Triple Infection of COVID-19, Respiratory Syncytial Virus and Adenovirus in 4-Month-Old Infant

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ABSTRACT

Since the beginning of the COVID-19 pandemic, many cases of SARS-CoV-2 co-infection with other respiratory pathogens have been reported. These situations may be a source of under-diagnosis leading to the spread of SARS-COV-2. We report the first case of triple infection involving SARS-CoV-2, Adenovirus and Respiratory Syncytial Virus in 4 months old infant. Initially admitted with symptoms of viral bronchiolitis. The aim is to highlight the importance of using multiplex PCR for the syndromic approach of respiratory infections in this pandemic period, especially in children, in order to limit spread of COVID-19 to others.

Keywords: Adenovirus, co-infection, mortality, multiplex PCR, respiratory syncytial virus, sars-cov-2, triple infection.

I. BACKGROUND

Coronaviruses are enveloped single-stranded RNA viruses, responsive of serious respiratory diseases as severe acute respiratory syndrome coronavirus (SARS-CoV) and Middle East respiratory syndrome coronavirus (MERS-CoV) [1].

In December 2019, a cluster of severe unexplained pneumonia was identified in the city of Wuhan, in China [2]. This was caused by a novel Coronavirus species called SARS-CoV-2 [3]. The World Health Organization (WHO) assigned in February 2020 the name COVID-19 to designate the disease caused by this virus.

COVID-19 may be asymptomatic which amplifies viral spread [4]. However, common clinical symptoms include dry cough, fever, and fatigue [5]. Less common symptoms include headache, abdominal pain, nausea, vomiting, anosmia, and dysgeusia [5], [6]. In children, fever and cough are most common symptoms [7], [8]. Furthermore, children are less likely to develop severe forms than adults, presenting mild symptoms [9].

Many Cases of SARS-CoV-2 co-infection with other pathogens have been reported, involving Influenza A virus, human adenovirus and other microorganisms [10]–[12]. However, Despite the rarity of reported cases, triple infection involving SARS-CoV-2 is possible [13].

We present here a rare case of triple infection of SARS-CoV-2, Adenovirus and Respiratory Syncytial Virus in a child and aim to study possible interactions between these viruses.
II. CASE PRESENTATION

A 4-month-old infant, with history of prematurity presented to pediatric emergency department, with respiratory distress with polypnea, dyspnea, productive cough associated with fever presented for 5 days. He had no known allergies and up to date on all vaccinations. None of the parents or siblings showed signs of respiratory infection.

The patient was conscious, apyretic, polynemic, with a saturation of 87% on room air. The examination of the respiratory tract shows a subcostal draught, nasal flaring with bilateral sibilant rales. He was placed in the prostrate position, on oxygen through high flow nasal cannula with improvement in respiratory symptomatology and saturation.

Blood cell count showed increased leukocytes with an anemia, C-reactive protein was normal at 0.7 mg/dL, but lactate dehydrogenase and AST were elevated respectively at 2369 U/L and 271 U/L. Chest X-ray showed right centriflobular micronodules and nasopharyngeal swab sample was collected.

Multiplex PCR assay was performed on BioFire FilmArray™ Respiratory Panel 2.1 plus (RP2.1plus) and it was positive for SARS-COV-2, Adenovirus and respiratory syncytial virus. The infant was admitted to the pediatric intensive care unit for 48 hours, receiving intravenous fluids and oxygen. He was transferred on the pediatric department for four days, then discharged at home following the good outcome.

III. DISCUSSION

Many studies have reported cases of co-infections of SARS-CoV-2 with other pathogens, such as influenza A virus, Adenovirus, respiratory syncytial virus, rhinovirus, and metapneumovirus [14], [15]. However, Co-infection rates seems to be higher in children than in adults [13]-[16].

To the best of our knowledge, this is the first case presented of an infant tripfly infected with SARS-CoV-2, respiratory syncytial virus and adenovirus in Morocco and in the literature.

It was impossible to determine the chronology of infection with the different viruses in this infant. This is due to the absence of previous PCR and documented cases in the siblings. Thus, it is not known whether the symptoms presented by this infant were due to the combination of the 3 viruses or to the respiratory syncytial virus-adenovirus co-infection associated with SARS-COV-2 carriage. In fact, the symptoms presented by this infant were not specific to any one virus.

Despite being more common in children, COVID-19 co-infection does not seem to worsen their prognosis[17], [18]. Indeed, the clinical manifestations of co-infections are not more severe than in common COVID-19 infection[18]. However, children hospitalized for co-infection tend to have a significantly lower levels of leukocytes and longer hospital stay [19]-[20].

Due to the unspecific clinical signs of viral respiratory infections, we suggest to test for COVID-19 on children positive for other respiratory viruses. Indeed, underdiagnosed cases of children can continue to transmit the virus in their environment and contribute to the persistence of the pandemic [21], [22]. We recommend the use of multiplex PCR as much as possible for the syndromic approach of respiratory infections in this pandemic period. It seems to be a good option for screening for respiratory pathogens, including SARS-COV-2 in less time.

CONFlict OF INTEREST

Authors declare that they do not have any conflict of interest.

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