



Coronavirus infection (covid-19) in neonates: a case report

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Abstract

Covid 19 infection started in Wuhan and subsequently spread worldwide affecting all ages including newborns. Neonatal Covid 19 cases are exceptional, so we report the clinical history, laboratory findings, and imaging features of Coronavirus disease 2019 in a 5 day old new born, whose mother was not infected by the Sars cov 2 virus, and which has well recovered with treatment.

Keywords

Newborn, pandemic, Covid 19, PCR.

Introduction

In late December 2019, Coronavirus disease 2019 (COVID-19) caused by SARS-CoV-2 was first detected in Wuhan, Hubei, China, people of all ages was susceptible to infection, but pediatric cases was less

detected. For well understand the infection with sars-cov-2 2019 in pediatric, we report a case of a newborn infected by covid19 hospitalized in RABAT MILLITARY HOSPITAL, MOROCCO.

Case report:

New born at day 5 of life, male, second twin from a twin pregnancy, which was completed and wellfollowed, cesarean delivery due to first twin was in breech presentation. Apgar score was 9-10 in the first minute and 10 in the 5 minute, and the birth weight was 3380g. His mother 29 years old had 3 pregnancies and 3 childbirth with 4 living child, without comorbidities, signs or symptoms before delivery. The newborn baby presented on the 3rd day of life a refusal suckling complicated with respiratory distress rated 3-4 / 10

according to the Silverman Andersen respiratory severity score. With no fever or other associated signs. Clinical examination found a cyanotic neonate, oxygen saturation was 84%, polypneic at 70 in respiratory rate, with intercostals retraction, xiphoid retraction and nasal flaring, and the heart rate was at 156 BPM without any heart murmur. Abdominal examination was painful but supple. Chest x-ray showed a pneumothorax, a right

pneumomediastinum pulmonary distension, right anterior trans mediastinal hernia and Bilateral alveolar opacities predominating on the left with a normal cardio thoracic index at 0.55 (figure 1). The chest CT scan confirmed the presence of bilateral pneumothorax slides, diffuse left alveolar interstitial syndrome with opacities in ground-glass (figure2). The laboratory studies showed some abnormalities:

Hb	15.6
VGM	108.8
CCMH	33.4
GB	14000
PNN	11000
Lymphocyte	1500
Eosinophile	100
Basophile	100
plaquettes	315000
LDH	1902
CRP	29
Na+	141
K+	4.6
RA	18
Urea	0.5
serum creatinine	11
ASAT	61
ALAT	8
PAL	243
total bilirubin	70

Covid 19 was confirmed by the real-time PCR for the SARSCoV-2 nucleic acid who was positive, after an infection with other virus has been eliminated by a multiplex PCR.

Newborn baby did not have a fever or cough, so her mother was asymptomatic before childbirth without fever or cough. PCR Covid19 was asked to the mother and the twin who came back negative, as well as the

mother's covid-19 serology with anti-SARS-COV-2 IgG antibodies levels at 0.03 (reference value<1.4) also chest X-ray which was normal.

The neonate received intensive care with continuous positive pressure breathing and an umbilical catheter with nutritional support also antibiotic therapy (amoxicillin, gentamycin, C3G and erythromycin) to treat bacterial superinfection. He responded well to

treatment with clinical improvement, Further detection of nucleic acid with nasopharyngeal swab samples made 7 days after the start of treatment showed a single N

positive gene which supports a recovering SARS-COV-2 viral infection, he also received a second chest x-ray which was normal (figure3).

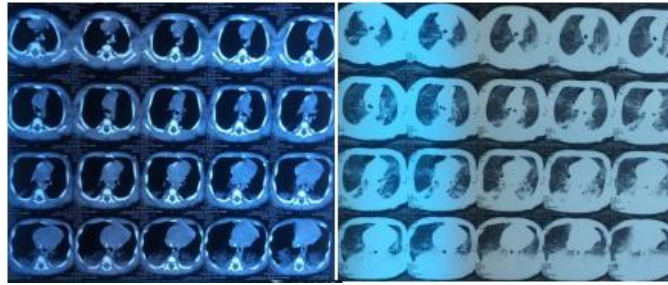


Figure 1: the newborn first chest X-ray

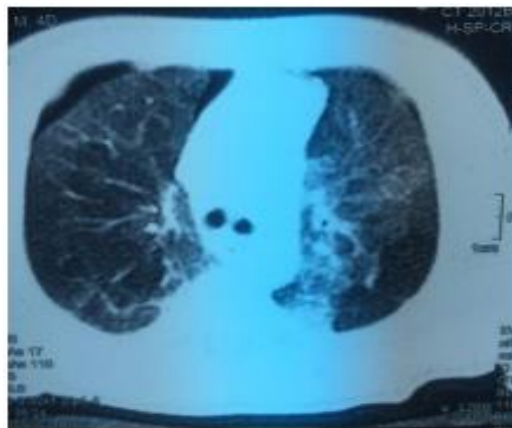


Figure 2: the newborn chest CT.

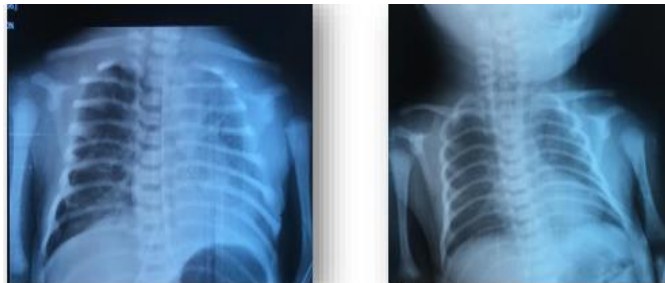


Figure 3: the newborn second chest X-ray.

Discussion

From late December 2019, there has been an outbreak of pneumonia in China caused by a novel coronavirus 2019-nCoV (1) named severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) (2) and in February 2020, the world health organization designed the disease Covid 19.

The disease spreads quickly with high contagiousness, the whole population is affected by the infection, children and newborns are also affected.

Little to know about neonatal covid19 infection until now, some publications have reported the outcomes of neonates born to mothers with suspected or confirmed

SARS-CoV-2 infection, but we are also interested in newborns whose mother was not infected or suspected before delivery.

The pathophysiology of the virus and how it comes to the human body soon to be revealed, researchers have found that covid-19 connects directly with ACE2 receptors using spike protein. Well studied in SARS-CoV-1, the binding of the S1 subunit to ACE2 leads to a conformational modification of the S protein, exposing S2 and allowing endocytosis and then membrane fusion (17) (18), this fusion requires the activation of S by the cleavage at the S1 / S2 junction, in the case of sars cov 2 there is a furin which allows the cleavage of the viral biosynthesis phase.

ACE2 is present in many cell types and tissues including the lungs, heart, blood vessels, kidneys, liver and gastrointestinal tract, they are especially present in epithelial cells (14). These receptors are highly abundant on type 2 pneumocytes in the adult's lungs, and are poorly expressed in children's lungs, which may explain the rare cases of coronavirus as well as the lower severity in children.

As previously confirmed, the main route of transmission is via respiratory droplets, as well as physical contact (3, 4); Fecal and oral transmission cannot be ignored, because the virus was detected in the fecal samples of patients in the United States and China (11). Regarding maternal and neonatal health, the evidence on maternal-infant vertical transmission is still unclear. Whether a pregnant woman with Covid-19 could pass the infection to her fetus or baby during pregnancy or delivery is unknown. Several case analysis want to prove the vertical transmission of COVID 19, as reported by VIVANTI et al (6) the study describes the manifestations of COVID19 infection in the mother with severe systemic inflammation and in the newborn with

neurological signs that suggest vertical transmission of the virus confirmed by real time PCR. Although a cohort of 23 patients with confirmed covid-19 showed that vertical transmission including development of severe neonatal COVID-19 complications seemed reassuringly rare (5), according to existing data, amniotic fluid, cord blood, neonatal throat swab, placental tissue and breast milk samples show low incidence (13), which supposed that neonate is affect During the postnatal period when they are exposed to mothers or other caregivers infected with SARS-CoV-2.

in our case the newborn was supposed infected after birth, since the symptoms appeared at day 3 of life with a mother who is asymptomatic with a PCR test of the SARS-COV-2 virus on nasopharyngeal swab specimens negative also anti-SARS-cov-2 igG antibodies negative which eliminates a previous infection with the virus, so the newborn was infected in postnatal period.

The incubation periods of COVID-19 were 1 to 14 days (7); in many cases the mean has been estimated to be 3 to 5 days.

In pediatrics, covid 19 infection may be asymptomatic or reveleled by non-specific symptoms such as myalgia or fatigue, but most common signs are the fever and cough. Some children may develop gastrointestinal involvement with diarrhea and aversion to food (9) but also symptoms can range to severe pneumotis with distress respiratory syndrome, also the virus can leaves severe complications The most frequent observed in children with severe forms of COVID-19 were septic shock, toxic encephalopathy, multiple organ dysfunction syndrome, disseminated intravascular coagulation, and status epilepticus(15).

The clinical presentation of SARS-COV-2 in our newborn is the respiratory distress that required artificial respiration, the chest X-ray showed diffuse left alveolar

syndrome with bilateral pneumothorax and the appearance of right lung hernia, but most common, the chest CT with typical manifestation similar to adult appearance with ground-glass opacities. Furthermore pneumothorax which is increasingly encountered in cases of covid 19 without being able to specify the exact mechanism of its occurrence, in a case study of 3 patients found that pneumothorax may be result from the prolonged inflammation of the lung parenchyma (8).

Despite the extent of the disease there is no specific drug. Children and newborns receive symptomatic treatment with nutritional support. When hypoxia occurs, effective oxygen therapy should be given immediately including nasal catheter, mask oxygen, nasal high-flow oxygen therapy and non-invasive or invasive mechanical ventilation should be undertaken when necessary (16). Antiviral therapy includes nucleosidic acid remdesivir tested by an international study on 61 adult patients and has proven its effectiveness in 68% of cases with observation of clinical improvement (17), also IFN- α nebulization prove effectiveness in reducing inflammation. But, antiviral drugs without clear evidences of safety and efficiency are not recommended to be used in pediatric patients.

The newborn described in our study received multiple neonatal intensive cares; he was under continuous positive pressure breathing with nutritional support. The antiviral treatment has not been given; on the other hand an antibiotic treatment aimed at super infection by typical and atypical germs has been started, with a good evolution.

The pertinent recommendations for countries for mothers who are Covid-19 positive and their babies are that the mother should not be separated from her baby, and breastfeeding should be encouraged as well as implementing increased hygiene practices. Because the

benefits of breastfeeding outweigh the risk of contracting the virus, following specific recommendations on breastfeeding resulted from analysis of seventeen studies reporting the outcomes for 115 positive mothers which found of 13 Covid-19 positive babies only four were breastfed and a further two mixed (10).

Conclusion

Our newborn is one of the less cases of covid 19 in neonate; he was symptomatic and well recovers with antibiotic and supportive treatment. The vertical transmission was not confirmed so we think of others ways of transmission who seems be like adults, also the risk of passing the virus to the breast milk is low so the breast feeding was encouraged with hygiene practice.

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