Chronic pulmonary aspergillosis among presumed TB patients at a tertiary hospital in Ghana

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Purpose:

The differential diagnosis of pulmonary tuberculosis (PTB) is broad and includes chronic pulmonary aspergillosis (CPA). CPA is typically considered a sequela of PTB by mimicking infection relapse, but it may also be misdiagnosed as primary PTB infection. Exclusion of CPA as an alternative diagnosis is challenging in resource-constrained settings due to scarce epidemiological data and inadequate access to relevant diagnostics. We conducted a study to detect CPA cases among patients presumed to have PTB using a resource-constrained setting targeted diagnostic algorithm, evaluated the significance of CPA as a differential diagnosis of PTB and assessed the clinical relevance of Aspergillus IgG & IgM LFD in CPA diagnosis.

Methods:

A cross-sectional survey was conducted among patients presenting with PTB-like symptoms and referred for GeneXpert MTB testing for PTB diagnosis at the TB Laboratory, Chest Diseases Unit, Korle-Bu Teaching Hospital, Accra. Participants' sociodemographic, clinical and risk factor details were captured using a questionnaire and blood samples collected for Aspergillus IgG & IgM and HIV testing. Sputum was obtained for high volume (1-2ml) fungal culture and chest radiograph was done for participants or previously taken ones obtained for review. GeneXpert MTB results were retrieved from laboratory records. Chest computed tomography (CT) scan was performed in participants with positive serology or cavitation on chest radiograph. CPA was defined following the case definition of CPA in resource-constrained settings by the Global Action Fund for Fungal Infections (GAFFI) International Expert Panel (2018).

Results:

A total of 183 participants were screened and 162 (88.5%) were recruited. For defining a case of CPA and determining its true proportionality, only 107 (66.0%) participants with both laboratory and imaging data were eligible. Respectively, 143 (88.3%) and 19 (11.7%) participants were being assessed for new PTB diagnosis and relapse. MTB positive cases were 45 (27.8%). Twelve (11.2%) participants met the criteria for CPA case definition. Nine (75%) CPA cases had previous PTB, representing 52.9% of participants suspected of PTB relapse. Of 6 trace and very low positive Xpert MTB cases, four (66.7%) had CPA. Only one (8.3%) CPA case was HIV positive. The common symptoms among CPA cases were fatigue (75%, n=9), weight loss (75%, n=9) and haemoptysis (50%, n=6) while major imaging findings were cavitation (83.3%, n=10; two containing fungal ball), fibrosis (83.3%, n=10) and pleural thickening (75.0%, n=9). The Aspergillus IgG & IgM LFD was positive in 16 (9.9%) of recruited participants, but among 14 eligible for CPA case definition, 11 (78.6%) were CPA and 3 (21.4%) were non-CPA cases (PPV: 78.6% and NPV: 98.9%). Sputum Aspergillus culture was positive in 32 (29.9%) cases, 9 in CPA cases.

Table 1: Xpert MTB and Aspergillus serology in presumed new PTB and PTB relapse

	Presumed new PTB (n=143)	PresumedPTB relapse(n=19)
Xpert MTB +	40 (28.0%)	5 (26.3%)
Aspergillus IgG & IgM +	8 (5.6%)	8 (42.1%)

Table 2: Laboratory results of CPA and non-CPA group among participants eligible for CPA classification

	CPA (n=12)	Non-CPA (n=95)
Xpert MTB +	4 (33.3%)	29 (30.5%)
Aspergillus IgG & IgM +	11 (91.7%)	3 (3.2%)
Aspergillus culture +	9 (75.0%)	23 (24.2%)
HIV positive	1 (8.3%)	45 (47.4%)

Table 3: Correlation between Xpert MTB result and Aspergillus IgG & IgM positivity

	PosHigh (n=23)	PosMedium (n=9)	PosLow (n=6)	PosVery Low (n=3)	PosTrace (n=3)	Negative (n=118)
Aspergillus IgG &IgM +	0	0	0	2 (66.7%)	2 (66.7%)	12 (10.2%)
Aspergillus IgG &IgM -	23 (100%)	9 (100%)	6 (100%)	1 (33.3)	1 (33.3%)	106 (89.8%)

Fig 1: Aspergillus IgG & IgM positive and negative results

Conclusion:

CPA is rarely considered as a differential diagnosis of PTB in Ghana. However, this study reveals that more one in ten patients presenting with PTB-like symptoms may have CPA particularly those with previous PTB. *Aspergillus* IgG & IgM LFD is a rapid and simple tool that allows for early screening of CPA among presumed PTB relapse patients prior to imaging findings and should be prioritised.