Validity of CD4 count as a Clinical Predictor for Isolating HIV patients with suspected Tuberculosis
A Retrospective Comparison HIV patients isolated for Pulmonary Tuberculosis at CUMC.

A. Study Purpose and Rationale

HIV infection markedly increases the susceptibility of new tuberculosis infection to develop into active disease, which can be rapidly progressive.[1] Since the description of the acquired immunodeficiency syndrome (AIDS) in 1981, an increase in the number of tuberculosis cases has been reported. This is reflected by an increase in the proportion of cases that represent primary TB and an increase in shear number of cases of MDR TB (multi-drug resistant TB).[2] [3] Many of the outbreaks of tuberculosis in HIV-infected person are known to have involved MDR-TB. Given these facts and the recent public health concern of XDR TB (extensively drug resistant TB), health care facilities have reason to be concerned about following strict adherence to acid-fast bacilli isolation precautions in HIV patients.

In 1994 the CDC published guidelines for preventing the transmission of TB in health-care facilities.[4] Since then, the transmission of TB in health-care facilities has been decreased in many institutions that have followed the CDC's aggressive guidelines which include prompt identification of patients with active pulmonary TB, placing them in negative pressure rooms, and the utilization of effective medical treatment.[5] However, the cost of implementing these guidelines is not easily paid for by all US hospitals.[6]

Again, the question of hospital preparedness is raised. How do isolation rooms need to be rationed in light of future outbreaks of MDR TB and even XDR TB? Prior investigators have attempted to shed light on this question. Many studies have attempted to identify clinical parameters that would correctly predict which patients do not require isolation and therefore put isolation rooms to their best use.[7] Specifically, three studies have stated that HIV status (seropositive verses seronegative) is a predictor for positive culture TB.[8] [9] [10] However, only one of these studies examined the CD4 counts as part of the HIV status.[11] The study found that patients co-infected with TB and HIV (n=47), had a mean CD4 count of 170.5 (+/- 56). The study also found that out of the co-infected group (n=47), 28/47 (60%) had a CD4>200, and 19/47 (40%) had CD4 count <200. However, the study did not disclose the distribution of the CD4 count was among the co-infected group, nor did the study state what the mean or distribution of the CD4 count was of the control group.

We would like to argue that a better understanding of CD4 count is warranted in the HIV population with suspected pulmonary TB. We plan to determine the mean, median and mode of both HIV seropositive patients co-infected with TB in comparison to HIV seropositive with no TB infection. We argue that is worthwhile to determine if CD4 counts are truly lower in subjects that are con-infected and what exactly those numbers are. If co-infected patients have a lower CD4 count, we believe this knowledge can be used as a tool by physicians when evaluating patients at first encounter for efficient triage and isolation. On the other hand, if our study shows that CD4 count is not lower in the co-infected group, this would suggest that clinicians should not rely on CD4 count, but rather rely on other clinical parameters that have been reproduced, and well documented in separate studies.

B. Study Design and Statistical Analysis

This will be a retrospective chart review of all Columbia University Medical Center admissions of HIV seropositive patients who were placed in respiratory isolation for pulmonary tuberculosis from a 10 year period, January 1997 through December 2006. We will accept prior documented HIV seropositive status or patients diagnosed as HIV Seropositive during their isolation

admission. We will accept the CD4 count within 3 months of the isolation admission at CUMC. In addition, TB positive patients are those with TB positive sputum culture or TB positive bronchial washing isolated by the CUMC microbiology laboratory.
Patients will be excluded from analysis if HIV status remains unknown, if there is no CD4 count documented in the medical record within 3 months of the isolation admission, or if they had inconclusive TB workup. Only subjects over the age of 18 will be included. Patients will be divided into two groups based on TB positive status, or TB negative status. Then the CD4 counts will be the variable recorded in each group. The primary study outcome will be determination if lower values of CD4 count are associated with HIV patients placed in respiratory isolation that are TB positive.

We Assume that during a 10 year period there will be at least 1000 hospital admissions for HIV patients with suspected pulmonary TB, and TB prevalence rate based on 5% (n=950 for HIV seropositive/TB negative and n=50 for HIV seropositive/TB positive). Power analysis using unpaired t-test showed 0.4 is the smallest difference between CD4 that can be found, using a SD of 1, for which the available number of subjects will lead (at chosen power of 80% and alpha value of 0.05%)to statistical significance.

C. Study Procedure
Given this is a retrospective study, the only study procedures are those that were done as part of the patients' routine medical care, such as obtaining blood and consent for HIV status, CD4 count if not known and collection of sputum and/or bronchial washing.

D. Study Drugs
Again, given the retrospective, observational nature of this study, the only study drugs that will be utilized were those given as part of the patients' routine medical care.

E. Medical Device
Not applicable.

F. Study Questionnaires
Not applicable.

G. Study Subjects
The study subjects are drawn from a database of hospital admission of HIV patients sent for respiratory TB isolation and vice versa we will also verify if any TB isolation cases were pat were sent admissions sent to respiratory TB isolation at CUMC.
Exclusion criteria are discussed above, under "B. Study Design and Statistical Analysis."

H. Recruitment of Subjects
No subjects will be recruited for this study, as the database already exists.

I. Confidentiality of Study Data
Data will be de-identified, linked by an assigned study number in lieu of name and medical record number. The database indexing study number to patient identifiers will be maintained on a separate password-protected computer, and this will be deleted after completion of the study.

J. Potential Conflict of Interest
There are no conflicts of interest.

K. Location of the Study
This study will be conducted on computers within the confines of the Columbia University Medical Center.

L. Potential Risks
This is a retrospective chart review with minimal risk to the subjects.

M. Potential Benefits
There will be no direct benefits to the subjects of this study.

N. Alternative Therapies
Not applicable.

O. Compensation to Subjects
Not applicable.

P. Costs to Subjects
Not applicable.

Q. Minors as Research Subjects
Not applicable.

R. Radiation or Radioactive Substances
Not applicable.

S. References

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