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Universal SARS-CoV-2 screening in pregnant women: experience from the Italian epidemic outbreak

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Abstract. *Background and aim:* Sars-CoV-2 infection has rapidly spread worldwide following the first cases reported in China. Piacenza is one of the most affected cities in Italy. Many infections occurred in the hospital due to the high frequency of patients and healthcare professionals interaction. The aim of the work is to evaluate advantages of universal screening for Sars-Cov-2 in pregnant women admitted to a hospital setting and calculate frequency of infection in an obstetrical population. *Methods:* all pregnant women attending Guglielmo da Saliceto Hospital in Piacenza from 22nd April to 18th June 2020 were screened for Sars-Cov-2 using a nasopharyngeal swab. *Results:* 240 pregnant women were tested upon admission: all twelve (5%) testing positive were asymptomatic. None of the positive asymptomatic women developed COVID-19 symptoms or adverse perinatal outcomes. *Conclusions:* the diagnosis of asymptomatic pregnant women through universal screening provides the opportunity to protect mothers, babies and heath care workers. In accordance with other studies, our findings add to the growing body of evidence showing high rates of asymptomatic infection in the healthcare setting and highlight a critical need for universal screening of pregnant women. (www.actabiomedica.it)

Key words: universal screening, COVID-19, Sars-Cov-2, pregnancy, asymptomatic women

Introduction

Novel coronavirus infection (Sars-CoV-2) has rapidly spread worldwide following the first cases reported in China in December 2019.

Italy is one of the most affected countries in the world: in particular the north was the site of the epidemic outbreak in Italy.

Since the early days of the COVID-19 pandemic, infected but asymptomatic or pre-symptomatic people have been thought to contribute to the dissemination of Sars-Cov-2 (1). While symptomatic disease is frequently associated with infectivity, there is speculation that for Sars-Cov-2, the latent period (time from exposure to onset of infectiousness) may be shorter than the incubation period (time from exposure to onset symptoms), leaving a window of time when the patient is infectious but not yet exhibiting symptoms. This is supported by a study of viral loads in Chinese patients, which indicated that pre-symptomatic viral transmission likely occurred. Using data from infector-infectee pair, the authors estimated that viral transmission may have occurred two to three days prior to symptoms onset in up to 44% of patients, indicating a transmission pattern more similar to seasonal influenza than Sars-Cov (2).

In a study of Sars-Cov 2 upper respiratory loads in 18 patients, one asymptomatic patient was included because of close contact with an infected patient. The viral load was similar to that in the symptomatic patients, which suggests the transmission potential of asymptomatic or minimally symptomatic patients (3).

In this situation healthcare workers are at increased risk for infection through occupational exposure: high rates of infection have been reported (4).

Guglielmo da Saliceto Hospital is located in Piacenza, the most affected city in the Emilia Romagna region, and provides maternity care for about 2000 women each year.

Piacenza is only 15 km from Codogno, the heart of the epidemic outbreak, and 60 km from Milan.

A few days after the first diagnosis of COVID-19 infection in Italy on 22nd February 2020, the first Italian COVID-19 infected pregnant woman gave birth to a healthy baby in our hospital.

In this challenging setting we began universal Sars-Cov-2 screening in pregnant women admitted to our Hospital in order to protect health care workers and women alike.

Aim of the work

The primary objective is to assess the potential benefit of a universal testing approach including the need to use Sars-Cov-2 status to decide: patient isolation practice, bed assignment, direct neonatal care and guide the appropriate use of protective equipment.

A second objective is to quantify infected and asymptomatic pregnant women admitted to our Maternity Unit.

Methods

Study design

This is a retrospective study. All data was collected from clinical records. The research protocol was approved by the Ethics Committee (442/2020/AUSLPC).

Sample

We enrolled all pregnant women admitted to the obstetrics and gynecology ward from 22nd April 2020 to 18th June. We have not applied exclusion criteria.

Procedure

Hospital policy was to routinely screen pregnant women for Sars-Cov-2 using reverse transcriptase-polymerase chain reaction (RT-PCR) on nasopharyngeal swab upon admission. We collected data from 22nd April to 18th June 2020. Informed consent for Sars-Cov-2 test was obtained for each patient.

Pregnant women were subjected to two nasopharyngeal swabs, performed by two different healthcare workers, in order to reduce the risk of false negatives (5).

For women with laboratory confirmed COVID-19 infection, data on maternal antepartum clinical evolution, laboratory and radiological exams, therapeutic management, delivery/pregnancy outcomes, neonatal outcomes and postpartum maternal clinical evolution were all recorded.

Results

As of the start of systematic screening on 22nd April 2020, until 18th June, 240 pregnant women were tested upon admission; all 12 (5%) testing positive were asymptomatic (100%).

Eleven pregnant women were admitted at term of pregnancy for delivery and one at 34^{+4} weeks for preterm labour. All pregnancies were singleton.

The median age of this infected group was 31 (27-37 ys) and origin was multi-ethnic (four Caucasian, six African and two Latin American)

Distribution among multiparous and nulliparous was even.

Pregnancy related disease was absent in eleven pregnant women with pregnancy induced hypertension in only one case (treated with a beta-blocker).

Eight patients delivered spontaneously. Four caesarean sections were performed for causes unrelated to COVID-19.

All patients underwent radiological chest assessment, which was negative in every case.

Hydroxychloroquine 400 mg bid on the first day upon diagnosis followed by 200 mg bid for four further days, according to Society of Infectious Disease in

Obstetrics and Gynecology (ISIDOG) recommendation guided counseling (6).

All COVID-19 positive pregnant women received low-molecular-weight heparin for at least 10 days (6).

All babies were healthy at birth, with negative swabs and absence of respiratory symptoms. Breastfeeding and rooming-in was allowed, with caution, in every case with the use of mask and gloves.

All positive asymptomatic women did not subsequently develop symptoms or have adverse perinatal outcomes (median length of stay 8 days).

All babies were healthy at discharge.

Discussion

The prevalence of Sars-CoV-2 infection in pregnant women admitted to Piacenza Hospital between 22nd April to 18th June 2020 was 5%, all asymptomatic, that would not have been detected without universal screening.

No Sars-Cov-2 infection in health workers was identified subsequently to the onset of universal testing.

Two other universal screening studies report higher prevalence in two hospitals: 15.4% in a New York hospital (7) and 9% in a London hospital (8): in both hospitals about 88% of positive pregnant women were asymptomatic, while in Piacenza 100% were asymptomatic.

The only other Italian study available reports low prevalence (0,56%) indicating significantly different Sars-Cov-2 infection prevalence in different Italian regions (9).

The prevalence of Sars-Cov2 infection in Piacenza was half that reported in London and one third that reported in New York. A possible explanation could be the fact that the beginning of universal screening didn't coincide with the peak of the Sars-Cov-2 pandemic, but was performed during lockdown subsequently ordered by the Italian government. Differences in case mix of women attending the three hospitals, including ethnicity mix, has been identified as a significant factor associated with the risk, severity and outcomes of Sars-Cov-2 infection (10).

All positive pregnant women enrolled did not develop symptoms or have adverse perinatal outcomes.

In the Literature pregnancy appeared to have no effect on clinical symptoms or time to presentation after symptom onset; however, complications and adverse outcomes were more common among pregnant women: women who were pregnant had a longer hospital stay, were statistically significantly more likely to develop renal failure, sepsis, and DIC, and were more likely to require intensive care unit admission (11).

According to recent RCOG guideline infection with Sars-Cov-2 in pregnancy should be considered as a transient risk factor and trigger reassessment. Prophylactic administration of low-molecular-weight heparin has been confirmed for the venous thromboembolism prevention. It should be offer to all pregnant women admitted with confirmed or suspected COVID-19 unless birth is expected within 12 hours and continue for 10 days after hospital discharge or longer for women with persistent morbidity (12).

The summary of the reviewed guidelines for the management of COVID-19 in pregnancy across different professional societies and institutions is consistent. Nevertheless strength recommendation about medical treatment in this especial group of patients is missing (13).

Conclusions

Diagnosing asymptomatic women allows for the use of appropriate personal protective equipment, early patient isolation with reduction of the risk of transmission to healthcare workers and other pregnant women (14,15).

From a broader prospective, prenatal care and delivery offer a unique opportunity to collect population-based data from an asymptomatic population. These data could be particularly important for Sars-Cov-2 infection which has often been reported to be asymptomatic (16).

We found that asymptomatic infected women would appear to be a small fraction of all pregnant women admitted to our Hospital.

In agreement with other studies, diagnosis and treatment of asymptomatic infected women has proven to be of benefit for all pregnant women and health care workers.

This study has three limitations: 1) the small number of participants; 2) the retrospective study design; 3) the monocentric nature of the study.

In our opinion Sars-Cov-2 universal testing could be a useful preventive tool in this challenging situation.

Conflict of interest: Each author declares that he or she has no commercial associations (e.g. consultancies, stock ownership, equity interest, patent/licensing arrangement etc.) that might pose a conflict of interest in connection with the submitted article.

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