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Point-of-care ultrasound: a promising diagnostic tool in HIV patients with *Pneumocystis Jirovecii* pneumonia (PJP)

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Background: PJP is one of the common opportunistic infection of the lung in HIV patients. If not timely diagnosed and treated case fatality is high. Survival has increased in the era of antiretroviral therapy, however it is still seen in patient with low CD4 cell counts. Most people living with HIV (PLHIV) are treated in resource limited settings, where the availability of intensive care and the access to microbiology and imaging diagnostics are limited, and the risk of dying from PJP is higher. In this settings, point-of-care ultrasound (POCUS) in lung disease could be a useful tool, but its diagnostic role has never been evaluated.

This study is aimed to identify ultrasonographic signs of PJP and to determine their sensitivity and specificity

Material/methods: A retrospective case-control study on HIV patients with or without microbiologically ascertained PJP admitted in our department was performed. All patients with respiratory disease admitted from January 2013 to October 2016 who were scanned by US with the BLUE protocol were included; the clinical and radiological data was extracted and all the US clips and images recorded were reassessed. Proportion of results were compared using Fischer-Exact test.

Results:

72 HIV-positive patients were admitted to our Department, 26 (36 %) of them were identified as having an acute lung diseases and were scanned using the BLUE protocol. Eleven patients had a microbiological diagnosis of PJP, while in 15 patients other lung conditions were diagnosed (non-PJP). The sonographic features are summarized in table 1.

Conclusions: A specific ultrasound pattern seems to be present in HIV patients with PJP. Lung consolidation with a “cystic” pattern (example in Fig 1) is significantly more frequent in PJP, while pleural effusion and aerial bronchogram are absent in our cohort of PJP patients ($p < 0.05$). B lines are reported in both groups but are more frequent in the PJP group. If confirmed by larger studies, these findings might be useful in narrowing the differential diagnosis of PJP when using chest POCUS in HIV patients. A prospective study to validate the use of the BLUE protocol seems warranted.

	Total (n=26)	PJP+ (n=11)	PJP- (n=15)	p
Age (range)		44 years (30-68)	45.6 y (32-54)	
Gender (M/F)		9/1	8/7	
Ethnic origin (Caucasian/Latin-American/African)		8/2/1	10/1/4	
B lines present		11 (100%)	6 (40%)	0.002
Number of B lines		5-46	3-10	
Pleural effusion		0 (0%)	8 (53%)	0.007
Lung consolidation with classic air bronchogram		0 (0%)	8 (53%)	0.007
Lung consolidation with “cystic” bronchogram		6 (55%)	0 (0%)	0.002

Diagnoses in non-PJP group: - pulmonary TB 4- lung cancer1, Aids-related lymphoma 1, bacterial pneumonia 4, acute-on-chronic bronchitis 1, - CMV pneumonitis 2 - pulmonary edema due to cardiac disease 2

Fig 1: Lung consolidation with a “cystic” pattern (arrow)

