

Managing Pregnancy During the Covid-19 Pandemic

ABSTRACT

COVID-19 has impacted the way we manage pregnancy, delivery and the postpartum period. Good obstetric care aims at preventing devastating complications by being knowledgeable on the routes of viral transmission, risk factors, clinical presentation and diagnostic findings. Maternal complications may include C-section, secondary maternal infection, pre-eclampsia, eclampsia, hyperglycaemia and mortality. Neonatal complications are mostly due to preterm delivery. Classifying disease severity allows the patient to be channeled into the appropriate care pathway. This allows a patient-centered approach to timely antenatal follow-up, screening, vaccination, delivery and neonatal care. Patient education and involvement of the mother in decision-making ensures a positive experience.

Keywords: COVID-19, pregnancy, neonate, complications, management

INTRODUCTION

Two years down the line, Malta is still fighting against the pandemic that is COVID-19. First identified in the city of Wuhan in China in December 2019, a strain called SARS-CoV-2 was found responsible for the pathogenicity of COVID-19.¹

Pregnant women have an equal chance of becoming infected with COVID-19 as the general population. However, its implications on maternal and fetal health may differ.

TRANSMISSION

The main method of transmission of COVID-19 is via respiratory droplets and contact with bodily fluids,

especially within the initial 3 days of symptoms. Fomites and the faeco-oral route represent other methods of transmission.

Vertical transmission is uncommon, with the likelihood of neonatal transmission increasing with higher maternal viral load. However, the method of delivery, timing of cord clamping, mode of feeding or maternal contact do not change the likelihood of viral transmission.² Vertical transmission may be evidenced by neonatal Immunoglobulin M against SARS-CoV-2.

The incubation time is on average 5-6 days, with some patients developing symptoms within 14 days from exposure.² Viral shedding may occur up to 3 days before developing symptoms.²

PATHOGENESIS

It is known that pregnancy upregulates Angiotensin-Converting Enzyme 2 (ACE2).³ Conversely, COVID-19 is associated with inhibition of the anti-inflammatory effects brought about by ACE2, along with enhanced angiotensin II function. Lymphopenia, demonstrated in two thirds of COVID-19 infected patients, can be explained by the inflammatory cascades which destroy these cells.⁴ In addition, endothelial damage is partly related to the presence of ACE2 receptors on the endothelial lining to which the coronavirus attaches.

The inflammatory response peaks during the first and third trimesters due to the pro-inflammatory stimulus provided by T Helper 1 cells.³ Also, the extent of virus elimination as well as maternal and neonatal complications vary with gestational age.

Interestingly, COVID-19 and pre-eclampsia share common features - mainly enhanced angiotensin II function, reduced ACE2 effect and potentiation of complement. This thus explains the increased risk of venous thromboembolism and endothelial cell damage seen in both conditions.

CLINICAL PRESENTATION

Over two thirds of pregnant women lack symptoms.² However, the maternal respiratory and cardiovascular adaptations may result in a delayed diagnosis of COVID-19 or increased morbidity.

Around 86% of pregnant women will have mild disease. 9% of pregnant women experience severe disease, with 5% manifesting life-threatening illness.² Red flags include tachypnoea, hypoxaemia, pulmonary crackles, stigmata of heart failure, arrhythmias, myocarditis and shock.

Pregnant women with COVID-19 mostly present with fever (40%) and cough (41%).² They may also experience myalgias (19%), breathlessness (21%), diarrhoea (8%), lack of taste (14%), lethargy and reduced appetite.² Other non-specific manifestations include sore throat, coryza, reduced sense of smell, nausea, vomiting and neurological manifestations such as seizures, encephalopathy and cerebrovascular accidents.¹

Affected pregnant women may manifest more severe symptomatology than non-pregnant women.² However, pregnant women have a lower risk of presenting with fever or myalgia.

Interestingly, while the Omicron variant is known to be more infectious, it manifests milder symptoms when compared to other variants such as the Delta variant.²

DIAGNOSIS

COVID-19 is typified by lymphopenia, thrombocytopenia and raised inflammatory markers. Liver enzymes and lactate dehydrogenase may also be elevated. A troponin rise may signify damage to the myocardium.

Viral and rapid antigen tests as well as serology are used to detect infection.⁵

Useful imaging modalities may include Chest X-Ray, Computed Tomography (CT) and pulmonary ultrasound. Chest X-Ray may demonstrate peripheral and lower lung zone opacities. CT may show bilateral ground glass appearance in 83% of gravid women, which may not be apparent until after the fourth day. Ultrasound may show thickened pleura and consolidations.

RISK FACTORS

The following increase the risk of infection and subsequent hospital admission:

- Age ≥ 35 years
- BMI ≥ 25 kg/m²
- Asian, Black or ethnic minority groups⁶
- Medical comorbidities present before pregnancy, exemplified by hypertension and diabetes⁶
- Poor socioeconomic background
- Occupations with frequent human interaction
- High viral load and elevated neutrophil-lymphocyte ratio.²

COMPLICATIONS

Maternal complications

Affected pregnant women are more likely to develop severe illness, with higher rates of intensive care (ICU) admission. Also, women who experience fever, dyspnoea and pneumonia have poorer maternal and neonatal outcomes.⁷

Infected pregnant women are thus at increased risk for the following:

- 17% risk of preterm delivery - In most cases this is iatrogenic, especially in symptomatic mothers.²
- 59% risk of C-Section²
- 25% risk of maternal mortality⁴
- Secondary maternal infections
- Pre-eclampsia and eclampsia
- Hyperglycaemia due to stress and antenatal corticosteroids.

Neonatal complications

COVID-19 does not increase the risk of congenital anomalies, stillbirth or neonatal mortality.² Effectively, 95% of neonates born to infected mothers are delivered healthy.² However, in the presence of maternal infection, 13% of neonates were found to be positive for COVID-19.⁷

The main neonatal risk associated with maternal infection is preterm delivery. This accounts for most of the perinatal morbidity and mortality such as fetal distress, low birthweight and higher rates of ICU admission.

MANAGEMENT

Antenatal Care

Pregnant women should be encouraged to attend their antenatal visits, with appropriate modifications to their visit schedule in cases of quarantine. In the latter cases, women should organize a visit as soon as possible. Patient-centered care calls are also made for quarantined high risk patients, which should be reviewed earlier, since they have a lower threshold for more aggressive management.

Women who had mild, moderate or asymptomatic disease need not be seen more frequently than non-affected patients. Women who suffered severe or critical disease with hospital admission should be followed up more closely, with a fetal ultrasound scan at 14 days following disease resolution, or earlier if the need arises.²

Educating women about concerning symptoms and signs, such as abdominal pain or headaches, bleeding, visual disturbances, presyncope, seizures, breathing difficulties and reduced fetal movement, is crucial for them to seek timely medical attention. Nevertheless, other diagnoses such as urinary tract infection and pulmonary embolism must be excluded.

Appropriate screening tools help in classifying disease severity and in guiding appropriate management. Screening should occur at every contact and appropriate questions regarding symptomatology and positive contacts

should be made. This allows patients who are suspected to have COVID-19 or are confirmed cases to be directed to the appropriate care pathway.

Healthcare professionals should be sensitive to the mother's mental wellbeing. With quarantine, loss, financial hardships, limited contact with support services and increased rates of domestic violence, psychological distress may be amplified. Thus, timely referral to support facilities is recommended.

Vaccinations

The importance of taking the recommended vaccines, including the flu vaccine, must be emphasised. In case of COVID-19 infection, women may resume routine vaccines after resolution of illness.²

The Malta College of Obstetricians and Gynaecologists is encouraging all pregnant women beyond 12 weeks of gestation to receive the COVID-19 vaccine, including the booster dose, since this is associated with a significant reduction in COVID-19 complications.^{8,9} It is also safe for lactating women, as well as those planning a pregnancy since there is no sound evidence that it causes fertility problems.⁸

Despite the Omicron variant being particularly infectious, pregnant women who have received three COVID vaccine doses exhibit an 88% reduction in the rate of hospital admission.²

Intrapartum Care

The approach towards labour must be patient-centered and led by a multidisciplinary team. At all times, the woman should be involved in the decision-making process and should not be denied skin-to-skin contact or delayed cord clamping.

COVID-positive women manifesting mild symptoms must present to the Labour Ward once the process of labour has been established, i.e. past the early latent stage of labour, unless the mother's state contraindicates this. Upon admission, parameters should be recorded every hour with continuous cardiotocography (CTG). The latter need not be offered continuously in asymptomatic women.

Cases of uncomplicated recovery from COVID-19 often do not require deviation from conventional labour management. Conversely, complicated recovery requiring hospital admission calls for a modified birth plan and frequent fetal growth monitoring.

Postpartum Care

It must be emphasised that mother and baby should not be separated, unless the mother has severe disease requiring ICU care.²

Neonates of suspected or confirmed cases can be tested for COVID-19 within 24 hours after birth, via nasopharyngeal, oropharyngeal or nasal swabs.¹⁰ The test can be repeated 48 hours after birth.¹⁰ A repeat

swab is especially important in high risk neonates. These include those born to COVID-positive mothers and those portraying highly suggestive symptoms.

COVID-positive mothers may still breastfeed since the risk of viral transmission is minimal and the benefits of breastfeeding and skin-to-skin contact by far outweigh the risks. However, mothers should be educated on infection control measures that reduce the risk of transmission to their baby. These include hand hygiene, washing of feeding devices, wearing a facemask as well as avoidance of coughing within the baby's proximity.^{10,11} Some mothers may also require help in daily neonatal care.

MEDICAL MANAGEMENT OF MATERNAL COVID-19 INFECTION

Symptomatic women should be treated as COVID-positive until infection can be excluded by a swab test. Febrile episodes should also prompt blood cultures to exclude bacterial infection.

The medical care of confirmed cases should be led by a multidisciplinary team with close follow-up by the leading obstetrician, especially if the woman exhibits unstable parameters.

Recording parameters every hour allows for escalation of treatment should the following be noted:

- Increased oxygen requirements
- Worsening tachypnoea
- Decreased urinary output
- Deranged renal function suggestive of acute kidney injury
- Reduced level of consciousness

Foetal heart monitoring is also vital, at intervals determined on a case-by-case basis.

Oxygen Therapy

One should aim for oxygen saturations of 94% to 98%.²

Fluid Therapy

Hourly input-output charting is advised, especially in moderate or severe cases. This ensures optimal hydration in preparation for delivery whilst avoiding fluid overload.

Antibiotic Therapy

Antibiotics may be administered in cases of suspected bacterial infection. Treatment must be revised especially in confirmed COVID cases, although antibiotic therapy may still hold if a secondary bacterial infection is suspected.

Venous Thromboembolism Prophylaxis

A comprehensive history quantifies the risk of venous thromboembolism and highlights comorbidities that might contraindicate low molecular weight heparin (LMWH) use.

Thromboembolism prophylaxis may be achieved by administering prophylactic LMWH along with thromboembolic deterrent stockings or pneumatic

compression devices. The latter may be used in isolation when LMWH is contraindicated or if there is a low platelet count. Platelet counts below $50 \times 10^9/L$ should instigate cessation of aspirin and LMWH until haematology review.²

A therapeutic dose of LMWH should be administered in suspected or confirmed cases of venous thromboembolism.

Antenatal Corticosteroids

Corticosteroids are key for women with severe COVID-19 disease, especially those requiring oxygen therapy. A 10-day course is usually administered, although shorter courses terminating on the day of discharge may be prescribed.¹ Steroids in the form of oral prednisolone or intravenous hydrocortisone may be used. Intramuscular dexamethasone may also be used if promotion of fetal lung development is required.

Other Medication

The decision to prescribe Remdesivir in pregnant or lactating women should be led by the multidisciplinary team and is only recommended in situations where the advantages exceed the risks, such as in women receiving oxygen therapy.² This is due to uncertainty regarding possible foetal effects.

On the other hand, Tocilizumab may enhance the survival of hypoxic patients with an ongoing inflammatory response who require oxygen therapy.² This is through blockade of interleukin-6 receptors.

Planning Delivery

The timing and mode of delivery should be jointly discussed with the mother and the multidisciplinary team, bearing in mind the maternal or foetal factors that may necessitate induction of labour or urgent delivery via a C-section. The obstetrician might also recommend corticosteroids and magnesium sulphate therapy in cases of premature delivery.

CONCLUSION

The COVID-19 pandemic, with all the uncertainties it has brought upon maternal and fetal medicine, has stirred much clinical research on how to adopt a safe practice that allows for optimal maternal and fetal wellbeing. Following updated versions of authorised clinical guidelines is crucial in the planning of good obstetric and neonatal care.

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