Aetiology and presentation of pulmonary disease in HIV-infected patients at risk of early mortality at the University Teaching Hospital in Lusaka, Zambia

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A dissertation submitted to the University of Zambia in partial fulfillment of the award of the degree of

Master of Medicine (Internal Medicine)

THE UNIVERSITY OF ZAMBIA

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CERTIFICATE OF APPROVAL

This dissertation entitled 'Aetiology and presentation of pulmonary disease in HIV-infected patients at risk of early mortality at the University Teaching Hospital in Lusaka, Zambia' by Kondwelani John Mateyo is approved in partial fulfillment for the award of the Masters of Medicine degree in Internal Medicine by the University of Zambia

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DECLARATION

I declare that this dissertation is my own work. It is being submitted for the Master of Medicine degree in Internal Medicine at the University of Zambia, Lusaka. It has not been submitted before for examination at this or any other University

Kondwelani John Mateyo

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Dr.Shabir Lakhi

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Dr.Brad Guffey

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DEDICATION

To my mother, Elizabeth Banda, and

the memory of my late father John Fwila Mateyo

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To God; for being my constant support

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ABSTRACT

Introduction: Pulmonary disease is a leading cause of morbidity and mortality in HIV-infected patients. Yet specific causes are often unknown in third-world settings due to a lack of extensive diagnostic facilities, particularly in patients with sputum smear negative for acid-alcohol fast bacilli (AAFB). Fibre-optic bronchoscopy (FOB) is available as a diagnostic tool at the University Teaching Hospital. It has been established as an accurate, reliable and safe diagnostic means for pneumonias in severely immunosuppressed patients.

Objectives: To determine the aetiology and presentation of pulmonary disease in Highly Active Anti-Retroviral Treatment (HAART)-naïve, HIV-infected Zambian adults with severe immunosuppression

Design: A cross-section study

Methods: Our study algorithm comprised initial sputum screening with Ziehl-Neelsen stain for HAART-naïve HIV-infected patients with CD4+ counts less than 200/μL presenting with pulmonary symptoms. Those who were unable to expectorate sputum and those in whom sputum smears were negative for AAFB, underwent bronchoscopy. Bronchoalveolar lavage (BAL) specimens were collected and assessed for bacteria, fungi, *Mycobacteria* and *Pneumocystis jirovecii*. Microbiological diagnoses were correlated with clinical and radiological findings.

Results: Of 113 enrolled patients, 43 (38.1%) had sputum smears positive for AAFB. 53 (46.9%) had smears negative for AAFB and 17 (15.0%) were unable to expectorate sputum. 58 of the 70 (82.9%) sputum AAFB-negative or sputum-scarce patients agreed to further screening with bronchoscopy. Seven (12.1%) of the BAL specimens were positive for TB on smear, while 14 (24.1%) had TB diagnosed on culture alone. Cumulatively, 64 (56.6%) patients were diagnosed with TB. Two (1.8%) patients had *Mycobacteria intracellulare* and one (0.9%) had *Mycobacterium avium complex* cultured on BAL. *Pneumocystis jirovecii* was found in five (4.4%) patients, *Candida* species in six (5.3%), *Klebsiella* in five (4.4%) and gram negative enteric bacteria in two (1.8%). One (0.9%) each of *Staphylococcus aureus*, *Streptococcus pneumonia* and *Proteus mirabilis* were cultured. Additionally, Kaposi's sarcoma was diagnosed in three (2.7%) patients on visual inspection at bronchoscopy. One (0.9%) patient had both TB and PJP. The cause was undetermined in 34 (30.1%) patients. Miliary infiltrates on chest radiograph was associated with TB (χ^2 5.353; p=0.02). TB was further associated with micro-nodular (χ^2 4.557; p=0.03) and nodular (χ^2 7.864; p=0.01) infiltrates, as well as bilateral hilar lymphadenopathy (χ^2 4.105; p=0.03) and haemoglobin less than 8g/dL (χ^2 6.160; p=0.01). Respiratory rate of 40/minute or more was associated with PJP (χ^2 5.595; p=0.02). BAL smears for TB in sputum smear negative patients had a sensitivity of 33% and specificity of 100%.

Conclusion: *Mycobacterium tuberculosis* is the commonest cause of pulmonary disease in our study population. Clinical and radiological correlates of TB can be used in the diagnosis of

AAFB smear negative pneumonia, in the absence of bronchoscopy, which has proven to be a useful tool for diagnosis of AAFB smear-negative pneumonia.

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ABBREVIATIONS

AAFB	Acid-Alcohol Fast Bacteria
AIDC	Adult Infectious Diseases Centre
AIDS	Acquired Immuno-Deficiency Syndrome
AMEU	Adult Medical Emergency Unit
BAL	Broncho-alveolar Lavage
BHL	Bilateral Hilar Lymphadenopathy
CEMART	Causes of Early Mortality in patients initiating Anti-Retroviral Treatment
CDC	Centres for Disease Control and Prevention
CD4	Cluster of Differentiation-4
CFU	Colony Forming Units
HIV	Human Immuno-deficiency Virus
IQR	Inter-Quartile Range
MAW	Medical Admission Ward
MMED	Master of Medicine
NTM	Non-tuberculous Mycobacteria
PCR	Polymerase Chain Reaction
PJP	Pneumocystis Jirovecii Pneumonia
RR	Respiratory Rate
SD	Standard Deviation
TB	Tuberculosis
TBB	Trans-Bronchial Biopsy
UTH	University Teaching Hospital
WHO	World Health Organisation

ZN	Ziehl-Neelsen