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HAEMOPHILUS INFLUENZAE BLOODSTREAM INFECTION CONCURRENT WITH INFLUENZA A(H1N1)PDM09 RESPIRATORY INFECTION: A CASE REPORT

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ABSTRACT

Background: Influenza A(H1N1)pdm09 predisposes to secondary bacterial infection, yet concurrent invasive Haemophilus influenzae infection in infants is rarely documented, and detection of a virus may prematurely close the diagnostic work-up. **Case:** An age-appropriately vaccinated 8-month-old girl (6 kg) presented with fever, dry cough, feeding difficulty and reduced urine output for 3 days. She had tachypnoea, chest retractions and SpO_2 of 91% on room air, and was admitted to the Paediatric Intensive Care Unit. Investigations showed microcytic hypochromic anaemia, thrombocytosis, raised CRP (23.3 mg/L) and LDH (780 U/L), hyponatraemia and respiratory alkalosis. Nasopharyngeal and oropharyngeal swabs and whole blood were tested the same day at the Virology Research and Diagnostic Laboratory by multiplex real-time PCR. Influenza A(H1N1)pdm09 was detected on the respiratory panel (Seegene Allplex; Ct 30.20 for Flu A and 30.71 for H1N1pdm09), and H. influenzae on the sepsis panel (RevoDx Sepsis v2.0; Ct 34.35). Intravenous ceftriaxone and oral oseltamivir were started on receipt of results, with oxygen (high-flow nasal cannula, then non-rebreather mask), steroids, intravenous fluids and magnesium sulphate. She improved, left the intensive care unit after 2 days and was discharged after 5 days from paediatric ward. **Conclusion:** Parallel respiratory and sepsis PCR panels ensured same-day, targeted antiviral and antibacterial therapy. A positive influenza result does not exclude bacterial coinfection, and microbiologists and clinicians should suspect invasive H. influenzae in infants with severe influenza, even when vaccinated.

KEYWORDS : Haemophilus Influenzae; Influenza A(H1N1)pdm09; Bacterial Coinfection; Multiplex Real-time PCR

INTRODUCTION

Influenza, commonly referred to as the flu, is an acute respiratory infection caused by Influenza viruses and has the potential to result in global pandemics. During seasonal outbreaks, influenza affects approximately 20%–30% of children.[1,2]

The main circulating types are influenza A and influenza B; however, influenza A is particularly concerning because of its substantial antigenic variability and associated health risks. (Neumann) Pneumonia is the most frequent complication of Influenza A infection in children and accounts for most severe cases and deaths.[3,4]

Bacterial coinfections commonly develop after influenza virus infection, further increasing disease severity and adversely influencing clinical outcomes like bacteraemia, sepsis and other invasive complications.[5]

Studies have reported that bacterial coinfections occur in approximately 20.3% of patients with influenza.[1]

Influenza is predominantly a respiratory viral illness, however, severe disease can be accompanied by secondary bacterial infection. Influenza-associated bacterial coinfection is clinically important because it may result in pneumonia, bacteraemia, sepsis and other invasive complications.[5]

Haemophilus influenzae is a Gram-negative coccobacillus that can cause both respiratory and invasive disease. Invasive disease includes bacteraemia/sepsis and bacteremic pneumonia, meningitis, epiglottitis, and septic arthritis, among other syndromes. The infection is common in patients with neoplasm, asplenia, alcohol use disorder, human immunodeficiency virus infection, chronic pulmonary disease, long-term steroid use, or underlying viral lung infection.[6]

Although introduction of Hib vaccination has markedly reduced *H. influenzae* type b disease, nontypeable and non-b *H. influenzae* strains continue to cause invasive infections.[6]

We report a case of *Haemophilus influenzae* bloodstream infection concurrent with Influenza A respiratory infection in an 8 months old female infant who presented with fever and respiratory distress, and was successfully managed with the use of appropriate antimicrobials and prompt supportive treatment.

Case Presentation

An 8 months old female infant, weighing 6 kgs presented with fever spiking every 2-3 hours, not associated with chills and dry cough lasting since past 3 days. She also had complaints of difficulty in feeding with decreased feed intake and decreased urine output with no passage of urine in the last 24 hours.

Her vaccination status was complete for her age.

The patient was admitted to Paediatric Intensive Care Unit (PICU) where she was further evaluated and managed.

On Examination

The patient was conscious, alert and irritable with normal hydration status and pallor present.

Respiratory examination revealed she had tachypnoea (Respiratory rate: 58/min), with bilateral rhonchi with subcostal and intercostal retractions indicating respiratory distress. $Sp0_2$was 91% on room air.

Diagnostic Assessment

Laboratory Investigations

The complete blood count showed microcytic hypochromic anaemia with thrombocytosis. The inflammatory markers were elevated [CRP: 23.3mg/L and LDH: 780 U/L] and serum sodium levels were low. Liver and kidney function tests were within normal limits. Arterial blood gas analysis revealed respiratory alkalosis.

Microbiology Investigations

Nasopharyngeal and oropharyngeal swabs and whole blood samples were collected and sent to Virology Research and Diagnostic laboratory (VRDL) for respiratory panel and sepsis panel respectively.

On the same day, samples were run using Multiplex real time PCR method. Influenza A(H1N1) pdm09 was detected in respiratory panel by using Seegene Allplex kit and *Haemophilus influenzae* was detected in sepsis panel by using RevoDx Sepsis v2.0 kit by Idil biotech. The cycle threshold values for Influenza Flu A, (H1N1)pdm09 and *Haemophilus influenzae* were 30.20, 30.71 and 34.35 respectively.

Treatment

The patient was given antimicrobial therapy along with supportive therapy which included steroids, IV fluids and magnesium sulphate.

On receiving the microbiological reports, the patient was started on intravenous injection ceftriaxone 300mg twice daily and syrup oseltamivir 3ml twice daily.

The patient was given supplemental oxygen, initially using high flow nasal canula (HFNC) and later, on improvement in oxygen saturation, by using non re-breather mask (NRBM).

Clinical Course and Outcome

The patient was managed in PICU for 2 days. Subsequently, her condition improved and she became clinically stable. Following this she was shifted to paediatric ward. She was off supplemental oxygen and was discharged after 5 days of observation and recovery.

DISCUSSION

The present case illustrates an important clinical association between Influenza A(H1N1)pdm09 respiratory infection and invasive *H. influenzae* disease in a young infant.

Influenza can impair respiratory epithelial integrity and alter host immune responses, creating conditions that may facilitate secondary bacterial infection.[7]

Haemophilus influenzae is a normal flora of the upper respiratory tract and possesses several mechanisms that facilitate adhesion to host cells and promote virulence. Encapsulated *H. influenzae* strains utilize protein H and *Haemophilus*-surface fibrils for adherence, whereas nontypeable *H. influenzae* (NTHi) can attach directly to respiratory epithelial cells and evade complement-mediated immune clearance. Invasive *H. influenzae* infection can manifest as bacteraemia, sepsis, pneumonia and other focal infections.[8]

Paediatric studies have demonstrated that *H. influenzae* bacteraemia can occur in young children and that bacteraemia may initially present without an obvious focal bacterial infection. Children with bacteraemia can subsequently develop serious focal disease, including pneumonia and meningitis.[9]

In a paediatric intensive-care study, bacterial/viral coinfection was found to be common among children with severe influenza, with *H. influenzae* being the commonest among the bacterial pathogens identified.[10]

This case report highlights that bacterial superinfection may occur concurrently with an existing viral respiratory infection, and the detection of a viral pathogen does not exclude a concomitant bacterial infection. Bacterial pathogens such as *H. influenzae* can cause invasive disease and may present as bacteraemia. If not recognized and treated promptly, such infections can progress rapidly and result in serious complications.

CONCLUSION

This case describes a young female infant with an acute febrile respiratory illness who was diagnosed with Influenza A respiratory infection concurrent with *Haemophilus influenzae* bloodstream infection. The clinical records document fever, cough, feeding difficulty, respiratory illness and the need for oxygen, intravenous therapy and antimicrobial/antiviral treatment.

The case highlights the importance of maintaining a high index of suspicion for bacterial coinfection in infants with influenza, particularly when systemic illness or clinical deterioration occurs. Early recognition of invasive *H. influenzae* infection and prompt appropriate antimicrobial treatment are important because bacteraemia can progress to serious focal disease.

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