381. HIV Patients with COVID-19 Hospitalized in a Tertiary Care Center in Mexico City

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Session: P-12. COVID-19 Complications, Co-infections, and Clinical Outcomes

Background: The main risk factors for severe COVID-19 described are diabetes, hypertension, cardiovascular disease, obesity, chronic lung and renal disease. HIV infection has not been found to be an independent factor for severe COVID-19, however, only small case series of HIV and COVID-19 have been reported. The aim of this study is to describe clinical characteristics and outcomes of HIV positive patients with COVID-19 hospitalized in a tertiary care hospital in Mexico City.

Methods: A single-center review of HIV-infected patients diagnosed with COVID-19 was performed using medical records from March 1st, 2020 to May 20th, 2020. We describe the clinical characteristics and outcomes

Results: A total of 11 PLWH were diagnosed with COVID-19, only 9 were hospitalized and are described here. One died, 6 were discharged and 2 remain hospitalized (table 1). Overall, the median age was 46 years, all males and most (7/9) were on INSTI based ART regimen and undetectable HIV viral load (9/9), with a median of CD4 counts of 581 cell/mm3. The median days since onset of COVID19 symptoms was 7 days. 6/9 had at least one comorbidity: hypertension (3/9) and chronic kidney disease (3/9). 7/9 had body max index >25. 7/9 had moderate to severe lung disease, evidenced by computed tomography. 4/9 required invasive mechanical ventilation, and all were successfully extubated.

Table 1. Characteristics and outcomes *

	Patients, n=9
Demographics	
Age, median (IQR)	46 (41 – 60)
Gender, (%)	
Males	9 (100)
Comorbilities, n (%)	
Hypertension	3 (33)
Chronic kidney disease	1 (33)
Diabetes mellitus	1 (11)
Ischemic cardiomyopathy	1 (11)
Body max index > 25	7 (77)
HIV status	
Last CD4, median (IQR)	581 (346 – 860)
Last HIV viral load before admission =40, n (%)	9 (100)
ART regimen before admission, n (%)	
Integrase	7 (78)
Non-nucleoside	1 (11)
Inhibitor protease	1 (11)
Clinical findings	
Days since disease onset at admission, median, (IQR)	7 (4 – 9)
Disease severity, n (%)	
Mild	3 (33)
Moderate	4 (44)
Severe	2 (22)
Tomographic severity, n (%)	
Mild	2 (22)
Moderate	4 (44)
Severe	3 (33)
Mechanical ventilation, n (%)	4 (44)
Laboratory, median (IQR)	
PaO2/FiO2 ratio	237 (206 – 274)
Total lymphocytes	1034 (733 – 1469)
Platelet count (K/uL)	165 (119 – 234)
Fibrinogen (mg/dL)	615 (381 – 909)
D-Dimer (ng/mL)	408 (277 – 835)
Serum ferritin (ng/mL)	551 (108 – 1054)
High-sensitivity C-reactive protein (mg/dL)	18 (2.3 – 24.14)
Outcomes, n (%)	
Currently hospitalized	2 (22)
Death	1 (11)
Discharge	6 (66)

* IQR denotes interquartile range. Percentage is represented by %.

Conclusion: Most of the HIV patients who required hospitalization due to COVID19 had comorbidities. In spite of severe and critical presentations, most patients have recovered. Outcomes appear no different from those seen for non-HIV infected patients, however larger studies to determine the risk that HIV infection confers to COVID19 outcomes are needed.

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382. Incidence of Hospital-Acquired and Ventilator-Associated Pneumonia in Patients with Severe COVID 19 on High Flow Oxygen

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Session: P-12. COVID-19 Complications, Co-infections, and Clinical Outcomes

Background: Hospital-acquired pneumonia (HAP) and ventilator-associated pneumonia (VAP) can be serious complications of coronavirus disease 19 (COVID-19). Co-infections may worsen outcomes and prolong hospitalization. This risk may be exacerbated by systemic corticosteroids (steroids) and other adjunctive therapies.

Methods: We reviewed the records of all adults admitted to Stony Brook University Hospital, NY, from 3/1 to 4/15, 2020 with severe COVID-19 pneumonia, requiring high-flow O2 (non-rebreather mask, Venturi mask with FiO2 >50%, or high-flow nasal cannula). We excluded patients who received mechanical ventilation (MV) or died within 24h. Patients were followed until death or hospital discharge. We reviewed positive sputum cultures (PSC) for pathogenic microorganisms and calculated the incidence of HAP and VAP (nosocomial pneumonia, [NP]), rates of MV and impact on mortality. Fungi isolated from sputum, were considered colonization unless associated with fungemia. We also examined the impact of adjunctive therapies with immunosuppressive potential (steroids and tocilizumab), on HAP or VAP.

Results: A total of 469 patients were included (**Table 1**). Of these, 199 (42.4%) required intensive care and 172 (36.7%) MV. Median length of stay was 13 days (8–22) and 105 (22.4%) had PSC. Of these, 59 were considered true pathogens (HAP: 11, VAP: 48), with predominance of *S. aureus (MSSA) 38.9%, Enterobacteriaceae 33.8% and Pseudomonas species 18.6%*. 39 isolates were considered colonization (**Table 2);** Patients with PSC < 48h (N=7) from admission, were not considered NP. The incidence of NP was 7.0 per 1000 patient-days (95%CI 5.5–8.5). Of 11 patients with HAP, 9 needed MV. NP was more frequent among patients receiving steroids (9.0 vs 5.7 per 1000 patient-days; P=0.023). Use of tocilizumab was not associated with NP (6.2 vs 8.4 per 1000 patient-days; P=0.11). Mortality was nonsignificantly higher in patients with (20/59, 33.9%) vs. without (103/410, 25.1%) NP (P=0.16). Intubation and length of stay were the strongest predictors of NP in multivariable models.

Cohort Characteristics of Patients with Severe COVID -19 Pneumonia on High Flow Oxygen (N= 469)

Table 1: Patient Characteristics (N=469)

Characteristic	Value
Age, years	61 (50-73)
Female	166 (35.4%)
White	249 (53.1%)
Black	31 (6.6%)
Asian	29 (6.2%)
Hispanic	158 (33.7%)
Body mass index, kg/m^2	29.3 (26.1, 33.9)
Duration of symptoms, days	7.0 (3.5, 9.0)
O_2 saturation, %	91 (87, 93)
Temperature, °C	38.1 (37.5, 39.0)
Hypertension	265 (56.5%)
Diabetes	155 (33.1%)
Coronary artery disease	71 (15.1%)
Atrial fibrillation	58 (12.4%)
Chronic lung disease	49 (10.4%)
Chronic kidney disease	48 (10.2%)
Congestive heart failure	45 (9.6%)
Asthma	36 (7.7%)
Immunocompromised	35 (7.5%)
Statins	180 (38.4%)
Angiotensin-converting enzyme inhibitors	74 (15.8%)
Angiotensin receptor blockers	73 (15.6%)
NT-proBNP pg/mL	205 (56, 991)
Troponin, ng/mL	0.01 (0.01, 0.01)
Creatine phosphokinase, IU/L	163 (80, 375)
Erythrocyte sedimentation rate, mm/h	54 (31, 80)
C-reactive protein, mg/dL	11.9 (6.4, 19.3)
D-Dimer, ng/mL	362 (241, 747)
Procalcitonin, ng/mL	0.21 (0.13, 0.49)
Ferritin, ng/ml	919 (489, 1534)
Lactate dehydrogenase, IU/L	407 (305, 538)
Interleukin-6, pg/mL	63 (30, 112)
Lymphocyte count, K/uL	0.8 (0.6, 1.1)
Creatinine, mg/dL	1.0 (0.8, 1.3)
Alanine transaminase, IU/L	34 (21, 55)
Aspartate aminotransferase, IU/L	46 (32, 70)
International normalized ratio	1.2 (1.1, 1.3)
Corrected QT interval on ECG, ms	437 (418, 460)

Values are N (%) or median (25th, 75th percentile)

All Microbes Isolated from Sputum Cultures

Table 2. Distribution of Microorganisms in Positive Sputum Cultures

True pathogens			
VAP N= 48		**HAP N=11**	
Staphylococcus aureus (MSSA)	21	*Staphylococcus aureus (MSSA)*	2
Pseudomonas aeruginosa	8	*Pseudomonas aeruginosa*	2
Klebsiella (enterobacter) aerogenes	6	*Staphylococcus aureus (MRSA)*	2
Klebsiella pneumoniae	5	*Aspergillus fumigatus*	2
Stenotrophomonas (Xanthomonas) maltophilia	3	*Klebsiella pneumoniae*	1
Klebsiella pneumoniae MDR	2	*Klebsiella (enterobacter) aerogenes*	1
Staphylococcus aureus (MRSA)	2	*Candida albicans*	1
Candida tropicalis	2		
Escherichia coli	2		
Candida albicans	1		
Streptococcus agalactiae (group B) beta hemolytic	1		
Streptococci (group C) beta hemolytic	1		
Burkholderia cepacia complex	1		
Acinetobacter baumannii complex	1		
Proteus mirabilis	1		
Klebiella oxytoca MDR	1		
Escherichia coli MDR	1		
Citrobacter farmeri MDR	1		
Citrobacter koseri (Citrobacter diversus)	1		
Candida dubliniensis	1		
Candida parapsilosis	1		
Streptococcus pneumoniae	1		
Pseudomonas putida	1		
Colonization			
Candida albicans	34		
Candida tropicalis	6		
Candida parapsilosis	5		
Candida krusei	1		
Candida dubliniensis	1		

MDR: Multidrug resistant; MRSA: Methicillin-resistant *Staphylococcus aureus;* MSSA: Methicillin-sensitive *Staphylococcus aureus*

Conclusion: Among high risk COVID-19 patients, NP is a common complication. *MSSA* and *Enterobacteriaceae* were the most frequent isolates. The risk increases with intubation, longer hospital stay and use of steroids but not tocilizumab.

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383. Increased Need for Antimicrobial Stewardship during a COVID-19 Outbreak in New York City

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Session: P-12. COVID-19 Complications, Co-infections, and Clinical Outcomes

Background: The impact of COVID-19 on the health care system in New York City (NYC) cannot be overstated. The first documented cases of COVID-19 in Queens NYC occurred in early March of 2020. The total number of patients with proven or suspected COVID-19 at Elmhurst Hospital peaked in early April. A dramatic increase in the use of antimicrobials occurred in April, and correlated with the increased number of intubated COVID-19 patients at Elmhurst Hospital.

Methods: Antimicrobial Stewardship Committee activities and meetings had been suspended for the months of March and April due to the increased clinical demands associated with the COVID-19 outbreak. In preparation for the May meeting, a retrospective analysis of antimicrobial use for March and April of 2020 was performed.

Results: The analysis revealed a 30% increase in the use of antimicrobials. The average total days of antimicrobials per 1000 patient days (TDA/TPD) was 445 for January through March of 2020. In April, this number climbed to 580. TDA/TPD increased from 57 to 90 (58%) for vancomycin, 25 to 35 (40%) for meropenem, and 31 to 89 (187%) for cefepime. The number of intervention by the Antibiotic Stewardship team remained low during this time period.

Total Days of Antimicrobials per 1000 Patient Days (TDA/TPD)

ANTIBIOTIC	JANUARY	FEBRUARY	MARCH	Q1 AVG	APRIL	PERCENT INCREASE
vancomycin	63	57	52	57	90	58
carbepenems	35	30	27	31	89	40
cefepime	35	30	27	31	89	187

Conclusion: A dramatic increase in the use of antimicrobials correlated with an increase in the number of intubated patients at Elmhurst Hospital during a COVID-19 outbreak. It is likely that the frequent appearance of fever and leukocytosis in intubated patients with COVID-19 prompted an increase in empiric antimicrobial use. The 48 hour time outs and prospective review of antimicrobial use may be necessary to maintain stewardship efforts during the COVID-19 epidemic. Further review of antibiotic usage in critically ill COVID-19 patients is needed to help define stewardship practices as we go forward in this pandemic.

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384. Invasive aspergillosis in COVID-19 patients in an intensive care unit in Mexico City

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ARMII study group

Session: P-12. COVID-19 Complications, Co-infections, and Clinical Outcomes

Background: An elevated incidence of invasive pulmonary aspergillosis (IPA) in patients with COVID-19 without traditional risk factors for IPA has been recently reported around the world. This co-infection has been described in patients requiring treatment in an intensive care unit. The risk factors for its development are still unclear.

Methods: We conducted a nested case-control study using the COVID-19 registry of the ARMII study group, based in the Centro Médico ABC, a private hospital in Mexico City. We included all patients that required admission to the intensive care unit (ICU) from March 12 to June 15, 2020, and excluded patients without serum galactomannan measurements or bronchial secretion cultures. We used the modified definition of IPA proposed by Schauwvlieghe et al for IPA in influenza patients. The control group was formed by patients with ruled-out IPA (negative galactomannan and secretion cultures). We compared both groups to identify risk factors for IPA using the chi-squared test or the Mann-Whitney U test as applicable.

Results: Out of a total 239 patients, 54 met the inclusion criteria. We identified 13 patients with IPA (24.07%) that met the definition of IPA (2 with positive cultures and 11 with positive galactomannan) and 41 without IPA. Only three patients with IPA had important comorbidities (COPD, chronic kidney disease, and HIV). Patients with IPA tended to have a higher median age (64.6 vs 53.59, p=0.075) and a higher serum glucose at their arrival (145 vs 119, p=0.028). All patients with IPA presented to the hospital with ARDS (100% vs 72.5%, p=0.034), but ultimately did not have a higher requirement for mechanical ventilation (100% vs 82.93%, p=0.110). There were no statistical significant differences in use of Tocilizumab, use of glucocorticoids, mortality (23.07% vs 17.50%, p=0.563) or length of stay.

Conclusion: It has been previously described that patients with acute respiratory disease syndrome triggered by viral infection, like the influenza virus, are prone to invasive aspergillosis even in the absence of underlying immunodeficiency. The use of antifungals to prevent aspergillosis in COVID-19 patients should be assessed because of the gravity presented in the patients with this co-infection.

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385. Kawasaki's Disease and Sars-Cov-2: an Unexpected Pediatric Global Crisis?

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Session: P-12. COVID-19 Complications, Co-infections, and Clinical Outcomes

Background: Infection by SARS-CoV-2 can lead to dyspnea, edema, deposition of intra alveolar fibrin, thrombosis and hemorrhages. During the COVID-19. outbreak, several questions were raised about the risks for the pediatric population. Pediatric patients appeared to be relatively safe, with only minor symptoms and a quick recovery. However, there have been reports of a relationship between COVID 19 and a Kawasaki-like inflammatory disease in this population. Kawasaki's disease (KD) is a rheumatological vasculitis prevalent in childhood characterized mainly by diffuse inflammation of the arteries associated with skin rash, changes in the mucosa and its main complication is coronary aneurysms.

Methods: A systematic literature review was performed in the PubMED database using the keywords "Kawasaki disease", "COVID-19" and "Pediatrics". The selected filters were "Case reports", "Multicenter study", "Clinical Study", "Observational study", "Human" and "English". A total of 18 articles were seleted.

Results: There seems to be a convergence between the literature published so far, pointing to a greater propensity for pediatric patients infected with Sars-Cov-2 to develop KD. The number of patients with KD symptoms seen at a specific center increased from 2 to 17 in 11 days (MOREIRA, 2020). In a sample space of 21 patients diagnosed with KD, 91% had previous contact with SARS-CoV-2 (TOUBIANA, 2020) whereas other studies point to a 30-fold increase in the prevalence of KD since the beginning of 2020 (VERDONI, 2020).

There is already an established relationship between DK and HCoV-NH, describing that 4.5% of patients with this infection develop KD. Therefore, it was suggested that infection with another Coronavirus strain could have a similar relationship.

Conclusion: Despite the relationship described between pediatric patients infected with COVID-19 being more likely to develop KD, further studies are needed to prove a statistical relationship between both condition.

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386. Long-term Complications Associated with COVID-19 Infection

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Session: P-12. COVID-19 Complications, Co-infections, and Clinical Outcomes

Background: In Michigan, 44,964 (68%) of the 66,269 COVID-19 patients have recovered. However, there is concern that COVID-19 infection may lead to long-term sequelae, including pulmonary defects, cardiac complications, blood clots, and neurocognitive impairment. This study describes the 30-day outcomes of patients who had recovered.