

CASE REPORT

COVID-19 and dengue infection in Bangladesh: A case of coinfection where hemoptysis as first presentation

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Abstract

Bangladesh recently faced large outbreaks of both COVID-19 and dengue. We present a case of COVID-19 and dengue coinfection in a patient who presented with hemoptysis. Our results demonstrate that COVID-19 and dengue fever are both public health issues in Bangladesh and other dengue-endemic nations and that they can coexist.

KEYWORDS

Bangladesh, coinfection, COVID-19, dengue, hemoptysis

1 | INTRODUCTION

COVID-19 infection is caused by the Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) virus, which has already propagated to over 210 nations and territories throughout the world. The World Health Organization (WHO) has declared it a pandemic emergency due to the rise of COVID-19 cases in March 2020. COVID-19 was confirmed for the first time in Bangladesh on March 8, 2020.¹ Till date, globally 190 million cases along with over four million deaths have been recorded due to COVID-19. COVID-19 infection can have a wide

range of symptoms, from mild to severe acute respiratory syndrome requiring respiratory support.² Hemoptysis is prevalent in about up to 13 percent of pulmonary embolism patients and seldom seen among COVID-19 patients.³ Aside from the continuing pandemic, dengue is predominant for the last decades and caused high morbidity and mortality. Bangladesh has been hit by dengue fever every year, and COVID-19 pandemic started in Bangladesh in March 2020.⁴ Dengue fever is a viral infection caused by four kinds of Flaviviridae viruses (DENV-1, DENV-2, DENV-3, and DENV-4). Infected *Aedes aegypti* and *Aedes albopictus* female mosquitoes are the most

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common carriers of these viruses.⁵ However, dengue and COVID-19 might be a hazardous combination. According to clinician observation, many cases have been detected in different hospitals in Bangladesh. In this report, we have presented a case of COVID-19 and dengue coinfection in a person in Bangladesh, where the patient presented hemoptysis as first presentation.

2 | CASE REPORT

The patient was a 28-year-old woman with no history of any significant co-morbidities. She had a history of contact with COVID-19 cases, but no history of travel outside Dhaka or other country for last six months. Her relative was diagnosed as COVID-19 on June 24, 2021, with whom she lives. On June 26, 2021, the case felt a mild cough followed by blood in cough one time. As her family history was positive, she went for testing for RT-PCR for SARS-CoV-2 and became positive on June 28, 2021, and was in isolation at home and in addition, the dengue RDT, Ag NS1 (ICT) was negative. Her symptoms included dry cough, sore throat, fever (100°F), and shivering at night. She had hemoptysis for two times on June 28, 2021, which consisted of scanty amount of blood. On the next day, she had fever (highest body temperature 102°F), with dry cough constantly, sore throat followed by fatigue. She monitored her vital signs regularly and her oxygen saturation was 98%–99%. Routine blood tests such as, complete blood count, serum creatinine, D-dimer, and serum ferritin were done and test results were normal (Table 1). Her chest X-ray also revealed no abnormalities. The patient started medications from June 29, 2021, which included paracetamol 500 mg 1tab 8hourly, azithromycin 500 mg once at night, montelukast 10 mg once at night, Desloratadine 10 mg once in the morning, and Multivitamin once in the morning.

On June 30, 2021, physical examination indicated normal vital signs. On auscultation of the lungs, a vesicular breath sound was heard, along with bilateral basal coarse crepitation. There was sign of red rash without itchiness on both upper limbs of the body. Then again on July 6, investigations were conducted; laboratory reports showed hemoglobin 11.5 L g/dl, lymphocyte count 23.2%, neutrophil 72.3%, total leucocyte count $5.13 \times 10^9/L$, red cell count $4.40 \times 10^{12}/L$, mean cell hemoglobin 26.1 pg, platelet count $175 \times 10^9/L$, and dengue IgM was positive, CRP was 0.34. Due to the lack of muscle or joint pain or swelling, as well as the low prevalence of Chikungunya disease in Bangladesh, no Chikungunya diagnostic test was performed. On July 6, mild respiratory distress occurred with dry cough and she was given salmeterol xinafoate and fluticasone propionate (25/125) two times a day and deflazacort 6mg started 2-tab 8 hourly.

Thoracic computed tomography (CT) done on July 6, 2021, revealed subtle ground-glass and consolidative opacities were noted in different segments of both lungs, predominantly in a peripheral location with basal distribution, nearly 30% of lung involvement was present. Also, sub centimetric mediastinal lymph nodes was also present (Figure 1). These findings were reported in accordance with alveolar hemorrhage.

On July 8, 2021, the patient was in moderate respiratory distress. Her temperature was 100°F, blood pressure 120/70 mm Hg, pulse rate 96 bpm (regular), and oxygen saturation on pulse-oximetry 92%–95% without oxygen. Basal crepitation was found on lung auscultation. She was admitted to the Green life medical college hospital, Dhaka for respiratory distress. Then she was immediately started on stat dose of Remdesivir 200 mg IV, hydrocortisone 100 mg 8 hourly, nebulization with ipratropium bromide plus salbutamol 8 hourly, montelukast 10 mg at night, paracetamol 500 mg as required, and moxifloxacin 400 mg once at night. She did not require any oxygen during hospitalization. On July 9, 2021, the patient was stable with ongoing treatment and her blood and urine culture, both reports revealed no bacterial growth and her oxygen saturation 95%–98%. On the July 10, 2021, she was discharged from hospital in a relatively stable condition, with the above-mentioned drugs and advice of respiratory exercise. Hemoptysis was her first symptom on June 26, and she experienced twice the next day, in the morning and at night. In our case, the patient was brought to the hospital only once for the treatment of COVID-19 symptoms such as dyspnea, cough, and fever, and there was no need for oxygen or a platelet transfusion for dengue. Actually, this patient was treated at home initially from June 29, 2021, to July 7, 2021, and she had self-medication at home. Also due to the red rash, a dengue test was again performed on July 6, 2021, and the results were positive for dengue IgM. Then on July 8, 2021, she was admitted to the hospital, and on July 10, 2021, she was discharged. On July 15, 2021, she recovered and became symptom-free. During follow-up on July 29, 2021, a chest CT revealed full clearance of the ground-glass opacities, and an RT-PCR of a nasopharyngeal swab for SARS-CoV-2 was negative, indicating that her clinical condition had improved. There was no further occurrence of hemoptysis after recovery from COVID-19.

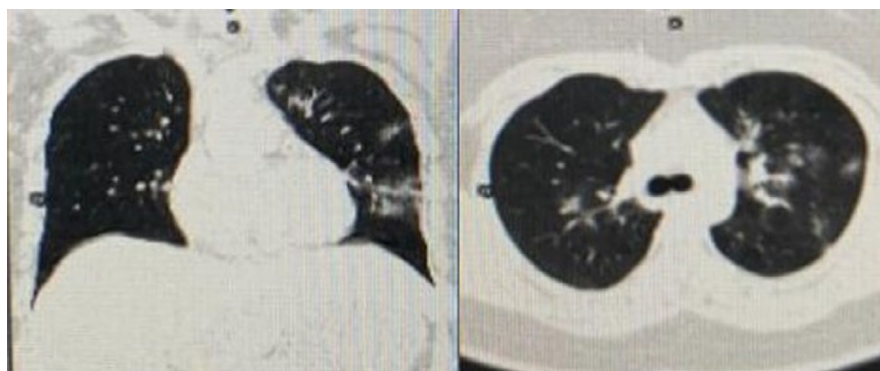
3 | DISCUSSION

COVID-19 and dengue have a spectrum of disease with overlap in clinical manifestations. Here, we reported a confirmed case of COVID-19 along with coinfection by dengue. Hemoptysis was the initial and only indication

TABLE 1 Laboratory parameters of the cases

Investigation	June 28, 2021	July 6, 2021	July 13, 2021
HB%	11.4 g/dl	11.5	11.8
ESR	63 mm in 1st hour		15
Total Leucocyte count	4.00	5.13	4.65
Lymphocytes	24%	23.2%	39%
Neutrophil	74%	72.3%	56%
Platelet count	$255 \times 10^9/L$	$175 \times 10^9/L$	$295 \times 10^9/L$
S. Creatine	0.96 mg/dl(0.60–1.10)		
CRP	0.34(<0.5)		
S. Ferritin	71.0 ng/ml (13–232)		
D-dimer	0.16 mg/L (<0.50)		
RT-PCR for SARS-CoV-2	Positive		
Dengue test	Ag NS1(ICT)-Negative	Positive IgM	
HR CT	Subtle ground-glass and consolidative opacities are noted in different segments of both lungs, predominantly in peripheral location with basal distribution, nearly 30% of lung involvement was present.		
Blood Culture	No growth		
Urine culture	No growth		

FIGURE 1 HR CT shows ground-glass and consolidative opacities



of COVID-19 infection in this patient with dengue fever, which was atypical. Hemoptysis can range from mild to severe from a smear of blood in the sputum to a life-threatening hemorrhage.⁶ The majority of dengue infection patients have bleeding, shock, organ failure, and metabolic acidosis as a result of their illness. It is unusual for lower respiratory tract to be involved. Dengue fever is a potentially fatal disease characterized by pulmonary capillaritis, which causes diffuse alveolar hemorrhage (DAH) which can lead to hemoptysis.⁷ It may be the symptom of a number of diseases such as tuberculosis, malignancy, bronchiectasis, and pneumonia or other conditions.⁸ This patient had no anticoagulated or antiplatelet drugs history previously. As she had no long-term history of low-grade fever, weight loss or cough, tuberculosis test for hemoptysis

was not performed. However, unusual symptoms, such as hemoptysis or atypical CT findings, may emerge in certain individuals, posing a significant challenge to the epidemic's management.⁹ In our case, the patients had hemoptysis with other accompanying symptoms. In a recent study, hemoptysis was found to be 1.45–2.7 percent in the case of dengue fever, whereas in COVID-19, it was about 13 percent.^{10,11} COVID-19 characteristics such as spike and nucleocapsid proteins activate the host's immune system, causing the virus to be eliminated. In the acute stage, these viral antigens can be identified by B cells or conveyed to T cells via MHC complexes, leading in antibody formation, enhanced cytokine secretion, and cytolytic activity.¹² Increased blood levels of IL-2, IL-6, IL-10, and IFN are signs of excessive cytokine production in severe instances

of COVID-19.¹³ High cytokine release and possible ACE2 expression downregulation in severe COVID-19 can not only promote a hypercoagulable condition separately but also bilaterally boost each other's pro-thrombotic activities.¹³ Coagulation system activation is common in critically ill COVID-19 patients.¹⁴ Hemoptysis may be an initial symptom of venous thromboembolism (VTE), and there is a case presenting with hemoptysis owing to pulmonary emboli associated with COVID-19.³ In our patients, hypercoagulability values such as D-dimer and ferritin were within normal limits, and no VTE was observed in the radiological examination. Alveolar hemorrhage is a potential COVID-19 consequence in this case. Dengue is not known to cause lung alterations, and imaging results are likely due to increased vascular permeability. Dengue fever, hemoptysis, especially diffuse pulmonary infiltration needs to be evaluated in the differential diagnosis. Bilateral regions of ground-glass opacity or consolidation, and bilateral pleural effusions are the most prevalent radiographic findings in dengue that also seen COVID-19 pneumonia.¹⁰ COVID-19 may invade hepatocytes via ACE-2 receptors on the liver, and the coinfection of COVID-19 with HBV reveals a greater risk of liver failure, as well as increased poor outcomes and death.¹⁵ Because the patient's liver function was not measured, we must be careful of COVID-19, which is associated with the hepatitis virus. Again, fungal and bacterial infections are common consequences of viral pneumonia in very sick patients.¹⁶ However, no notable pathogen was detected in our patient's blood culture. So, every critical COVID-19 patients undergo a detailed investigation. Males, expectant mothers, the aged, and concomitant illnesses such as hypertension, diabetes, coronary artery disease, respiratory disease, and cancer were all shown to be more common in extreme situations at admission¹⁷; however, this case did not meet those criteria. Whether or if remdesivir is a viable treatment for acute COVID-19 patients, symptomatic benefits have been noted. Remdesivir was linked to a 31% reduction in "duration towards recovery." After 11 days, about half of those who took remdesivir were released from the hospital, compared to 15 days for those who received placebo.¹⁸ In the instance of this patient, after commencing remdesivir, she was symptom-free after a week. COVID-19-infected individuals regain in most cases within a few weeks, even if the patient has a serious infection.¹⁹ This patient is not associated with severe septicemia and recovers without difficulty. Our study also had some limitations: first, considering evaluation and screening tests were done at the discretion of attending clinicians, some of the data acquired had limitations. Second, there was no calculation of the high-risk area for additional viral coinfections in Bangladesh. The key take away message from this case is that a lack of knowledge of hemoptysis as a potential

COVID-19 clinical manifestation has resulted in initial misdiagnosis and delayed diagnosis. When dealing with any patient arriving to the hospital in this pandemic situation with a history of hemoptysis, COVID-19 should be evaluated in the differential diagnosis list, even if the other characteristic clinical symptoms of COVID-19, such as fever, dry cough, myalgia, and shortness of breath are missing. COVID-19 is a novel illness with many unknown features, unusual presentations such as severe hemoptysis should also arouse concern regarding the diagnosis of COVID-19, particularly in pandemic situations in dengue-endemic settings. Additional viral outbursts, such as hepatitis viruses, Chikungunya viruses, Epstein-Barr virus (EBV), influenza virus incidences, and so on, may impact the prevalence of viral coinfection with COVID-19, thus various anti-COVID assessments must be considered in the future.^{20,21}

4 | CONCLUSION

In summary, COVID-19 should be considered as a differential diagnosis of acute undifferentiated febrile illness. In endemic regions, however, clinically suspected patients should be tested for both COVID-19 and dengue fever, especially during the rainy season. This will aid in determining the burden of dengue and COVID-19 coinfection. Precise diagnosis is very crucial considering clinical presentation, exposure history, and laboratory assays. During the COVID-19 pandemic, isolation of febrile ill patients' needs to be considered, which leads to the prevention of disease transmission. COVID-19 can show with nonspecific symptoms; therefore, it is critical that physicians are aware of this potential. As a result, instances of COVID-19 with extrapulmonary and unusual manifestations, as well as coinfections such as dengue fever, should not be overlooked when patients present to hospital settings, where healthcare professionals should be cautious. We believe that a combination of these strategies will help Bangladesh deal with the COVID-19 and dengue virus outbreaks, lowering higher mortality rates and increasing the survival rate of COVID-19 cases, which may be intensified by dengue.

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CONFLICT OF INTEREST

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

AUTHOR CONTRIBUTIONS

The article's first draft was written by MAA and AIK. MAA, AIK, FQ, IIK, MTI, and ZHK contributed to the literature review and manuscript preparation. All authors contributed to the final version by critically reviewing and editing drafts.

ETHICAL APPROVAL

The article is about a case study. As a result, our Ethics Committee's consent was not required.


CONSENT

The patient's written informed consent for publishing of this case report, as well as images, was acquired. The editor-in-chief of this journal has a copy of the written consent to review.

DATA AVAILABILITY STATEMENT

Data can be shared based on the reader's reasonable request and priority base and some restrictions will apply.

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