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KLINIČKE KARAKTERISTIKE I LABORATORIJSKI REZULTATI TRUDNICE SA SARS-CoV-2 INFEKCIJOM

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SAŽETAK

Uvod/Cilj: : Najčešći klinički simptomi i laboratorijski znaci SARS-CoV-2 infekcije u trudnoći su povišena temperatura, kašalj, dispneja, dijareja, limfocitopenija, leukocitoza i porast vrednosti C reaktivnog proteina. Međutim, trudnice sa komorbiditetima imaju veći rizik od teže forme kovida-19. Mnoge studije upućuju na to da trudnice sa potvrđenom SARS-CoV-2 infekcijom imaju više od dva puta povišen rizik od prevremenog porođaja, da su pod većim rizikom za razvoj preeklampsije i potrebom za hitnim carskim rezom. Cilj ovog rada je da se analizira tok i ishod SARS-CoV-2 infekcije potvrđene kod mlade žene u 39 nedelji trudnoće.

Prikaz bolesnika: Trudnica sa dokazanom SARS-CoV-2 infekcijom u 39. nedelji trudnoće porađaja se šesti dan od pojave simptoma i znakova bolesti. Na početku infekcije pacijentkinja navodi temperaturu i opšte loše stanje, a potom kašalj i na kraju bol u grudnom košu. Infekciju prate povišene vrednosti C reaktivnog proteina, D-dimera i limfocitopenija. Trudnica je mlađa osoba, osoba bez komorbiditeta, ali se kod nje šestog dana od pojave simptoma i znakova bolesti dijagnostikuje pneumonija sa tendencijom progresije, zbog čega je njena hospitalizacija nakon porođaja produžena. Nalaz kompjuterizovane tomografije odgovara bilateralnoj intersticijalnoj kovid-19 pneumoniji. Pacijentkinja je bila, sve vreme tokom hospitalizacije, hemodinamski stabilna bez potrebe za kiseoničnom potpornom terapijom. Dete je rođeno vaginalnim putem i na rođenju je bilo dobrog zdravstvenog stanja (Apgar skor 9/10, telesna težina). SARS-CoV-2 infekcija nije dokazana brzim antigenskim testom kod novorođenog deteta.

Zaključak: Neophodna su dalja istraživanja u ovoj oblasti, pogotovo o toku i ishodu infekcije kod trudnica tokom prvog i drugog trimestra trudnoće, kao i kako smanjiti neželjene neonatalne ishode kod trudnica sa SARS-CoV-2 infekcijom.

Ključne reči: COVID-19, trudnoća, prikaz slučaja

Uvod

COVID-19 je visoko kontagiozno infektivno oboljenje prouzrokovano SARS-CoV-2 virusom koje predstavlja veliki javnozdravstveni problem i vodeći je uzrok umiranja na globalnom svetskom nivou (1). Procenjuje se, prema podacima Svetske zdravstvene organizacije, da je u svetu do 14. marta 2022. godine potvrđeno oko 457 miliona slučajeva COVID-19 i oko 6 miliona smrtnih slučajeva (1). Ova infekcija uticala je na sve ginekologe i akušere (kao i na njihova udruženja) da pokušaju da daju odgovore na brojna pitanja vezana za uticaj ove infekcije, kako na tok i ishod trudnoće, tako i kakav efekat ova infekcija ima na fetus (2).

SARS-CoV-2 infekcija predominantno doprinosi nastanku pneumonije, ali ova sistemska virusna infekcija može dovesti do disfunkcije mnogobrojnih organa i sistema (kardiovaskularnog, hematološkog, gastrointestinalnog, endokrinog, urogenitalnog) (2). Infekcija COVID-19 može da bude od asimptomatske do klinički manifestne (od blage, srednje teške, teške, do fatalne). Teže kliničke forme ove infekcije dovode se u vezu sa prisustvom jednog ili više komboditeta (stariji uzrast, hipertenzija, dijabetes, astma, HIV infekcija, hronična bolest srca, hronična bolest jetre, hronična bolest pluća, hronična bolest bubrega, transplantacija solidnih organa, maligni tumori, imunodeficitna stanja) (3-5).

Neka istraživanja ukazuju da trudnice nisu u većem riziku od COVID-19 infekcije ili teške forme

CASE REPORT

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CLINICAL CHARACTERISTICS AND LABORATORY RESULTS OF A PREGNANT WOMAN WITH SARS-COV-2 INFECTION

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SUMMARY

Introduction/Aim: The most common symptoms and laboratory signs of SARS-CoV-2 infection in pregnancy are the following: fever, cough, dyspnea, diarrhea, lymphocytopenia, leukocytosis and a high level of CRP. However, pregnant women with comorbidities are at an increased risk of severe forms of COVID-19. Numerous studies point to the fact that pregnant women with the confirmed SARS-CoV-2 infection have more than two times higher risk of preterm labor, and that they are at an increased risk of preeclampsia and emergency Cesarean section. The aim of this paper is to analyze the course and outcome of SARS-CoV-2 confirmed in a young woman in the 39th week of pregnancy.
Case report: A pregnant woman with the confirmed SARS-CoV-2 infection in the 39th week of pregnancy delivered a baby on the sixth day from the appearance of symptoms and signs of disease. At the beginning of infection, the patient reported fever, poor general health status, and then cough and chest pain. The infection was accompanied by increased levels of C reactive protein, D-dimer and lymphocytopenia. The patient is a young woman without comorbidities, but pneumonia with a tendency toward progression was diagnosed six days after symptoms and signs appeared, due to which her hospitalization after delivery was prolonged. The findings of computerized tomography showed bilateral interstitial COVID-19 pneumonia. The patient was hemodinamically stable all the time during hospitalization and did not need oxygen support. The baby was delivered vaginally with good general health status (Apgar score 9/10, body weight). SARS-CoV-2 infection was not confirmed with the rapid antigen test in the newborn.
Conclusion: Further research is needed in this field, especially research on the course and outcome of infection in pregnant women during the first and second trimester of pregnancy, as well as on the ways how to reduce unwanted neonatal outcomes in pregnant women with SARS-CoV-2 infection.

Keywords: COVID-19, pregnancy, case report

Introduction

COVID-19 is a highly contagious disease caused by SARS-CoV-2 virus, which presents a great public health problem and it is the leading cause of deaths globally (1). It is estimated, according to the data of the World Health Organization, that 457 million cases of COVID-19 and about 6 million deaths were confirmed in the world by 14th March 2022 (1). This infection influenced all gynecologists and obstetricians (as well as their associations) to try to give response to numerous questions regarding the impact of this infection on the course and outcome of pregnancy, as well as the effect which this infection has on the fetus (2).

SARS-CoV-2 infection predominantly contributes to the occurrence of pneumonia, but this systemic viral infection may lead to the dysfunction of numerous organs and systems (cardiovascular, hematological, gastrointestinal, endocrine, urogenital) (2). The COVID-19 infection may be asymptomatic or it can have different clinical manifestations (from mild, moderate, severe to fatal). Severe clinical forms of this infection are associated with the presence of one or more comorbidities (older age, hypertension, diabetes, asthma, HIV infection, chronic heart disease, chronic liver disease, chronic pulmonary disease, chronic kidney disease, solid organ transplants, malign tumors, immunodefficient conditions) (3-5).

Some studies point to the fact that pregnant women are not at an increased risk of COVID-19

bolesti ili češćeg boravka u jedinicama intezivne nege ili smrtnog ishoda u odnosu na žene koje nisu trudne (6). Međutim, neke studije ukazuju da trudnice sa komorbiditetima imaju veći rizik od teže forme COVID-19 (7).

Najčešći klinički simptomi i laboratorijski znaci SARS-CoV-2 infekcije u trudnoći su povišena temperatura, kašalj, dispneja, dijareja, limfocitopenija, leukocitoza i porast nivoa C reaktivnog proteina (8).

Mnogi radovi upućuju na to da trudnice sa potvrđenom SARS-CoV-2 infekcijom imaju više od dva puta povišen rizik od prevremenog porođaja, perinatalnog mortaliteta (kod trudnica sa težim oblikom bolesti), da su pod većim rizikom za razvoj preeklampsije i potrebom za hitnim carskim rezom (9-11). Oboje, i majka i novorođenče, su pod većim rizikom da imaju produženu hospitalizaciju nakon porođaja, a i češća je poteba za ponovnom hospitalizacijom porodilja nakon porođaja (9,12).

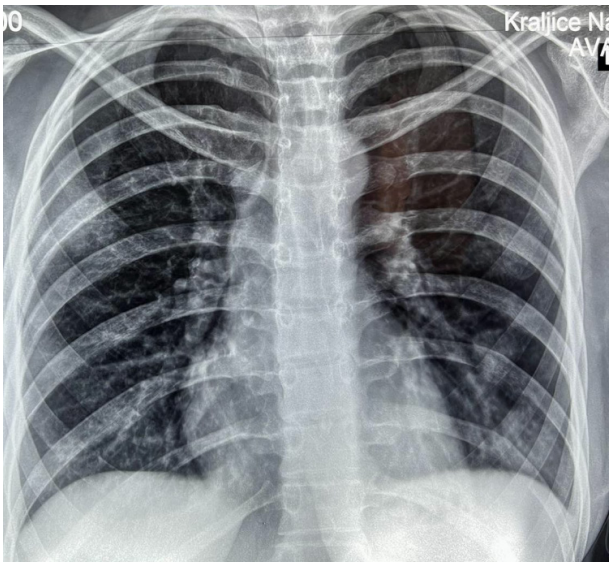
Cilj ovog rada je da se analizira tok i ishod SARS-CoV-2 infekcije potvrđene kod mlade žene u 39. nedelji trudnoće.

Prikaz pacijenta

Trudnica stara dvadeset i šest godina sa urednim tokom trudnoće, u anamnezi sa jednim porođajem i trudnoćom bez komplikacija, bez pobačaja, kao i bez hroničnih oboljenja, redovno je kontrolisala tok trudnoće ambulantno u Domu zdravlja Voždovac, Beograd. Na svim rutinskim pregledima koji su obuhvatali i laboratorijske analize krvi, uključujući i test opterećenja glukozom (OGTT), rezultati su bili u fiziološkim granicama. Trudnica je bila normotenzivna, dobro se osećala, a indeks telesne mase na početku trudnoće je bio 22,5 kg/m^2. Do kraja trudnoće telesna težina je uvećana za još 15 kg. Svi ultrazvučni nalazi ukazivali su na eutrofičan rast morfološki urednog ploda, a akušerski pregledi su bili uredni. Pacijentkinja nije bila vakcinisana protiv SARS-CoV-2.

U trideset devetoj nedelji trudnoće javlja se u COVID ambulantu pri Domu zdravlja zbog povišene telesne temperature (37,8^{o}C), navodi bol u gornjem delu leđa i zapušenost nosa. Fizički status na plućima je uredan. Brzim antigenskim testom se dokazuje prisustvo SARS-CoV-2 infekcije, a laboratorijske analize su ukazale samo na povišene vrednosti laboratorijskog parametra inflamacije – C reaktivnog proteina (CRP), koji je bio 11,3 mg/l (granična vrednost 0-3 mg/l). Ordinirana je antibiotska, antipiretična i vitaminska terapija uz izolaciju i mirovanje.

Na kontroli nakon tri dana od pojave simptoma, trudnica navodi da nema tegobe, da je bez temperature i da se oseća bolje. Nalaz na plućima je bio uredan, a CRP je iznosio 28,5 mg/l. Nakon šest dana od pojave simptoma, trudnica dobija trudove i javlja se u porodilište radi porođaja. Po prijemu je kompletno laboratorijski i klinički ispitana. Laboratorijske analize na prijemu ukazuju na povišene vrednosti CRP-a od 32,4 mg/l i D dimera od 2110 ng/l (referentne vrednosti za treći trimestar trudnoće kreću se 300-1700 ng/l). Trudnica se dobro osećala, negirala je respiratorne tegobe i bila je afebrilna sa urednim internističkim nalazom. Na rentgenskom (Rtg) snimku pluća opisuje se sa



Slika 1. Prvi rendgenski snimak pluća

infection, severe forms of disease, more frequent stay at intensive care units, or deathly outcomes in comparison to non-pregnant women (6). However, some studies indicate that pregnant women with comorbidities are at an increased risk of severe forms of COVID-19 (7).

The most common clinical symptoms and laboratory signs of SARS-CoV-2 infection in pregnancy are fever, cough, dyspnea, diarrhea, lymphocytopenia, leukocytosis and increased levels of C reactive protein (8).

Numerous studies indicate that the risk of preterm birth is more than twice as high in pregnant women with the confirmed SARS-CoV-2 infection, as well as the risk of perinatal mortality (in pregnant women with severe forms of disease), of preeclampsia and emergency Cesarean section (9-11). Both the mother and the child are at an increased risk of prolonged hospitalization after delivery, and the need for repeated hospitalization of pregnant women after delivery is more frequent (9,12).

The aim of this paper is to analyze the course and outcome of SARS-CoV-2 infection, which was confirmed in a young woman in the 39th week of pregnancy.

Case report

A twenty-six-year old pregnant woman with normal pregnancy course had one delivery and pregnancy without complications in her anamnesis, with no miscarriages, and chronic diseases. She regularly controlled the course of pregnancy at the Health Center Vozdovac, Belgrade. The results of all routine check-ups, which included the laboratory analyses of blood including the oral glucose tolerance test (OGTT), were within reference values. The pregnant woman was normotensive, she felt well, while the body mass index at the beginning of pregnancy was 22.5 kg/m^2. Her body weight increased for 15 kg till the end of pregnancy. All ultrasound findings indicated the eutrophic growth of fetus with normal morphology, and the obstetric examination was normal. The patient was not vaccinated against SARS-CoV-2.

In the thirty-ninth week of pregnancy, the patient came to an outpatient COVID clinic at the Health Center due to fever (37.8^{0}C), upper back pain and congested nose. Physical lung status was normal. A rapid antigen test proved the presence of SARS-CoV-2 infection, while laboratory results indicated only the increased levels of the laboratory inflammation parameter – C reactive protein (CRP), which was 11.3 mg/l (reference values 0-3 mg/l). Antibiotic, antipyretic and vitamin therapy was administered together with isolation and bed rest.

During the control check-up, three days after the symptoms appeared, the pregnant woman stated that she did not have symptoms, that she had no fever and that she felt better. Findings on the lungs were normal, and CRP was 28.5 mg/l. Six days after the symptoms appeared, the pregnant woman experienced labor contractions and went to the maternity hospital. After she was admitted, complete clinical and laboratory examination was

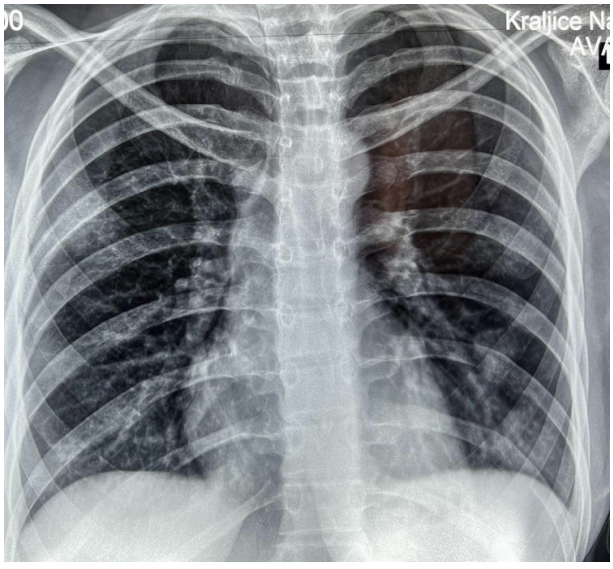
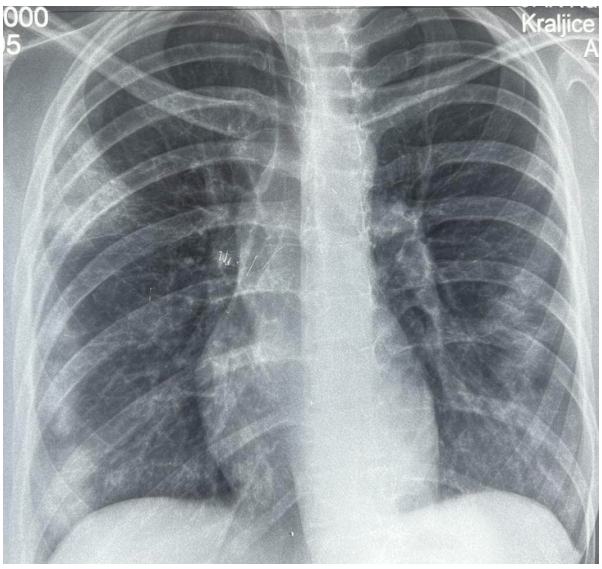


Figure 1. The first X-ray of the lungs



Slika 2. Drugi rendgenski snimak pluća

leve strane parakardijalno manja zona konsolidacije parenhima po tipu inflamacije (slika 1). Trudnica se istog dana spontano vaginalno porađa i rađa dete telesne mase 3920 grama sa Apgar ocenom 9/10. Dete je nakon rođenja testirano brzim antigenskim testom. Test je bio negativan. Porođaj i postporođajni tok protekli su uredno. Pacijentkinja je tokom hospitalizacije bila pod konstatnim intezivnim nadzorom, uz svakodnevno merenje telesne temperature, saturacije kiseonikom (nivoa zasićenja hemoglobina crvenih krvnih zrnaca kiseonikom - SpO_2) i ostalih vitalnih parametara, koji su bili uredni.

Četvrtog dana od porođaja, odnosno devetog dana od pojave simptoma, urađen je kontrolni Rtg snimak pluća i konstatovano je difuzno prisustvo zona konsolidacje u plućnom parenhimu po tipu inflamacije, dominantnije sa desne strane (slika 2). Zbog radiografskog pogoršanja u smislu bilateralne pneumonije u progresiji u odnosu na ranije načinjen snimak, a uz uredan ginekološki nalaz, porodilja se prevodi u Kovid bolnicu u Batajnicu. Na dan otpusta ona navodi tegobe u vidu suvog kašlja, afebrilna je, normotenzivna, eupnoična, puls 91/min, SpO_2 98% (normalne vrednosti su preko 95%), bez kiseonične potpore, laboratorijske analize u granicama referetnih vrednosti sem CRP -a koji je iznosio 22,3 mg/l.

Pacijentkinja se prima na odeljenje polutezivne nege Kovid bolnice, a laboratorijska analiza na dan prijema ukazuje na povišene vrednosti CRP (40,6 mg/l) i limfocitopeniju (0,83 x 10^9/l; referentne vrednosti se kreću 1,19-3,35x10^9/l). Svi drugi parametri su bili uredni, a njeno opšte stanje je bilo dobro. Drugog dana od prijema u Kovid bolnicu urađen je Rtg snimak pluća i srca na kome je opisana naglašena bronhovaskularna šara obostrano. Tokom hospitalizacije u Kovid bolnici pacijentkinja je lečena prema aktuelnom Nacionalnom protokolu za lečenje COVID-19 uz primenu sistemske kortikosteroidne, parenteralne antibiotske, antikoagulantne i gastroprotektivne terapije uz nadoknadu tečnosti i elektrolita. Petog dana od prijema u Kovid bolnicu urađena je kompjuterizovana tomografija (CT) grudnog koša gde se navodi da se u svim lobusima pluća vide fokalne kružne promene povišenog denziteta parenhima pluća po tipu mlečnog stakla, lokalizovane dominantno periferno. Nalaz odgovara bilateralnoj intersticijalnoj COVID-19 pneumoniji. CT skor pluća (engl. *severity score*) je 6/25. Posle primenjene terapije dolazi do subjektivnog i kliničkog poboljšanja uz pad CRP-a koji je 2,8 mg/l, ali i povišenih vrednosti D dimera (do 910 ng/ml). Pacijentkinja je sve vreme hospitalizacije hemodinamski stabilna bez potrebe za kiseoničnom potpornom terapijom, te se otpušta nakon trinaest dana od pojave simptoma sa odeljenja uz nastavak terapije (*per os*) još narednih sedam dana i izolaciju od dve nedelje.

Nakon 10 dana od otpusta iz Kovid bolnice pacijentkinja se javlja u Dom zdravlja na kontrolni pregled, a od tegoba navodi jedino osećaj pritiska u grudima. Rtg snimak pluća i srca je ukazao na obostrane difuzne trakaste senke zadebljalog intersticijuma u sklopu organizacije COVID infekcije. CRP je iznosio 5,1 mg/l, a SpO_2 je bila 98%.

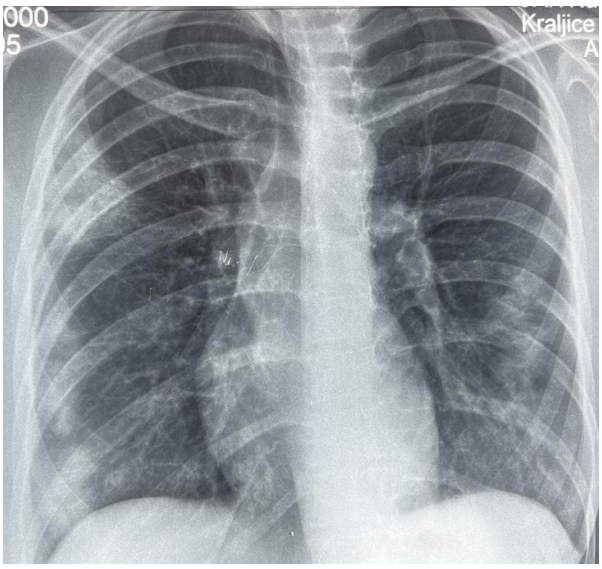


Figure 2. The second X-ray of the lungs

done. Laboratory analyses on admission indicated increased values of CRP of 32.4 mg/l and D-dimer of 2110 ng/l(reference values for the third trimester range between 300-1700 ng/l). The pregnant woman felt well, she negated the respiratory problems and was not febrile with normal clinical findings. On chest radiography, a smaller zone of parenchymal consolidation, whose type of change was inflammatory, was described on the left side pericardially (Figure 1). The pregnant woman delivered a baby spontaneously and vaginally on that day, and she gave birth to a baby with Apgar score 9/10 and body weight 3920 grams. The baby was tested with the rapid antigen test. The test was negative. Delivery and postpartum course were normal. During hospitalization, the patient was under constant supervision, and body temperature was measured every day, as well as oxygen saturation (the fraction of oxygen-saturated hemoglobin relative to total hemoglobin in blood) and other vital parameters, which were within normal ranges.

Four days after delivery, that is, nine days after the appearance of symptoms, control chest X-ray was done and it showed diffuse presence of consolidation in lung parenchyma, reflecting inflammation, which was more dominant on the right side (Figure 2). Due to the radiographic worsening, that is, bilateral pneumonia which progressed in comparison to the previous image, and with normal gynecological findings, the patient who had given birth was transported to the COVID Hospital "Batajnica". On the day of discharge from the hospital, she reported cough, she was not febrile, she was normotensive, eupneic, her heart rate was 91/min, SpO^2 98% (normal values are over 95%), without oxygen support, and laboratory analyses were within reference values, except CRP which amounted to 22.3 mg/l.

The patient was admitted to high dependency unit of COVID Hospital, and laboratory results showed elevated values of CRP (40.6, mg/l) and lymphocytopenia ($0.83x10^9$/l; reference values range from $1.19\text{-}3.35x10^9$/l). All the other parameters were normal, and her general health status was good. Two days after admission to the hospital, a chest X-ray was done and prominent bronchovascular marking was described bilaterally. During the hospitalization in the COVID Hospital, the patient was treated according to the National Protocol for the treatment of COVID-19, with the application of corticosteroids, parenteral antibiotics, anticoagulant and gastroprotective therapy with the replenishment of fluids and electrolytes. Five days after admission to the hospital, computerized chest tomography was done and focal ground-glass changes of increased parenchymal density were seen in all pulmonary lobules, and the localization was dominantly peripheral. The findings corresponded to the bilateral interstitial COVID-19 pneumonia. The CT score was 6/25. After the administered therapy, there came to the clinical and subjective improvement with a decline in CRP, which was 2.8 mg/l, but also the increase in D-dimer values (to 910 ng/ml). The patient was hemodinamically

Pacijentkinja se upućuje na pregled u pulmološku ambulatnu Kliničko bolničkog centra Zemun, gde je D dimer 865 ng/ml, EKG urednog zapisa, a srčana frekvencija 90/min. Na osnovu urađene CT pulmoangiografije utvrđeno je da je glavno stablo bez defekata u punjenju. Pacijentkinja se otpušta uz nastavak sistemske antikoagulantne terapije još dve nedelje. Poslednji pregled je obavljen u Domu zdravlja nakon 62 dana od početka simtoma i nakon završene terapije, kada se pacijentkinja osećala dobro, urednog fizičkog nalaza i uz uredne laboratorijske analize.

Diskusija

U našem radu prikazan je tok i ishod SARS-CoV-2 infekcije kod trudnice kod koje je dokazana infekcija u 39 nedelji trudnoće i koja se porađa šesti dan od pojave simptoma i znakova bolesti (u 40 nedelji trudnoće). Trudnica je mlađa osoba, bez komorbiditeta, ali kod nje se šestog dana od pojave simptoma i znakova bolesti dijagnostikuje bilateralna intersticijalna pneumonija uzrokovana SARS-CoV-2 infekcijom, zbog čega je njena hospitalizacija nakon porođaja bila produžena. Osim toga, nije došlo do infekcije novorođenog deteta i ono je na rođenju bilo dobrog zdravstvenog stanja (ocena prema Apgar skoru 9/10).

Dosadašnja istraživanja ukazuju da trudnice imaju isti rizik od zaražavanja SARS-CoV-2 infekcijom kao i ostale zdrave osobe (13). Većina trudnica, tj. oko dve trećine onih koje su inficirane SARS-CoV-2 virusom su bez simptoma ili sa blagim oblikom bolesti, a jedna trećina sa srednje teškim /teškim oblikom COVID-19. One trudnice koje su imale težu formu bolesti imale su veći rizik za pojavu komplikacija, kao što su preterminski porođaj i mala telesna težina ploda na porođaju, neonatalna infekcija, kao i potreba za intezivnom negom novorođenčeta (13). Neke studije ukazuju na značajnu povezanost između težeg oblika COVID-19 kod trudnica i preterminskog porođaja jatrogeno izazvanog, naročito u trećem trimestru (13). Ovi nepovoljni ishodi u trudnoći naročito su povezani sa pneumonijom, koja je glavni faktor komplikacija kod trudnice sa COVID-19. Takođe je uočena i češća hospitalizacija kod trudnica koje se nalaze u kasnijem periodu trudnoće (14). Moguća je i vertikalna transmisija virusa sa majke na dete, ali ona nije česta (15,16). Novorođenčad SARS-CoV-2 pozitivnih trudnica češće imaju potrebu za intezivnom negom nakon rođenja, a neke sudije ukazuju da kod inficirnih trudnica možemo da očekujemo češći preterminski porođaj i fetalnu smrt (7,15,16).

Neophodna su dalja istraživanja u ovoj oblasti, pogotovo tok i ishod infekcije kod trudnica tokom prvog i drugog trimestral trudnoće, kao i kako smanjiti neželjene neonatalne ishode kod trudnica sa SARS-CoV-2 infekcijom.

Zaključak

Dosadasnja znanja o SARS-CoV-2 infekciji su nepotpuna. Kod prikazane pacijentkinje nije se očekivao ozbiljniji razvoj toka bolesti s obzirom da nije postojao ni jedan faktor rizika udružen sa COVID-19, jer se radilo o mladoj osobi bez komorbiditeta. Međutim, zbog specificnosti stanja organizma u trudnoći, trudnice sa laboratorijski pozitivnim testom na infekciju SARS-CoV-2, spadaju u deo populacije na koju treba obratiti posebnu pažnju zbog mogućih komplikacija, kao i zbog mogućnosti prenošenja infekcije sa majke na plod.

Konflikt interesa

Autori su izjavili da nema konflikta interesa.

Literatura

1. WHO: Coronavirus disease (COVID-19) pandemic. [Internet] Available at: https://www.who.int/emergencies/diseases/novel-coronavirus-2019 [Accessed 14th March 2022]
2. Ryan GA, Purandare NC, McAuliffe FM, Hod M, Purandare CN. Clinical update on COVID-19 in pregnancy: A review article. J Obstet Gynaecol Res 2020: 10.1111/jog.14321. [Epub ahead of print]
3. Qin C, Zhou L, Hu Z, Zhang S, Yang S, Tao Y, et al. Dysregulation of Immune Response in Patients with Coronavirus 2019 (COVID-19) in Wuhan, China. Clin Infect Dis 2020; 71(15):762-768.
4. RCPI IoOaG. COVID-19 Infection Guidance for Maternity Services. Version 3.0. 2020. Available from URL: https:// www.rcpi.ie/news/releases/theinstitute-of-obstetricians-andgynaecologists-issuesguidance-on-covid-19-and-maternityservices/
5. Pešić S, Jovanović H, Trajković H. Dosadašnja saznanja o etiopatogenezi i mogućnostima terapije Kovid-19. Zdravstvena zaštita 2020; 49(3):43-54.
6. Ryan GA, Purandare NC, McAuliffe FM, Hod M, Purandare CN. Clinical update on COVID-19 in pregnancy: A review article. J Obstet Gynaecol Res 2020;46(8):1235-45.
7. ACOG. Outpatient assessment and management for pregnant women with suspected or confirmed novel coronavirus (COVID-19). 2020. Available

stable all the time during hospitalization with no need for oxygen support, and therefore, she was discharged thirteen days after the appearance of symptoms with the continuation of therapy (per os) during the following seven days and isolation of two weeks.

Ten days after she had been discharged from the COVID hospital, the patient came to the Health Center for the control examination, and she reported only the feeling of chest pressure. Rtg image of lungs and heart showed bilateral diffuse patchy shadows with interstitial thickening caused by COVID-19 infection. CRP was 5.1 mg/l, while SpO2 was 98%. The patient was directed to the outpatient respiratory clinic within the Clinical Center "Zemun", where D-dimer was 865 ng/ml, ECG was normal, and heart rate was 90/min. According to the CT pulmonary angiography, the main pulmonary trunk was without filling defects. The patient was discharged with the continuation of systemic anticoagulant therapy lasting two weeks. The last examination was done in Health Center, 62 days from the appearance of symptoms and after therapy, when the patient felt good, with normal physical examination and normal laboratory analyses.

Discussion

The course and outcome of SARS-CoV-2 infection in the pregnant woman, whose infection was confirmed in the 39th week of pregnancy and who delivered a baby six days after the appearance of symptoms and signs (in the 40th week of pregnancy), was presented in our paper. The pregnant woman is a younger person, without comorbidities, however, bilateral interstitial pneumonia caused by SARS-CoV-2 infection was diagnosed on the sixth day after the appearance of symptoms, due to which her hospitalization after delivery was prolonged. In addition, the newborn baby was not infected, and it had a good health status at birth (Apgar score 9/10).

Previous studies indicate that pregnant women are at the same risk of SARS-CoV-2 infection as other healthy persons (13). The majority of pregnant women, that is, about two thirds of them, who are infected with SARS-CoV-2 virus have no symptoms/or mild form of disease, while one third of them have moderately severe/severe forms of COVID-19. Those pregnant women, who had a severe form of disease, were at an increased risk of complications, such as preterm birth and small body weight of fetus at the time of birth, neonatal infection, as well as the need for the intensive care of the newborn (13). Some studies point to the significant correlation between severe forms of COVID-19 in pregnant women and iatrogenic preterm birth, especially in the third trimester (13). These unfavorable outcomes in pregnancy are associated with pneumonia, which is the main factor of complications in a pregnant woman with COVID-19. More frequent hospitalization was noticed in pregnant women, who were in late periods of pregnancy (14). Vertical mother-to-child transmission is possible, but it is not frequent (15,16). Newborns of SARS-CoV-2 positive pregnant women need intensive care after birth more frequently, and some studies indicate that in infected pregnant women, preterm birth and fetal death can be expected (7,15,16).

Further research is needed in this field, especially research on the course and outcome of infection in pregnant women during the first and second trimester of pregnancy, as well as on the ways how to reduce unwanted neonatal outcomes in pregnant women with SARS-CoV-2 infection.

Conclusion

Previous knowledge of SARS-CoV-2 infection is not complete. In the presented patient, severe development of the course of disease was not expected because there were no risk factors linked to COVID-19 because the patient was a young person without comorbidities. However, due to the specific state of organism in pregnancy, pregnant women with the laboratory confirmed positive test for SARS-CoV-2 infection belong to the population group, which requires special attention due to possible complications and mother-to child transmission.

Competing interests

The authors declare no competing interests.

Literature

1. WHO: Coronavirus disease (COVID-19) pandemic. [Internet] Available at: https://www.who.int/emergencies/diseases/novel-coronavirus-2019 [Accessed 14th March 2022]

from URL: https://www.acog. org/-/media/project/acog/acogorg/files/pdfs/clinicalguidance/practice-advisory/covid-19-algorithm.pdf?la=en&hash=2D9E7F62C97F8231561616FFDCA3B1A6.

8. Allotey J, Stallings E, Bonet M, Yap M, Chatterjee S, Kew T, et al. Clinical manifestations, risk factors, and maternal and perinatal outcomes of coronavirus disease 2019 in pregnancy: living systematic review and meta-analysis. BMJ 2020; 370:m3320.
9. Gurol-Urganci I, Jardine JE, Carroll F, Draycott T, Dunn G, Fremeaux A, et al. Maternal and perinatal outcomes of pregnant women with SARS-CoV-2 infection at the time of birth in England: national cohort study. Am J Obstet Gynecol 2021; 225(5):522.e1-522.e11.
10. Wei SQ, Bilodeau-Bertrand M, Liu S, Auger N. The impact of COVID-19 on pregnancy outcomes: a systematic review and meta-analysis. CMAJ 2021; 193:E540.
11. Conde-Agudelo A, Romero R. SARS-CoV-2 infection during pregnancy and risk of preeclampsia: a systematic review and meta-analysis. Am J Obstet Gynecol 2022; 226:68.
12. Zambrano LD, Ellington S, Strid P, Galang RR, Oduyebo T, Tong VT, et al. Update: Characteristics of Symptomatic Women of Reproductive Age with Laboratory-Confirmed SARS-CoV-2 Infection by Pregnancy Status - United States, January 22-October 3, 2020. Morb Mortal Wkly Rep 2020; 69:1641.
13. Dileep A, ZainAlAbdin S, AbuRuz S. Investigating the association between severity of COVID-19 infection during pregnancy and neonatal outcomes. Sci Rep 2022; 12:3024.
14. Vousden N, Bunch K, Morris E, Simpson N, Gale C, O'Brien P, et al. The incidence, characteristics and outcomes of pregnant women hospitalized with symptomatic and asymptomatic SARS-CoV-2 infection in the UK from March to September 2020: A national cohort study using the UK Obstetric Surveillance System (UKOSS). PLoS One 2021; 16(5):e0251123.
15. Yu N, Li W, Kang Q, Xiong Z, Wang S, Lin X, et al. Clinical features and obstetric and neonatal outcomes of pregnant patients with COVID-19 in Wuhan, China: A retrospective, single-centre, descriptive study. Lancet Infect Dis 2020; 20:559–564.
16. Taghavi SA, Heidari S, Jahanfar S, Amirjani S, Aji-Ramkani A, Azizi-Kutenaee M, et al. Obstetric, maternal, and neonatal outcomes in COVID-19 compared to healthy pregnant women in Iran: a retrospective, case-control study. Middle East Fertil Soc J 2021; 26(1):17.

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2. Ryan GA, Purandare NC, McAuliffe FM, Hod M, Purandare CN. Clinical update on COVID-19 in pregnancy: A review article. J Obstet Gynaecol Res 2020: 10.1111/jog.14321. [Epub ahead of print]
3. Qin C, Zhou L, Hu Z, Zhang S, Yang S, Tao Y, et al. Dysregulation of Immune Response in Patients with Coronavirus 2019 (COVID-19) in Wuhan, China. Clin Infect Dis. 2020; 71(15):762-768.
4. RCPI IoOaG. COVID-19 Infection Guidance for Maternity Services. Version 3.0. 2020. Available from URL: https:// www.rcpi.ie/news/releases/theinstitute-of-obstetricians-andgynaecologists-issuesguidance-on-covid-19-and-maternityservices/
5. Pešić S, Jovanović H, Trajković H. Dosadašnja saznanja o etiopatogenezi i mogućnostima terapije Kovid-19. Zdravstvena zaštita 2020; 49(3):43-54.
6. Ryan GA, Purandare NC, McAuliffe FM, Hod M, Purandare CN. Clinical update on COVID-19 in pregnancy: A review article. J Obstet Gynaecol Res 2020;46(8):1235-45.
7. ACOG. Outpatient assessment and management for pregnant women with suspected or confirmed novel coronavirus (COVID-19). 2020. Available from URL: https://www.acog. org/-/media/project/acog/acogorg/files/pdfs/clinicalguidance/practice-advisory/covid-19-algorithm.pdf?la=en&hash=2D9E7F62C97F8231561616FFDCA3B1A6.
8. Allotey J, Stallings E, Bonet M, Yap M, Chatterjee S, Kew T, et al. Clinical manifestations, risk factors, and maternal and perinatal outcomes of coronavirus disease 2019 in pregnancy: living systematic review and meta-analysis. BMJ 2020; 370:m3320.
9. Gurol-Urganci I, Jardine JE, Carroll F, Draycott T, Dunn G, Fremeaux A, et al. Maternal and perinatal outcomes of pregnant women with SARS-CoV-2 infection at the time of birth in England: national cohort study. Am J Obstet Gynecol. 2021; 225(5):522.e1-522.e11.
10. Wei SQ, Bilodeau-Bertrand M, Liu S, Auger N. The impact of COVID-19 on pregnancy outcomes: a systematic review and meta-analysis. CMAJ 2021; 193:E540.
11. Conde-Agudelo A, Romero R. SARS-CoV-2 infection during pregnancy and risk of preeclampsia: a systematic review and meta-analysis. Am J Obstet Gynecol 2022; 226:68.
12. Zambrano LD, Ellington S, Strid P, Galang RR, Oduyebo T, Tong VT, et al. Update: Characteristics of Symptomatic Women of Reproductive Age with Laboratory-Confirmed SARS-CoV-2 Infection by Pregnancy Status - United States, January 22-October 3, 2020. Morb Mortal Wkly Rep 2020; 69:1641.
13. Dileep A, ZainAlAbdin S, AbuRuz S. Investigating the association between severity of COVID-19 infection during pregnancy and neonatal outcomes. Sci Rep 2022; 12:3024.
14. Vousden N, Bunch K, Morris E, Simpson N, Gale C, O'Brien P, et al. The incidence, characteristics and outcomes of pregnant women hospitalized with symptomatic and asymptomatic SARS-CoV-2 infection in the UK from March to September 2020: A national cohort study using the UK Obstetric Surveillance System (UKOSS). PLoS One 2021; 16(5):e0251123.
15. Yu N, Li W, Kang Q, Xiong Z, Wang S, Lin X, et al. Clinical features and obstetric and neonatal outcomes of pregnant patients with COVID-19 in Wuhan, China: A retrospective, single-centre, descriptive study. Lancet Infect Dis 2020; 20:559–564.
16. Taghavi SA, Heidari S, Jahanfar S, Amirjani S, Aji-Ramkani A, Azizi-Kutenaee M, et al. Obstetric, maternal, and neonatal outcomes in COVID-19 compared to healthy pregnant women in Iran: a retrospective, case-control study. Middle East Fertil Soc J 2021; 26(1):17.

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