Managing Unanticipated Childbirth Complications

Ebony Boyce Carter, MD, MPH
Maternal Fetal Medicine
Washington University in St. Louis

Disclosures

• I have no financial disclosures to report.

Objectives

• Learn a practical approach to three clinical scenarios one may face on a Labor and Delivery Unit.
Welcome to Labor and Delivery Rounds!!!

Room 1 (triage)

- A 23 yo G6P2031 presents at 28 weeks gestation with no prenatal care. Her PMH is unremarkable except she has a known history of narcotic dependence. She wants to get clean and wants a referral to detox.
- How do you manage her care?

Heroin use: 2002-2013

80% of heroin users initially used Rx opioids
One- and 3-year probabilities of continued opioid use among opioid-naïve patients, by number of days' supply of the first opioid prescription 2006–2015

Shah A et al, MMWR 2017

Neonatal abstinence syndrome, Missouri

Natural History of Opioid Use Disorder
Modifiers of Euphoria

- Route
  - IV > Smoking > Subcutaneous > Oral/intranasal
- Half life
  - Heroin > Methadone
- Lipophilicity
  - Heroin > Morphine > Methadone

Natural History of Opioid Use Disorder

Tolerance versus Dependence

- Both occur after chronic opioid exposure

Tolerance
- Increased dosage needed to achieve specific effect
  - Euphoria
  - CNS depression

Dependence
- Withdrawal due to cessation or reduction
Definition of Opioid Use Disorder

Table. DSM-5 Diagnastic Criteria for Opioid Use Disorder

1. Opiates are taken in larger amounts or for longer than intended
2. Failure to fulfill obligations at work, school, or home
3. Persistent desire or unsuccessful efforts to cut down or control use
4. A great deal of time is spent on acquiring, using, or recovering from the effects of opioids
5. Restless or irritable when not using opioids
6. Consistent use despite adverse social or interpersonal consequences
7. Important social, occupational, or recreational activities given up or reduced because of opioids
8. Tolerance, as evidenced by needing to take larger amounts to achieve the desired effect
9. Withdrawal when opioids are not taken

Morbidity with Opioid Use Disorder

Maternal
- HIV and hepatitis
- Endocarditis
- Cellulitis/Abscess formation
- Abruption (14%)
- Chorioamnionitis
- Preeclampsia
- PPROM/Preterm birth
- Postpartum hemorrhage
- Overdose/Death

Fetal
- SAB/UFID
- Birth defects (clefts, ONTD)
- LBW (50%)
- PPROM/Preterm birth (30%)
- Ischemization
- Neonatal mortality
- Neonatal abstinence syndrome (50-90%)

Stover MW et al, Semin Perinat 2015
Saia K et al, Curr Obstet and Gyne Repo 2016

5.8 in 1000
Neonatal abstinence syndrome

- Neurologic excitability
  - Tremors
  - Irritability
  - Wakefulness
  - High-pitched cry
  - Increased tone
  - Hyperactive reflexes
  - Exaggerated Moro
  - Seizures
  - Increased sweating
  - Frequent yawning and sneezing
- GI dysfunction
  - Poor feeding
  - Uncoordinated sucking
  - Vomiting
  - Diarrhea
  - Dehydration
  - Poor weight gain
- Autonomic signs
  - Increased sweating
  - Nasal stuffiness
  - Fever
  - Mottling
  - Temperature instability

Complex Social Problems

- >50% unemployed without partner support
- >25% history of abuse
- >50% undiagnosed mental illness
- Risk behaviors: sharing needles, prostitution, unprotected intercourse

The Urine Drug Screen

- Used to detect or confirm drug use
- Routine universal screening controversial
  - Positive test not diagnostic of opioid use disorder or severity
  - Only assesses current use
  - Not able to detect all substances
  - False positives common

"Additional research is needed to better understand the effects of universal urine screening on maternal and neonatal outcomes."
Indications for Maternal UDS include (but are not limited to):

- Previously documented or admitted history of drug use/abuse at any point during previous 12 months (licit or illicit use of the following classes of drugs: opioids, benzodiazepines, barbituates, or marijuana)
- Positive urine drug screen at any point during previous 12 months
- Absent, late, or inadequate prenatal care (defined by):
  - Gestational age 30 weeks or less and <3 prenatal visits
  - Gestational age greater than 30 weeks and <5 prenatal visits
- Abnormal change in mental status or aggressive/abusive behaviors
- Pinpoint or dilated pupils
- Unexplained hypertensive crisis
- Unexplained seizure
- Admitted or current prostitution activity
- Newborn being placed for adoption per agency requirements
- Request by state or state-contracted agent

The Urine Drug Screen

"Additional research is needed to better understand the effects of universal urine screening on maternal and neonatal outcomes."

Screening Questions

*Screening Questions*

**NEPA Quick Screen**

1. Ask patient about past year drug use—the NEPA Quick Screen
2. Begin the NEPA-Modified ASSIST
3. Conduct a Brief Intervention
4. Address, Assess, Assist, and Arrange

**CBORT (Cannabis Abuse Risk Test)**

1. Ask patient if they have ever smoked marijuana or any other cannabis product.
2. Recall past year consumption of any cannabis products.
3. Address any past-year cannabis consumption.
4. Address recent cannabis consumption.

**PAS (Problem Alcohol Screening Tool)**

1. Ask patient if they have ever used alcohol or drugs with a friend.
2. Ask patient if they have ever used alcohol or drugs with a family member.
3. Ask patient if they have ever used alcohol or drugs with a friend and a family member.
4. Address any past-year alcohol consumption.

**Detoxification**

1. Ask patient if they have ever used alcohol or drugs with a friend and a family member.
2. Ask patient if they have ever used alcohol or drugs with a friend and a family member and a family member.
3. Address any past-year alcohol consumption.

**CART (Cannabis Assessment and Referral Tool)**

1. Ask patient if they have ever used alcohol or drugs with a friend and a family member.
2. Ask patient if they have ever used alcohol or drugs with a friend and a family member and a family member.
3. Address any past-year alcohol consumption.

**ASSIST (Alcohol Screening and Sedimentation Test)**

1. Ask patient if they have ever used alcohol or drugs with a friend and a family member.
2. Ask patient if they have ever used alcohol or drugs with a friend and a family member and a family member.
3. Address any past-year alcohol consumption.

**WEST (Widely Employed Screening Test)**

1. Ask patient if they have ever used alcohol or drugs with a friend and a family member.
2. Ask patient if they have ever used alcohol or drugs with a friend and a family member and a family member.
3. Address any past-year alcohol consumption.

**UDS (Urine Drug Screen)**

1. Ask patient if they have ever used alcohol or drugs with a friend and a family member.
2. Ask patient if they have ever used alcohol or drugs with a friend and a family member and a family member.
3. Address any past-year alcohol consumption.
Medically Supervised Withdrawal

- Rates of relapse high
  - <50% abstinent at 6 months
  - <10% abstinent at 12 months
- Rates of overdose during relapse increased
  - Decreased tolerance
- Protracted abstinence syndrome
  - Chronic withdrawal symptoms
  - Conditioned cues trigger craving

Natural History of Opioid Use Disorder

COMMITTEE OPINION

“For pregnant women…opioid agonist pharmacotherapy is the recommended therapy and is preferable to medically supervised withdrawal because withdrawal is associated with high relapse rates, which lead to worse outcomes…”

-ACOG Committee Opinion No. 711
Opioid Use and Opioid Use Disorder in Pregnancy
August 2017
Medically-Assisted Treatment (MAT)

- Goals of treatment:
  - Alleviate withdrawal symptoms and cravings
  - Block opiate receptor
  - Normalize brain chemistry

Why Use MAT?

- >90% relapse rate without MAT
- Increased retention in treatment programs
- 80% decrease in drug use and crime
- 70% decrease in death rate

MAT in Pregnancy

- Reduces relapse rates
  - Reduces risk of hepatitis, HIV/AIDS, STIs
  - Removes patient from drug-seeking environment and illegal behaviors (ie, prostitution)
  - Decreases LBW infants
  - Prolongs gestation
  - Reduces maternal mortality, severe morbidity, and obstetrical complications
- Improves adherence to prenatal care and substance abuse treatment
MAT Medication Options

- Opioid antagonist
  - Naltrexone
- Opioid agonist
  - Methadone (full)
  - Buprenorphine (partial)

Opioid Agonists for MAT

Methadone

- Full opioid agonist
- 90% bioavailability
  - Tablets, liquid, parenteral
- 60 minute onset of action, 27 hour half-life
  - Typical starting dose 30mg
- Typical maintenance dose 80-120mg
  - Doses titling associated with high rates of relapse
- Highly regulated
  - Narcotic Addict Treatment Act of 1974
  - Opioid Treatment Program License required
  - Daily nursing assessment
  - Weekly counselling
  - Random supervised drug test
  - Varies by state; observed daily vs "take homes"
Methadone Maintenance Treatment

Benefits
- Increases survival
- Increases retention
- Decreases illicit opioid use
- Decreases hepatitis/HIV
- Decreases criminal activity
- Increases employment
- Improves birth outcomes

Limitations
- Limited access
- Inconvenient
- Lack of privacy
- Stigma
- No ability to graduate

Buprenorphine

- Partial opioid agonist
  - Must be licensed provider (DATA 2000 Waiver)
- Sublingual tablets and films
  - Monotherapy “Subutex”
  - Combination with naloxone “Suboxone”
  - To prevent injection
- Metabolized by CYP3A4
  - Elevated levels with administration of atazanavir/ritonavir
  - Decreased levels with rifampin
- Low risk of overdose
  - Seen in combination with other CNS depressants (ie, benzoes)
- Low risk of abuse
  - Euphoria seen in opioid-naïve individuals
- Coming soon: extended release injection, implants

Buprenorphine vs Methadone

- RCTs demonstrate equal efficacy for:
  - Abstinence from illicit opioid use
  - Decreased opioid craving
  - Lower retention rate for buprenorphine use
MAT In Pregnancy – the MOTHER study

- Buprenorphine in pregnancy is:
  - Viable alternative to methadone in pregnancy
  - Safe for mothers
  - Reduction in severity of NAS for neonates
  - Higher rate of attrition

- Care with respect to agent should be individualized

**COMMITTEE OPINION**

“If a woman does not accept treatment with an opioid agonist, or treatment is unavailable, medically supervised withdrawal can be considered under the care of a physician experienced in perinatal addiction treatment and with informed consent.”

**Exhibit 11-1: Symptoms of Withdrawal by Stage**

<table>
<thead>
<tr>
<th>Stage of Withdrawal</th>
<th>Symptoms of Withdrawal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antepartum (0 to 4 hours after last use)</td>
<td>Headache, sweating, crying, irritability</td>
</tr>
<tr>
<td>Early (5 to 10 hours after last use, for short acting opioids such as heroin)</td>
<td>Acuity, restlessness, irritability, vomiting, diarrhea</td>
</tr>
<tr>
<td>Fully Developed (1 to 3 days after last use, for short acting opioids such as heroin)</td>
<td>Nausea, anxiety, tremor, hallucinations, pain, vomiting, diarrhea, muscle aches, increased blood pressure, tachycardia, fever, chills</td>
</tr>
</tbody>
</table>

Antepartum Care

- Universal screen for substance abuse at first visit
- Register and use state’s PDMP prior to prescribing opioids
- Consider repeat STI panel in third trimester
- Screen for depression and other mental illness
- Consultation with anesthesia, addiction medicine, pain management, neonatology, Maternal-Fetal Medicine, behavioral health, nutrition, social work
- Anticipatory breastfeeding guidance
- Screening for other substance abuse
  - UDS: patient consent should be obtained

Intrapartum Care

- Continue established maintenance regimen
  - Confirm dose w/ prescribing clinic
- Add additional analgesia as needed
  - Tolerance, hyperalgesia
- Consider prenatal Anesthesia consultation
- AVOID partial agonist/antagonists
  - Stadol (butorphanol)
  - Nubain (nalbuphine)
  - Talwin (pentazocine)
- Early epidural/spinal

Overall Pain Management Approach:
Continue long-acting opioid agonist for treatment of opioid dependence

Consider either full agonist opioid (e.g., fentanyl or hydromorphone)
Offer regional analgesia
Repeat postpartum orders w/ in-hospital opioid agonist only if needed
Consider epidural/spinal anesthesia
Consider IV/fentanyl PCA for postpartum analgesia
Consider TPN if parenteral nutrition is needed
Postpartum Care

- Higher requirement of opioid analgesia after cesarean
  - 47-70% higher requirement for opioid pain relief
  - No difference in vaginal delivery
- Multimodal therapy can achieve adequate relief after CS
  - NSAIDs (e.g., ketorolac)
  - Acetaminophen
  - Spinal or epidural morphine
  - PI-controlled analgesia
  - Transversus abdominus plane (TAP) block
- Consider dividing buprenorphine or methadone Q6-8 hours
  - Additional analgesia will be required
- ? Discontinuation of buprenorphine for planned CS
  - Controversial

Post-delivery care

- Breastfeeding:
  - Encouraged, if no contraindications
  - Decreased NAS risk (less need for medication, decreased length of stay)
  - Codeine and Tramadol contraindicated (rapid conversion in breastmilk)
- Counsel regarding contraception and STI prevention
- Behavioral health psychosocial support
  - Screen for postpartum depression
- DO NOT DECREASE MAINTENANCE DOSE EMPIRICALLY
  - Only if overly sedated at 2-6 hours
- Rx for Narcan and overdose training

Take-home point:

- PICK THE OPIOID ADDICT.
Welcome to Labor and Delivery Rounds!!!

Room 2-triage
- 38 yo G1P0 presents to triage with an intractable headache and blood pressure of 168/100. What do you want to do?

Preeclampsia - 2013
Older Terminology
- Mild preeclampsia
- Severe preeclampsia
- Pregnancy-induced hypertension
- Pregnancy-associated HTN
Signs and Symptoms of Preeclampsia

- **CEREBRAL/CV**
  - Headaches
  - Dizziness
  - Epigastric Pain
  - Changes in level of consciousness
  - Tachycardia, Elevated RR

- **ENT/GASTROINTESTINAL**
  - Nausea/Vomiting
  - Tinnitus
  - Hematemesis

- **VISUAL**
  - Diplopia
  - Scotomata
  - Amaurosis fugax

- **RENAL**
  - Oliguria
  - Anuria
  - Hemoglobinuria

Management

Delivery is always appropriate therapy for the mother but may not be so for the fetus.
Initial Assessment

Maternal:
- Laboratory work-up (CBC, CMP, urine P/C or 24hr urine, LDH, ?coags)
- Strict I/Os
- Assess need for inpatient versus outpatient management
- Antenatal corticosteroids
- Magnesium sulfate

Initial Assessment

Fetus:
- Pediatrics consultation
- Frequent assessment of fetal status
- Daily NSTs
- Obstetric ultrasonography
  - Growth, fluid
  - Implementation of Dopplers ONLY if growth restriction
    - No test of fetal well-being is satisfactory when the mother’s condition is unstable → should be repeated every time the maternal status changes

Disease with Severe Features

- Inpatient management
- Treatment for BPs above 160/110 (goal is 140-155/90-105)
  - IV acutely, orals to follow
- Q8hr vitals, close I/Os
- Daily testing, weekly fluid check, serial growth q 3 weeks
- Daily – QOD labs, or if any clinical change
- Delivery at 34 weeks; deliver with any presentation after 34 weeks
Delivery before 34 weeks?

<table>
<thead>
<tr>
<th>Before completion of steroids</th>
<th>After completion of steroids</th>
</tr>
</thead>
<tbody>
<tr>
<td>Morphometric growth restriction</td>
<td>Fetal compromise</td>
</tr>
<tr>
<td>Edema</td>
<td>FGR + HELLP</td>
</tr>
<tr>
<td>Abnormal anatomy</td>
<td>FGR due to oligohydramnios (2-3x vertical plasma)</td>
</tr>
<tr>
<td>Physical exam</td>
<td>US diagnosis of HELLP</td>
</tr>
<tr>
<td>blood pressure</td>
<td>FGR, HELLP</td>
</tr>
<tr>
<td>STEEP</td>
<td>Pristane, DOCA</td>
</tr>
<tr>
<td>HELLP</td>
<td>Persistent elevated (platelet, protein, Jaffé) or severe (platelet, protein, Jaffé)</td>
</tr>
</tbody>
</table>

Disease without Severe Features

- Outpatient management
- Treatment for BPs above 160/110 (goal is 140-155/90-105)
- Home blood pressure monitoring
- 2x/wk NSTs, weekly fluid check, serial growth q 3 weeks
- Weekly labs
- Delivery at 37 weeks

Would an 8/10 BPP reassure you?

Disease without Severe Features

- Outpatient management
- Treatment for BPs above 160/110 (goal is 140-155/90-105)
- Home blood pressure monitoring
- 2x/wk NSTs, weekly fluid check, serial growth q 3 weeks
- Weekly labs
- Delivery at 37 weeks
Three tenets of intrapartum management

- Anti-Hypertensives
- Seizure management
- Hemodynamic monitoring

Intrapartum Management (BP)

- Antihypertensive therapy
  - Goal = prevention of intracranial bleeding and stroke
  - Provide margin of safety without compromising uterine perfusion (overly aggressive tx lowers maternal cardiac output)

<table>
<thead>
<tr>
<th>Medication</th>
<th>Starting dose</th>
<th>Max dose in 24 hours</th>
<th>Time of onset</th>
<th>Peak effect</th>
<th>Duration of onset</th>
</tr>
</thead>
<tbody>
<tr>
<td>Labetalol</td>
<td>20mg IV</td>
<td>300 mg IV</td>
<td>1-2 min</td>
<td>10 min</td>
<td>6-16 hours</td>
</tr>
<tr>
<td>Hydralazine</td>
<td>5-10mg IV</td>
<td>40 mg IV</td>
<td>10-20 min</td>
<td>20-40 min</td>
<td>3-8 hours</td>
</tr>
<tr>
<td>Nifedipine</td>
<td>10 mg PO of immediate release</td>
<td>30 mg PO</td>
<td>5-10 min</td>
<td>10-20 min</td>
<td>4-8 hours</td>
</tr>
<tr>
<td>Nicardipine*</td>
<td>5 mg/hr</td>
<td>15 mg/hr</td>
<td>Minutes</td>
<td>1-2 hours</td>
<td>&lt; 8 hours</td>
</tr>
</tbody>
</table>
Intrapartum Management (Sz)

• Seizure prophylaxis
  – Most occur during intra- and postpartum period (most likely time for acceleration of disease)
    • Magpie Trial (2002) → RCT of 10,000+ women (placebo vs mag sulfate)
      » Clear reduction in the risk of eclampsia
      » Mild disease NNT = 100
      » Severe disease NNT = 60


Intrapartum Management (Sz)

• Magnesium:
  – Loading dose: 6 or 4g IVP over 20-30 minutes
  – Maintenance dose: 1-2 g/hr
  – REMEMBER...most likely reason someone has a seizure on magnesium is that they are not therapeutic

Intrapartum Management (Sz)

  – Therapeutic levels
    • 4-7 mEq/L
    • Renal excretion (caution when Cr > 1.0)
  – Toxicity
    • 5-10 mEq/L = EKG changes
    • 10 mEq/L = loss of patellar or deep tendon reflexes
    • 15 mEq/L = respiratory paralysis
    • >25 mEq/L = cardiac arrest
      – Treatment of overdose = calcium gluconate (10 mL of 10% solution over 3 min)
Intrapartum Management (HD)

- Oliguria
  - < 0.5 cc/kg/hr in 2 or more hours
  - If no signs of CHF, may administer 1000cc of isotonic crystalloid over 1 hr
    - If UOP increases, can maintain at 100cc/hr
    - If no response, consider central monitoring
    - Consider delivery

Intrapartum Management (HD)

- Pulmonary Edema
  - Usually from iatrogenic fluid overload
  - Non-cardiogenic = decreased colloidal pressure leading to capillary leakage
  - Most common = post partum
  - Tx: fluid restriction, hydralazine for afterload reduction and IV furosemide

How do we reduce her of developing Preeclampsia next time risk for next time?
Welcome to Labor and Delivery Rounds!!!

Room 3-labor and delivery

- 28 yo G2P1 at 39+3 weeks gestation presents in labor. Her cervix is 4/80/0. Of note, she has a history of a prior cesarean section for breech.
Room 3-labor and delivery

- 28 yo G2P1 at 39+3 weeks gestation presents in labor. Her cervix is 4/80/0. Of note, she has a history of a prior cesarean section for breech.

This is her fetal heart tracing on admission

You’re sitting at the nurse’s station when you see this on the monitor...

What are you worried about??
Signs and symptoms of uterine rupture

- Category II or III tracing
  - Recurrent decelerations or bradycardia
- Abdominal pain
- Vaginal bleeding
- Loss of fetal station
- Vital sign abnormalities
  - Tachycardia
  - Hypotension

QUESTIONS???