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DISSEMINATED INTRAVASCULAR COAGULATION WITH MASSIVE PULMONARY THROMBOEMBOLISM IN A MALE NEWBORN OF A SARS-COV-2 POSITIVE MOTHER

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ДИСЕМИНОВАНА ИНТРАВАСКУЛАРНА КОАГУЛАЦИЈА СА МАСИВНОМ ПЛУЂНОМ ТРОМБОЕМБОЛИЈОМ МУШКОГ НОВОРОЂЕНЧЕТА МАЈКЕ ПОЗИТИВНЕ НА SARS-COV-2

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ABSTRACT

Immune and physiological changes that occur during pregnancy may increase the risk of developing serious SARS-CoV-2 infections. In this paper a case report was presented about the non-infected newborn with 5-minute Apgar score of 8 who developed massive pulmonary thromboembolism in the first 36 hours of being born, from a SARS-CoV-2 positive mother without any symptoms. Careful monitoring of the newborn and determination of the coagulation status and inflammation markers on a daily basis could be justified in SARS-CoV-2 positive pregnancy.

Key words: *SARS-CoV-2; infant, newborn; thromboembolism.*

САЖЕТАК

Имуне и физиолошке промене које се јављају током трудноће могу повећати ризик од развоја озбиљних SARS-CoV-2 инфекција. У раду је приказан случај неинфицираног новорођенчета, чија је вредност Апгар скора у петом минуту била осам и које је развило масивну плућну тромбоемболију у првих 36 сати од рођења од мајке позитивне на SARS-CoV-2 без икаквих симптома. Пажљиво праћење новорођенчета и одређивање коагулационог статуса и маркера запаљења на дневном нивоу може бити оправдано у SARS-CoV-2 позитивној трудноћи.

Кључне речи: *SARS-CoV-2; одојче, новорођенче; тромбоемболизам*

INTRODUCTION

The SARS-CoV-2 viral genome has been isolated from maternal and newborn nasopharyngeal swabs, vaginal swabs, maternal plasma, and umbilical cord plasma, placental and umbilical cord biopsies, amniotic fluid, and human milk (1-4). In addition, specific anti-SARS-CoV-2 antibodies have been implicated in inflammatory responses in the placenta, maternal or umbilical cord blood / plasma, vaginal mucosa, and milk samples (1-4). There is currently a hypothesis that vertical transmission of SARS-CoV-2 is possible in utero, but with a low incidence and strong inflammatory response (1-4). Typical Covid-19 congenital dysmorphism has not yet been reported, and there is insufficient evidence that a "cesarean section" is better than a vaginal delivery, in preventing a possible vertical transmission of SARS-CoV-2 during pregnancy. There are ongoing studies which patients have an increased risk of developing severe inflammation, multiorgan failure or thromboembolic complications (5).

CASE REPORT

A Romani 20-year-old, asymptomatic pregnant woman was admitted at the full thirty seventh week of gestation with fetal bradycardia. The rapid antigen test and Polymerase chain reaction (PCR) test from nasopharyngeal swabs for Covid 19 were routinely used and tested positive. Laboratory analyses showed an increase in the inflammation parameters: C-reactive protein (CRP)=91.7mg/l; Le=16.51 (Gran=12.7). The analyses also indicated a slight increase in the activated partial thromboplastin time: PT (INR)=1.18 (reference range 0.9-1.1); PT(s)-A=13.7 (reference range 9.1-12.1

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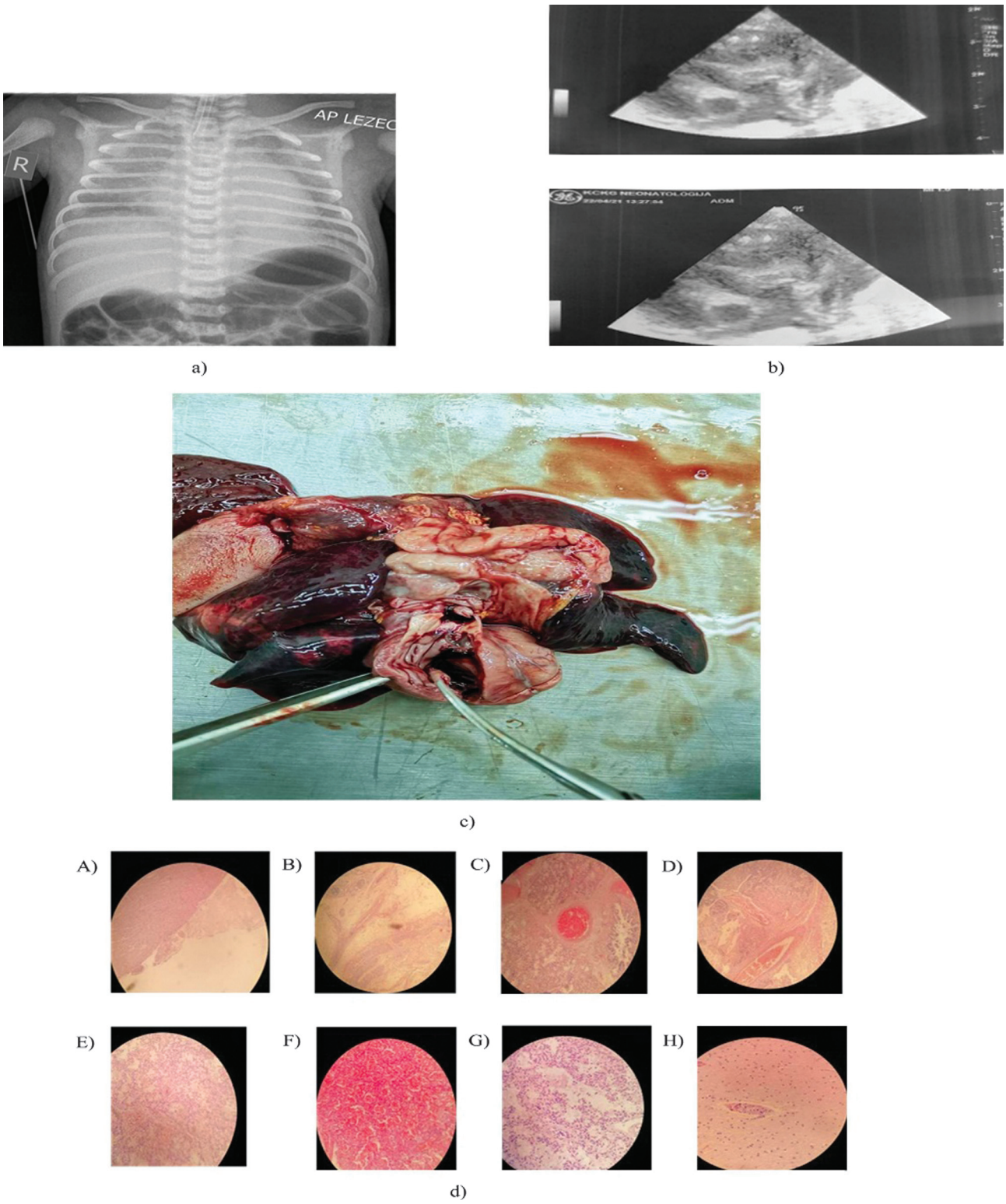

Figure 1: a) Chest radiography performed at admission to intensive care unit; b) Echocardiographic 2-D image of the three parietal thrombi in the right ventricle and massive thrombotic occlusion of the pulmonary artery; c) Macroscopic view of the pathohistological sampling with visible thrombus in the pulmonary artery lumen; and d) A) Thrombus insertion in the right ventricle lumen, B) Epicardial thrombus, C) Thrombus in the smaller branch of the pulmonary artery, D) Thrombus in the bigger blood vessel of the hilum of the lung (right), E) Microthrombi in small pulmonary blood vessels, F) Diffuse alveolar hemorrhage, G) A network of granular eosinophil content in the alveolar lumen, alveolar epithelial desquamation, rare neutrophil granulocytes, an atypical macrophage of the hypertrophic nucleus, leukocyte in blood vessels, H) Thrombus in blood vessels of the brain.

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s). Following a successful cesarean section, a male, term, and hypotrophy neonate was born. It was the mother's first and irregularly controlled pregnancy. After birth, the newborn baby was vital (Apgar score of 8), however, a short-term apnea ensued, followed by bradycardia and cyanosis. After the primary reanimation, the neonate was put in an isolate (FiO2 45%), rehydrated intravenously, and monitored. Blood culture was sterile. A double-active antimicrobial therapy was introduced (Ampicillin and Amikacin). The neonate was tested negative with the rapid antigen test and PCR test for Covid 19. A peripheral smear of complete blood count shows a slight increase in the values of eosinophils and monocytes: Le 12.6; (Gran 7.0; Lym 3.9; Baso 0.3; Eos 0.5; Mono 7.0); CRP=4.2mg/l.

On the following day, the neonate developed opisthotonos, fixed gaze, tonic spasm of extremities, pale with cyanosis of lips and feet, with skin petechial hemorrhage on the body. The neonate was intubated by an anesthesiologist and given Epinephrine. He was unconscious and there were indications of cardiogenic shock and disseminated intravascular coagulation. Eventually he was transferred to the intensive care unit (thirty hours after birth) due to severe hemorrhage from the tube and upper respiratory tracts. It was not possible to check the coagulation status of the neonate due to the circulatory collapse, however blood gas interpretation pointed to the significant values of hypoxemia and combined acidosis. An exogenous surfactant of animal origin (Curosurf 120mg) was administered intratracheally, i.v. rehydrated, received twice a bolus of 0.9% NaCl 20ml due to hypotension and dual antimicrobial therapy (Meropenem + Vancomycin), vitamin K and tranexamic acid was introduced. Epinephrine and 4.2% NaHCO3 were given several times, with manual heart massage, and then continued with continuous infusion of Dopamine and Dobutamine.

Native lung RTG indicated bilateral decreased densities (Fig. 1a). Echocardiographic examination suspected a presence of massive thrombotic occlusion of the pulmonary artery (Fig.1b), which was later confirmed after the pathohistological diagnosis at the thirty-sixth hour (Fig.1c and Fig.1d). Written informed consent for publication of clinical details was obtained from the mother of the patient.

DISCUSSION

To date, there is a lack of conclusive evidence that would confirm which neonates have an increased risk of developing severe inflammations, multiple organ failure, thromboembolic complications, and determine the time it takes for SARS-CoV-2 to 'travel' within the human body, and the regions in which it causes most damage. Deinhardt-Emmer et al. conducted a pathohistological diagnosis in eleven patients who died of COVID-19 (6). The autopsies were performed within the interval of 1.5 and 15 hours. The biggest 'pool' of SARS-CoV-2 was present in lungs, where it caused severe damage to the alveoli, at the end of terminal bronchioles. Small amounts of the virus were detected in other organs and tissues, but no severe damage was noticed. The levels of mastocyte-specified proteases and eosinophil granules were detected postmortem in the lungs of the patients who tested positive for SARS-CoV-2. These levels positively correlated with the levels of the most inflammatory cytokines (7). This may suggest that the inflammation caused by SARS-CoV-2 leads to the over-increased immunological reaction in the body. This further leads to multiple organ failure, especially lung failure, based on the type of vascular dysfunction including thrombosis and/or damaged microcirculation (8).

The prevalence of thromboembolic complications in neonates born to SARS-CoV-2 positive mothers has not been well documented, to date, nor are there clear thromboprophylaxis guidelines (9). Although in our case there are other reasons, such as perinatal asphyxia, infections, polycythemia, etc. that could favor thromboembolic complications, SARS-CoV-2 infection of the fetus should be considered in the differential diagnosis. SKalyanshettar et al emphasize the possibility of vertical transmission of COVID-19 in a newborn from an asymptomatic SARS-CoV-2 positive mother, while the newborn developed significant SARS-CoV-2 infection-arterial thrombosis with right foot necrosis, occurring in the first 24 hours of birth (10).

A large number of arterial, and especially venous thromboembolic events were diagnosed within 24 hours of admission, in adult patients with COVID 19, which suggests an urgent need to improve diagnostic strategies and the safety of thromboprophylaxis. Increases in D-dimer, fibrinogen, and prothrombin time correlated with inflammatory markers (primarily CRP) were strong predictors of mortality (11-13).

CONCLUSION

Presymptomatic and asymptomatic SARS-CoV-2 infections of newborn can be complicated because there are no clearly defined guidelines on antiviral, immunomodulatory and anticoagulant therapy. A careful monitoring and determination of the coagulation status and inflammation marker on a daily basis could be justified in the first days of their lives.

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