

WebM&M

Morbidity and Mortality Rounds on the Web

Spotlight

Hurried Team Huddle and Poor Communication: Unsafe Practice During Anesthesia for Emergency Cesarean Delivery



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Source and Credits

- This presentation is based on the June 2023 AHRQ WebM&M Spotlight Case
 - See the full article at <https://psnet.ahrq.gov/webmm>
 - CME credit is available
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Objectives

At the conclusion of this educational activity, participants should be able to:

- Summarize the advantages and disadvantages of various forms of anti-coagulation pre-delivery.
- Define safe time frames for neuraxial anesthesia following anticoagulation use.
- List benefits of preoperative huddles in addition to pre-incision time outs.
- Identify the potential benefits of multidisciplinary medical simulations.
- Recognize the importance of performing an unbiased and individualized assessment of risks and benefits of prophylactic anticoagulation use around the time of delivery.

HURRIED TEAM HUDDLE AND POOR COMMUNICATION: UNSAFE PRACTICE DURING ANESTHESIA FOR EMERGENCY CESAREAN DELIVERY

A case highlighting the importance of preoperative huddles and pre-incision time out checklists to improve patient outcomes during cesarean deliveries as well as the role of emergency cesarean simulation training for obstetric, anesthesia and nursing care teams.

Case Details (1)

- A 25-year-old obese patient in labor required a category 1 (immediate) cesarean delivery. As the obstetric team was in a hurry to deliver the baby, the team huddle was rushed.
- The anesthesia care provider inserted a spinal needle swiftly and uneventfully. He injected hyperbaric bupivacaine 0.5% and the cesarean delivery was carried out uneventfully.
- A live baby girl was born with an Apgar score of 10 at 5 minutes.
- When the anesthesia care provider later opened the patient's electronic health record, he discovered that the patient had received subcutaneous enoxaparin 40 mg four hours preoperatively. The obstetric team had not mentioned this information during the previous huddle.

Case Details (2)

- Postoperatively, the patient was monitored closely and was found to have a dense, persistent motor and sensory block of the lower limbs at 6 to 8 hours after delivery.
- Thus, magnetic resonance imaging (MRI) of the lumbar spine was performed, which did NOT show any epidural hematoma.
- Over the next day, the dense sensory block gradually wore off, and the patient recovered without any permanent sensory or motor impairment.

HURRIED TEAM HUDDLE AND POOR COMMUNICATION: UNSAFE PRACTICE DURING ANESTHESIA FOR EMERGENCY CESAREAN DELIVERY

THE COMMENTARY

By Anna Curtin, MD and
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Case Summary (1)

- This case represents a “near miss,” in that a pregnant woman received neuraxial anesthesia only four hours after her last dose of prophylactic low molecular weight heparin (LMWH).
- Whether to administer general anesthesia or neuraxial anesthesia prior to cesarean delivery depends on risks and benefits for each individual patient.
- However, the short interval between LMWH and spinal needle placement in this case is not in line with national guidelines including those from the Society for Obstetric Anesthesia and Perinatology (SOAP) and the American Society of Regional Anesthesia and Pain Management (ASRA).
- Administering neuraxial anesthesia within 12 hours of prophylactic LMWH increased the patient’s risk of epidural bleeding and hematoma.

Case Summary (2)

- Although this patient did not experience an adverse event attributable to the short interval, placement of a spinal needle was contraindicated given recent dosing of LMWH.
- Had the anesthesia care provider known about this recent medication, they might have chosen to administer general anesthesia instead.
- The reason for this patient's unusually long duration of neuraxial anesthesia is unknown, but this uncommon complication has been described in case reports and may be due to reduced cerebrospinal fluid volume.¹

BACKGROUND AND SIGNIFICANCE

Background and Significance (1)

- Pregnant women are 4 to 5 times more likely than non-pregnant women to develop pulmonary embolism or deep vein thrombosis, collectively known as venous thromboembolism (VTE).²⁻⁴
- VTE is one of the leading causes of maternal mortality in the United States, accounting for 9 to 11 percent of pregnancy-related deaths.^{2,3,5}
- Anticoagulants are frequently used to help prevent venous thrombosis in pregnant patients with additional risk factors, including those with any inherited thrombophilia, history of prior VTE, or prolonged antepartum admission.⁶⁻¹⁰

Background and Significance (2)

- Hospital admission increases the risk for VTE in pregnancy 17-fold with the greatest risk occurring after 72 hours in the hospital.^{3,11}
- There is wide variation in professional guidelines for anticoagulation during antepartum admissions, ranging from use of prophylactic pharmacologic anticoagulation for all pregnant patients to use of a risk stratification protocol.
 - The American College of Obstetricians and Gynecologists (ACOG) and The American College of Chest Physicians (ACCP) do NOT recommend routine prophylactic anticoagulation for pregnant patients admitted to the hospital in the absence of other risk factors.^{9,10,12}
 - In contrast, the National Partnership for Maternal Safety and the California Maternal Quality Care Collaborative (CMQCC) recommend use of low molecular weight heparin (LMWH) 40 mg once daily or unfractionated heparin (UFH) twice daily in all antepartum patients hospitalized for more than 72 hours unless they are at significant risk for bleeding or imminent delivery.^{8,13}
 - Similarly, the Royal College of Obstetricians and Gynaecologists (RCOG) recommends that all pregnant women admitted to the hospital be offered LMWH for thromboprophylaxis.⁷

Background and Significance (3)

- Neuraxial anesthesia is the most common and effective form of anesthesia used in labor and delivery.^{14,15}
- It is usually preferred to general anesthesia, even during urgent or emergent cesarean deliveries.
- General anesthesia places pregnant patients at greater risk of cardiopulmonary complications, uterine atony, and postpartum depression.^{6,14,16,17}
- Fetal exposure to general anesthesia may cause respiratory depression in the neonate.^{6,14,16}
- Neuraxial anesthesia has been associated with lower rates of surgical site infections and VTE, superior postoperative pain control, and reduced postpartum use of oral opiates.^{14,16,18,19}
- In addition, neuraxial anesthesia allows for early maternal and infant bonding and promotes earlier initiation of breastfeeding.^{6,16}

Background and Significance (4)

- A complicating consideration is that urgent or emergent delivery may be needed at any time among pregnant patients admitted to the hospital.
- Although regional anesthesia is generally preferred for all deliveries requiring anesthesia (even emergent cesarean deliveries), recent use of prophylactic or therapeutic anticoagulation increases the risk of spinal epidural hematoma (SEH) formation.^{14,20}
- SEH, although rare, can have a devastating outcome resulting in permanent loss of motor and sensory function in addition to loss of bowel and bladder function.¹⁴
- Thus, the dose and timing of anticoagulation must be considered before urgent and emergent cesarean delivery and certainly before administration of neuraxial anesthesia.^{6,14,20}

Background and Significance (5)

- In 2018, SOAP and ASRA updated their guidelines regarding neuraxial anesthesia in obstetric patients on anticoagulation.^{14,20}
 - SOAP recommends use of mechanical thromboprophylaxis or UFH 5,000 units twice daily for admitted antepartum patients requiring prophylactic anticoagulation. Neuraxial anesthesia can be safely administered 4-6 hours after the last dose of UFH and can be considered even sooner based on the clinical scenario and patient comorbidities. With use of prophylactic enoxaparin at 40 mg daily, the SOAP guidelines recommend waiting at least 12 hours from the last dose before administering neuraxial anesthesia.¹⁴
 - The ASRA guidelines are similar to the SOAP guidelines, with recommendations to place neuraxial block at least 4-6 hours after the last dose of UFH (or sooner, based on clinical risks and benefits) and 12 hours after the last dose of LMWH.²⁰
 - By contrast, both ACOG and ACCP list LMWH as their preferred prophylactic anticoagulant in pregnancy due to its longer half-life and more predictable drug levels.^{9,12}

Background and Significance (6)

- In summary, pregnant patients admitted to the hospital are at increased risk of developing VTE. Prophylactic anticoagulation is frequently used to reduce this risk.
- The use of prophylactic anticoagulation can place patients at increased risk for SEH after urgent neuraxial anesthesia and at increased risk for receiving general anesthesia if an urgent or emergent delivery is indicated.
- At this time, the benefits of prophylactic anticoagulation seem to outweigh the risks associated with SEH as the incidence of VTE exceeds that of SEH, even in the setting of recent prophylactic anticoagulation.^{21,22}
- However, the dose and last administration time of anticoagulation needs to be considered when choosing the safest type of anesthesia.

CONTRIBUTING FACTORS

Contributing Factors (1)

- In this case, the patient received emergent spinal anesthesia prior to her cesarean within four hours of LMWH administration, placing her at increased risk for SEH.
- The need for an emergent cesarean delivery creates a high acuity situation involving multiple medical teams.
- Knowledge of the patient's clinical history, clear communication, hospital protocols, and cumulative experience are all critical to executing emergent deliveries safely and efficiently.

Contributing Factors (2)

There are multiple factors that likely contributed to this medical error:

1. The anesthesia care provider performing the neuraxial procedure was not familiar with the patient's pertinent clinical history, including her current medications.
2. The obstetric preoperative huddle and time-out checklist were rushed and probably did not include review of pertinent medications such as anticoagulants. As a result, there was a missed opportunity to discuss anticoagulation use and its implications for the treatment plan.
3. The nature of emergency procedures inherently places providers at greater risk for making errors.

The only identifiable risk factors for VTE in this patient are pregnancy and obesity.^{3,23} She does not meet clear clinical criteria for use of prophylactic anticoagulation unless she was admitted to the antepartum service leading up to her delivery.^{7,8}

Contributing Factors (3)

- The obstetrics team, anesthesiologists, and nurses should all be familiar with a patient's current medications and comorbid conditions.
- Clear communication of pertinent information among multiple providers can reduce the risk of a single individual missing important information when making medical decisions, such as selecting the safest route of anesthesia for cesarean delivery.
- Preoperative surgical huddles and time-outs have been implemented to reduce medical errors, improve patient safety, and promote communication among all providers caring for a patient. Not including pertinent information about this patient's anticoagulation in the standard preoperative huddle and pre-incision checklist likely contributed to this near miss, which may happen again in the future (with worse consequences) without a process change.

APPROACH TO IMPROVING PATIENT SAFETY

Approach to Improving Patient Safety (1)

Multiple practices can help reduce the risk of a similar medical error in the future.

1. Preoperative huddles and pre-incision time-out checklists should include a review of pertinent medications including anticoagulants. Review of recent anticoagulation use is particularly important during the preoperative huddle because this information may impact both surgical and anesthetic management.
2. There should be discussion about which prophylactic anticoagulant may be best for each patient admitted to the antepartum unit, taking into consideration both the risk of VTE and the risks of general anesthesia.
3. As Electronic Health Records (EHRs) become more customizable, there is an opportunity for technology to help highlight critical information instantaneously. Enhancements in EHR can call attention to recent anticoagulation use and possible contraindication for regional anesthesia.
4. Implementation of an emergency cesarean simulation involving the obstetrics, nursing, and anesthesia teams may be beneficial.²⁴⁻²⁷

Approach to Improving Patient Safety (2)

- Prior to any procedure on the labor and delivery ward, the obstetric team typically holds a preoperative huddle at the patient's bedside. This huddle includes at least one provider from obstetrics, anesthesia, nursing, and the operating room surgical scrub nurse.
- A formal checklist is reviewed in the presence of the patient, confirming her name, medical record number, date of birth, planned procedure, need for prophylactic antibiotics, and planned route of anesthesia.
- A second pre-incision time-out occurs just before the procedure starts, and a similar checklist is reviewed. If they have not done so already, institutions should also implement a more succinct check list for use prior to emergency cesarean deliveries to optimize safety without causing significant delay in care.
- Emergency checklists are particularly important given the challenge of reviewing essential information while providing urgent clinical care. Each of these checklists should be adapted as needed, and review of anticoagulant name, dose, and timing of last injection should be included in all checklists.

Approach to Improving Patient Safety (3)

- Both LMWH and UFH can be used for prophylactic anticoagulation in pregnant inpatients.
 - They have similar risks of bleeding complications when used in the peripartum period.²⁸
 - LMWH has a longer half-life and more predictable drug levels than UFH; however, neuraxial anesthesia is contraindicated for 12 hours after the last dose of LMWH.
 - Neuraxial anesthesia can be considered at any time in patients receiving prophylactic doses of UFH.
 - When selecting an agent for a patient whose only VTE risk factors are prolonged hospitalization and pregnancy, it may be reasonable to use UFH instead of LMWH to permit timely and safe administration of neuraxial anesthesia if cesarean delivery becomes necessary.
 - Use of UFH is consistent with The National Partnership for Maternal Safety, CMQCC, RCOG, and SOAP guidelines.^{7,8,13,14}

Approach to Improving Patient Safety (4)

- The indication for anticoagulation use in this specific patient is unclear. Her risk factors for VTE include pregnancy and obesity.
- Despite the variation in guidelines for prophylactic anticoagulation, she does not meet any published criteria outlined above if she was admitted less than 72 hours before her surgery.
- She may have been admitted to the antepartum service or perhaps prescribed the medication based on her body mass index alone.
- Obesity is associated with higher rates of cesarean delivery and difficult intubation during general anesthesia.²⁸
- It is possible that her obesity, and perhaps other social factors, led to an exaggerated assessment of her antepartum VTE risk. This highlights the importance of an individualized and non-biased risk assessment, which should take into consideration the risk of VTE and the risks associated with anticoagulation use near the time of delivery.

Approach to Improving Patient Safety (5)

- Finally, simulation has been implemented on many labor and delivery wards to improve team based medical care and reduce errors during obstetrical emergencies.²⁴⁻²⁷
 - Addition of an emergent cesarean delivery simulation involving the obstetrics, anesthesia, and nursing teams would be beneficial to avoid poor teamwork.
- Simulation allows staff to practice providing collaborative care during high acuity situations with no risk to patients. As a result, appropriate actions and decisions can occur more quickly during emergencies.
- In addition, debriefing after simulation sessions can reinforce the importance of knowing and communicating pertinent clinical information, such as recent administration of anticoagulation.
- Facilitating simulation sessions after updating the preoperative check list to include pertinent medications may provide additional benefit, as it would allow the teams to practice implementing the new policy and refine it, if needed.

TAKE HOME POINTS

Take-Home Points (1)

- Prophylactic anticoagulation using daily LMWH or twice daily UFH should be considered in all pregnant patients admitted to the hospital for more than 72 hours who are not at significantly increased risk for bleeding or imminent delivery.
- Guidelines for use of neuraxial anesthesia in patients on preventive anticoagulation were updated in 2018 with a recommendation to avoid needle placement within 4-6 hours from the last dose of UFH 5,000-7,500 units and 12 hours from the last dose of LMWH 40 mg. However, with use of prophylactic heparin, placement may be considered sooner if benefits outweigh risks of both SEH and general anesthesia.
- Both the preoperative huddle and the pre-incision time out checklists should be implemented on all labor and delivery wards and should include pertinent medications and conditions that may impact the patient's outcome. Topics should include drug name, dose of medication, and timing of last administration of anticoagulation for all patients.

Take-Home Points (2)

- Implementation of team-based simulations including an emergency cesarean simulation involving obstetrics, anesthesia, and nursing is imperative. Simulations have the potential to improve communication and teamwork during high acuity clinical scenarios, resulting in better patient outcomes.
- Use of anticoagulation should be based on an individualized and non-biased risk assessment, which should take into consideration the risk of VTE and the risks associated with anticoagulation use near the time of delivery.

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