

COVID-19 Related Pneumonia with Concurrent Dengue Fever in a Middle-Aged Patient a case report

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Consent for Publication

Written informed consent was obtained from the patient to publish this report in accordance with the journal's patient consent policy.

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Key clinical message:

This case emphasizes the importance of considering multiple differential diagnoses, even in patients presenting with overlapping symptoms, such as fever and respiratory distress. It highlights the significance of a comprehensive diagnostic approach, including thorough physical examination, appropriate laboratory testing, and timely management strategies to address complex conditions like concurrent COVID-19 related Pneumonia and Dengue Fever. Multidisciplinary care and close monitoring are essential in optimizing patient outcomes and promoting successful recovery in such challenging cases.

Abstract:

The co-occurrence of pandemics with co-infections poses a significant threat to public health and can lead to increased mortality rates, as seen historically in events like the Spanish Flu and in the ongoing COVID-19 pandemic. This paper discusses a case study of a 37-year-old individual in Sudan presenting with concurrent COVID-19 and Dengue fever. The patient's symptoms, diagnostic process, and treatment in the COVID-19 unit are detailed. Challenges in distinguishing symptoms between Dengue fever and COVID-19, especially in regions endemic to Dengue like Sudan, are highlighted. The effective multidisciplinary management of the patient involved hydration, antibiotic therapy, anticoagulation, acid suppression therapy, and supportive treatments. The patient responded well to treatment, with fever resolution and stable vital signs, showcasing the importance of early diagnosis and tailored interventions in complex cases of viral co-infections. This case underscores the need for enhanced vigilance, rapid diagnostics, and collaborative efforts to address co-infections amid the COVID-19 pandemic, particularly in resource-constrained settings like Sudan.

Keywords:

COVID-19; Dengue fever; Coinfection; Pneumonia; Resource-limited setting; Multidisciplinary care

1 Introduction:

The devastating impact of pandemics is often compounded by the presence of co-infections, which can significantly increase mortality rates [1, 2]. A notable example is the Spanish Flu of 1918, where many deaths were attributed to secondary infections occurring alongside the primary respiratory viral pathogen, leading to more severe outcomes [3]. Fast forward to the recent COVID-19 pandemic caused by SARS-CoV-2, originating in Wuhan, China, similar concerns around co-infections persist [4]. Recent studies indicate that up to 50% of COVID-19-related deaths involve secondary bacterial infections, prompting empirical antimicrobial treatment in a significant percentage of hospitalized patients to mitigate the risk of co-infections, despite challenges posed by antimicrobial resistance [5,6].

In addition to bacterial co-infections, cases of fungal co-infections alongside SARS-CoV-2 have also been documented, highlighting the complexity and challenges associated with managing multiple infections during major respiratory outbreaks [7,8].

It is worth noting the importance of studying and understanding the impact of co-infections, particularly involving viruses from different groups, which remains an area that requires further exploration, especially in the context of major respiratory infection outbreaks [9 - 12]. Moreover, the timing of the COVID-19 outbreak during the monsoon season, when diseases like dengue fever are prevalent in tropical regions, including countries like Sudan [13 - 20], adds another layer of complexity [21]. Dengue fever, transmitted by Aedes mosquitoes and caused by one of four arbovirus serotypes, has been a growing concern due to its rapid spread and impact on public health [15 - 20].

In Sudan specifically, the surge in dengue fever cases in 2023 posed significant public health challenges [9]. Managing cases of simultaneous infections from different virus groups, such as Coronaviruses and Flaviviruses, requires a well-coordinated and effective approach to ensure successful outcomes in such complex scenarios. In this communication we reported on patient who concurrently had COVID-19 and Dengue fever, which was effectively managed in the COVID-19 unit

2 Case History:

A 37-year-old freelancer from a middle socio-economic background resides in a household with his spouse and three children. They have had no recent travel history in the past month. The individual arrived at Kassala Teaching Hospital in eastern Sudan in August 2023 with a chief complaint of a fever persisting for nine days, with the highest recorded temperature at 39.4°C. Additionally, the patient experienced generalized body aches over the last two days and had vomited fresh blood at home on the morning of hospital admission.

3 Methods:

At the admission, the patient weighed 78 kg with a BMI of 30 kg/m². The patient is a non-smoker, doesn't consume alcohol, and has no underlying health conditions. Vital signs on admission showed a temperature of 39.1°C, a pulse rate of 78 beats per minute, and blood pressure reading 110/79 mm Hg. Although the respiratory rate was slightly elevated at 25 breaths per minute, the patient maintained 99% oxygen saturation in room air and showed no signs of dehydration. Physical examination did not reveal any abnormal findings.

Considering the symptoms presented in the case, our differential diagnosis includes COVID-19, dengue fever, chikungunya, and other arbovirus diseases, as well as malaria. We proceeded with relevant laboratory tests based on this list to work towards a definitive diagnosis. However, the ongoing conflict and lack of access to upper gastrointestinal (GI) endoscopy posed a challenge in ruling out the possibility of a GI ulcer as a contributing factor.

The patient tested positive for COVID-19 through RT-PCR. A chest X-ray revealed pneumonia, showing ill-defined ground-glass opacifications in the lower regions of both lungs. Due to concerning symptoms like vomiting blood and prolonged fever, a blood sample was sent for detecting dengue virus and other arbovirus diseases. The patient's serum tested positive for recent dengue virus infection with ELISA IgM antibodies present, while IgG antibodies were not detected. Additionally, a complete blood count was conducted as outlined in Table 1. Furthermore, blood film for malaria parasite was negative.

4 Conclusion and results:

Based on the patient's medical history, symptoms, physical examination, and lab results, we diagnosed the patient with COVID-19 related Pneumonia along with Dengue Fever. Initially, the patient received hydration with intravenous Ringer's lactate solution at a rate of 80 ml/h (total of 1920 ml) within the first 24 hours of admission before the lab reports were available. Treatment included starting Ceftriaxone 2 g daily and Ciprofloxacin 400 mg twice daily to address potential bacterial infections in COVID-19 cases. Additionally, Low Molecular Weight Heparin (Enoxaparin 60 mg subcutaneous injection twice daily) was initiated to prevent clotting issues associated with COVID-19. To manage stress ulcers, Injection Omeprazole 40 mg IV once daily was administered, along with Domperidone 10 mg three times daily before meals to reduce gastrointestinal disturbances due to the patient's history of vomiting. To leverage their antiviral properties, Zinc 20 mg, Vitamin C 250 mg, Vitamin D 1000 IU, and Famotidine 20 mg were included in the treatment plan.

Following treatment, the patient experienced a bout of blood-vomiting within the initial 24 hours of admission and later developed a fever (one-time occurrence, without chills or shivering, temperature reaching 39 °C) during that period. The fever was managed with sponging and oral Paracetamol 500 mg (2 tablets at once). The fever resolved by the second day of hospitalization. The patient maintained good oxygen saturation levels and had uneventful breathing patterns throughout their stay. Intravenous fluid management was adjusted based on hematocrit levels for dengue management. Vital signs such as blood pressure, pulse rate, fluid intake-output, respiratory rate, and temperature were regularly monitored every 6 hours. The patient did not require oxygen therapy or steroids to prevent a cytokine storm. Upon discharge, the patient was afebrile, well-hydrated, and free from respiratory distress. They were advised to continue treatment at home isolation.

5 Discussion:

Coinfections of SARS-CoV-2 with other pathogens have been well-documented [22 - 24], highlighting the need for vigilance in regions prone to multiple infectious diseases like Sudan [25 - 37]. Notably, cases of

COVID-19 and Dengue fever coinfection have been reported in areas like Thailand, Singapore and United state of America [38 - 41].

Dengue fever, historically widespread in Africa, is influenced by factors like climate change and urbanization, affecting the *Aedes* mosquito population and consequently the spread of the dengue virus [13 – 20, 42]. Sudan, being endemic to Dengue fever, faces particular challenges [13 - 20]. Dengue and COVID-19, both viral infections, share similarities, necessitating a high index of suspicion in areas where Dengue is prevalent [43, 44]. Recognizing the overlap in symptoms between non-severe Dengue and COVID-19 poses diagnostic challenges, emphasizing the importance of a rapid and accurate diagnostic strategy, especially during the ongoing COVID-19 pandemic [45, 46].

In the case presented, the patient concurrently had COVID-19 and Dengue fever, which was effectively managed in the COVID-19 unit. While patients co-infected with SARS-CoV-2 and other respiratory viruses exhibit clinical similarities to COVID-19, Dengue fever typically manifests with fever, vomiting, rashes, and body aches, including the ominous sign of blood vomiting [47, 48]. Surprisingly, the platelet count in this case remained within the normal range, contrary to the frequently lowered platelet count reported in COVID-19 and Dengue coinfections [38 – 41, 47,48]. The management of the patient involved a multidisciplinary approach. Treatment included hydration, antibiotic therapy for potential bacterial infections, anticoagulation to prevent clotting issues associated with COVID-19, acid suppression therapy to manage stress ulcers, and antivirals and supplements to support the immune system. Adjustments were made in intravenous fluid management based on hematocrit levels for Dengue Fever.

Monitoring of vital signs, fluid balance, and symptom management were crucial during the patient's hospital stay. Regular assessment ensured early detection of any complications and guided appropriate interventions. The patient responded well to the treatment provided, with the fever resolving, stable oxygen saturation levels, and no requirement for oxygen therapy or steroids.

Despite the challenges posed by the COVID-19 pandemic, particularly in regions like Sudan and other African countries where data on coinfections are limited, it is crucial to adapt to the evolving situation. It is essential to provide adequate care for patients with multiple infections, considering the limited resources and healthcare systems in developing nations. Collaborative efforts and tailored management strategies are imperative to address the complex interplay of viral infections in such settings.

Consent for Publication

Written informed consent was obtained from the patient to publish this report in accordance with the journal's patient consent policy.

Authors' contributions

EES, JCSN, CMM, and AA contributed in the Conceptualization; Data curation; Formal analysis; Investigation; Methodology; Supervision; Validation; Visualization; Writing – original draft and Writing – review & editing of final version.

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Table legends:

Table 1: Laboratory Investigation report.

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