Abstract:

Introduction: Tuberculosis (TB) and Human Immunodeficiency Virus (HIV) infections have fueled each other. India being a high burden country, shoulders a greater responsibility in handling these. Multidrug resistance (MDR) is also on the rise throughout the globe. Added to this, candidiasis is another major fungal opportunistic infection which is worsening the situation. Hence, this study on TB and candidiasis in HIV patients was taken up and antibiogram of these isolates was carried out.

Objective:

➢ To diagnose TB in HIV reactive and AFB smear negative patients, by culture (Group A).
➢ To know the occurrence of candidiasis in HIV patients (Group B).
➢ To find out the drug susceptibility of both mycobacterial and candidal isolates obtained from both the groups.

Materials and Methods: Patients attending a tertiary care hospital in Mysore constituted the study subjects. From Group-A blood and stool samples along with other relevant specimens were collected. From Group-B: Oral, esophageal swabs were collected.

Group A: All clinical samples collected were processed by direct microscopy-Zeihl Neelsen staining and cultured on Lowenstein-Jensen media. Blood samples were processed by lysis centrifugation. The mycobacterial isolates obtained were then subjected to antimycobacterial susceptibility by proportion method and was confirmed by Line Probe Assay- GenoType MTBDR plus assay.

Group B: The specimens collected were directly examined by KOH and Gram stain method. They were then cultured on Sabouraud dextrose agar and CHROMagar to characterize into species by morphological and biochemical tests. The isolates were then subjected to antifungal susceptibility testing (AST) by Vitek 2 automated system.

Results: Out of the 416 HIV patients, 162 (40%) cases with features suggestive of TB but sputum smear negative were studied. Among 162 cases, 67 (41.4%) patients had
both TB and candidiasis. Pulmonary TB was detected in 21 (13%) patients, extrapulmonary TB in 41 (25%) and 5 (3%) patients had both. Totally 76 mycobacterial isolates were recovered out of 443 clinical samples. Among which 69 isolates were typical and 7 were atypical Mycobacteria. Out of these, 5 strains were MDR and 26 strains were resistant to at least a single drug.

Among 100 suspected cases of candidiasis in HIV seropositive patients, oral candidiasis was the most common (88%) followed by esophageal (10%) and 2% showed both. *Candida* (109) was recovered from 98 patients. *Candida albicans* (42-38.5%) was the most common isolate followed by *Candida tropicalis* (29-26.6%), *C. guillermondii* (13-11.9%), *C. parapsilosis* (10-9.2%), *C. lusitaniae* (6-5.5%), *C. krusei* (5-4.6%), *C. dubliniensis* (2-1.8%) and *C. glabrata* (2-1.8%). Single isolates were obtained from 87 patients and mixed isolates from 11 patients. The occurrence of *Candida albicans* and non *Candida albicans* were found to be 38.5% and 61.5% respectively. Non *Candida albicans* were predominant. On AST apart from *C. albicans* and *C. tropicalis*, all other species (93-85%) were totally sensitive to all antifungal agents tested (Amphotericin B, Fluconazole, Fluycytosine, Voriconazole, Caspofungin) and 16 (15%) were resistant to flucytosine and fluconazole drugs. Among *C. albicans*, 4 (10%) were resistant to fluconazole and 8 (19%) were resistant to flucytosine. Whereas in *C. tropicalis*, 4 (14%) were resistant to flucytosine.

**Conclusion:** Culturing clinical samples obtained from suspicious cases of TB in HIV seropositive patients is the most sensitive technique in diagnosing the disease. Isolates obtained through the culture technique in both candidiasis and TB helps in speciation and drug susceptibility. Drug susceptibility testing provides guidance to therapeutic decisions, improve prognosis, aid in drug development studies, and to track the mycobacterial and antifungal resistance in epidemiological studies.

**Key words:** HIV, Tuberculosis, Candidiasis, Speciation, Antibiogram, GenoType MTBDR plus assay, Vitek 2.