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CHEST Annual Meeting
October 18-21
2020

Chest Infections

SESSION TITLE: Chest Infections Posters
SESSION TYPE: Original Investigation Posters
PRESENTED ON: October 18-21, 2020

SUPERINFECTIONS IN PATIENTS INFECTED WITH COVID-19: A SINGLE-CENTER EXPERIENCE

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PURPOSE: Bacterial and fungal infections in COVID-19 patients have been inadequately studied and reported. The purpose of this study is to determine the incidence and outcomes of superinfections in patients with COVID-19.

METHODS: A retrospective observational study of all patients diagnosed with COVID-19 at Fairview Hospital-Cleveland Clinic. Main outcomes were incidence of bacterial, viral and fungal infections among COVID-19 patients and in-hospital mortality.

RESULTS: There were 82 patients diagnosed with COVID-19 . Fifty-one (62.2%) were male and median age was 64.5 years. On admission, 48 (58.5%) patients were admitted to ICU and 13 (15.9%) required mechanical ventilation. Of all patients, 22 (26.8%) developed superinfection during admission. Only three had positive PCR for other viruses; two had respiratory syncytial virus and one had influenza A. Methicillin resistant staphylococcus aureus (MRSA) was detected in 5 (6.1%) patients. Superimposed bacterial pneumonia were detected in 13 (12.2%) patients; 2 MRSA, 2 methicillin sensitive staphylococcus aureus, 2 Corynebacterium striatum, 2 pseudomonas aeruginosa, 2 mycoplasma pneumoniae, 1 legionella, 1 serratia marcescens and 1 klebsiella pneumoniae. Only one patient had aspergillus fumigatus lung infection. Positive blood cultures were detected in 4 (4.9%) patients and included a case of candidemia. Urinary tract infection was diagnosed in 10 (72%) patients, and only 2 had a foley's catheter. Corticosteroids were used in the treatment of 37 (45.1%) patients, with only 8 of the 22 patients who developed superinfections. Compared to the no superinfection cohort, patients who developed superinfection were more likely to require ICU admission (77.3% vs 53.3%, p 0.05), develop circulatory shock (59.1% vs 30.0%, p 0.016), require mechanical ventilation (63.6% vs 33.3%, p 0.014) and had lower median absolute lymphocytes count (1455/mm3 vs 5700/mm3, p 0.006). In multivariate analysis, circulatory shock (p 0.046) and need for mechanical ventilation (p 0.037) remained significantly associated with superinfection. Median time to superinfection development was 5 days with an overall mortality of 19.5%. The mean overall survival time among patients who developed superinfections was not significantly different compared to no superinfection group, 53.5 days (95% CI: 46.7-60.3) and 48.5 days (95% CI: 42.6-54.5) respectively, (p 0.278).

CONCLUSIONS: In our COVID-19 cohort the rate of superinfection was 26.8%. Superinfection was associated with higher rates of circulatory shock and mechanical ventilation. The use of corticosteroids was not associated with higher rates of infections.

CLINICAL IMPLICATIONS: This study will help in identifying frequent infections among COVID-19 patients in an attempt to predict and treat superinfections early in the course of the disease.

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DOI: http://dx.doi.org/10.1016/j.chest.2020.08.347
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