

Case Report

Lessons learned from first case of Cesarean delivery in a COVID-19 positive parturient in Greek region

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Abstract

We report the successful anesthetic management of a 24-year-old patient, with an active COVID-19 viral infection, scheduled for elective Cesarean section at 40th week of pregnancy. This was the first case in Greek region, and we report and discuss the difficulties and safety issues regarding a COVID-19 positive patient during an elective cesarean delivery. Regional anesthesia with full protective equipment for health personnel involved, along with careful planning and adherence to guidelines achieved safe completion of the operation.

Keywords: Anesthesia, Cesarean section, COVID-19

Background

We report the case of a 24-year-old woman, with an active COVID-19 viral infection, who was scheduled for elective cesarean section at 40th week of pregnancy. Because this was the first case in Greek region, we would like to report and discuss the difficulty and safety issues regarding management of surgery in pregnancy, in a COVID-19 referral centre tertiary hospital in Athens. A written consent for publication of data has been obtained from the patient.

Procedure

The patient presented with mild upper respiratory symptoms and fever five days before surgery, but COVID-19 was

officially diagnosed the day of delivery based on the diagnostic criteria established by the Hellenic National Public Health Organization (HNPHO).^[1] The patient on the day of cesarean delivery had only mild upper respiratory symptoms, no fever and normal laboratory results. She was scheduled for cesarean delivery due to obstetric reasons being already at the 40th week of pregnancy.

Pre-anesthetic assessment was performed over an inter-communication system, and only at the time of surgery the clinical examination and informed consent were established. At the time of surgery she had normal respiratory auscultation, normal electrocardiogram (ECG), an SPO₂ of 100% with nasal cannula with oxygen at 3 lt/min under a standard surgical mask, blood pressure (BP) of 107/47 mmHg and HR of 80 beats/min.

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The protocol followed regarding operating room preparation, personnel entry and exit was pre-determined according to the HNPFO^[2] and International guidelines.^[3-10] The operating room selected and used exclusively for parturients COVID-19 positive was without active aeration (since negative pressure OR was not available). The same room was used for patient's Post-Anesthesia care until transfer to ward [Figure 1] The parturient was transferred between the isolation ward and the operating room and reversibly by staff appropriately protected, and she wore a regular surgical mask throughout the process.

The minimum personnel required were implicated according to instructions (2 obstetricians, 1 anesthesiologist, 1 anesthesiology nurse, 1 scrub nurse, 1 circulating nurse/midwife were into the operating theatre) Appropriate personal protective equipment (PPE) (coverall Tyvec gown, FFP3 mask, glasses, double gloves head cover and shoe covers) [Figure 2] was applied and removed at a designated anteroom. Medical personnel entered and exited the operating room in strict accordance with the published guidelines regarding clean and contaminated area.^[3-9] A designated nurse ensured the implementation of standard procedures. Also, a 'runner' nurse was designated to be in the 'clean' area and help throughout the procedure. All selected anesthetic equipment required, were brought into the operating theatre, but the video laryngoscope was kept outside in case needed for emergency intubation.

Standard monitoring was applied to the parturient at arrival in the operating theatre). Two 18G IV cannulae were inserted and combined spinal-epidural anesthesia (CSEA) was performed at L3-4 interspace. The insertion of an epidural catheter was selected in order to be able to administer subsequent doses of anesthetic in cases of inadequate

spinal anesthesia or surgical delay, and avoid endotracheal intubation.^[10-13] A total of 1.35 mg of ropivacaine 0.75% (1.8 ml), with 20 µg fentanyl were administered intrathecally. The epidural catheter was inserted and stabilized 5 cm into the epidural space. Cesarean section was uneventful, with the newborn having an APGAR score of 8 and 9 at 1st and 5th minute, respectively. The operation lasted 1 hour. The patient was hemodynamically stable during the procedure and did not exhibit increased demand for vasopressors'. Postoperative analgesia was achieved with wound infiltration with ropivacaine 0.375% (20 ml), paracetamol 1 g, and tramadol 100 mg.

Postoperatively, the patient was kept in the operating theatre for monitoring for two hours, during which she was hemodynamically stable. After recovery from anesthesia, the epidural catheter was removed in the operating theatre.

Postoperative care of the patient was performed in a designated Covid ward by HCWs in appropriate PPE (FFP2, gowns, double gloves, goggles, face shield, protective boots) as per our institutional personnel safety protocol Post-operative analgesia included paracetamol (1 g every 8 hours), and tramadol 100 mg as required (up to 3 doses/24 h), and ondasetron (8 mg every 12 hours). The baby was kept apart from the mother for 15 days.^[11-12] Routine postoperative neurological assessments of the patient following epidural catheter removal were performed via the ward nurses after questioning about vital signs, numbness of the lower extremities, movement, mobilization and urination. All information was delivered via telephone by a member of Acute Pain Service.

As for disinfection protocol, immediately after the end of the surgery, the nursing staff involved discarded all disposable materials and disinfected the surgical instruments that had been used. Chlorine solution 5000 ppm/litre of water was

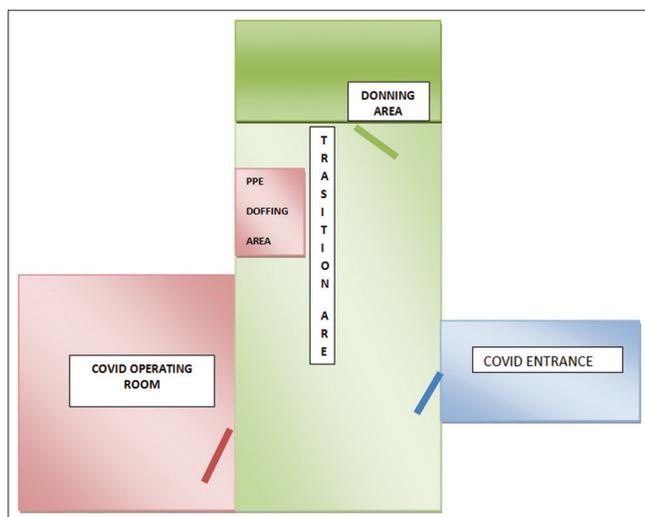


Figure 1: Diagram of operating theatre and entrance/exit with clear and donning areas



Figure 2: Full protection high-level PPE applied for cesarean section delivery

applied, which was left on for 30 minutes. After that, the instruments were washed out and then soaked into CIDEX OPA solution for 20 minutes, according to the manufacturer's instructions. After the patient was moved to the clinic, the Operation Room was disinfected with chlorine solution 5000 ppm/litre of water as above and with 70% alcohol solution by specially trained personnel wearing proper PPM.

Discussion

Neuraxial anesthesia techniques including CSEA, represent the first choice for cesarean section delivery in order to avoid endotracheal intubation, which could induce or exacerbate pulmonary complications and also induce viral spread, since it is an aerosol-generating procedure.^[11-13] General anesthesia remains certainly an option in cases of maternal or fetal emergencies, or for patients with contraindications to regional techniques or regional failure.^[11-13] In this case, the indicated protocol for COVID-19 parturients undergoing cesarean section under general anesthesia should be followed. Our case was completed uneventful due to adherence to available guidelines that have been developed by our Department of Anesthesiology in accordance to existing literature and have been adopted by the Hellenic Society of Anesthesiology.^[14]

Chen *et al.*,^[13] reported the outcome of 17 parturients who underwent cesarean section delivery, 14 with regional and 3 with general anesthesia. They performed a chest CT-scan to diagnose ground-glass pneumonia, and they report that all 17 patients presented with multiple patchy ground-glass opacities. In our case, no CT scan was performed before delivery. This is a point of discussion, since neuraxial anesthesia is the method of choice for parturients who do not have contraindications. Therefore, regional anesthesia, would have been performed with or without a preoperative chest CT-scan. In addition, the patient had mild symptoms, without lower respiratory compromise and a normal SPO₂ before the procedure. So, her clinical presentation did not indicate the necessity of a preoperative chest CT scan.

As for regional anesthesia per se, no differences compared to a normal patient were recorded, as stated also by Chan *et al.*,^[13] as for the onset of block, hemodynamic stability, and time required for recovery. Regarding hypotension reported in the study by Chan, the hypothesis behind this is that COVID-19 can interfere with angiotensin-converting enzyme-II receptor, leading possibly to more hypotension compared to normal parturients.^[13] However; we did not have such a finding, since the patient exhibited only mild, transient hypotension that was successfully managed with small doses of ephedrine.

Postoperative analgesia was based on paracetamol and tramadol, despite existing concerns about the use of tramadol in nursing mothers, as the mother would not breastfeed her baby. Although, non-steroidal anti-inflammatory drugs (NSAIDs) are an integral part of the gold standard of managing pain after caesarean delivery, in this case, we withheld their use, since guidance on NSAIDs and COVID-19 infection is still under investigation.^[15] Systemic antiemetic prophylaxis was also prescribed according to recommendations, in order to minimise postoperative retching and virus spread.

Regarding precautions about COVID-19, the protocol used seemed to be adequate, since no one was infected during surgery. Since we have adopted this strict protocol concerning full PPE for HCWs even for regional anesthesia techniques as for Aerosol Generating Procedures/AGP and no breach of the protocol was observed the personnel involved was not tested for COVID-19, unless they become symptomatic as per our institutional personnel safety protocol. Everybody was screened through careful observation of symptoms and temperature measurement daily.

Although there was no negative pressure transfer unit and the operating theatre was also not of negative pressure, but the air chambers were sealed, air-spread of the virus was not confirmed. It is worth noting that none of the personnel involved has developed any COVID-19 clinical signs. It seems that the appropriate donning and doffing of PPE by all personnel involved along with the use of a surgical mask to the parturient throughout the procedure further reduce spread of droplets and aerosols.

Difficulties during the whole procedure included the high temperature of the operating theatre, the difficulty of performing techniques with the PPE and the adherence to biosafety precautions continuously. However, the absence of a telephone in order to have immediate communication with the anesthetic department for help and with the transfusion department for blood products, and the limitation of equipment could be problematic in case of major obstetric hemorrhage. In easy and uncomplicated cases such as this, no further requirements would be necessary. However, if the cesarean section was more emergent or required more equipment (i.e., ultrasound guided central venous catheter insertion, arterial line, etc.), it would be problematic, since the 'runner' nurse should bring all the additional equipment and make all the required contacts, which would be very time consuming.

Furthermore, the neurologic assessment of the patient after epidural catheter removal and postoperative care was also problematic, since the anesthesiology team had to obtain information from the ward nurses and only in cases of neurologic

symptoms to perform a thorough clinical examination in order to minimise both staff exposure and PPE consumption.

Conclusions

Our experience may be helpful in planning management of suspected or confirmed COVID-19 obstetric patients undergoing cesarean section, especially in centres with no experience so far. Key points include:

- A thorough planning and adherence to guidelines
- Adherence to strict protocols regarding personal protective equipment (PPE), as well as operating room entry/exit and equipment protection and disinfection
- Involvement of the least personnel
- Selection of anesthesia based on clinical characteristics of the patient. However, in most cases regional anaesthesia is the method of choice for caesarean section delivery. All airway devices to treat emergency intubation based on the guidelines for intubating COVID-19 patients should be immediately available
- Postoperative analgesia as usual, with special ward measures taken for patients with COVID-19 positive patients.

However, each centre's unique characteristics and practice may require modifications and flexibility to ensure better outcomes.

Ethics approval

The study protocol conforms to the ethical guidelines of the 1975 Declaration of Helsinki.

Declaration of patient consent

An Informed consent was obtained from the patient of the case report.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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