COVID-19 with Multiple Bacterial Co-infections: A Case Report

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ABSTRACT

Coronavirus disease 2019 (COVID-19) is a contagious disease which was first identified in Wuhan, China in December 2019. Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is responsible for this ongoing pandemic worldwide. COVID-19 itself has a high mortality rate but in addition with bacterial co-infection, the risk of death amplifies much higher. The diagnosis of COVID-19 along with other respiratory co-infections can be a difficult task due to the similarities in their presentations. Here, we present a case of 60-years-old gentleman who was COVID-19 positive, co-infected with three types of bacterial pathogens, which were Mycobacterium tuberculosis, Enterobacter spp. and Pseudomonas. The patient was isolated and treated according to the pathogens’ culture sensitivity reports and was discharged when his condition improved and advised for routine follow-up. The source of the co-infection could not be identified and may have been hospital acquired. Therefore, every hospital should give utmost priority to infection prevention and control (IPC) strategies.

Keywords: COVID-19, Enterobacter, Pseudomonas, SARS-CoV-2.

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I. INTRODUCTION

A rapidly spreading newly recognized pneumonia caused by Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) was first declared in Wuhan (Hubei province), China, on December 2019. Since then, this novel Coronavirus (2019-nCoV) has generated 16 812 755 confirmed cases including 662 095 deaths worldwide as of 30 July, 2020 [1]. People of all over the world are deeply concerned both by the alarming levels of its transmission and severity, and by the alarming levels of inertia. The World Health Organization (WHO) has been evaluating this outbreak around the clock and declared it as a Pandemic condition. SARS-CoV-2 pneumonia has a diverse clinical spectrum ranging from mild to critically ill patients. Significant high mortality rate in COVID-19 has been found due to severe pneumonia and acute respiratory distress syndrome. But it varies according to time, place and person [2]. Covid-19 has become the center of attention of the medical world and the pandemic of 2020 though originating from bats, like other virulent coronavirus (CoV) strains such as severe acute respiratory syndrome corona virus (SARS-CoV) and Middle East respiratory syndrome coronavirus (MERS-CoV) [3]. The main mode of transmission of this novel virus is respiratory droplet particles (>5-10 μm in diameter), aerosols and contact routes [4]. If a symptomatic individual (e.g., coughing or sneezing) comes in a close contact (within 1 meter) with a
A 60 years old diabetic gentleman hailing from Noakhali, Bangladesh admitted to Bangladesh Medical College Hospital on 8th July, 2020 with the complaints of low grade fever, cough with productive sputum and exertional breathlessness for 15 days. On query he mentioned neither fever, cough with productive sputum and exertional breathlessness for 15 days. On examination, he was tachypnoeic (Respiratory rate 30breaths/min), tachy cardiac (heart rate 110/min), blood pressure-125/75 mm of Hg, Temperature: 98 degree Fahrenheit, mildly anemic with no evidence of cyanosis or clubbing. On respiratory system examination bronchial breath sounds and crepitations were found involving the upper and middle zone of right lung. The treatment was started with Amoxicillin and Clavulanic acid, Clarithromycin, anti-diabetic medications and other symptomatic management.

His initial investigations revealed: Hemoglobin (Hb) 8.86 g/dl, Total white cell count 14x10^9/L (neutrophilic leukocytosis), ESR 90mm in 1st hour, CRP 96 mg/dl, D-dimer 2.76 mg/L, Procalcitonin 0.26 ng/ml. X-ray showed homogenous opacity and cavitary lesion mainly involving the upper and middle zone of right lung (Fig. 1). After 48 hours his RT-PCR test for COVID-19 came positive. He was shifted to an isolation room and was given 12 mg of tablet Ivermectin along with other ongoing medications. His sputum culture showed profuse growth of Enterobacter spp and no acid fast bacilli were seen in microscopic examination. His antibiotics were changed according to his sensitivity profile (Table 1).

2 days later his condition deteriorated, he became hypoxic with a saturation of 77% with 14 liter of oxygen per minute and was transferred to the Intensive Care Unit (ICU). Some of his investigations were repeated showing Hb-10.10g/dl, Total count of WBC 15.40 x10^9/L, Total count of WBC 15.40 x10^9/L, Total count of WBC 15.40 x10^9/L (neutrophilic leukocytosis), low Albumin level (25.5 g/L). His repeat X-ray showed slight shifting of trachea to the right side with patchy opacity involving both lungs showing a cavitary lesion in the right upper zone with air-fluid level (Fig. 2).

Following ongoing treatment his saturation improved i.e. 98-99% with 10 litres of oxygen and he was also given 1 unit of convalescence plasma as plasma therapy for COVID-19. Due to cavitary lesion we sent his sputum...
For GeneX-pert which came positive for Mycobacterium tuberculosis without any resistance to Rifampicin. According to this anti TB medications were added to his treatment regimen. His condition improved gradually that’s why he shifted to the isolated room but he developed bed sores on his left buttocks for which appropriate treatment was given. Both of his HIV 1 & 2 antibody test were negative. As his sputum amount did not improve so a repeat X ray was done showing patchy opacity on both lungs especially the right lung and an increased size of the cavitary lesion which was previously present (Fig. 3).

A repeat sputum culture was done showing profuse growth of Pseudomonas spp. this time. His antibiotics sensitivity profile was given in Table 2 and modifications of antibiotics were done accordingly.

TABLE 2: ANTIBIOTIC SENSITIVITY OF PSEUDOMONAS SPP

| ANTIBIOTIC          | SENSITIVITY |
|---------------------|-------------|
| CEFTRIAXONE         | R           |
| AMIKACIN            | S           |
| CIPROFLOXACIN       | S           |
| CEFTAZIDIME         | S           |
| IMIPENEM            | R           |
| GENTAMYCIN          | R           |
| CEFUROXIME          | R           |
| PIPERACILLIN        | S           |
| MEROPENEM           | R           |
| NETILMICIN          | R           |
| AZTREONAM           | S           |
| COLISTIN            | R           |

14 days of following ongoing treatment his RT-PCR test for COVID-19 came negative and his overall well-being improved a lot. Significant improvement was also found on his subsequent X rays (Fig. 4) along with his further sputum culture showed no growth. He was discharged 6 weeks later and advised for routine follow-up.
IV. CONCLUSION

The case highlights the fact that the possibility of co-infection with other respiratory pathogens when diagnosing COVID-19 infection cannot be ruled out. Similarly, COVID-19 infection cannot be ruled out by detecting other respiratory pathogens. Therefore, testing for COVID-19 and other respiratory pathogens should be carried out simultaneously. Nosocomial or hospital acquired pneumonia is another concern for patients with longer hospital stays. To prevent nosocomial infection and to reduce morbidity, mortality and cost of hospital stay strict infection control measures should be taken. Further studies are needed in order to explore the risk factors, outcomes, management and prognosis of cases with COVID-19 and co-infection with other bacterial pathogens.

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REFERENCES

[1] World Health Organization, "Covid-19 Situation Report: 192," 30 July 2020. [Online]. Available: https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200730-covid-19-sitrep-192.pdf?sfvrsn=5e529801f_4.

[2] Yang, X., Yu, Y., Xu, J., & Shu, H. (2020). Clinical course and outcomes of critically ill patients with SARS-CoV-2 pneumonia in Wuhan, China: a single-centered, retrospective, observational study. The Lancet. Available: https://doi.org/10.1016/S2213-2600(20)30079-5

[3] Cui, J., Li, F., Shi, Z-L. (2019) Origin and evolution of pathogenic coronaviruses. Nat Rev Microbiol. 17(3):181-192. doi:10.1038/s41579-018-0118-9.

[4] World Health Organization. Infection prevention and control of epidemic- and pandemic-prone acute respiratory infections in health care. Geneva: World Health Organization; 2014 Available from: https://apps.who.int/iris/bitstream/handle/10665/112656/9789241507 134_eng.pdf?sequence=1.

[5] Ong, S.W., Tan, Y.K., Chia, P.Y., Lee, T.H., Ng, O.T., Wong, M.S., et al. Air, surface environmental, and personal protective equipment contamination by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) from a symptomatic patient. JAMA. 2020 Mar 4 [Epub ahead of print].

[6] Zhang, Y., Chen, C., Zhu, S. et al. [Isolation of 2019-nCoV from a stool specimen of a laboratory-confirmed case of the coronavirus disease 2019 (COVID-19)]. China CDC Weekly. 2020;2(8):123-4. (In Chinese).

[7] J. F-W. Chan, S. Yuan, K.-H. Kok, K.-W. To, H. Chu and J. Yang, "A familial cluster of pneumonia associated with the 2019 novel coronavirus indicating person-to-person transmission: a study of a family cluster. The Lancet." [Online]. Available: https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(20)30154-9/fulltext.

[8] Rice, T.W., Robinson, L., Uyeki, T.M., et al. Critical illness from 2009 pandemic influenza A virus and bacterial coinfection in the United States. Crit Care Med. 2012;40(5):1487-1498. doi:10.1097/CCM.0b013e3182416f23

[9] J. Cohen, W. Powderly and S. Opal, Infectious Disease (Fourth Edition), Elsevier, 2016.

[10] Patel, J. A., Nielsen, F., Badiani, A. A., Assi, S., Unadkat, V. A., Patel, B., Ravindrane, R., & Wardle, H. (2020). Poverty, inequality and COVID-19: the forgotten vulnerable. Public health, 183, 110-111

[11] World Health Organization, Laboratory testing for coronavirus disease, March 2020.