Pneumocystis-Tuberculosis Co-infection in the HIV Positive Host

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The occurrence and co-occurance of opportunistic infections in HIV positive patients is dependent on numerous factors. In a South Indian population we demonstrate a higher than previously reported rate of TB in patients presenting with pneumocystis pneumonia. Further study is needed of this entity, particularly the effect of steroids in this population.

Introduction

- Developed countries, where guidelines on the treatment of PJP have been created, have dramatically lower rates of latent and active TB than developing countries.
- PJP may delay the diagnosis and treatment of TB.
- Furthermore, treatment of PJP with corticosteroids may be detrimental to the course of TB.
- The objective of this study was to examine the frequency and the clinical characteristics of the co-infection of PJP and TB in HIV.

Methods

- The clinical details of all HIV patients being treated at Amrita Hospital in South India have been prospectively collected in an electronic database since 2006.
- We compiled the data from 2006 to 2018 and further examined the clinical and laboratory results from electronic charts of patients admitted with PJP.
- Statistical analysis of the data was performed with descriptive analysis.

Results

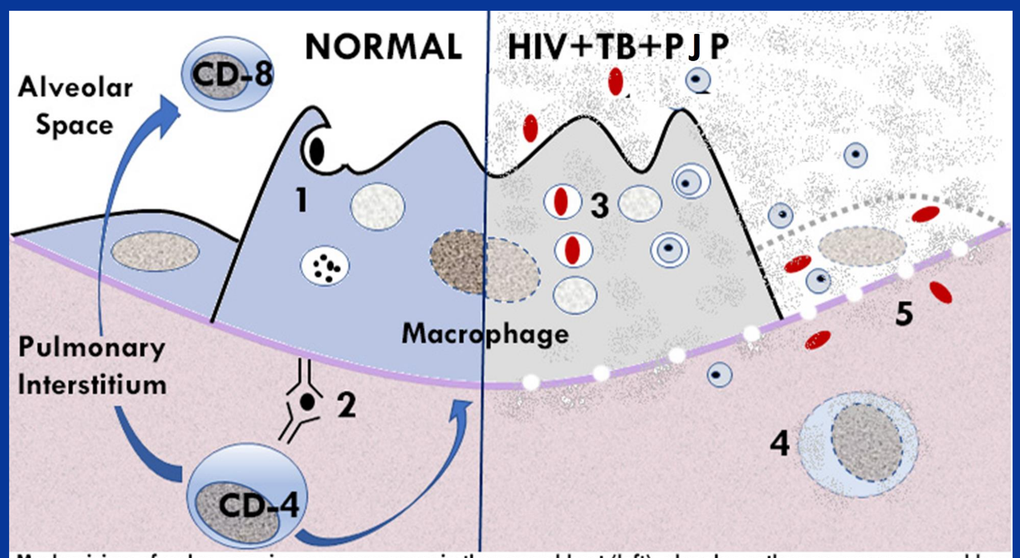
- A total of 21 of the 576 HIV patients had admissions for PJP.
- Of these 9/21 (43%) were co-infected with PJP and TB.
- In all cases PJP presentation was the event leading to the diagnosis of HIV.
- The mean age and gender ratios were similar in our total population and our PJP subgroup however, the CD-4 count of the PJP group was significantly lower (50 vs 237 cells/ul p=0.004) . All of our PJP cases were below the classical 200/ul threshold for developing PJP.
- Seven of the nine PJP-TB co-infected patients had been started on antitubercular therapy in the community prior to diagnosis of HIV.
- There were no significant differences between the PJP only and the PJP-TB group.

Table 1. Comparison of PJP group to all HIV patients

Parameter (SD)	All HIV patients	PJP group
Age	43 years (10)	43 years (5.7)
Gender	64% Male 36% Female	71% Male 29% Female
CD-4 count at presentation	237 cells/ul (265) Range (2-1874)	50 cells/ul (40) Range (2-135)
Number	576	21

Table 2. Comparison of TB-PJP group to PJP only

Parameter	TB Positive Mean (SD) | N	TB Negative Mean (SD) |N
Age	40 years (5.1) | 9	45 years (5.3) |12
Male:Female	8:1	7:5
CD-4 Count	49.7 (40.5) | 9	50.9 (40.9) |12
Length of Stay	16.5 Days (17.5) |9	11.8 Days (6.2) |11
ICU Admission Rate	33% |9	36% |11
Hypoxia (SpO2</=88%)Rate	88% |8	55% |11
Expired	0/9 |9	3/12 |11
WBC count/ul	8116 (3494) |9	7004 (3685) |11
Lymphocyte count/ul	1017(689) |9	1131 (402) |11
Serum Sodium mEq/L	128.6 (3.8) |8	130.7 (4.6) |10
Albumin:Globulin Ratio	0.67 (0.18) |9	0.67 (0.17) |11



Mechanisims of pulmonary immune response: in the normal host (left), alveolar pathogens are consumed by pulmonary macrophages (1), followed by phagolysosome fusion and microbial digestion and death. In conjunction with MCH-II protiens (2) antigens are presented to CD-4 T cells which further stimulate immune response and recruit CD-8 cytotoxic T cells. In the HIV/TB infected host (Right) several abnormailites are seen. Tuberculoid Mycobacteria inhbit phagolysosome fusion (3), this potentially allows further infection by other organsisms. Furthermore in HIV infection, the absence of effective CD-4 Cells (4) limts propogation of host immune response, leading to organism invasion (5) and breakdown of alveolar gas exchange

Results

Table 3. Previously reported rates of TB-PJP co-infection in patients presenting with PJP pneumonia in different populations.

Study	TB-PJP prevalence	National HIV prevalence	National TB prevalence
Barnes 1992 (Los Angeles)	4%	0.6%	10/100,000
Castro 2000 (Miami)	10%	0.4%	5/100,000
Orlovic 2007 (South Africa)	9%	0.7%	20/100,000
Udaiwadia 2009 (Mumbai)	10%	0.3%	40/100,000
Rani 2010 (Chennai)	40%	0.3%	40/100,000
Our Data	43%	0.26%	40/100,000

Conclusion

- Our report highlights the need to increase awareness of occurrence of this dual infection in HIV infected patients, as both infections can mimic each other clinically and radiologically
- In addition we report a much higher rate of underlying TB in our patients with PJP than what has been generally reported in the literature
- Further research is needed to determine the risk benefit ratio of steroids in these populations.
- We conclude that higher clinical suspicion for this entity is warranted, particularly in countries with a high prevalence of TB.

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Abbreviations; HIV, Human Immunodeficiency Virus; PJP, Pneumocystis Jiroveci Pneumonia; TB, Tuberculosis