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Screening and Testing Pregnant Patients for SARS-CoV-2: First-Wave Experience of a Designated COVID-19 Hospitalization Centre in Montreal



M-J. Trahan

Marie-Julie Trahan, MD;¹ Cristina Mitric, MD;¹ Isabelle Malhamé, MD, MSc;² Haim A. Abenheim, MD, MPH^{1,3}

¹Department of Obstetrics and Gynecology, McGill University, Montréal, QC

²Department of Medicine, Division of General Internal Medicine, McGill University Health Centre, Montréal, QC

³Department of Obstetrics and Gynecology, Division of Maternal-Fetal Medicine, Jewish General Hospital, Montréal, QC

Abstract

Objective: Coronavirus disease 2019 (COVID-19) may present asymptotically in a large proportion of cases in endemic areas. Accordingly, universal testing has been suggested as a potential strategy for reducing transmission in the obstetrical setting. We describe the clinical characteristics of patients who tested positive for severe acute respiratory syndrome coronavirus (SARS-CoV-2) during pregnancy at a designated COVID-19 hospitalization centre in Montréal, Québec.

Methods: A single-centre retrospective cohort was constructed to include all pregnant patients who tested positive for SARS-CoV-2 between March 22 and July 31, 2020, and received care at the Jewish General Hospital. Initially, testing was restricted to at-risk patients, identified through the use of a screening questionnaire. Beginning on May 15, 2020, universal testing was implemented, and all pregnant patients admitted to the hospital were tested. Data were collected through chart review.

Results: Of 803 patients tested for SARS-CoV-2 during the study period, 41 (5%) tested positive. Among those patients who were symptomatic, the most commonly reported symptoms were cough (53%), fever (37%), dyspnea (30%), and anosmia and/or ageusia (20%). Before the implementation of universal testing, 13% (three of 24) of patients with SARS-CoV-2 were asymptomatic. After implementation of universal testing, 80% (eight of 10) of patients with SARS-CoV-2 were asymptomatic.

Keywords: COVID-19; coronavirus; COVID-19 diagnostic testing

Corresponding author: Haim A. Abenheim, haim.abenheim@gmail.com

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Conclusion: Our findings suggest that most pregnant patients with SARS-CoV-2 are asymptomatic or have mild symptoms of COVID-19. Particularly in endemic areas, universal testing of pregnant patients presenting to the hospital should be strongly considered as an important measure to prevent in-hospital and community transmission of COVID-19.

Résumé

Objectif : Dans les zones endémiques, la maladie à coronavirus 2019 (covid-19) peut être asymptomatique dans une grande proportion de cas. Par conséquent, le dépistage systématique a été proposé comme stratégie potentielle pour atténuer la transmission dans le milieu obstétrical. Nous décrivons les caractéristiques cliniques des patientes qui ont obtenu un résultat positif au test de dépistage du coronavirus 2 du syndrome respiratoire aigu sévère (SARS-CoV-2) pendant la grossesse dans un centre désigné d'hospitalisation de la patientèle covid à Montréal, au Québec.

Méthodologie : Une cohorte rétrospective monocentrique a été formée pour inclure toutes les patientes enceintes qui ont reçu un résultat positif au test de dépistage du SARS-CoV-2 entre le 22 mars et le 31 juillet 2020 et qui ont reçu des soins à l'Hôpital général juif. Au départ, le dépistage était limité aux patientes à risque, sélectionnées au moyen d'un questionnaire de dépistage. À compter du 15 mai 2020, le dépistage systématique a été mis en place et toutes les patientes enceintes admises à l'hôpital ont fait l'objet d'un dépistage. Les dossiers ont été consultés pour recueillir les données.

Résultats : Sur les 803 patientes soumises à un dépistage du SARS-CoV-2 pendant la période à l'étude, 41 (5 %) ont obtenu un résultat positif. Chez les patientes symptomatiques, les symptômes les plus souvent signalés étaient la toux (53 %), la fièvre (37 %), la dyspnée (30 %) et l'anosmie et/ou l'agueusie (20 %). Avant la mise en place du dépistage systématique, 13 % (3 sur 24) des patientes atteintes de SARS-CoV-2 étaient asymptomatiques. Après la mise en place du dépistage systématique, 80 % (8 sur 10) des patientes atteintes de SARS-CoV-2 étaient asymptomatiques.

Conclusion : Nos résultats indiquent que la plupart des patientes enceintes qui ont contracté le SARS-CoV-2 sont asymptomatiques

ou présentent des symptômes légers de la covid-19. Dans les zones endémiques en particulier, il y a lieu de considérer fortement le dépistage systématique chez les patientes enceintes qui se présentent à l'hôpital comme une mesure importante pour prévenir la propagation de la covid-19 en milieux hospitaliers et communautaires.

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INTRODUCTION

The coronavirus disease 2019 (COVID-19) pandemic represents an unprecedented global health crisis. The province of Québec has seen the greatest number of cases in Canada.¹ Although the majority of COVID-19–related deaths have occurred in the elderly population, cases of severe and critical COVID-19 have been reported across all demographics, including in pregnant women.²

Because of pregnancy-related immunological changes, pregnant women are more susceptible to severe manifestations of certain viral infections.³ Variable symptom presentations between pregnant and non-pregnant women with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) have been described.⁴ Furthermore, in certain endemic areas, asymptomatic presentations among obstetrical patients has been reported in over 80% of cases.⁵ Undetected SARS-CoV-2 in pregnancy presents a unique challenge because patients must interact closely with health care professionals throughout pregnancy and during labour and delivery. Universal testing of pregnant patients has been suggested as a potential strategy for protecting patients and health care workers from COVID-19.⁵

This study describes the initial experience of a tertiary care centre in Montréal, Québec, in screening and testing pregnant patients with COVID-19. For scientific accuracy and to maintain standardization of scientific communications, this paper will refer to the novel *coronavirus disease* as COVID-19 and to the associated *severe acute respiratory syndrome-related coronavirus 2* as SARS-CoV-2.

METHODS

The Jewish General Hospital (JGH) is a tertiary care centre in Montréal, Québec, and a teaching site for McGill University. The JGH provides specialized obstetrical care, handling over 4000 births annually, and comprises a level III neonatal intensive care unit. Québec, and more specifically Montréal, is described as the epicenter of the COVID-19

pandemic in Canada. As one of the first designated COVID-19 hospitalization centres in Québec and a referral centre for pregnancies affected by COVID-19, the JGH is therefore uniquely situated to report valuable data on its experience with screening and testing pregnant patients for SARS-CoV-2.⁶

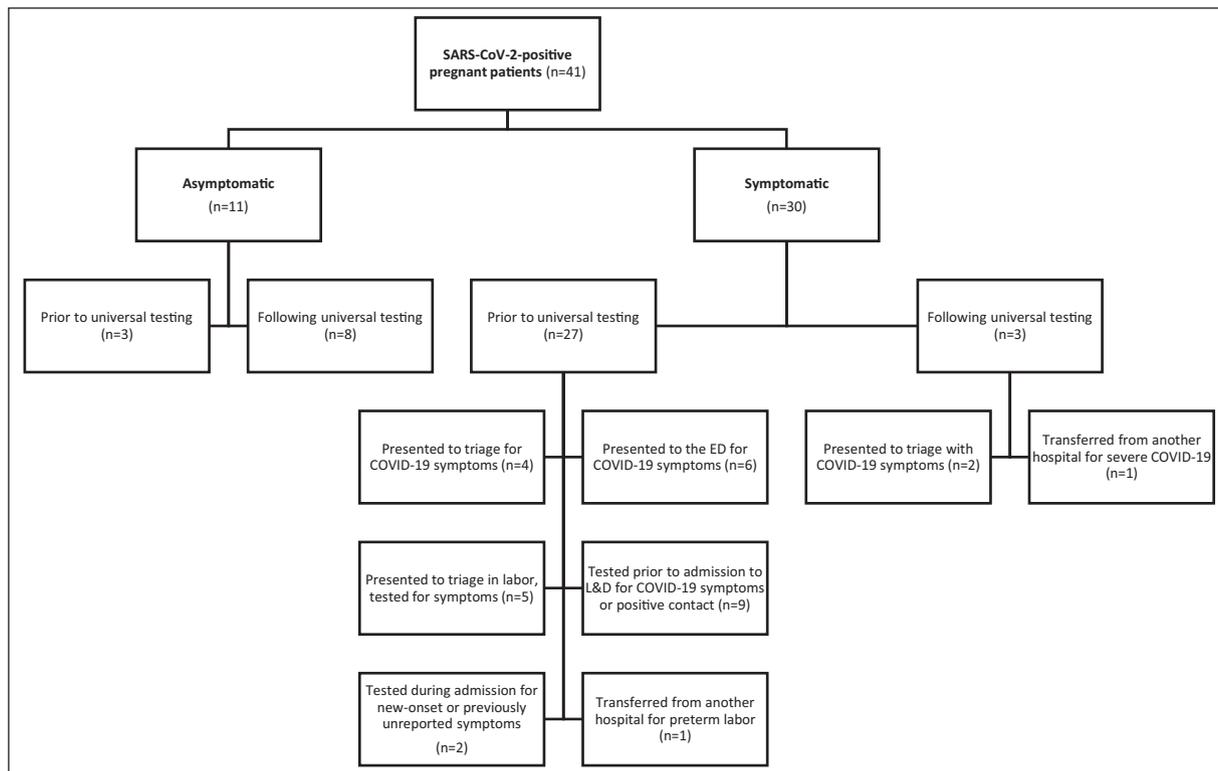
For this study, a retrospective cohort was constructed to include pregnant patients who tested positive for SARS-CoV-2 between March 22 and July 31, 2020, and received care at the JGH. Patients were identified according to a prospective log maintained on the hospital's labour and delivery unit and continuously updated by members of the obstetrical care team to reflect all pregnant patients who tested positive for SARS-CoV-2 and received care on the unit or elsewhere in the hospital. Case identification was cross-checked with nursing records maintained in the postpartum unit. In all cases, SARS-CoV-2 testing was performed with polymerase chain reaction on nasopharyngeal swabs. Data on maternal demographic and clinical characteristics were extracted from electronic medical records. Baseline maternal characteristics collected included age, obstetrical history, gestational age at time of first positive SARS-CoV-2 test result, and presence of medical comorbidities. Clinical characteristics related to SARS-CoV-2 included presenting symptoms, including asymptomatic presentation; timing of onset of symptoms; and disposition. Additional details were collected for patients requiring antepartum in-hospital care for COVID-19.

This study was conducted in accordance with the TCPS 2, Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans (2018) and was approved by the Research Ethics Board of the CIUSSS West-Central Montreal (Project #2021-2346).

RESULTS

A total of 41 patients with SARS-CoV-2 during pregnancy were included in this cohort. This included 24 patients who tested positive for SARS-CoV-2 during the period in which a screening questionnaire, which included questions on symptoms, travel, and symptomatic and/or SARS-CoV-2–positive contacts, was used within the labour and delivery unit to screen patients at risk of infection (March 22 to May 14, 2020), and 10 patients who tested positive for SARS-CoV-2 after universal testing was implemented (May 15 to July 31, 2020). In addition, six patients (15%) were admitted directly from the Emergency Department after presenting with symptoms of COVID-19, and one patient with a prior diagnosis of COVID-19 was transferred from an outside hospital for preterm labour (Figure 1).

Figure 1. Pregnant patients with severe acute respiratory syndrome coronavirus.



During the period in which the screening questionnaire was used, 141 patients were tested for SARS-CoV-2 upon admission, of whom 24 tested positive (17%). One patient was asymptomatic on admission and was subsequently tested in the context of intrapartum fever. Another patient was tested only after delivery despite the presence of mild symptoms, owing to a language barrier preventing accurate completion of the admission screening questionnaire. During the period in which universal screening was performed, 662 patients were tested, 10 (1.5%) of whom tested positive.

Maternal demographic and clinical characteristics are summarized in the Table. The majority (35/41; 85%) of patients had no comorbid medical conditions. Among symptomatic women who tested positive for SARS-CoV-2, the most common presenting symptoms were cough (53%), fever (37%), dyspnea (30%), and anosmia and/or ageusia (20%) (Figure 2). Before the implementation of universal testing, 13% (3/24) of those who tested positive for SARS-CoV-2 were asymptomatic throughout admission. After implementation of universal testing, 80% (8/10) of patients who tested positive for SARS-CoV-2 were asymptomatic throughout admission. According to the definition of mild, severe, and critical disease proposed by Wu et al.⁷ and subsequently used by others,⁸ 83% of

patients had mild disease, 12% had severe disease, and 5% had critical disease. The majority of patients (34/41; 83%) did not require in-hospital care for COVID-19. Of the seven patients (17%) who required admission for COVID-19, five had one or more medical comorbidities and two had a twin pregnancy. Seven patients (17%) required supplemental oxygen therapy, with intensive care unit admission in three patients (7%) requiring supplemental oxygen and close monitoring and two patients (5%) requiring mechanical ventilation. There were no maternal deaths.

DISCUSSION

We found that most pregnant patients with SARS-CoV-2 are asymptomatic or have mild symptoms of COVID-19. Among patients with symptoms, fever, cough, dyspnea and anosmia and/or ageusia were among the most frequently reported symptoms.

Our study revealed certain similarities and differences compared with the current literature on COVID-19 symptoms in non-pregnant and pregnant adults. In a meta-analysis of 43 studies involving 3600 non-pregnant patients, most patients were symptomatic.⁹ The most common symptoms were fever, cough, and fatigue reported in 83%, 60%, and 38% of patients, respectively.⁹ Similarly, in a meta-analysis of

Table. Characteristics of pregnant patients with SARS-CoV-2

Characteristics	No. (%) of pregnant patients with SARS-CoV-2; n = 41
Age category	
<25 y	5 (12)
25–34 y	23 (56)
≥35 y	13 (32)
GA at diagnosis (wk)	
≤27 ⁶	4 (10)
28–36 ⁶	15 (37)
≥37	22 (54)
Comorbidities	
None	35 (85)
Obesity	4 (10)
Asthma	3 (7)
Hypertension	2 (5)
Diabetes	1 (2)
Pregnancy risk factors	
None	39 (95)
Twin pregnancy	2 (5)
Timing of symptom onset	
Asymptomatic	11 (27)
Before admission	29 (70)
During admission	1 (2)
Reason for hospital admission	
Obstetrical (labor, planned c/d, induction, preterm labor, PPRM)	34 (83)
COVID-19	7 (17)

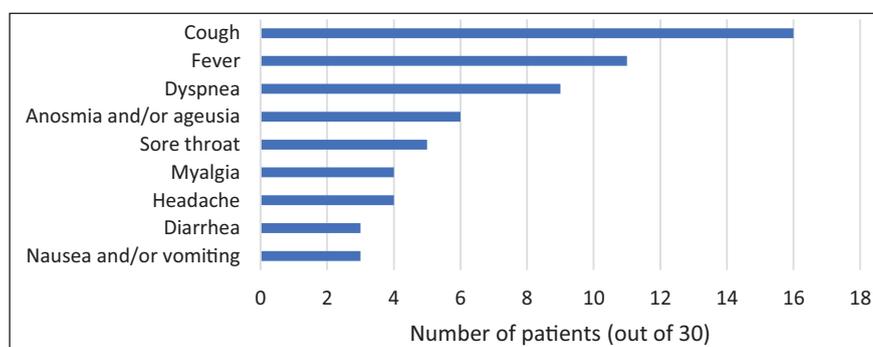
COVID-19: coronavirus disease 2019; GA: gestational age; c/d: cesarean delivery; PPRM: preterm premature rupture of membranes.

33 studies involving 385 pregnant patients, most patients were symptomatic.¹⁰ Fever and cough were also among the most commonly reported symptoms, in 93% and 67% of

patients, respectively.¹⁰ In contrast, the symptom distribution in our patient population differed. Although cough and fever were the most commonly reported symptoms, these were less frequently reported compared to previous studies. In addition, dyspnea and anosmia and/or ageusia were among the most commonly reported symptoms in pregnant patients with COVID-19 in our cohort.

Early published case studies on COVID-19 reported a similar disease severity in pregnant and non-pregnant adults.^{8,11,12} However, initial reports compared disease severity between pregnant and non-pregnant patients without accounting for age differences in these two populations, thus potentially providing premature reassurance regarding the vulnerability of pregnant women to severe and critical manifestations of COVID-19.^{8,11} More recently, the Centers for Disease Control and Prevention reported on data from 8207 pregnant women with SARS-CoV-2. Compared with 83 205 non-pregnant women of reproductive age with SARS-CoV-2, those who were pregnant were significantly more likely to be admitted to the intensive care unit (absolute risk ratio 1.5; 95% confidence interval 1.2–1.8) and to receive mechanical ventilation (absolute risk ratio 1.7; 95% confidence interval 1.2–2.4).⁴ Thus, vigilance needs to be maintained regarding COVID-19 in the pregnant population.

Similar to the experience with universal testing for SARS-CoV-2 in pregnant patients admitted for delivery described by others, we report on a patient who was initially asymptomatic on admission, developed intrapartum fever, and subsequently tested positive for SARS-CoV-2.⁵ This event, in combination with previous findings suggesting that asymptomatic presentations among pregnant patients may be common in endemic regions, prompted the implementation of universal testing within our labour and delivery unit.⁵ The finding that most new cases detected since the implementation of a universal testing policy were among asymptomatic

Figure 2. Symptom distribution among symptomatic patients with severe acute respiratory syndrome coronavirus.

patients (8/10; 80%) supports the continued use of universal testing within our labour and delivery unit.

As a designated COVID-19 hospitalization centre in Canada's epicenter for COVID-19, this study provides valuable data on the initial Canadian experience in screening and testing pregnant patients for SARS-CoV-2. Our study includes patients who presented to hospital for COVID-19 symptoms and/or obstetrical concerns, and we were able to discern which patients required in-hospital care for COVID-19 symptoms specifically. Unfortunately, however, we were unable to include patients who may have tested positive for SARS-CoV-2 but did not seek care at our hospital.

CONCLUSION

Since the implementation of universal testing within the labour and delivery unit, the majority of cases of SARS-CoV-2 were detected in asymptomatic carriers. As the province of Québec now faces a second wave of infection, rates of infection among our universally tested obstetrical population may serve as an early warning sign of increasing infection rates in the province. Therefore, universal testing should be maintained and may serve as a strategy for monitoring and preventing transmission within the labour and delivery unit and within the community.

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