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Abstract #: T10-01

Nalbuphine for management of intrathecal morphine-induced hypothermia: A Case Report

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Background: Neuraxial morphine is universally recommended in Enhanced Recovery After Cesarean protocols.[1] Common side effects include nausea and vomiting, pruritus, respiratory depression and sedation.[2] Hypothermia occurs with neuraxial local anesthetic alone due to vasodilation and radiant heat loss, but neuraxial opioids can exacerbate this effect.[3] Description of an intrathecal morphine-induced hypothermia (IMIH) syndrome with doses of morphine between 50-250mcg involves a maternal core temperature of less than 35°C, subjective warmth, profuse sweating, nausea, vomiting, and pruritus.[4-5] Prior treatment modalities have included naloxone (between 80-400mcg) and lorazepam, though the mechanism of action for successful reversal with benzodiazepines remains unclear.

Case-report: We report a case of IMIH in a primigravid 50yo 70.3kg woman with an IVF pregnancy and preeclampsia undergoing cesarean delivery with spinal anesthesia (hyperbaric bupivacaine 0.75% 12mg, fentanyl 15mcg, morphine 150mcg, clonidine 30mcg). Active warming with an underbody warming blanket (3M™ Bair Hugger™) was maintained throughout the procedure. In the PACU, refractory vomiting, profuse sweating, and an initially unmeasurable temperature were noted (Figure). After active warming, and despite returning sensory motor function, the first measured temperature 5h after spinal dosing was 34.1°C. Hypothermia and all symptoms resolved with 5mg IV nalbuphine. To our knowledge, this is the first case describing the use of nalbuphine to treat IMIH. Nalbuphine has a long track record of safety and efficacy in parturients and is a practical and attractive treatment option for management of this rare but ominous syndrome.

Conclusion: This case emphasizes the importance of temperature monitoring protocols, both in the operating room and in the PACU, and for early identification and management of IMIH with nalbuphine. Future studies should evaluate the effect of nalbuphine on postpartum temperature regulation and identify the optimal dose to reverse IMIH.

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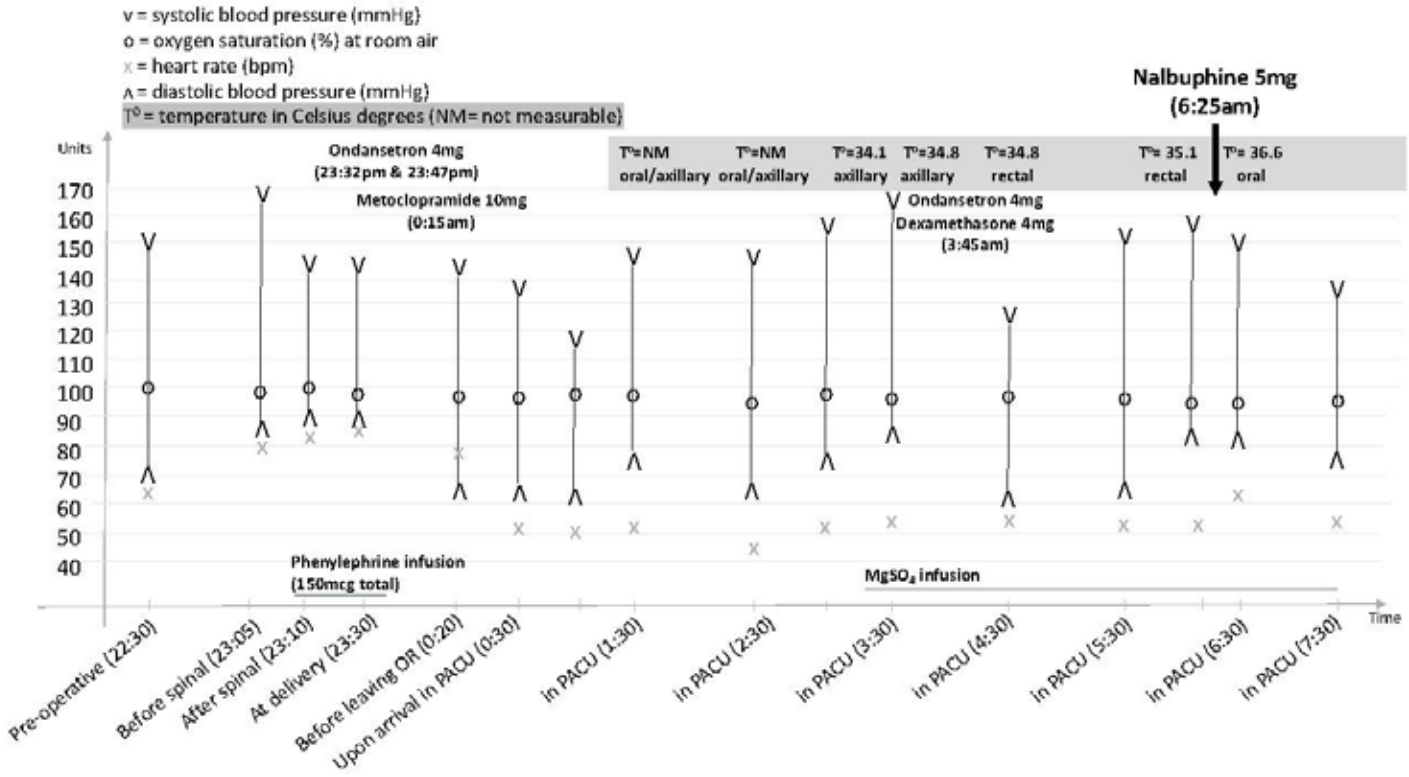
Abstract #: T10-01



Abstract #: T10-02

Severe Pre-Eclampsia Complicated by Pleural Effusions and Pericardial Effusion: A Case Report

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Introduction: Asymptomatic pericardial effusion is seen in up to 40% of pregnant women with pre-eclampsia (PEC) with severe features.[1] We present a case and management of a parturient with PEC with severe features complicated by pericardial effusion with bilateral pleural effusions undergoing urgent, cesarean delivery (CD).

Case Report: A 31 yo G1 at 27w6d was transferred for management of PEC with severe features based on severe hypertension (MAP ranged from 109 to 141) and pulmonary edema. Chest radiograph showed pulmonary edema, bilateral pleural effusions and an enlarged cardiac silhouette. She was treated with IV hydralazine and PO nifedipine, IV magnesium, betamethasone and furosemide for 12 hours. Prior to CD a maternal transthoracic echo (TTE) was ordered to rule out cardiomyopathy, which revealed moderate pericardial effusion and mildly depressed LV function (LVEF of 45-50%). Per cardiology consult, pericardiocentesis was not indicated. The risk of a sympathectomy with neuraxial anesthesia was weighed against the risk of positive pressure ventilation under general anesthesia. A pre-operative arterial line was obtained and a combined spinal epidural was placed with a low spinal anesthetic dose to minimize reduction in systemic vascular resistance and bradycardia. A T10 anesthetic level was achieved, but when positioning supine, the patient became dyspneic and the fetal heart rate declined to the 60 beats per minute. Rapid sequence induction was performed and the trachea was intubated. Incision was made with delivery of the infant (APGARS 1, 7). Persistent maternal hypotension (MAP 50 mmHg) prompted the team to obtain central venous access for fluid resuscitation, and administration of norepinephrine, epinephrine and vasopressin infusions; 100% FiO2 was required to maintain a SpO2 >90%. Cardiac anesthesia was called to conduct a TEE to evaluate for cardiac tamponade and/or signs of pulmonary or amniotic fluid embolism. TEE revealed a significant pleural effusion, estimated >1L of fluid, and a large pericardial effusion with RA collapse. No RV dilation or systolic dysfunction was noted thus ruling out pulmonary and amniotic fluid embolism. She was transported to the CVICU intubated and diuresed 1.7 liters overnight. The patient was weaned off all vasoactive agents, extubated, and was discharged home on post-operative day 3.

Discussion: Pericardial and pleural effusions secondary to severe PEC are rare, yet life-threatening complications of PEC with severe features. This case highlights competing management strategies for pulmonary edema and pleural effusions in the setting of cardiac tamponade in a patient with PEC with severe features. A multidisciplinary care team should be established in order to optimize the patient and develop a comprehensive delivery and postpartum plan.

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Abstract #: T10-02

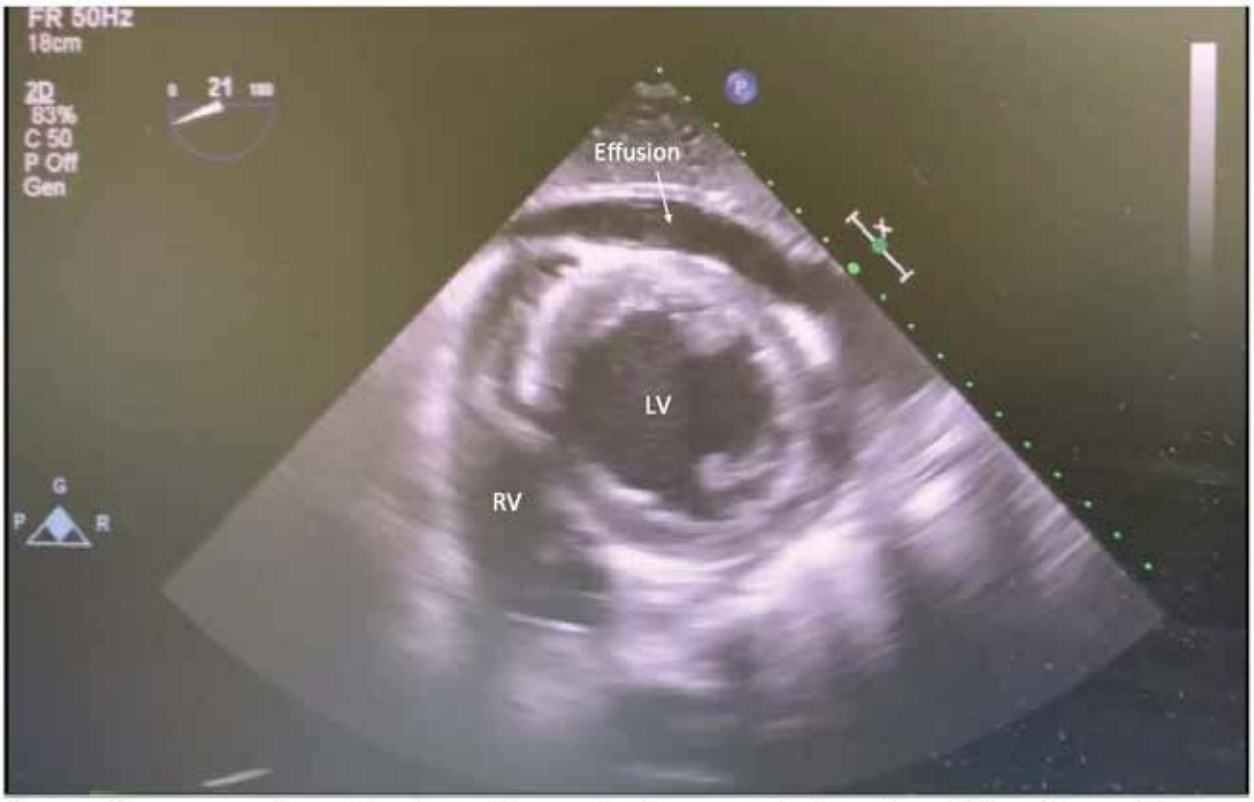

Figure 1. Transesophageal echocardiography: Trans-gastric mid-papillary view with pericardial effusion, predominantly in the inferior to the LV and RV. LV, left ventricle; RV, right ventricle.

Abstract #: T10-03

Multidisciplinary Management of a Pregnant Patient with Metastatic Pancreatic Adenocarcinoma

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Although rarely diagnosed in the reproductive years, pancreatic cancer (PC) remains one of the top five leading causes of cancer-related deaths for women in the United States. Little is known about disease progression in pregnancy, however, potential contributors include the presence of estrogen and progesterone receptors on PC cells and pregnancy induced immunosuppression. Management is highly dependent on the resectability of the mass and life expectancy.[1,2]

A 43 y.o G5P3 at 32 weeks gestation with metastatic pancreatic adenocarcinoma and 3 previous cesarean deliveries (CD) was admitted following a syncopal episode. Laboratory evaluation reveal anemia and anion gap metabolic acidosis secondary to starvation ketosis. Imaging was remarkable for a negative chest computerized tomography and a magnetic resonance imaging that revealed progression of disease (Fig 1). After fluid resuscitation, the patient's acid base status improved and fetal status was reassuring. Multidisciplinary planning recommended control of pain, deep vein thrombosis prophylaxis, nutrition support, and hemoglobin optimization prior to CD that was scheduled for 36 weeks gestation.

Pain control was provided with fentanyl 75 mcg patch every 72 h, PO morphine immediate release 15 or 30 mg, and IV morphine 2mg as needed. Her admission was complicated by an episode of confusion attributed to narcotics and prolonged hospital stay. At 36 weeks gestation, the patient underwent CD via midline vertical incision under combined spinal-epidural anesthesia. Spinal dosed with 12mg of hyperbaric bupivacaine, 20 mcg fentanyl, 200 mcg morphine, 0.25 mcg/kg clonidine. Delivery of a female infant was uneventful with Apgars 8 and 9 at 1 and 5 min., respectively, without evidence of neonatal abstinence syndrome. Adequate postpartum pain control was achieved via multimodal analgesia with bilateral transversus abdominis plane blocks (20cc bupivacaine 0.25% and 133mg liposomal bupivacaine each side), acetaminophen, and ketorolac with continuation of her baseline pain regimen. Although the surgery was complicated by preoperative anemia, ascites, and hemorrhage requiring transfusion, she recovered well and was discharged on postoperative day 4. She commence palliative chemotherapy which she is currently continuing 9 months postpartum.

A multidisciplinary approach involving Maternal Fetal Medicine, Gastroenterology, Oncology, Palliative Care, and Anesthesiology is essential to provide individualized, patient-centered care. As surgical intervention does not improve survival with metastatic disease and mortality of PC is high, focus was placed on the patient's desire for pain management, optimization for CD scheduled at 36 weeks for fetal benefit, and palliative chemotherapy in the peripartum period.[1,2]

References:

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2. Davis, J. et al. *Acg Case Reports J* **3**, e190 (2016).

Abstract #: T10-04

Undiagnosed Primary Hyperparathyroidism in Pregnancy- a case report

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Presenting Author's Institution: Clinical Center of Vojvodina - Novi Sad
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Case report: A 40-yr-old primigravida, at 28 weeks EGA, with an intrauterine twin pregnancy from IVF, was admitted complaining of nausea and vomiting. Lab tests showed leucocytosis, electrolyte imbalance, elevated serum amylase and LDH, and hypoproteinemia. An initial diagnosis of preeclampsia was made. Antihypertensive therapy and anticoagulation (enoxaparinum 0.2ml) was started. When her condition deteriorated, a decision to transfer to higher level hospital was made, and she was transferred to our facility. On admission to our hospital, she was somnolent, and unable to answer on our questions. PE revealed edema on her face, hands and legs; hypertension (170/100) and tachycardia. A urinary catheter was placed but no urine was present.

The patient responded to gross stimuli, but verbal communication was very poor. The admitting obstetrician diagnosed uterine hypertonicity, and immediate cesarean delivery was planned. Because of the previous anticoagulant therapy shortly before transfer, general anesthesia was performed. Two viable infants were delivered 35 minutes after admission: a male, weight 1150g /37cm high (Apgars 2/4/6 at 1/5/10min**)** and second male 1250g /36cm (Apgars 2/3/5). Each received a single surfactant dose and were subsequently transferred to the neonatal intensive care unit. The patient was extubated and transferred to the intensive care unit where she received antihypertensive therapy (urapidil infusion - an α-adrenoceptor antagonist), Mg++, two antibiotics (elevated procalcitonin indicated possible sepsis), diuretics, and anticoagulation**,** but she remained unresponsive almost 24 hours later. By the 2nd postoperative day, her condition had improved slightly - she became more responsive, with a decreased amylase level, but increased creatinine required dialysis. Concern for sepsis remained. Further investigation revealed an elevated serum Ca++ (2.6mmol/l, range 1.15-1.29mmol/l), and an elevated parathyroid hormone level (834.0 pg/ml- normal range 10-65 pg/ml). With further dialysis and zoledronic acid therapy, serum Ca++ normalized, and ultrasound examination revealed a mass near the left lower lobe of the thyroid gland. Approximately one month following CS she was discharged home. Two months after delivery, the patient had a partial parathyroidectomy performed, and recover was uneventful. She was discharged home five days after this procedure in a good condition. Both infants were eventually discharged home in a good condition (first baby 3 months after delivery, and the second, 2 months after).

Hyperparathyroidism is much more common in women than men, and is relatively uncommon in both genders until the 6 decade of life, when incidence increases significantly (1). In this case, both preeclampsia and hyperparathyroidism likely contributed to the patient's clinical presentation (nausea, vomiting, confusion).

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Abstract #: T10-05

Starvation Ketoacidosis in a Near-Term Parturient

Presenting Author: Jessica Rock, MD
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Introduction: Severe maternal acidosis leading to fetal harm is ascribed to many etiologies in pregnancy. We report a rare case of acute starvation ketoacidosis in a parturient.

Case Report: A 30-year-old G3P2002 at 36 weeks gestation with no significant past medical history presented after four days of nausea, vomiting, and poor oral intake. Additional symptoms included tachycardia, tachypnea, borderline hypertension, and hypoxia requiring four liters nasal cannula. Fetal heart rate (FHR) demonstrated a category two tracing. Concern was initially for pre-eclampsia given the increased blood pressure and elevation in urine protein and creatinine. Urgent delivery was discussed between teams and delayed in lieu of broadened workup. After intravenous fluid resuscitation, oxygen requirements and FHR showed some improvement. Etiologies such as pulmonary embolism, pulmonary edema, acute fatty liver of pregnancy, pancreatitis, coagulopathy, infection, and drug ingestion were all ruled out during workup, but the patient was found to have a large anion gap. During the workup, dyspnea worsened, oxygen requirements increased, and the fetal tracing developed late decelerations. After discussion by OB, internal medicine, and anesthesia, bicarbonate and a dextrose-containing infusion were administered for a significant anion gap metabolic acidosis and increased serum ketones. Patient and fetal clinical status improved. Supplementation of electrolytes was required as anion gap and pH began normalizing. A final diagnosis of starvation ketoacidosis secondary to prolonged vomiting and poor oral intake was made. At this point, the multidisciplinary team deemed it safe to induce labor for treatment of pre-eclampsia (thought to be the cause of the GI symptoms). Soon after induction, the patient requested an epidural for labor analgesia and went on to an unremarkable spontaneous vaginal delivery.

Discussion: Metabolic acidosis during pregnancy may result in fetal acidosis and hypoxemia leading to an adverse outcome. Pregnancy causes an increased tendency towards ketogenesis due to relative insulin deficiency and resistance, respiratory alkalosis, and renal excretion of bicarbonate. The ketogenic response is further accelerated during periods of stress, such as illness/vomiting. In a pregnant patient with poor oral intake, starvation ketoacidosis should be considered early in a presentation with a large anion gap. As maternal acidosis will cause fetal intolerance of labor, delivery should be delayed until correction of maternal pH, unless maternal or fetal status requires immediate delivery.

Conclusion: Starvation ketoacidosis can present quickly and severely in the pregnant patient. Early recognition and treatment are critical for favorable fetal outcome.

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Abstract #: T10-06

A multidisciplinary approach to a pregnant patient with Pentology of Fallot and VACTERL

Presenting Author: Seth Fischer
Presenting Author's Institution: UCSD
Co-Authors: Anne E. Shapiro - UCSD
Lawrence Weinstein, MD - UCSD

A 30-year-old G3P0202 with PMHx significant for pentalogy of fallot s/p corrective surgery, VACTERL syndrome complicated by severe scoliosis with persistent severe restrictive lung disease, TE fistula s/p repair with G-tube dependence complicated by chronic malnutrition, and PHTN, pulmonic valve regurgitation and severe RV dilation, presented for c-section.

This patient's 2 prior pregnancies delivered pre-term via c-section secondary to maternal respiratory decompensation and acute malnutrition. They were done under general anesthesia, as scoliosis and Harrington rods precluded neuraxial.

A multidisciplinary approach was crucial to her safe delivery. She underwent a scheduled c-section at 37 weeks. Adequate IV access and an A-line were placed. Anesthesia was induced with minimal cardiovascular changes and TEE was done by a cardiac anesthesiologist. Six minutes after induction the infant was delivered. In spite of pitocin she continued to bleed, requiring methergine, TXA, and a Bakri balloon. She was transported to the ICU, extubated, for further monitoring. The Bakri was removed post-op day 1 and she was discharged home post-op day 2.

Myriad considerations need to be addressed within the growing population of patients with congenital heart defects that are surviving to reproductive age. This case highlights how patients can be delivered safely with an interdisciplinary approach.

Pregnant patients with both pentalogy of Fallot and VACTERL are exceedingly rare in obstetric anesthesia literature. Pentalogy is a rare form of tetralogy of Fallot (2:100,000 live births) which encompasses the four defects in tetralogy of Fallot - RV hypertrophy, VSD, overriding aorta, pulmonic valve stenosis - with the addition of an ASD. In this patient, the physiology of pregnancy, specifically the increased cardiac output, threated to overwhelm her already taxed RV. Her VACTERL syndrome, also rare, further complicated her care (i.e. severe scoliosis complicated by restrictive lung disease and G-tube dependence). A multidisciplinary approach that included the expert input of obstetricians, obstetric and cardiac anesthesiologists, cardiologists, pulmonologists and intensivists, along with extensive planning, allowed for an uncomplicated c-section and delivery.

References:

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Partana P, Tan JKH, Tan JL, *et al*

Multiple pregnancy in a primigravida with uncorrected Pentalogy of Fallot

Case Reports 2017;2017:bcr2016216809.

Abstract #: T10-07

Considerations for the Transgender Parturient

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Co-Authors: Elizabeth Lange, MD - Northwestern University, Feinberg School of Medicine
Paul Scott, MD - Northwestern University, Feinberg School of Medicine

Introduction: Transgender individuals represent a sexual and gender minority population whose gender identity differs from their sex assigned at birth. Despite efforts by medical and social activists, transgender patients encounter barriers to adequate and gender-appropriate healthcare, resources, and support. Transgender parturients face improper pronoun use, insensitive treatment, and denial of medical care[1]. As some transgender men may desire childbirth, physicians must strive to become familiar with and respectful of the unique considerations for this patient population in the peripartum setting.

Case: Our patient is a 38-year-old G1P0 transgender man with no significant past medical history. In transitioning from female-to-male, he underwent gender-affirming hormonal therapy, which was discontinued prior to conception via in vitro fertilization. Before our patient arrived for induction of labor, we coordinated a multidisciplinary meeting to educate healthcare staff about appropriate gender identity language and information and provide a safe place to ask questions.

He presented at 39 3/7 weeks of gestation for induction with cervical ripening balloon and oxytocin due to polyhydramnios. A combined spinal-epidural was performed for labor analgesia. A healthy infant was born via spontaneous vaginal delivery, which was complicated by postpartum hemorrhage due to retained placenta and lower uterine segment atony. The patient received oxytocin, misoprostol, methylergonovine, and carboprost, and a Bakri balloon was placed; he remained hemodynamically stable with a final EBL of 1400 mL. He was discharged home on postpartum day three in stable condition.

Discussion: Labor and delivery has traditionally been viewed as a female process. As a result, transgender men often face increased difficulty with gender sensitivity and identity in the peripartum period. These challenges are emphasized by survey respondents in Light et al. such as "people don't assume that someone who looks like me could be pregnant."[1]

Standard of care should encourage patients to disclose their preferred name, preferred pronouns, gender identity, and sex assigned at birth. It is also important to empower transgender parturients and their partners as they affirm their parental role identities (e.g. "dad," "mom," "carrier," "gestational parent"). This would help ensure that individuals are addressed in the manner in which they desire. Another consideration includes asking individuals if they prefer the term "breastfeeding" or "chestfeeding" as a gender-neutral alternative. Our case demonstrates that multidisciplinary meetings may help avoid assumptions and stereotypes during the peripartum period, affording healthcare providers the opportunity to greatly improve the experience of transgender parturients.

References:

1. Light et al. (2014). Obstet Gynecol. 124: 1120-1127.

Abstract #: T10-08

Hemorrhagic Stroke in a Laboring Parturient Following Unintentional Placement of an Intrathecal Catheter

Presenting Author: Immaculate Fernandes, MD
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Introduction: The estimated incidence of stroke in pregnancy is around 30 cases per 100,000 deliveries [1]. Reversible cerebral vasoconstriction syndrome (RCVS) is the most common cause of cerebrovascular events associated with pregnancy; however, there is a lack of guidelines for anesthetic management of peripartum stroke [2]. We present the management of acute stroke in an actively laboring parturient.

Case: A 27-year-old G1P0 African American female with past medical history of asthma, obesity, and reflux presented for induction of labor at 37.1 weeks. The patient requested an epidural for labor analgesia. The catheter was placed at the L3-4 interspace using a loss of resistance technique. Initial aspiration of the catheter was negative for blood or cerebrospinal fluid. A 3mL test dose of 1.5% lidocaine with epinephrine indicated intrathecal placement of the catheter as the patient developed loss of sensation to pinprick to the T4 level, inability to move her lower extremities, and hypotension treated with phenylephrine. No further medications were administered through the intrathecal catheter. An hour following the test dose, the patient became nauseous and vomited. She then had sudden onset of left arm and left leg weakness accompanied by a headache. Imaging of her head revealed a subarachnoid hemorrhage (SAH). Since the patient was actively contracting, a Cesarean section was performed using general endotracheal anesthesia. Postoperatively, she was transferred to the intensive care unit for management of her SAH. Cerebral angiography confirmed RCVS with vasospasm in multiple vessels. The patient was discharged home two weeks later with persistent yet improving left sided neurological deficits.

Discussion: Stroke in pregnancy can lead to significant morbidity and mortality. Management is focused on maintenance of cerebral perfusion and treatment of the underlying etiology. For our case, Cesarean section was performed under general endotracheal anesthesia for rapidity of delivery and ability to tightly control blood pressure and cerebral perfusion. Angiography revealed that the patient's SAH was secondary to RCVS. The pathogenesis of RCVS is poorly understood; however, vasoactive drugs are known to trigger RCVS [3]. Consequently, it is possible that the epinephrine in the neuraxial test dose or the phenylephrine used to treat her hypotension exacerbated the RCVS.

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Abstract #: T10-09

Veno-Arterial ECMO rescue from massive Pulmonary Embolus maintains viable pregnancy

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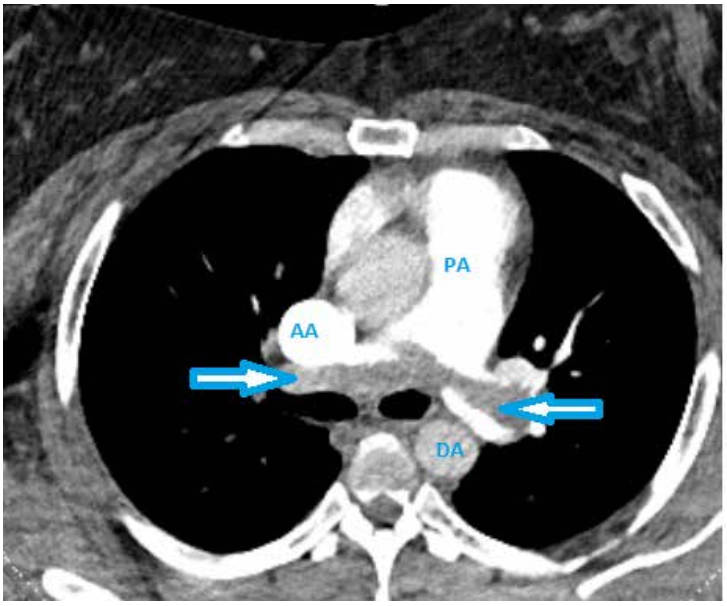
A 44-year-old G5P1122 (full-term VBAC) at 23 weeks' estimated gestational age (EGA) initially presented to an outside hospital with abdominal pain/vomiting. Past medical history was notable for heterozygous Factor V Leiden mutation and a distant history of Roux-en-Y gastric bypass. BMI= 44. Ultrasound confirmed a live breech, FHR=150. The patient was resuscitated from mild lactic acidosis (lactate level= 3 mmol/L) with intravenous infusion of crystalloid solutions. Abdominal pelvic CT revealed a jejeuno-jejeunal intussusception. She remained hemodynamically stable and transferred to our facility.

On arrival, FHR=160s without deceleration. Not previously anticoagulated, she was injected with enoxaparin, general anesthesia induced and 45cm of small bowel resected. Her intra- and immediate post-operative course was uneventful. Over the course of post-operative day (POD) 1-2, she was injected with two doses of betamethasone (12 mg); daily enoxaparin (40 mg) was continued; and, she began ambulating. While standing on POD 5, the patient complained of acute onset of chest pain; her HR=113 bpm; BP=74/51 mmHg; with room air SpO2=88%. The attending anesthesiologist performed point-of-care TTE revealing right ventricular (RV) strain and severe tricuspid regurgitation (TR). Subsequent CT angiography revealed a pulmonary saddle embolus extending bilaterally into the lobar segments. A cardiothoracic surgeon was consulted and the patient transported to the ICU. On Vapotherm, the right femoral artery and left femoral vein were immediately cannulated for VA-ECMO with initial blood flow = 3 LPM, RPM 3125, sweep FiO2=100% and sweep flow=2 LPM. Maternal systemic BP was supported with intermittent infusion of epinephrine and anticoagulation achieved with intravenous heparin to keep aPTT= 60-80s. Throughout ECMO, EFM revealed FHR 140s with moderate variability and no contractions.

On POD 10, TTE demonstrated improvement in RV function, mild RV dilation and TR. She was weaned off VA-ECMO, decannulated, and transferred back to the L&D unit, now on twice-daily subcutaneous injection of enoxaparin (90mg) to maintain anti-Xa level of 0.8 to 1.2 IU/mL. On POD 20, with almost complete resolution of RV dysfunction with minimal TR, the patient was discharged home, continuing on twice-daily enoxaparin. Follow-up lower extremity venous duplex revealed no evidence of DVT. Investigation of intermittent bleeding from the left femoral cannulation site revealed arterio-venous fistula with pseudoaneurysm.



She had follow-up with intermittent fetal and post-surgical assessment. At 31 weeks' EGA, while at home, she reported two hours of uterine cramping followed by a spontaneous vaginal delivery. EMS responded, finding an apneic and pulseless neonate. The patient was transported to an outside hospital for an otherwise uncomplicated postpartum stay.

Abstract #: T10-10

Evidence of mother-to-newborn infection with COVID-19

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Vertical and perinatal mother-to-newborn transmission of COVID-19 has not yet been confirmed,[1, 2] although there are reports of COVID-19 infections in newborns.[3-7] Here, we report three mothers with COVID-19 and the outcomes of their newborns in Henan province, China. All three mothers did not have significant past medical histories but had confirmed COVID-19, who underwent Cesarean deliveries. In all three cases, the obstetricians, anesthesiologist, neonatologist and nurses wore full personal protection equipment (PPE) and the COVID-19 disinfection policy was fully executed. Notably, only obstetricians touched both the mothers and newborns during the time of Cesarean delivery, handing the newborns off to neonatologists from the operating tables. The resuscitation tables for newborns were about 3 meters away from the head of the mothers in the operating rooms.

The first patient was a 28-year-old nulliparous woman at 37 weeks' gestation. The mother had a Cesarean delivery under general anesthesia. The newborn was taken from the operating room before extubation of the mother. For the remainder of his hospitalization, the newborn was in the patent's inpatient room, but was placed in a temperature-controlled isolate, which was 3 meters away from the mother's head. The newborn was cared for by a nurse who was not in physical contact with the mother or other visitors after the delivery. Visitors wore masks in the mother's room but were not allowed to be in contact with the newborn. The mother wore a face mask all the time after the surgery. The medical staff wore the same level of PPE in the inpatient room as they did in the operating room. The newborn was discharged home 11 hours after birth and tested positive for COVID-19 on postnatal (P) day 6. The second mother was a 30-year-old pregnant (G3P2) woman at 30.5 weeks gestation, who had a Cesarean delivery under spinal anesthesia. The newborn tested negative for COVID-19 on P3. The third case was a 29-year-old pregnant woman at 36 weeks' gestation who had a Cesarean delivery under spinal anesthesia. The newborn had a fever (P3), lung rales and abnormal lab results. A chest CT scan of the newborn was performed on P6 that demonstrated findings suggestive of COVID-19.

It is not known whether the transmission of COVID-19 to the newborn in case 1 occurred in utero, in the operating room, recovery room or community while being cared by his grandmother (wearing a mask), or whether the route of transmission was via airborne droplets, personal contact, or blood. Interestingly, the newborn in case 3 who tested negative for COVID-19 had clinical symptoms and classical chest CT findings consistent with COVID-19, although other acute lung diseases could also cause the CT findings.

While there is a common belief that general anesthesia, associated with more aerosol generation during intubation, may increase the risk of transmission of SARS-CoV-2, our case series included a case of potential transmission under regional anesthesia. The limited case number in this series precludes our definitively knowing the effects of anesthesia techniques on COVID-19 maternal-to-newborn transmission. Therefore, it is not yet known whether general versus regional anesthesia for Cesarean deliveries can lead to different outcomes.

Nevertheless, this report highlights the risk of mother-to-newborn transmission of SARS-CoV-2 and suggests that more systematic investigations are warranted to determine if vertical transmission is possible.

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