

Original article

Health care of COVID-19 positive pregnant women at the Clinic for Gynecology and Obstetrics of the University Clinical Center of Republic of Srpska

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Summary

Introduction. Corona-virus disease 2019 (COVID-19) is caused by heavy acute respiratory syndrome coronavirus 2 (SARS-CoV2) and represents the example of fast spreading disease. There has been a rapid increase of new and fatal cases since the virus was discovered in Wuhan, China, at the beginning of December 2019. Pregnant women are at a higher risk for the infection SARS-CoV2 and are prone to developing more severe clinical picture. Pregnant women with COVID-19 pneumonia mostly show different clinical pictures in comparison to the rest of the population.

Methods. There have been observed 184 COVID-19 positive pregnant women which were hospitalized in the period since the pandemic begun in Republic of Srpska. Included patients were treated at the University Clinical Center of Republic of Srpska and referred to this center from different parts of Republic of Srpska. The study was conducted from March 5th 2020 to March 15th 2022. Eight outcome parameters were observed in this study.

Results. During the observation period a total of 184 COVID-19 positive pregnant women were included in the study. An average age of patients was 30,63 years. An average duration of hospital stay was 8,90 days. A median of a gestation week of pregnant women was 37,5 weeks. The total number of patients in need of an oxygen support until a delivery was 18. All 18 pregnant women who were on an oxygen support delivered over a cesarean section.

Conclusion. COVID-19 brought a multitude of changes in clinical practice. However, COVID-19 is not an indication for a delivery change, as there are no evidences for favorization of one method of a delivery to the other one. A transmission of the infection from a mother to a child is possible but the cases of transplacental transmission remain scarce.

Key words: SARS-CoV2, COVID-19, pregnancy, pneumonia, newborns

Introduction

COVID-19 (Coronavirus Disease 2019) is a disease caused by a new coronavirus SARS-CoV2. Its rapid spread across the world became a huge challenge to health systems. The World Health Organization (WHO) proclaimed an urgent international situation on January 30th, 2020, and a global pandemic was announced on March 11th, 2020. The first case in Republic of Srpska was diagnosed on March 5th, 2020. Enormous efforts were invested into understanding of a virus and a disease in order to find efficient prevention methods, treatment strategy and finally developing a vaccine [1].

A virus transmission is dependent on close contact with an infected person or over the contaminated surfaces. The transmission by both droplets (aerosol) and feco-oral route are important. There has been alertness about the impact of COVID-19 on pregnant women and newborns. At the moment it is not elucidated if the virus spreads through ejaculate or vaginal discharge [2].

According to recent researches, a prognosis of the vast majority of pregnant women and newborns affected by COVID-19 is good. Many evidences show that pregnancy does not increase a risk for contracting SARS-CoV2, but clinical disease could take more severe course in comparison to non-pregnant women of the same age [3].

Complications of COVID-19 can lead to delivery complications. Risk factors in severe manifestations of COVID-19 infection in pregnant patients are pulmonary comorbidities, hypertension and diabetes mellitus. Pregnant women with severe COVID-19 have a higher incidence of cesarean section, premature delivery and their newborns are more often hospitalized in neonatal intensive care units [4].

After the COVID-19 infection is confirmed during pregnancy, a delivery is observed as potentially complicated. A choice of method of delivery should be individually adjusted.

Generally, the recommendations for the delivery have not been subjected to change for women with confirmed infection [5].

It is advisable to test both symptomatic and asymptomatic pregnant women at admission due to high percentage of mild or difficult-to-detect cases. It is necessary to set special rooms or sections for pregnant women with a suspicion and/or confirmed infection of COVID-19, as well as decreasing the rotations of involved health staff. It is obligatory to wear adequate protective equipment [6].

All the world leading gynecologist associations recommend a vaccination against COVID-19 in a pregnancy. Immunization during a pregnancy protects a mother and a fetus from complications of a certain infection, also offers a passive protection to a newborn after a delivery. IgG antibodies peak four weeks after the immunization, while gestational age represents an important factor in regard to possibility of passive immunization which is beneficiary for fetus [7, 8].

The aim of this work was to examine the spectrum and effects of COVID-19 infection to a pregnancy outcome, both for a mother and her newborn.

Methods

This was a retrospective study conducted in the Clinic of Gynecology and Obstetrics of the University Clinical Centre of Republic of Srpska. A total of 184 COVID-19 positive pregnant women were observed since the beginning of pandemic in March 2020. The patients were admitted from different parts of Republic of Srpska to our tertiary care center. The study period ranged from March 5th, 2020 to March 15, 2022.

Our results included epidemiologic data on number of examined pregnant women with confirmed or suspected COVID-19, number of hospitalized patients due to this indication, a number of isolated patients and

prevalence of oxygen supplementation use in studied population. Following parameters and outcomes were observed during the study period: age of patients, a duration of hospital stay, choice of delivery method, presence of comorbidities.

Quantitative data are presented as absolute and relative frequencies. Quantitative data are further processed by a descriptive statistics. Pearson χ^2 test was used in assessment of frequency differences. Median values of multiple groups were compared by the use of Kruskal-Wallis test. For a comparison of median values for two independent samples (groups), a Mann-Whitney was used.

Statistical significance was set at $p < 0.05$.

For statistical analysis and data presentation IBM SPSS Statistics 23.0; MS Office Word 2016 and MS Office Excel 2016 were used.

Results

During the study period, a total of 184 COVID-19 positive patients (pregnant women) were admitted to the Clinic for gynecology and obstetrics of the University Clinical Center of Republic of Srpska. The average age of the patients was 30.6 years.

In the observed period four patients died with an average duration of hospital stay of 17 days (range 1-32 days) as presented in table 1.

An average period of hospital duration for all patients was 8.90 days, while median was 7 days. Patients discharged before delivery had significantly shorter hospital stay (median 5.5 days) when compared to patients who had deliveries before discharge (median 8 days) (Mann-Whitney's test $z = -3.898$, $p = .000$) (Table 2).

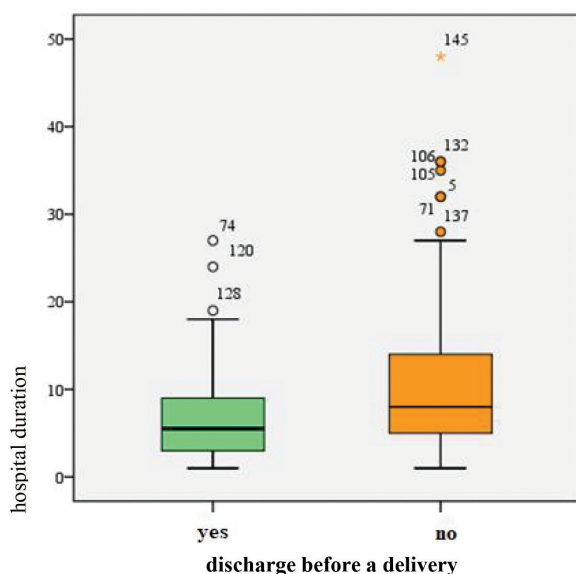
Table 1. Duration of hospital stay (days) for the COVID-19 patients at the Clinic for gynecology and obstetrics of the University Clinical Center of Republic of Srpska

Died	N	Minimum	Maximum	Median	Mean	Std. Deviation
Lethal outcome	4	1	32	17.50	17.00	12.987
Survived	180	1	48	6.50	8.72	7.330
Total	184	1	48	7.00	8.90	7.536

Table 2. Hospital discharge of patients and hospital duration (days)

Discharge before a delivery	N	Minimum	Maximum	Median	Mean	Std. Deviation
yes	98	1	27	5.50	6.81	4.843
no	86	1	48	8.00	11.28	9.204
Total	184	1	48	7.00	8.90	7.536

The graphic 1 shows a difference in duration of hospital stay (in days) for patients in regard to delivery.



Graphic 1. Hospital duration (days) of patients in a relation to the timing of discharge (prior or after the delivery)

In a group of 98 (53.3%) patients discharged before delivery oxygen support was applied in 19 (19.4%) cases. For 86 patients (46.7%) who had deliveries, supplementary oxygen was used in 18 (20.1%) (Table 3).

Table 3. Oxygen use in patients in regard to the timing of discharge (prior or after the delivery)

Discharge	Oxygen support		Total
	yes	no	
prior to delivery	19	79	98
after delivery	18	68	86
Total	37	147	184

Applying a χ^2 test, with a correction according to Yates, showed that statistical significance difference was not achieved ($\chi^2 = .006$, $p = .939$) when comparing these two groups of patients.

In all 18 COVID-19 patients treated at the Clinic until a delivery and receiving an oxygen

support, a cesarean section (CS) was applied – table 4.

Table 4. Delivery methods of COVID-19 patients requiring oxygen support

Delivery	Oxygen support		Total
	yes	no	
Vaginal delivery	0	26	26
Cesarean section	18	42	60
Total	18	68	86

Applying Fisher’s Exact test, a high statistical significance of difference was achieved ($p = .000$), demonstrating that the COVID-19 patients requiring an oxygen support have significantly higher prevalence of cesarean section when compared to milder COVID-19 cases among pregnant women

At the time of cesarean section patients were in 35.7 weeks of gestation at an average. Patients requiring oxygen support were at an average in 33.06 gestational weeks, while patients without need of oxygen support were at average in 39.93 gestational weeks (Table 5). A gestation week median at the hospital admission for all the patients was 37.5.

Applying Mann-Whitney’s test showed a high statistically significant difference ($z = -3.533$, $p = .000$) when comparing gestational week of patients undergoing cesarean section in relation to the need of an oxygen support: significantly earlier deliveries were performed in more severe, oxygen requiring cases of COVID-19.

Trombophilia as the isolated comorbidity was registered in 17 patients, and in association with hypertension in four patients and with diabetes in another four cases. Trombophilia was associated with other comorbidities in 11 patients. Other comorbidities were registered as isolated in 26 patients (15 patients with hypothyroidism was registered).

A presence of comorbidities was registered in a total of 68 (36.96%) patients; 16

Table 5. Gestational week at the time of a cesarean section

Oxygen support	N	Minimum	Maximum	Median	Mean	Std. Dev.
Yes	18	26	39	34.00	33.06	4.193
No	42	27	41	39.00	39.93	3.809
Total	60	26	41	37.50	35.77	4.284

(23.53%) out of this number required an oxygen support. A total of 37 patients had oxygen support with 16 (43.24%) of these having at least one comorbidity. Two out of three patients (63.04%) did not have any comorbidity, but 21 (18.1%) of patients received an oxygen support (Table 6).

Table 6. A presence of comorbidity in COVID-19 pregnant patients and the requirement of oxygen support

Comorbidity presence	Oxygen support		Total
	yes	no	
yes	16	52	68
no	21	95	116
Total	37	147	184

Applying χ^2 test, with a correction according to Yates, statistical significance was not achieved ($\chi^2 = .484$, $p = .487$) indicating that the presence of comorbidities did not affect the need for oxygen support in the studied COVID-19 pregnant patients.

Discussion

In our work, we analyzed data from the Clinic of Gynecology and Obstetrics of the University Clinical Centre of Republic of Srpska. A total number of admitted patients during the observation period was 184 COVID-19 positive pregnant women which an average age of 30,63, and an average hospital stay of 8,90 days. A median of a gestation week of all pregnant women in our work was 37,5 weeks. The total number of our patients in need of an ox-

xygen support until delivery was 18, and all of these were delivered by the cesarean section. During the 2020-2022 period, the COVID-19 pandemic dominated the obstetric health care. Unlike routine medical procedures, prenatal examinations and deliveries could not be postponed. At least 100 million babies were born during the pandemic, meaning that millions of women needed care during pregnancy, labor, and delivery, while performing antiepidemic measures [9]. Therefore, healthcare workers have made major adjustments to the healthcare delivery system to prevent COVID-19 infection. Along with basic hygiene measures such as disinfection and wearing protective clothing, more drastic measures, designed to prevent or slow contamination, included isolating patients with COVID-19, monitoring and contacting those infected or exposed, and enforcing social distancing [9].

Some studies show that pregnant women with COVID-19 showed to higher risk of severely symptomatic COVID-19 when compared to the non-pregnant women [10]. Additionally, women at late pregnancy have an increased risk of serious forms of COVID-19, which implies hospitalization, and even placement in an intensive care unit. The risk factors for a serious form of COVID-19 infection include being overweight, age over 35 years, and the existence of comorbidities [9].

Maternity staff is usually in close physical contact with pregnant and laboring women and are therefore, at high risk of infection, especially as infected pregnant women are often asymptomatic or have mild, difficult-to-detect Covid-19 infections [9].

Pregnant women should be regularly advised to stay at home minimally for two weeks before the predicted delivery term. For most of the women this period should start at 27th week of pregnancy. For women with suspicion or confirmation COVID-19 infection in an early pregnancy with complete recovery, a change of delivery term is not necessary. On the other hand for women with suspicion or confirmed COVID-19 infection in the third trimester who has not been recovered yet, it is reasonable to postpone a delivery (if other medical conditions allow this) until negative results of RT-PCR come back in order to prevent a virus transmission onto a newborn [11].

If there is no improvement of a clinical status, the early delivery should be planned. In a case of worsening of pregnant woman respiratory status or overall condition, further responsibility should be taken by the multidisciplinary team consisting of a gynecologist, anesthesiologist, intensivist and a neonatologist. All the decisions should include the consent of pregnant woman and her family [11]. For women with COVID-19 and pneumonia, who are not intubated, a delivery is considered at 32-34th gestational week [12].

For pregnant women with good clinical status and mild symptoms of COVID-19, a

vaginal delivery is safe and recommended while a cesarean cut is performed for standard medical indications. A newborn with COVID-19 is usually mildly affected, by requires a close monitoring in hospital setting [13]. A relatively small number of pregnant women were vaccinated against COVID-10, although there are evidence that a vaccine is safe both in regard to pregnancy and breastfeeding [14]. A great role during a delivery belongs to midwives, and their job grows more demanding during the pandemic era.

Conclusion

Pregnant women represent a vulnerable group during epidemics of infectious diseases due to specific physiology of pregnancy, sensitivity to infections. Maternal and fetal health must be additionally prioritized in these challenging circumstances. COVID-19 severely impacted health systems, affecting obstetric practices as well. As our data showed, severe COVID-19 in pregnancy, especially in patients requiring oxygen support, affects the timing of delivery and increases the probability of cesarean section.

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Ethical approval. The Ethics Committee of the University Clinical Center of Republic of Srpska approved the study and informed consent was obtained from all in-

dividual respondents. The research was conducted according to the Declaration of Helsinki.

Conflicts of interest. The authors declare no conflict of interest.

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Zdravstvena njega COVID-19 pozitivnih trudnica u Klinici za ginekologiju i akušerstvo Univerzitetskog kliničkog centra Republike Srpske

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Uvod. Bolest korona virus (COVID-19) uzrokuje teški akutni respiratorni sindrom koronavirus 2 (SARS-CoV2) i predstavlja primjer brzo šireće bolesti. Došlo je do brzog porasta novootkrivenih i smrtnih slučajeva otkako je otkriven virus u Wuhanu, Kina, početkom decembra 2019. Trudnice mogu biti u većem riziku za infekciju sa SARS-CoV2 i mogu da razviju težu kliničku sliku. Trudnice sa upalom pluća COVID-19 pokazuju različite kliničke slike u poređenju sa ostalom populacijom.

Metode. Praćeno je 184 COVID-19 pozitivnih trudnica koje su hospitalizovane u periodu od početka pandemije u Republici Srpskoj. Uključene pacijentkinje koje su liječene u Univerzitetskom kliničkom centru Republike Srpske upućene su iz različitih dijelova Republike Srpske. Studija je provedena od 05. marta 2020. do 15. marta 2022. U istraživanju je praćeno 8 parametara.

Rezultati. Tokom posmatranog perioda, ukupno 184 COVID-19 pozitivne trudnice bile su uključene u istraživanje. Prosječna starost pacijentkinja bila je 30,63 godine. Prosječno trajanje hospitalizacije bilo je 8,90 dana. Medijana gestacijske nedjelje trudnica bila je 37,5 nedjelja. Ukupan broj pacijentkinja koje su zahtijevale kiseoničku podršku do porođaja bio je 18. Svih 18 trudnica koje su bile na kiseoničkoj podršci su porođene putem carskog reza.

Zaključak. COVID-19 donio je mnoge promjene u kliničkoj praksi. Međutim, COVID-19 nije indikacija za promjenu načina porođaja, jer ne postoje dokazi koji favorizuju jednu metodu porođaja u odnosu na drugu. Prenos infekcije sa majke na dijete je moguć, ali su slučajevi transplacentarnog prenosa vrlo rijetki.

Ključne riječi: SARS-CoV2, COVID-19, trudnoća, upala pluća, novorođenčad