





CLINICAL OVERVIEW

Early Essential Newborn Care can still be used with mothers who have COVID-19 if effective infection control measures are applied

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Abstract

We describe the first infant born to a woman with COVID-19 in Vietnam, by Caesarean section at 36 weeks and 5 days of gestation. The mother and baby remained together during their hospital stay and prolonged skin-to-skin contact and early and exclusive breastfeeding were achieved. This was in line with the World Health Organization's Early Essential Newborn Care (EENC) recommendations, the national Vietnamese standard of care since 2014. The baby remained virus-free throughout the 34-day postpartum follow-up.

Conclusion: The EENC approach can still be used with mothers who have COVID-19 if effective infection control measures are applied.

KEYWORDS

breastfeeding, Caesarean section, COVID-19, Early Essential Newborn Care, skin-to-skin contact

Early pandemic guidance was that mothers with COVID-19 should be separated from their babies immediately to avoid perinatal transmission.¹⁻³ However, emerging evidence has shown that placental, amniotic fluid and breast milk samples are usually virus-free. Newborn infections are uncommon, not severe and usually come from contact with infected carers or family.⁴⁻⁷ Unnecessary separation increases crowding in clinical areas, including neonatal intensive care units (NICU), and exposes newborn infants to contact with potentially contaminated staff, surfaces and unrelated infants.⁸ Although COVID-19 increases prematurity and maternal intensive care

admissions, most infected women have a mild disease.⁹ Therefore, the World Health Organization (WHO) recommends that early essential newborn care (EENC), including prolonged skin-to-skin contact (SSC), rooming-in and exclusive breastfeeding, are used when stable mothers have COVID-19, because of strong associations with improved maternal and newborn outcomes.^{10,11} Despite this, policymakers and clinicians often recommend early separation to avoid perceived transmission risks.

By 16 February 2021, there had been 2269 confirmed virus cases and 35 deaths in Vietnam.¹² Only three were pregnant women

Abbreviations: EENC, early essential newborn care; NICU, neonatal intensive care unit; CPAP, continuous positive airway pressure; SSC, skin-to-skin contact; PPE, personal protective equipment.

with COVID-19 during labour. We describe using EENC for the first COVID-19 delivery in Vietnam, at the Hoa Vang Medical Centre, a 170-bed district hospital in Da Nang City, assigned to manage COVID-19 cases. Written, informed consent was provided by the mother and the hospital approved the case study.

The 35-year-old woman was expecting her third baby and tested positive for the virus at 34 weeks and 4 days of gestation in July 2020. She apparently caught the virus when she was admitted to Da Nang General Hospital with a urinary tract infection at 32 weeks. Four days after discharge, she developed flu-like symptoms and tested positive. She was admitted to Hoa Vang Medical Centre with mild symptoms. Labour started at 36 weeks and 5 days and she had a Caesarean section, like her previous two deliveries.

The mother was informed about the importance of EENC and the infection control methods that she, staff and family members would need to follow. Additional sterile cloths for drying the baby were placed on the surgical tray and the neonatal resuscitation area was placed within two metres of the operating table. The surgical team comprised two obstetricians and one surgical assistant, an anaesthesiologist and assistant, midwife, neonatologist and senior neonatal nurse, all in full personal protective equipment (PPE). The woman wore a surgical mask and received spinal anaesthesia.

The postnatal room had two separate adult beds 2 m apart, a neonatal incubator, a continuous positive airway pressure (CPAP) machine, a ventilator and a cardiopulmonary monitor. Alcohol hand gel and medical masks were supplied, along with sterile daily baby packages, including towels, hats and clothes. Waste disposal followed the hospital's regulations. The room's door and windows were opened for natural ventilation. One midwife and three general nurses worked in three shifts. An obstetrician, neonatologist and senior neonatal nurse monitored the dyad's progress.

The surgeon thoroughly dried the baby immediately after birth, covered with a sterile cloth and placed on a sterile drape on the mother's thighs. The baby was vigorous and crying. The cord was clamped and cut after 1 minute, when pulsations had stopped. The midwife transferred the baby into SSC on the mother's bare chest. The baby displayed grunting, tachypnoea and respiratory distress 5 min after birth and was provided with CPAP via nasal prongs, with a positive end expiratory pressure of 6 cmH₂O and oxygen concentration of about 30%. SSC continued during CPAP (Figures 1). The baby's oxygen saturation was 94%–95% at 15 min, and the oxygen concentration was then reduced to 25% and 21%. At 40 min after birth, her saturation was 96%–98%, her heart rate was 170–180 beats/min and CPAP was withdrawn. At 45 min, the dyad were taken to the postnatal care room in SSC.

The baby was afebrile, with no feeding cues 2 h after birth. She received drops of her mother's expressed colostrum from a syringe and five millilitres of pasteurised donor breast milk, as the mother could not express more breast milk. After 3 h of SSC, the baby was swaddled and placed next to her mother. At 4 h, the baby demonstrated feeding cues and breastfed for around 5 min. However, she did not feed strongly and was given about 5 ml of pasteurised donor



FIGURE 1 Receiving continuous positive airway pressure (CPAP) during skin-to-skin contact (SSC) after the Caesarean section



FIGURE 2 Breastfeeding during hospitalisation in an isolation room

milk after each attempt. On day 2, she breastfed well and the donor milk stopped (Figures 2). By day 5, she was in good condition and weighed 3000 g, with mild jaundice.

All staff wore full PPE in the room. Only one nurse cared for the baby at any time, except for special situations. The mother wore medical masks, especially when holding the baby or in close contact. These were changed every 4–6 h or when they felt wet. She washed

her hands before and after caring for her baby. The dyad shared the same bed to establish breastfeeding. The baby was periodically placed in the second bed, 2 m away. Extra breast cleaning with soap and water was recommended if the woman was coughing or producing evident secretions.

Real-time polymerase chain reaction (PCR) virus testing was carried out at specific timepoints. The mother tested positive at the time of surgery, but the umbilical cord blood, placenta, amniotic fluid and breast milk samples tested negative. Three follow-up tests on the dyad were also negative. When her baby was 5 days old, the mother tested positive for virus antibodies, 26 days after becoming symptomatic. The dyad were discharged on day 7 when both tested negative.

The neonatologist video called the mother every 2 days for the first week after discharge and then every 3 days during the second week. The mother tested positive for the virus 14 days after discharge and was readmitted with her baby, despite being asymptomatic. The mother was tested 8 times over the next 13 days, 34 days after the birth, and the baby was tested 7 times. The last samples were taken 2 days after discharge. The mother's first three tests were positive, then negative. All the baby's tests were negative. The dyad remained healthy, and at 5 months, the baby weighed 7.5 kg and was exclusively breastfed.

We effectively managed this Caesarean birth to a COVID-19 infected mother without separating the dyad. No transmission occurred despite 180 min of uninterrupted SSC, feeding the baby colostrum, exclusive breastfeeding and rooming-in from the first hours of life. This echoed 120 infants born to 116 mothers with COVID-19 in three US hospitals, who received SSC, early and exclusive breastfeeding and mostly roomed-in. None tested positive for the virus 14 days after birth.¹³ Our baby tested negative up to 34 days of life. The mother tested positive again for the virus after negative tests, but false-positives due to retained viral fragments are considered likely.¹⁴

Vietnam uses EENC evidence-based interventions that prevent, or manage, the most common causes of newborn morbidity and mortality. EENC requires that mothers and babies are kept together for at least 90 min after birth and include immediate and thorough drying, immediate and sustained SSC and delayed cord clamping. It promotes early and exclusive breastfeeding, resuscitation if required and hand hygiene and eliminates harmful suctioning and early bathing.¹⁵ EENC has been associated with 30% fewer NICU admissions.^{16,17} After Da Nang Hospital for Women and Children introduced EENC in 2014, monthly infant formula costs fell by 78% in the NICU and 96% in postnatal wards and NICU admissions after Caesarean sections fell from 16.7% to 11.8% in the first year.¹⁶

Our case study baby had transient tachypnoea of the newborn, which resolved in around 40 min. Drying the baby immediately after birth and providing SSC kept her warm and lying prone on her mother's chest helped manage her respiratory distress. SSC has been shown to stabilise neonatal cardiorespiratory function and reduce hypothermia and hypoglycaemia.^{16,18,19} Introducing SSC after Caesarean sections has been associated with increased early and

exclusive breastfeeding rates at discharge and up to 6 months.²⁰ SSC contact for at least 90 min after delivery, coupled with rooming in and lactation support, can increase early and exclusive breastfeeding,²¹ which has numerous benefits, including reduced morbidity and mortality. Transferring immunoglobulin A, M and G antibodies may protect against, or reduce, the severity of COVID-19.^{22,23} Furthermore, decreasing early separation and NICU admissions reduces infection transmission risks, due to crowding, bed sharing, contaminated surfaces, poor hand washing by staff and contact with multiple staff.²⁴

Strict infection control procedures are needed to prevent mothers transmitting the virus to their babies. Our dyad were transferred to the postnatal ward in SSC and isolated in their own room. The mother was the primary caretaker and followed the recommended hygiene practices. Only one nurse provided routine care at any one time.

The baby was placed on the mother's bed or the other bed instead of in an incubator, which was available for invasive ventilation if required. This helped the mother recognise feeding cues, increased bonding, was more convenient and minimised unnecessary handling by medical staff. Critical close monitoring of the baby was provided by the mother and staff. The mother was counselled on breastfeeding practices, danger signs and infection prevention practices. Our protocols allow babies to stay in SCC during CPAP if they require less than 40% oxygen before their first breastfeed. SCC can continue if the baby is preterm and low birth weight and can be provided by a family member if the mother requires treatment that inhibits SSC. We believe that this should continue when mothers have COVID-19, subject to effective infection control.

Using EENC and strict infection control after this Caesarean prevented newborn transmission and enabled the baby to stay with her mother. EENC had already substantially improved newborn outcomes and reduced unnecessary infant formula use and NICU admissions. It remains feasible during the pandemic and should be prioritised by policymakers and programme managers.

CONFLICT OF INTEREST

None.

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