Cesarean Delivery in Patient under Investigation for COVID-19: A Case Report

Namtip Triyasunant

Department of Anesthesiology, Faculty of Medicine, Siriraj Hospital, Mahidol University, Bangkok 10700, Thailand

The novel coronavirus disease 2019 (COVID-19) is rapidly spreading across the world. The clinical data in COVID-19 parturient remains limited. This article aims to share clinical experience in perioperative management of 41 year old patient under investigation (PUI) for COVID-19 underwent emergency cesarean section. Cesarean delivery was operated in a designated operating theater. Some difficulties occurred during performing spinal anesthesia due to layers of clothing and gloves (personal protective equipment, PPE), however the operation and the anesthesia were uneventful. The result of COVID-19 RNA viral test was subsequently negative. The anesthesia management for cesarean section during COVID-19 outbreak has been discussed.

Keywords: COVID-19, cesarean delivery, pregnancy

วิสัญญีสาร 2563; 46(3) ฉบับพิเศษ: 61-65. • Thai J Anesthesiol 2020; 46(3) supplement: 61-65.

Introduction

The 2019-novel coronavirus or SARS-CoV-2, causing coronavirus disease 2019 (COVID-19) outbreak in Wuhan, China is rapidly spreading across the world. The World Health Organization (WHO) has declared COVID-19 a pandemic.[1] However, there are limited clinical evidences on maternal and neonatal outcomes. This article aims to share clinical experience as an anesthesiologist's perspective in perioperative management of patient under investigation (PUI) for COVID-19 infection who underwent cesarean section.

Case report

A 41-year-old woman who was 38 week pregnant (gravida 2, para 1) presented to the emergency department with dyspepsia for 2 hours. She had pre-existing chronic hypertension for a year and she had been taking methyldopa 250 mg/day. She attended antenatal clinic regularly. Her first baby was born by cesarean delivery under spinal anesthesia 4 years ago. At the beginning, she had no headache or visual disturbance. On physical examination, she was obese, body weight was 86 kg and height was 163 cm with body mass index 32 kg/m^2. She was afebrile, pulse rate 112 beats /min, respiratory rate 16 beats/min, blood pressure 156/116 mmHg. Results of cardiovascular, respiratory and central nervous system examinations were unremarkable. She was admitted to labor unit for further investigations and observation for preeclamptic condition.

The laboratory study results were as follow: CBC; hemoglobin 14.1 g/dl hematocrit 41.5% , slightly raised of white blood cell count of 11,180 /mm^3 with a differential of 84.6% neutrophil, 10.4% lymphocyte, platelet count 301,000 /mm^3, BUN 7.8 mg/dl creatinine 0.54 mg/dl, uric acid 4.7 mg/dl. Serum electrolytes, liver function test and coagulogram were within normal limits. Electrocardiogram showed sinus tachycardia with heart rate 110 beats/min. Urine examination revealed no proteinuria and urine protein: creatinine ratio was 0.2. She was diagnosed with chronic hypertension without preeclampsia. Two hours later, she had painful

Correspondence to: Namtip Triyasunant, MD., E-mail: triyasunant@yahoo.com

Received 25 May 2020, Revised 29 May 2020, Accepted 29 May 2020

uterine contraction and she developed fever. An infectious disease specialist was consulted for risk assessment of COVID-19 infection.

The patient had been working at outpatient unit as a physical medicine and rehabilitation (PM&R) officer at a government hospital in Bangkok until the day before arrival. She had never worked at acute respiratory tract infection (ARI) clinic. She had no history of contact with a confirmed COVID-19 patient. She and her family members had not travelled abroad recently. She had no symptoms of respiratory tract infection such as cough, sore throat, nasal congestion or dyspnea. On physical examination, her body temperature was 38 ^{0}C, pulse rate 110 beats /min, respiratory rate 18 beats/min, blood pressure 150/100 mmHg. Breath sounds were normal without adventitious sounds. The cause of fever was still undetermined. The consulted infectious disease specialist had declared her as patient under investigation (Table 1 in the supplementary appendix). An obstetrician in charge decided to schedule her for cesarean section due to previous cesarean delivery in labor. The teams including obstetrician, anesthesiologist, neonatologist and scrub nurse teams were notified.

Operating theater and personnel preparation

An isolated operating theater had been equipped beforehand. Anesthetic machine, monitoring devices and medication carts were wrapped with plastic sheet to avoid viral contamination. A mobile high efficiency particulate air (HEPA) filter was moved to the operating room. A prepared tray containing the essential supplies and drugs for neuraxial block were brought to the operating room. The airway devices and medications for general anesthesia were also available in the designated area outside the operating room. To minimize personnel exposure, each team consisted of two persons. All medical staffs in operating room wore maximal personal protective equipment (PPE) including a long-sleeved plastic gown with hood, surgical cap, plastic apron, face shield, N95 respirator mask, nitrite gloves, disposable rubber gloves and shoe covers. Additional staffs such as circulating nurses who worked outside the isolation area wore airborne personal protective equipment including a long-sleeved plastic gown without hood, surgical cap, face shield, N95 respirator mask and nitrite gloves.

Anesthetic technique for cesarean delivery

Standard monitoring including non-invasive blood pressure, electrocardiogram, and pulse oximetry were applied. The patient wore a surgical mask. The oxygen saturation was 96-100% while she was breathing room air. Nasopharyngeal swab and throat swab for SARS-CoV-2 (COVID-19) RNA viral test were obtained by an obstetrician in the operation theater. Spinal anesthesia was established with the patient in the lateral position, using a 25G Whitacre needle. The 0.5% hyperbaric bupivacaine with 0.2 mg morphine, total volume 2.2 ml was administered. Then the patient was turned supine with a 15° left lateral tilt (left uterine displacement). Anesthetic level was achieved at the fourth thoracic dermatome bilaterally. The neuraxial block was technically difficult by several factors. Patient factor was high body mass index and thickness of subcutaneous tissue at back. Personal protective equipment (PPE) which had multiple layers of clothing resulted in heat production and encapsulated sweat. Sweat droplets at face obscured visibility during the procedure. In addition, wearing 3 layers of medical gloves including nitrite gloves, disposable rubber gloves and sterile gloves caused difficulty in palpating anatomical landmarks. Obstetrician also encountered some difficulty resulted from fogging up in their goggles and eye-glasses. Fortunately, the operation was uneventful. Hypotension and tachycardia occurred briefly after intrathecal injection. Intraoperative hemodynamics was maintained by using few doses of norepinephrine. Maternal oxygenation was with in normal range without supplemental oxygen. A healthy baby boy weighing 3,480 gram was delivered with Apgar score of 8 and 9 at 1 and 5 min, respectively. Immediately after delivery, the baby was transferred to separated room and skin contact between mother and infant was not permitted. Operative time was 1 hour 15 minutes. Surgical blood loss was 350 ml. After operation was finished, the patient was monitored in the operating room for 1 hours and 30 minutes until she was stable.

Postoperative care

The patient was transferred in a plastic-cover isolation stretcher to the designated isolation ward. Postoperative period was uneventful. Nasopharyngeal swab and throat swab for COVID-19 RNA viral test showed that the virus was not detected. The patient was subsequently transferred to general postpartum ward. She was discharged home with the baby on hospital day 5.

Discussion

As the previous influenza pandemics, pregnant patient had been reported as higher risk for severe complications and increased mortality rate compared with the general population.[2, 3] Accordingly, possible severe adverse outcomes in COVID-19 pregnancy such as spontaneous abortion, preterm delivery, intrauterine growth restriction, fetal distress and maternal death have been greatly concerned. Nevertheless, a retrospective case control study by Li N, et.al had shown most COVID-19 parturients had no or mild respiratory symptoms and fever was the dominant presenting symptom. No severe maternal and fetal complications had been reported even in parturients with peripartum pneumonia.[4] A retrospective review studied in New York City hospitals similarly showed that more than 80% of COVID-19 parturients had asymptomatic or mild respiratory symptoms.[5] Universal testing for women admitted for delivery indicated an unexpected number of asymptomatic cases.[5, 6] The choice and timing of delivery should be individualized depending on gestation age, maternal and fetal conditions.[7, 8] Based on recent evidences, COVID-19 infection is not a contraindication to neuraxial anesthesia.[9] In laboring women, it is recommended to provide early epidural labor analgesia to avoid exacerbation of respiratory symptoms and reduce the chance for general anesthesia in emergency conditions.[9, 10] For scheduled cesarean delivery, spinal anesthesia is recommended as the primary anesthetic technique if no contraindication.[11, 12] Prior to neuraxial block, complete blood count including platelet count must be obtained. According to preliminary report from China showed that thrombocytopenia may be associated with COVID-19 infection.[13] A meta-analysis of 9 studies revealed that platelet count was significantly lower in patients with more severe COVID-19 infection.[14] It is principally safe to perform neuraxial block at platelet counts of 70,000/mm^3 or above.[10]

Intraoperative sedation should be suspended to decrease the requirement for airway manipulation or interventions.[15] In case supplementary oxygen is required, the oxygen mask should be applied over the surgical mask.[11] It is recommended to administer low flow supplemental oxygen at below 5 L/min to reduce the risk of aerosolization.[10,15] General anesthesia with rapid sequence induction must be prepared as a backup plan in case of unsuccessful neuraxial block or conversion to general anesthesia is indicated.[11] To minimize droplet spreading, it is recommended to cover the patient's nose and mouth with two layers of wet gauze and place the face mask over the wet gauze during preoxygenation. To prevent coughing during intubation, adequate doses of neuromuscular blocking agent should be administered. Oral intubation using a video-laryngoscope with disposable blade is suggested.[11] For the management of post-dural puncture headache (PDPH) in COVID-19 parturient, there is recommended to try conservative treatment initially. To avoid the risk of injecting viremic blood in the epidural space, epidural blood patch should be suspended until the infection had been subsided.[10,16] Other treatment procedures such as sphenopalatine ganglion block which is aerosol-generating procedure may increase the risk of viral transmission to healthcare providers. Therefore, it should be avoided as well.[10,16] Even the risk of intraoperative viral transmission from a mildly symptomatic patient who received neuraxial anesthesia is quite low, because this is not an aerosol-generating procedure. The maximal personal protective equipment should be applied to all in-room medical personnels to reduce the risk of acquiring COVID-19.[12, 17] Prophylactic antiemetics should be administered to prevent vomiting which resulted in viral spreading perioperatively.[10, 18] Although, the vertical transmission via placenta or during cesarean section

had not been proved, a newborn should be isolated from infected mother.[11, 18] Because of asymptomatic COVID-19 presentations are common, the protocol in screening all patients presenting to hospital for signs, symptoms, or risk factors for COVID-19 should be established. All patients must wear a surgical mask at all times to minimize droplet spreading.[10, 11, 18] In high prevalence communities, universal testing with nasopharyngeal swabs and real-time reverse transcriptase-polymerase chain reaction (RT-PCR) tests in all pregnant women admitted to the labor unit should be implemented.[5, 6, 10]

Conclusion

Due to the ongoing COVID-19 pandemic, screening procedure for all pregnant women admitted to the labor unit should be operated. The isolated operating room must be equipped for airborne precaution. The anesthesia equipment, supplies and medications should be available in designated area. All involved healthcare providers should strictly adhere to the standard infection prevention.

References

1. Cucinotta D, Vanelli M. WHO declares COVID-19 a pandemic. Acta Biomed 2020;91:157-60.
2. Rasmussen SA, Jamieson DJ, Bresee JS. Pandemic influenza and pregnant women. Emerg Infect Dis 2008;14:95-100.
3. Jamieson DJ, Honein MA, Rasmussen SA, et al. H1N1 2009 influenza virus infection during pregnancy in the USA. Lancet 2009;374:451-8.
4. Li N, Han L, Peng M, et al. Maternal and neonatal outcomes of pregnant women with COVID-19 pneumonia: a case-control study. Clinical Infectious Diseases 2020. doi: 10.1093/cid/ciaa352.
5. Breslin N, Baptiste C, Gyamfi-Bannerman C, et al. COVID-19 infection among asymptomatic and symptomatic pregnant women: two weeks of confirmed presentations to an affiliated pair of New York City hospitals. Am J Obstet Gynecol MFM 2020 Apr 9. DOI: 10.1016/j.ajogmf.2020.100118
6. Sutton D, Fuchs K, D'Alton M, Goffman D. Universal screening for SARS-CoV-2 in women admitted for delivery. N Engl J Med 2020 Apr 13. DOI: 10.1056/NEJMc2009316
7. Favre G, Pomar L, Qi X, Nielsen-Saines K, Musso D, Baud D. Guidelines for pregnant women with suspected SARS-CoV-2 infection. Lancet Infect Dis 2020 Mar 3. DOI:https://doi.org/10.1016/S1473-3099(20)30157-2
8. Rasmussen SA, Smulian JC, Lednicky JA, Wen TS, Jamieson DJ. Coronavirus disease 2019 (COVID-19) and pregnancy: what obstetricians need to know. Am J Obstet Gynecol 2020; 222:415-26.
9. Boelig RC, Manuck TA, Oliver EA, et al. Labor and delivery guidance for COVID-19. Am J Obstet Gynecol MFM 2020 Mar 25. DOI: 10.1016/j.ajogmf.2020.100110
10. Bauer M, Bernstein K, Dinges E, et al. Obstetric anesthesia during the COVID-19 pandemic. Anesth Analg 2020 Apr 6. DOI: 10.1213/ANE.0000000000004856
11. Chen X, Liu Y, Gong Y, et al. Perioperative management of patients infected with the novel coronavirus: recommendation from the Joint Task Force of the Chinese Society of Anesthesiology and the Chinese Association of Anesthesiologists. Anesthesiology 2020;132:1307-16.
12. Zhong Q, Liu YY, Luo Q, et al. Spinal anaesthesia for patients with coronavirus disease 2019 and possible transmission rates in anaesthetists: retrospective, single-centre, observational cohort study. BJA 2020;124:670-5.
13. Guan W-j, Ni Z-y, Hu Y, et al. Clinical Characteristics of Coronavirus disease 2019 in China. N Engl J Med 2020;382: 1708-20.
14. Lippi G, Plebani M, Henry BM. Thrombocytopenia is associated with severe coronavirus disease 2019 (COVID-19) infections: A meta-analysis. Clinica Chimica Acta 2020;506:145-8.
15. Uppal V, Sondekoppam RV, Landau R, El-Boghdadly K, Narouze S, Kalagara HKP. Neuraxial anaesthesia and peripheral nerve blocks during the COVID-19 pandemic: a literature review and practice recommendations. Anaesthesia 2020 Apr 28. DOI: 10.1111/anae.15105
16. Breslin N, Baptiste C, Miller R, et al. COVID-19 in pregnancy: early lessons. Am J Obstet Gynecol MFM 2020 Mar 27. doi.org/10.1016/j.ajogmf.2020.100111
17. Chen R, Zhang Y, Huang L, et al. Safety and efficacy of different anesthetic regimens for parturients with COVID-19 undergoing Cesarean delivery: a case series of 17 patients. Can J Anaesth 2020;67:655-63.
18. Zucco L, Levy N, Ketchandji D, Aziz M, Ramachandran SK. Perioperative considerations for the 2019 Novel Coronavirus (COVID-19). Anesthesia Patient Safety Foundation [Internet]. 2020 [cited 2020 May 10]. Available from; https://www.apsf.org/news-updates/perioperative-considerations-for-the-2019-novel-coronavirus-covid-19.

Supplementary Appendix

Table 1 Definition of patient under investigation (PUI) for COVID-19 infection, from Department of Disease Control, Ministry of Public Health, Thailand.

นิยามผู้ป่วยที่ต้องสอบสวนโรคติดเชื้อไวรัสโคโรนา 2019 (Patient Under Investigation: PUI) ฉบับวันที่ 3 เมษายน 2563

อาการและอาการแสดง	ปัจจัยเสี่ยง
กรณีที่ 1 การเฝ้าระวังที่ด่านควบคุมโรคติดต่อระหว่างประเทศ ผู้ป่วยมีอาการ และอาการแสดง ดังนี้ อุณหภูมิร่างกายตั้งแต่ 37.3 องศาเซลเซียสขึ้นไป **หรือ**อาการของระบบทางเดินหายใจอย่างใดอย่างหนึ่ง ดังต่อไปนี้ ไอ น้ำมูก เจ็บคอ หายใจเหนื่อย หรือหายใจลำบาก	**ร่วมกับ** มีประวัติเดินทางไปยัง หรือ มาจาก**ต่างประเทศ**ทุกเที่ยวบินทุกช่องทางระหว่างประเทศ
กรณีที่ 2 การเฝ้าระวังในสถานพยาบาล **กรณีที่ 2.1** ผู้ป่วยมีอาการ และอาการแสดง ดังนี้ อุณหภูมิร่างกายตั้งแต่ 37.5 องศาเซลเซียสขึ้นไป หรือให้ประวัติว่ามีไข้ในการป่วยครั้งนี้ **ร่วมกับ** มีอาการของระบบทางเดินหายใจอย่างใดอย่างหนึ่ง ดังต่อไปนี้ ไอ น้ำมูก เจ็บคอ หายใจเหนื่อย หรือหายใจลำบาก **หรือ** มีโรค**ปอดอักเสบ**	**ร่วมกับ** การมีประวัติในช่วงเวลา **14 วัน** ก่อนวันเริ่มป่วย อย่างใดอย่างหนึ่งต่อไปนี้ 1) มีประวัติเดินทางไปยัง หรือ มาจาก หรืออยู่อาศัยใน**พื้นที่เกิดโรค**ติดเชื้อไวรัสโคโรนา 2019 2) ประกอบ**อาชีพ**ที่เกี่ยวข้องกับ**นักท่องเที่ยว สถานที่แออัด หรือติดต่อกับคนจำนวนมาก** 3) ไปใน**สถานที่ชุมนุมชน** หรือ สถานที่ที่มี**การรวมกลุ่มคน** เช่น ตลาดนัด ห้างสรรพสินค้า สถานที่พยาบาล หรือ ขนส่งสาธารณะ **4) สัมผัสกับผู้ป่วยยืนยัน**โรคติดเชื้อไวรัสโคโรนา 2019
กรณีที่ 2.2 ผู้ป่วยโรคปอดอักเสบ	**ร่วมกับ** ข้อใดข้อหนึ่งดังต่อไปนี้ 1) หาสาเหตุไม่ได้ หรือ รักษาแล้วไม่ดีขึ้นภายใน 48 ชั่วโมง 2) มีอาการรุนแรง หรือ เสียชีวิตโดยหาสาเหตุไม่ได้ 3) ภาพถ่ายรังสีปอดเข้าได้กับโรคติดเชื้อไวรัสโคโรนา 2019
กรณีที่ 3 การเฝ้าระวังในบุคลากรด้านการแพทย์ และสาธารณสุข อุณหภูมิกายตั้งแต่ 37.5 องศาเซลเซียสขึ้นไป หรือประวัติมีไข้ **หรือ**อาการของระบบทางเดินหายใจอย่างใด อย่างหนึ่ง ดังต่อไปนี้ ไอ น้ำมูก เจ็บคอ หายใจเหนื่อย หรือหายใจลำบาก หรือมีโรคปอดอักเสบ	**ทุกราย**
กรณีที่ 4 การเฝ้าระวังการป่วยเป็นกลุ่มก้อน กลุ่มก้อน (cluster) ของผู้มีอาการติดเชื้อระบบทางเดินหายใจ (Acute respiratory tract infection) ที่ผลตรวจ rapid test หรือ PCR ต่อเชื้อไวรัสไข้หวัดใหญ่ให้ผลลบจากทุกรายที่มีการส่งตรวจ	• **กรณีเป็นบุคลากรทางการแพทย์** ตั้งแต่ 3 รายขึ้นไป ในแผนกเดียวกัน ในช่วงสัปดาห์เดียวกัน (หากสถานพยาบาลขนาดเล็ก เช่น คลินิก ใช้เกณฑ์ 3 รายขึ้นไปในสถานพยาบาลนั้นๆ) • **กรณีบุคคลในสถานที่แห่งเดียวกัน (ไม่ใช่บุคลากรทางการแพทย์)** ตั้งแต่ 5 รายขึ้นไป ในช่วงสัปดาห์เดียวกัน โดยมีความเชื่อมโยงทางระบาดวิทยา