Acta Scientific MEDICAL SCIENCES (ISSN: 2582-0931)

Volume 7 Issue 8 August 2023

Case Report

A Case of Human Meta-pneumovirus Infection in Pregnancy Involving Superimposed Bacterial Pneumonia and Respiratory Distress

Sunil Kumar Shivarame Gowda[1]*, Fekri Eltahir Abdalla[2] and Raghunanda Narasimhaiah[3]

[1]Specialist Internal Medicine, District Community Hospital, Abu Dhabi, UAE

[2]Consultant Emergency Medicine, District Community Hospital, Abudhabi, UAE

[3]Consultant Anesthesiology and Critical Care, District Community Hospital, Abudhabi, UAE

***Corresponding Author:** Sunil Kumar Shivarame Gowda, Specialist Internal Medicine, District Community Hospital, Abu Dhabi, UAE.

DOI: 10.31080/ASMS.2023.07.1635

Received: July 03, 2023

Published: July 18, 2023

Abstract

Human metapneumovirus (hMPV) is an emerging human pulmonary pathogen that is genetically related to the respiratory syncytial virus. Over the last few decades, it has been increasingly associated with respiratory illnesses. Human metapneumovirus is a non-segmented single negative-stranded RNA-enveloped virus classified in the Pneumovirinae subfamily of the Paramyxoviridae family. Given the close relationship between hMPV and Avian pneumovirus (APV), it was speculated that hMPV might have originated from birds [1]. HMPV infection can affect all age groups and the symptoms range from mild infection affecting the upper and lower respiratory tracts to wheezing, bronchiolitis, and pneumonia, which can be life-threatening. Thus, hospitalization, supplemental oxygen, and mechanical ventilation may be necessary for severe hMPV infections [1,2]. Immunocompromised patients are particularly susceptible to this infection with resultant morbidity and mortality. Ribavirin (oral and aerosolized) with IVIG is a potentially effective treatment option for those with severe disease.

The present case reports are regarding two pregnant women who had respiratory distress in association with a positive respiratory panel PCR for hMPV. Both of them had developed clinical features suggestive of pulmonary edema and respiratory distress, requiring oxygen and anti-failure treatment. It was later superimposed by bacterial pneumonia. These case reports show that hMPV can also be an important cause of severe respiratory illness in pregnant women.

Keywords: Human Metapneumovirus (hMPV); Avian Pneumovirus (APV); Women

Introduction

hMPV was first described in 2001 by researchers in ~~the~~ Netherlands. It was identified using Reverse Transcription-Polymerase Chain Reaction (RT-PCR) amplification techniques of stored nasopharyngeal samples from children with respiratory illness [1]. hMPV induces weak memory response due to poor T and B cell memory immunity. This is possibly by the insufficient activation of naive CD4+ T cells due to the secretion of soluble molecules by hMPV-infected dendritic cells that down-modulate T-cell activation [3].

Therefore, reinfection is possible throughout life [4].

The present case reports of hMPV infection in pregnant women with superimposed bacterial pneumonia leading to acute

respiratory distress will be helpful to better understand the potential clinical course of hMPV infection.

Case Report 1

A 34 -year-old woman (G3P2) at term gestation with a history of gestational diabetes in the last pregnancy was presented to the Emergency Department, community Hospital, UAE with symptoms of cough, throat pain, fatigue, and mild shortness of breath. She was admitted to ER twice within 10 days before, with the same symptoms, and was discharged with oral antibiotics and symptomatic treatments.

On the day, she had fever, productive cough, sore throat and body aches, but there was no history of chest pain, nausea, vomiting, and diarrhea. The patient was febrile (37.4°C) and normotensive (121/78 mm Hg) with pulse rate of 107 beats per minute (bpm) and a respiratory rate of 18 breaths per minute. There were no abnormal findings on physical examination with bilateral clear lung sounds and a normal chest X-ray (CXR). Blood investigation showed a high leucocyte count of $15\times10^3/\mu L$ which was predominantly neutrophils and CRP was found to be 9.9 mg/dl.

The patient was admitted to the hospital for close observation and treatment and was closely followed up by internal medicine and OBG team. The treatment was initiated by oral antibiotics (Amoxicillin + Clavulanate 1gm TID) and other supportive therapies.

Fetal monitoring revealed a normal baseline heart rate with moderate variability, positive accelerations and no decelerations. The patient was shifted to the labor room and CTG showed an isolated deceleration which returned to normal within 2 minutes.

The preceding and the following traces showed good variability and plenty of accelerations. The patient underwent a c-section and a healthy female infant (birth weight of 3695 gm) was delivered.

After 6 hrs of delivery, the patient-reported severe fatigue along with an increasing cough with frothy sputum, on lying down. Clinical examination showed bilateral wheezing, and fine crepitus along the mid and lower zones, with the left side more than the right. The pulse rate was 60 bpm and the respiratory rate was 22 breaths per minute. The patient remained afebrile (36.8°C) and her oxygen saturation was normal. She was clinically distressed due to a severe cough. A pneumonia panel and rapid flu test were done. A repeat CXR showed bilateral pleural effusion on the left side more than right and left basal consolidation. Blood reports showed neutrophil predominant, high leucocyte count of $27\times10^3/\mu L$, CRP of 85mg/dl, D-Dimer of 1.2 mg/dl and high procalcitonin of 1.2. Cardiac consultation was done and a 2D echo showed a good EF of 65%, with mild to moderate mitral regurgitation.

The patient was transferred to ICU as further respiratory decompensation was anticipated. She received budesonide/albuterol nebulization and anti-failure medications.

Pneumonia panel PCR was positive for hMPV. After the infectious disease consultation, antibiotics were escalated to ceftriaxone and vancomycin 1gm BID.

With the continuing medications, on day 2, the patient was tacchypnic intermittently and febrile. On day 3, she was better on room air, with no fever spikes. On day 4, the sputum culture demonstrated normal respiratory flora. Vancomycin was discontinued on day 4 since the nasal swab screening test for methicillin-resistant Staphylococcus aureus (MRSA) was negative. The patient was transferred out of the ICU on day 4 as she continued to remain afebrile and had an overall improving respiratory status. On day 5, air space opacities with air-bronchogram within, are noted in CT. involving the basal segments of left lower lobe, suggestive of basal consolidation. Right basal atelectatic changes and small left-sided pleural effusion were also observed. On day 6, the patient was discharged, with oral antibiotics as she maintained the O2 saturation on room air of > 95%.

Case Report 2

A 37 -year-old woman at 7 months of gestation was presented to the Emergency Department of community hospital, UAE. She was reported with fever, productive cough, throat pain, severely dyspnoeic, shortness of breath, and body aches. There was no history of chest pain, nausea, vomiting, and diarrhoea.

The patient was febrile (37.4°C) and hypotensive (90/78 mm Hg) with pulse rate of 107 beats per minute (bpm) and a respiratory rate of 32 breaths per minute. Her physical examination was normal including bilateral extensive wheeze all over the lung

fields, with nasal coarse crepitus. Chest X-ray was normal. Blood investigation showed a high leucocyte count of $14\times10^3/\mu L$, which was predominantly neutrophil, and CRP was 44 mg/dl.

The patient was admitted in ICU for close monitoring in the hospital and was initially given ceftriaxone 1 mg bid, oseltamivir 75 mg bid, azithromycin 500 mg OD and supportive therapy.

In the ICU, the patient had an increasing cough on lying down, fatigue, and she was under oxygen support and nebulisation. Fetal monitoring revealed a normal baseline heart rate with moderate variability, positive accelerations, and no decelerations.

CT thorax, pneumonia panel and rapid flu test were done. CT showed, bilateral patchy ground glass opacities. COVID was ruled out by rapid PCR.

On 2nd day clinical examination showed bilateral wheezing, fine crepitus, bilateral mid and lower zones left more than right. Pulse rate was 100 bpm and respiratory rate was 30 breaths per minute. The patient remained febrile (38°C). Oxygen saturation was normal. She was clinically distressed due to a severe cough.

Neutrophil predominant, high leucocyte count of $14\times10^3/\mu L$, CRP of 219 mg/dl, D-Dimer 0.75 mg/l, were the investigation findings. Pneumonia panel PCR showed positive for HMPV.

On day 2 of ICU admission, she continued antibiotics and other supportive treatments. She was tachypneic intermittently and febrile.

On day 3, she was better on room air, with no fever spikes. Sputum cultures returned to normal respiratory flora on day 4.

The patient was transferred out of the ICU on day 4. A repeated CT chest on day 5 showed air space opacities with air-bronchogram within are noted which was having a regressing pattern.

She was discharged on day 6 and asked to continue oral antibiotics for a short duration.

Discussion

Illness and death from respiratory viruses among pregnant women have received greater appreciation following the COVID pandemic. Pregnancy has an immunomodulating effect, hence pregnant women are at elevated risk for complications from various viral and bacterial infections. The clinical presentation of non-influenza respiratory viral infections, including hMPV, during pregnancy, as well as its consequences on the fetus, are not well described, despite advances in molecular diagnostic methods and increasing surveillance of respiratory viruses. The most common symptoms among pregnant women with hMPV infection were cough, rhinorrhea/nasal congestion, myalgia, and fever. The risk for secondary bacterial infections, such as pneumococcus and staphylococcus is greatly increased by a preceding respiratory viral infection [5].

Very few studies have described the clinical course of hMPV respiratory infection and the effect of it on the fetus. Two recent studies have examined the significance of hMPV viral load, as assessed by real-time PCR, on illness parameters. One study showed that increased viral loads correlated with lower respiratory tract illness and hospitalization [6].

hMPV is relatively a frequent cause of respiratory illness during pregnancy. The development of inexpensive viral diagnostic tests is necessary in order to help focused prevention strategies. Attempts to develop a vaccine or antiviral therapy for hMPV are currently under process. The identification of risk factors for infection and severe disease is crucial to identify those who are more susceptible to this disease during pregnancy [5].

Conclusions

It is imperative to consider viral etiologies when pregnant women come with respiratory illness in the third trimester/term. hMPV can be an important cause of respiratory infections in pregnant women which can range from mild URI symptoms to severe respiratory failure. This case reports highlight the role of hMPV as a cause of respiratory distress in a pregnant woman without any comorbidities. The cases further impose the heightened vigilance for superimposed bacterial pneumonia in pregnant women with confirmed hMPV infection. In the cases reported, progression to ALI/ARDS is effectively averted by early, aggressive treatment with antibiotics since pneumonia was suspected.

Considering the potential for severe respiratory illness in pregnant women due to hMPV, further research is needed about the antiviral therapies and vaccination that are effective and safe in pregnancy.

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