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Letter to the Editor

Impact of human immunodeficiency virus infection on the clinical presentation and outcome of community-acquired pneumonia in hospitalized Nigerian adults: a multicenter case–control study

Dear Editor,

Community-acquired pneumonia (CAP) is an important cause of morbidity and mortality both in human immunodeficiency virus (HIV)-infected inividuals,[1] and in the general population.[2] So far, the effect of HIV infection on the outcome of CAP is controversial. While there is evidence that HIV-infected persons with CAP have increased mortality compared with HIV negative individuals,[1] similar outcomes in both groups have also been reported.[3] However, the role of co-morbidities was not completely established in a good number of the observations.[1,3] In addition, some of the studies included a substantial proportion of HIV-infected patients receiving ART,[1] which further complicates the scenario. There is limited information about the effect of HIV infection on the evolution of CAP in sub-Saharan Africa. We investigated the impact of HIV on CAP by comparing the clinical presentation and in-hospital outcomes of CAP between ART-naive HIV-infected and HIV negative Nigerian patients who had no co-morbidities.

We conducted a five-year multicenter retrospective case–control study of patients hospitalized with CAP between January 1, 2008 and December 31, 2012 in four major referral hospitals in South East Nigeria. Standard CAP definition was used.[4] Patients with co-morbidities or opportunistic respiratory infections were excluded. After applying the exclusion criteria, we enrolled a consecutive sample of 44 HIV-infected patients with CAP (cases) and 234 HIV negative patients with CAP (control). Demographic, clinical, laboratory and treatment data were obtained from the patients' folders. The primary outcome was in-hospital mortality while the secondary outcome was length-of-hospital stay (LOS). Patients whose sputum culture yielded organisms other than *Streptococcus pneumoniae* were categorized as having CAP of non-pneumococcal etiology. Pneumonia severity was assessed using the CURB-65 scoring system.[5]

Data analyses were performed using the Epi Info version 3.5.3. Comparisons between cases and controls were carried out using the chi-square or Fisher's exact test for qualitative variables, and Student's *t*-test or non-parametric equivalents for quantitative variables as appropriate. *p*-Value <0.05 was considered statistically significant.

The results are shown in Table 1. HIV-infected patients were significantly younger than the controls (37 vs. 49 years, $p = 0.0002$), otherwise both groups had similar sociodemographic characteristics and received comparable treatments. While the control group had a higher proportion of patients with sputum production (73 vs. 54%, $p = 0.01$) and chest pain (28 vs. 14%, $p = 0.04$); fever (89 vs. 73%, $p = 0.02$) and breathlessness (75 vs. 58%, $p = 0.04$) were more frequent in the cases. HIV-infected patients were more likely to have severe pneumonia as assessed by the CURB-65 score (38.7 vs. 6.0%, $p < 0.0001$), and were also more likely to have anemia ($p < 0.0001$) and hyperglycemia ($p = 0.002$). HIV-infected patients had higher in-hospital mortality (54.5 vs. 8.5%, $p < 0.0001$) and longer LOS among survivors (13 vs.10 days, $p = 0.03$).

In conclusion, we found that HIV infection negatively impacts on CAP clinical presentation, overall mortality, and LOS among survivors. Corroborating our findings in large prospective cohort studies would have strong implications for the management of CAP in HIV-infected populations especially in sub-Saharan Africa.

Table 1 – Characteristics of HIV-infected and HIV negative patients with community-acquired pneumonia.

	HIV+ve with CAP (*N* = 44)	HIV−ve with CAP (*N* = 234)	*p*-Value
Characteristics			
Female gender	24 (54.5)	121 (51.7)	0.73
Age (yrs), mean ± SD	36.8 ± 11.9	48.6 ± 18.8	0.0002
Age > 65 years	3 (6.8)	58 (24.8)	0.008
Social class			0.60
1–2 (upper)	14 (31.8)	84 (35.9)	
3–5 (lower)	30 (68.2)	150 (64.1)	
Urban residence	22 (50.0)	141 (60.3)	0.21
Ever smoked	8 (18.2)	21 (9.0)	0.07
Alcohol use	13 (29.5)	49 (20.9)	0.21
Time to first in-hospital assessment (hrs), median (IQR)	1.0 (0.5–2.5)	1.3 (1.0–3.0)	0.09
Time to first in-hospital antibiotics (hrs), median (IQR)	6.0 (2.5–10.0)	4.0 (3.0–7.0)	0.11
Antibiotics basis			0.63
Entirely empirical	26 (59.1)	129 (55.1)	
Changed to sensitivity pattern	18 (40.9)	105 (44.9)	
Class of antibiotics received			0.96
Penicillin	18 (40.9)	101 (43.2)	
Cephalosporin	10 (22.7)	55 (23.4)	
Fluoroquinolone	12 (27.3)	62 (26.5)	
Macrolide	2 (4.5)	16 (6.8)	
Received oxygen	14 (31.8)	104 (44.4)	0.12
ICU admission	0 (0.0)	2 (0.9)	0.54
Symptom duration (days), median (IQR)	8 (3.5–14)	5 (3–7)	0.0003
Clinical features			
Cough	37 (84.1)	200 (85.5)	0.81
Sputum production	24 (54.5)	171 (73.1)	0.01
Breathlessness	33 (75.0)	137 (58.5)	0.04
Chest pain	6 (13.6)	66 (28.2)	0.04
Fever	39 (88.6)	170 (72.6)	0.02
RR (breaths/min)	36.7 ± 9.5	32.9 ± 9.9	0.003
SBP (mmHg)	108.6 ± 21.2	116.1 ± 18.8	0.003
DBP (mmHg)	68.9 ± 15.0	73.4 ± 12.6	0.04
CURB-65 score			<0.0001
0–2	32 (61.3)	220 (94.0)	
≥3	12 (38.7)	14 (6.0)	
Laboratory parameters			
Chest X-ray finding			0.37
Unilobar consolidation	37 (84.1)	208 (88.9)	
Multilobar consolidation	7 (15.9)	26 (11.1)	
Sputum isolate[a]*, n (%)*			0.09
Pneumococcal	7 (31.8)	71 (52.2)	
Non-pneumococcal	9 (40.9)	36 (26.5)	
No pathogen	6 (27.3)	19 (15.1)	
Serum urea (mmol/l)	8.3 ± 3.5	5.0 ± 2.1	<0.0001
Blood glucose (mmol/l)	8.6 ± 3.1	6.9 ± 1.9	<0.0001
Hemoglobin (g/dl)	8.4 ± 2.9	11.3 ± 1.7	<0.0001
WBC (mm^3), median (IQR)	6400 (4800–11,550)	9300 (5800–13,100)	0.03
Outcome variables			
Length-of-hospital stay (days)			
Survivors	12.6 ± 6.1	10.3 ± 4.4	0.03
Dead	6.4 ± 5.9	6.3 ± 2.8	0.96
Survivors and dead	9.9 ± 4.7	9.2 ± 5.5	0.32
Mortality	24 (54.5)	20 (8.5)	<0.0001

Except where stated, values are *n* (%) or mean ± standard deviation; HIV, human immunodeficiency virus; CAP, community-acquired pneumonia; ICU, intensive care unit; SD, standard deviation; IQR, interquartile range; DBP, diastolic blood pressure; SBP, systolic blood pressure; WBC, white blood cell count.

[a] 22 HIV-infected and 126 HIV negative patients had sputum cultures available of which only 16 and 107 patients, respectively, had organisms isolated. The non-pneumococcal organisms included the following: HIV-infected (*Klebsiella pneumoniae* = 7, *Staphylococcus aureus* = 2) and HIV negative (*K. pneumoniae* = 19, *S. aureus* = 8, *Streptococcus pyogenes* = 9).

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Conflicts of interest

The authors declare no conflicts of interest.

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