JMS 2021; 4(3):126-130
UDC: 616.24-005.7:[616.98:578.834

PULMONARY EMBOLISM: A COMPLICATION OF COVID-19 INFECTION IN POSTPARTUM – CASE REPORT

Tatjana Stojanoska[1], Marija Cvetanovska,[1] Ilir Demiri[1], Milena Stevanovic[1], Romir Kadriu[3], Velimir Saveski[1], Nevenka Ridova[2]

[1]University Clinic for Infectious Diseases and Febrile Conditions, Clinical Centre, Faculty of Medicine, Ss. Cyril and Methodius University in Skopje, R. North Macedonia, [2]University Clinic for Hematology , Clinical Centre, Faculty of Medicine, Ss. Cyril and Methodius University in Skopje, R. North Macedonia, [3]University Clinic of Gynecology and obstetric, Clinical Centre, Faculty of Medicine, Ss. Cyril and Methodius University in Skopje, R. North Macedonia

Abstract

It has been proposed that pregnant women and their fetuses may be particularly at risk for poor outcomes due to the coronavirus pandemic.

Case presentation

A 28-year old women in early postpartum period after Caesarian delivery presented with a five-day history of malaise, bone and muscle pains, dry cough, fever and dyspnea. A nasopharyngeal swab was positive for SARS-CoV-2. Laboratory findings confirmed increased inflammatory markers. Her condition rapidly worsened after delivery, leading to a severe respiratory failure, low oxygen saturation and the need of non-invasive ventilation.

What was the most notable from laboratory follow-ups was marked elevation of fibrin degradation products, despite anticoagulation prophylaxis. We immediately performed CT angiography, which showed thromboembolism. Subsequently, anticoagulant therapy doses were increased up to therapeutic doses and additional antithrombotic therapy was initiated. Ten days later, she was discharged in a good clinical condition, oxygen-free, with normal auscultatory findings and laboratory analyses within reference ranges.

The purpose of this case report is to draw attention to probably one of the most life-threatening and severe complications of COVID-19, which is the thrombogenic component of the infection, appealing toregular monitoring of haemostasis and predictive laboratory markers of inflammation.

This may alleviate or prevent the occurrence of cytokine storm and to direct the therapeutic approach, emphasizing the need of adequate doses of anticoagulant therapy, with special consideration to the most vulnerable group of patients –gravid patients and new mothers in early postpartum period.

Keywords: COVID- 19, thromboembolism, post-partum complications.

Introduction

The pandemic caused by the severe acute respiratory syndrome coronavirus 2 (SARS CoV-2) has exposed vulnerable populations to an unprecedented global health crisis. From the knowledge gained from previous human coronavirus outbreaks, it has been proposed that pregnant women and their fetuses are particularly at risk for poor outcomes.

The maternal and neonatal outcomes of pregnant women with COVID-19 is limited to a handful of case reports which present diverse results. Obstetricians are still learning about COVID-19 presentation and progression in pregnancy and even though the majority of pregnancies infected by COVID-19 have good outcomes, a recent systematic analysis showed that up to 3% of pregnancies were associated with severe maternal morbidity.

It was indicated that mothers with a complicated medical history could be at increased risk for severe outcomes. Furthermore, experts are of the opinion that the clinical recommendations for managing COVID-19 in pregnancy should be based on lessons learned from the current epidemic which emphasizes the importance of presenting COVID-19 cases associated with complex clinical management.

We therefore present a case report of a young woman in postpartum period with severe COVID-19 disease, emphasizing the implications and complications of SARS-CoV-2 in coagulation disorders.

Case Report

A 28-year-old woman in early postpartum period after Caesarian delivery was transferred to The University Clinic for Infective Diseases and Febrile Conditions – Skopje with severe form of COVID-19. She was diagnosed with COVID-19 three days ago by PCR test, during the hospitalization at the University Clinic for Gynecology and Obstetrics – Skopje.

At admission, she had oxygen saturation of 80% on oxygen mask, heart rate of 120 bpm, auscultatory findings of rales, suggesting pneumonia. She had no previous remarkable medical history. This was her second pregnancy and delivery; the first ones were completely normal. First symptoms of COVID-19 appeared 5 days ago with malaise, bone and muscle pains, irritating dry cough, fever reaching up to 38,5 C, progressing to intensive cough and dyspnea in a period of 2 days.

Due to these symptoms, she presented to our clinic and clinical examination at that time revealed localized palpatory pain in lower abdomen, auscultatory findings of pneumonia, but with no signs of dyspnea and hypoxia, with normal heart rate. Laboratory findings confirmed increased inflammatory markers. As she was at week 36 of pregnancy, she was referred to and admitted at the University Clinic for Gynecology and Obstetrics.

A few hours later, she had C-section and gave birth to a healthy baby girl. The next day, her condition worsened with oxygen saturation drop, requiring supplemental oxygen and she was transferred to our institution for further treatment. At admission, she was put on oxygen therapy with Non Reabreather oxygen mask, reaching oxygen blood saturation of 93% and hospitalized at the Intensive Care Unit. Intensive symptomatic and supportive treatment was initiated with antibiotics, antimycotics, steroids, anticoagulant prophylaxis with low molecular heparin.

Two hours of admission, a dramatic worsening of respiratory function was noted with oxygen saturation decrease to 85% despite oxygen supplementation and therefore, she was put on non-invasive ventilation.

What was notable the most from laboratory follow-ups was marked elevation of fibrin degradation products, despite anticoagulation prophylaxis as shown in table 1. Subsequently, anticoagulant therapy doses were increased up to therapeutic doses and additional antithrombotic therapy was initiated. We performed CT angiography, showing filling defects within right principal pulmonary artery, extending to right superior lobar artery and less marked central filling defects within lateral and posterior branches for lower right lobe.

In addition to the findings of pulmonary embolism, also signs of interstitial pneumonia were shown, suggesting atypical bacterial superinfection. Clinical and laboratory improvement was achieved in short time. We gradually decreased FiO2 and on day 13 of hospitalization, she was switched to Non Rebreather oxygen mask with oxygen flow 13L/min. This improvement in oxygen status was followed by regression in symptoms and auscultatory findings as well as general symptoms withdrawal. As of one month of admission, oxygen therapy was not further required.

Anticoagulant therapy with low molecular heparin was continued. Ten days later, she was discharged in a good clinical condition, oxygen-free, with normal auscultatory findings and laboratory analyses within reference ranges. At home, she received anticoagulant therapy with low molecular heparin and she was regularly monitored in the outpatient unit by infectologist and pulmonologist. Clotting and bleeding times and D-dimers were also measured on a regular basis.

Table 1.

	06.11. 2020	**06.11. 2020**	**10.11. 2020**	**13.11. 2020**	**15.11. 2020**	**16.11. 2020**	**04.12 .2020**	**09.12. 2020**
Hb	82	111	102	94	98	92	90	100
Erit	3880	5460	4940	4680	4800	4460	4330	4320
Leuk	20.4	10.8	24.1	22.3	27	28	13.4	7.1
Trom	347	171	500	364	427	434	519	451
Hem	0.24	0.33	0.3	0.29	0.3	0.28	0.27	0.28
Neut	0.93	0.91	0.95	0.96	0.96	0.91	0.76	0.62
Limf	0.04	0.06	0.03	0.03	0.02	0.05	0.13	0.23
Mono	0.03	0.03	0.02	0.01	0.02	0.04	0.06	0.1
Viro	nlr= 23.2	NLR= 15.1	nlr= 31.6	NLR = 32	NLR = 43	NLR= 18.2	NLR =5.8	nlr= 2.6
IL-6	111.23							
CRP	148		80		112	36	16	5
(LDH)	844		1000		656	511	203	195
(CK)	117		23		26	23	20	20
CK-MB	13		16					
(ALT)	17				14	10	13	25
(AST)	43				34	13	18	27

	Tr	Hct	PT	APtt	TT	D-dimeri
04.11.2020	280	25.5	9.74	38.6	18.9	1973
06.11.2020	315	25.7	11.15	35.9	15.6	17445.8
10.11.2020	342	30.7	12.5	34	20	35712
15.11.2020	377	30.7	11.6	33.3	20.7	7910
17.11.2020	409	29.4	11.8	38.5	23	4464
23.11.2020	387	29.6	11.5	32.2	25.4	1796
04.12.2020	428	28.4	11.5	32.8	16.6	2404
09.12.2020	381	29.9	11.47	31	18	1176

CT (25.11.2020) CTPA according to the protocol for arterial BTE with sub-adequate quality for interpretation. Suspected defect in filling of the right principal artery and with extension to the superior lobar artery. Suspected central defects are also seen in the segmental branches for the lower left lobe, and most likely the lateral and posterior segmental branch for the lower right lobe.

Finding in support of acute BTE without signs of DSD. Reticulonodular, in some places confluent reticular interstitial pattern and multifocal zones of consolidation with varying degrees of evolution bilaterally, diffusely and predominantly peripherally. Abscessing cavitating lesion anterobasically in DDL.

Mixed picture of acute BTE, inflammatory interstitial changes with probable superinfection with atypical bacteria, and signs of DDL abscess.

Discussion

By analyzing this casein correlation with previous knowledge onCOVID19 and pregnancy, we can conclude that although the majority of pregnant women manifest only mild to moderate symptoms of COVID19, the pregnancy may complicate the infection with Sars CoV-2 evenin the absence of pre-existing comorbid conditions.

That makes this group of patients more vulnerable todevelopment of severe clinical presentation and complications of Sars CoV-2 infection. This is especially true for new mothers, as there are no data on vertical transmission of the infection to the fetus.COVID19, caused by Sars CoV-2 infection begins with penetration of viral particles into human cells,which express angiotensin converting enzyme 2 receptors on their surface. The virus enters the epithelial cells of the respiratory tract, interacting with TLR-like- receptors.

Once viruses are recognized and identified by TLR-like receptors, the information is transmitted to the transcriptional NF-kB which causes expression of responsible genes. The activated epithelial cells begin to synthesize various biollogically active molecules. Results from preclinical studies suggest that ROS production increases and antioxidant protection decreases, which may play a key role in the pathogenesis, disease course and outcome in Sars CoV2 infection.

Sars CoV-2 infection triggers a hyperactive immune response by releasing a series of proinflammatory cytokines. The affinity of the virus for angiotensin converting enzyme receptors, which are mainly present on the endothelial cells, leads to disruption of their integrity and architecture and further activation of an inflammatory cascade.

The subsequent cellular hypoxia stimulates production of various free radicals by damaged cells, which further elucidates a series of hemostasis abnormalities leading to hypercoagulability. This provides an ideal basis for formation of microthrombi in blood vessels in multiple organs. The analyzed cases of patients with severe forms of COVID-19 so far showed that increased NLR ratio (ie patients with low lymphocyte values), increased levels IL-6, CRP, as well as lactate dehydronase are associated with more severe forms and worse outcome in patients with COVID-19, which may also be observed in this case report.

Previous data suggest that infection with Sars CoV-2 during pregnancy is associated with anincreased risk of thrombotic complicationsfor the mother. Therefore, frequent monitoring of haemostatic parameters is strongly advised in this group of patients.

Significantly increased d-dimers were detected in a large group of patients with thromboembolic events, as well as shortened clotting times. This was also noted in our patient and these abnormalities correlated with clinical status.

Although, this positive correlation is well dsecribed, these laboratory findings are not sufficient for establishing a diagnosis, especially in gravid patients and new mothers, where the physiological changes lead to hypercoagulability. The golden standard of diagnosis remains CT angiography and additional echocardiography may be useful.

Conclusion

The purpose of this case report is to draw attention to probably one of the most life-threatening and severe complications of COVID-19, which is the thrombogenic component of the infection, appealing toregular monitoring of haemostasis and predictive laboratory markers of inflammation.

This may alleviate or prevent the occurrence of cytokine storm and to direct the therapeutic approach, emphasizing the need of adequate doses of anticoagulant therapy, with special consideration to the most vulnerable group of patients –gravid patients and new mothers in early postpartum period.

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