de l'infection VIH et incitée à avoir un test VIH.

**RESUMEN.** *Marco de referencia:* La tuberculosis es una enfermedad que amenaza la vida, es transmisible y pandémica, especialmente entre los millones de personas infectadas con VIH. En los países en desarrollo como India, donde la infección VIH se está haciendo prevalente y donde la infección tuberculosa ha sido endémica desde hace mucho tiempo, la incidencia está en aumento.

*Objetivo:* Poner en evidencia la tendencia de la infección VIH en pacientes con tuberculosis pulmonar en el sur de la India.

**Método:** Se evaluó la serología VIH en 1 430 pacientes con tuberculosis pulmonar confirmada bacteriológica y/o radiológicamente, atendidos en los principales centros antituberculosos de Madras por la Célula SIDA del Instituto de Microbiología, Madras Medical College, de enero de 1991 a mayo de 1993.

**Resultados:** Se encontró que la seropositividad VIH había aumentado de 0,77% en 1991 a 3,4% en 1993 ( $P < 0,05$ ). De un total de 24 pacientes con tuberculosis pulmonar VIH-positivos, 22 (91,67%) tenían cavidades pulmonares y 21 (87,5 %) tuvieron una confirmación bacteriológica de tuberculosis.

**Conclusión:** Los resultados de este estudio prospectivo sugieren que los pacientes con tuberculosis pulmonar infectados con el VIH se encuentran en la primera fase de la inmunosupresión. Este estudio revela la tendencia al aumento de la infección VIH y por consiguiente, todas las personas con tuberculosis deben ser interrogadas sobre los factores de riesgo para la infección VIH y deben ser instados a someterse a un test de serología VIH.

## INTRODUCTION

HIV infection is making rapid in-roads among tuberculosis patients in India; this association has been reported from Pondicherry,<sup>1</sup> Bombay,<sup>2</sup> and Madras.<sup>3</sup>

## MATERIALS AND METHODS

Bacteriologically and/or radiologically confirmed pulmonary tuberculosis patients were screened for the possible association of HIV infection at 4 major centres of Thoracic Medicine in Madras by the AIDS cell of the Institute of Microbiology, Madras Medical College, Madras from January 1991 to May 1993.

Routine history was taken and a detailed clinical examination was done. All the patients were subjected to chest roentgenography and their sputa were examined for the presence of *Mycobacterium tuberculosis* by smear and culture methods. Blood samples were taken and the serum was separated and tested for HIV antibodies by ELISA technique (Wellcozyme kit). The blood samples, which were proved seropositive twice by ELISA, were also confirmed by Western Blot method.

## RESULTS

1430 pulmonary tuberculosis patients were selected for this study from January 1991 to May 1993. There is a definite rising trend in the selection of patients over the succeeding years. Whilst there is no significant difference in the pattern of age groups selected during 1991, 1992 and 1993, there is a noticeable increase in the in-

take of female patients, from 25.77% in 1991 to 32.3% in 1993 (Table).

HIV infection was detected in 24 (1.68%) of the 1430 pulmonary tuberculosis patients screened (Table). There was a significant rise of HIV infection among pulmonary tuberculosis patients, from 0.77% in 1991 to 3.35% in 1993 ( $P < 0.05$ ). During 1992 the HIV infection rate was 1.32%.

20 (83.33%) of the 24 HIV seropositive patients were in the  $\leq 40$  year age group. In 1993 the number of young seropositives ( $\leq 20$  years) was a great deal higher than in the previous years (Table). The HIV detection rate was high (7.14%) during 1993 among female patients, as against the figures of 0.99% and 0.5% obtained during 1991 and 1992 respectively.

Pulmonary cavitory lesions were seen in 22 (91.67%) of total 24 patients and bacteriological confirmation (sputum smear and/or culture positivity for *M. tuberculosis*) was obtained in 21 patients (87.5%).

Heterosexual intercourse was the major risk factor among 16 pulmonary tuberculosis patients with HIV infection. While many patients gave a history of previous administration of intravenous medication, as advised by their physicians for various other ailments, none of them was found to be a drug addict.

## DISCUSSION

Persons with latent tuberculosis infection may be more likely to develop overt tuberculosis if they are infected with HIV.<sup>4,5</sup> Reactivation of tuberculosis infection tends to occur relatively early (often as a sentinel disease) in the course of HIV immunosuppression, before the

Table. Trend of HIV infection among pulmonary tuberculosis patients

Age and sex distribution	1991			1992			1993 (Up to May)			Total		
	Total	HIV+	%	Total	HIV+	%	Total	HIV+	%	Total	HIV+	%
<b>Age (in years)</b>												
$\leq 20$	31	0	0	51	0	0	29	4	13.79	111	4	3.60
21-40	231	0	1.30	396	6	1.52	213	7	3.29	840	16	1.90
41-60	130	0	0	233	3	1.29	116	1	9.86	479	4	0.84
<b>Sex</b>												
Male	291	2	0.69	478	8	1.67	246	4	1.63	1015	14	1.38
Female	101	1	0.99	202	1	0.50	112	8	7.14	415	10	2.41
<b>Total</b>	392	3	0.77	680	9	1.32	358	12	3.35	1430	24	1.68

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invasion of other opportunistic infections and other overt manifestations of AIDS and AIDS-related complex (ARC).<sup>6</sup> Although reactivation of perviously acquired tuberculosis is mainly responsible for tuberculosis in HIV-infected individuals, the disease may also develop from recent primary infection and possibly from exogenous reinfection.<sup>7</sup>

Classical tuberculosis upper lobe infiltrates and cavitary lesions are more frequently seen among patients who have contracted tuberculosis in the earlier stages of HIV infection.<sup>8,9</sup> 91.67% of 24 patients in this study, 50% of 6 patients in the Pondicherry series<sup>1</sup> and 52.63% of 57 patients in the Bombay study<sup>2</sup> had cavitary tuberculosis. Demonstration of tubercle bacilli in the sputum specimens obtained from 21 (87.5%) HIV seropositive pulmonary tuberculosis patients is another important pointer in this study. Prospective studies such as the present one, undertaken in developing countries like India on the spectrum of tuberculosis among HIV-infected patients, include more HIV associated cases of tuberculosis occurring earlier in the course of immunosuppression.<sup>10</sup>

The most significant finding of this study was the rising trend of HIV seropositivity in pulmonary tuberculosis patients, from 0.77% in 1991 to 3.35% in 1993 ( $P < 0.05$ ). This trend was also observed in Bombay,<sup>2</sup> where HIV infection among patients with respiratory disease (89% of them with tuberculosis) increased to 3.43% in 1990-91 from 2.32% in 1988-89.

In India, an estimated 1 753 000 people were infected with HIV during 1993 and 87 650 new cases of tuberculosis with HIV are likely to emerge.<sup>11</sup> The present study reveals the rising trend of HIV infection among pulmonary tuberculosis patients in India and therefore, as recommended by the Centers for Disease Control,<sup>12</sup> all persons with tuberculosis should be questioned about risk factors for HIV infection and, whether or not risk factors are elicited, urged to have an HIV test.

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## References

1. Sivaraman V, Gillert Fernandez, Sambasiva Rao R. HIV infection and pulmonary tuberculosis: report on 6 cases. *Indian Journal of Tuberculosis* 1992; 39: 35-39.
2. Mohanty K C, Sundari R M, Sudhir Nair. HIV infection in patients with respiratory disease. *Indian Journal of Tuberculosis* 1993; 40: 5-12.
3. Anuradha S, Solomon S, Rajasekaran S. HIV seropositivity in patients with respiratory disease. *Indian Journal of Tuberculosis* 1993; 40: 13-15.
4. Rieder H L, Snider D E Jr. Tuberculosis and the acquired immunodeficiency syndrome. *Chest* 1986; 90: 469-470.
5. Quinn T C. Interactions of the human immunodeficiency virus and tuberculosis and the implications for BCG vaccination. *Rev Infect Dis* 1993; 11 (Suppl): 379-384.
6. Theuer C P, Chaisson R E, Schecter G F et al. Human immunodeficiency virus in tuberculosis patients in San Francisco (abstract). *Am Rev Respir Dis* 1988; 137: 121.
7. Styblo K, Enarson D A. The impact of infection with HIV on tuberculosis. In: Mitchell D M, ed. *Recent advances in respiratory medicine*, 5th Edn. Edinburgh: Churchill Livingstone, 1991: pp 147-162.
8. Pitchenik A E, Burr J, Suarez M et al. Human T-cell lymphotropic virus-III (HTLV-III) seropositivity and related disease among 71 consecutive patients in whom tuberculosis was diagnosed. A prospective study. *Am Rev Respir Dis* 1987; 135: 875-879.
9. Theuer C P, Hopewell P C, Elias D et al. Human immunodeficiency virus infection in tuberculosis patients. *J Infect Dis* 1990; 162: 8-12.
10. Pitchenik A E, Fertil D. Medical management of AIDS patients: tuberculosis and nontuberculosis mycobacterial disease. *Med Clin North Am* 1992; 76: 121-171.
11. Lalit Kant. Upsurge in tuberculosis: HIV effect. *Indian Journal of Tuberculosis* 1993; 40: 43-46.
12. Centers for Disease Control. Tuberculosis and human immunodeficiency virus infection: recommendations of the Advisory Committee for the Elimination of Tuberculosis (ACET). *MMWR* 1989; 38: 236-238.

IV+ %

4	3.60
5	1.90
4	0.84
4	1.38
0	2.41
4	1.68