Opioids in pregnancy
Minimizing risks, dealing with abuse

Agatha S. Critchfield, MD, and Wendy F. Hansen, MD

MATERNAL MORTALITY
Postpartum hemorrhage + Toolkits, safety bundles, guidelines

MIGS: Avoiding complications

TOOLS TEST DRIVE
Laparoscope defogger, cleaner

LEGALY SPEAKING
Hemorrhage: Unavoidable or negligent?

Transport across the placental barrier of methadone, a full agonist of the mu-opioid receptor, which is used in medication-assisted withdrawal.
NOW AVAILABLE

DEMONSTRATED TO SIGNIFICANTLY DECREASE MODERATE TO SEVERE DYSPAREUNIA DUE TO MENOPAUSE* 

NON-ESTROGEN BASED, CONVERTS TO ESTROGENS AND ANDROGENS* 
Prasterone is a precursor that is locally converted to estrogens and androgens with minimal systemic exposure.1,2 “The mechanism of action of INTRAROSA is not fully established”

ONCE-DAILY TREATMENT 
Individually wrapped vaginal inserts with disposable applicators1

To order samples and learn more about INTRAROSA, including our patient savings program, visit IntrarosaHCP.com

Indication 
INTRAROSA is a steroid indicated for the treatment of moderate to severe dyspareunia, a symptom of vulvar and vaginal atrophy, due to menopause.

Important Safety Information 
INTRAROSA is contraindicated in women with undiagnosed abnormal genital bleeding. Estrogen is a metabolite of prasterone. Use of exogenous estrogen is contraindicated in women with a known or suspected history of breast cancer. INTRAROSA has not been studied in women with a history of breast cancer.

In four 12-week randomized, placebo-controlled clinical trials, the most common adverse reaction with an incidence ≥2 percent was vaginal discharge. In one 52-week open-label clinical trial, the most common adverse reactions with an incidence ≥2 percent were vaginal discharge and abnormal Pap smear.

Brief Summary: Consult full Prescribing Information for complete product information.

CONTRAINDICATIONS 
Undiagnosed abnormal genital bleeding: Any postmenopausal woman with undiagnosed, persistent or recurring genital bleeding should be evaluated to determine the cause of the bleeding before consideration of treatment with INTRAROSA.

WARNINGS AND PRECAUTIONS Current or Past History of Breast Cancer 
Estrogen is a metabolite of prasterone. Use of exogenous estrogen is contraindicated in women with a known or suspected history of breast cancer. INTRAROSA has not been studied in women with a history of breast cancer.

ADVERSE REACTIONS Clinical Trials Experience 
Because clinical trials are conducted under widely varying conditions, adverse reaction rates observed in the clinical trials of a drug cannot be directly compared to rates in the clinical trials of another drug and may not reflect the rates observed in practice.
In four (4) placebo-controlled, 12-week clinical trials [91% - White Caucasian non-Hispanic women, 7% - Black or African American women, and 2% - “Other” women, average age 58.8 years of age (range 40 to 80 years of age)], vaginal discharge is the most frequently reported treatment-emergent adverse reaction in the INTRAROSA treatment group with an incidence of ≥2 percent and greater than reported in the placebo treatment group. There were 38 cases in 665 participating postmenopausal women (5.71 percent) in the INTRAROSA treatment group compared to 17 cases in 464 participating postmenopausal women (3.66 percent) in the placebo treatment group.
In a 52-week non-comparative clinical trial [92% - White Caucasian non-Hispanic women, 6% - Black or African American women, and 2% - “Other” women, average age 57.9 years of age (range 43 to 75 years of age)], vaginal discharge and abnormal Pap smear at 52 weeks were the most frequently reported treatment-emergent adverse reactions in women receiving INTRAROSA with an incidence of ≥2 percent. There were 74 cases of vaginal discharge (14.2 percent) and 11 cases of abnormal Pap smear (2.1 percent) in 521 participating postmenopausal women. The eleven (11) cases of abnormal Pap smear at 52 weeks include one (1) case of low-grade squamous intraepithelial lesion (LSIL), and ten (10) cases of atypical squamous cells of undetermined significance (ASCUS).

Olympus Gynecology Solutions

We bring innovation to her care through our offering of minimally invasive products and solutions to meet your needs in the O.R. and office.

Contact your Olympus sales representative or visit medical.olympusamerica.com/specialty/gynecology to learn more.

© 2018 Olympus America Inc. Trademark or Registered Trademark of Olympus and its affiliated entities in the U.S. and/or other countries of the world. All patents apply. OA/GYN0218AD24931
Opioid abuse and its sequelae: treatment strategies for ob/gyns
Steps we can take to help limit OUD in our pregnant and non-pregnant patients

In a previous editorial (Why there is an opioid crisis, February, 2018) I reviewed the origins and public health magnitude of the current national opioid epidemic. We are all familiar with its grim statistics—90 people die each day and over 33,000 die each year in the United States of an opioid overdose, with half of these fatalities due to misuse of prescription opioids. Every year, 2 million individuals abuse prescription opioids at a cost of $78.5 billion. Women are particularly vulnerable to opioid use disorder (OUD). Compared with men, women are more likely to be treated for chronic pain and appear to develop OUD at lower dosages over shorter durations while experiencing more cravings, a phenomenon known as “telescoping.” Between 1999 and 2015, deaths from prescription opioid overdoses increased 471% among women versus 218% among men. Thus, ob/gyns, as the primary providers of health care for reproductive age women, are squarely on the front line of the opioid crisis.

It is both simple logic and an established fact that reducing the quantity of opioids prescribed will reduce the occurrence of OUD, the transition to heroin, fentanyl and other illicit opioids, and overdose deaths. And yet, as is the case with most physicians, we ob/gyns are “systematically undertained and under-engaged in addiction treatment efforts.” There are also a host of barriers to such training and engagement. For example, to prescribe buprenorphine, an opioid with lower abuse potential and an effective medication-assisted treatment (MAT) for OUD, physicians must obtain a waiver from the Drug Enforcement Administration (DEA) requiring 8 hours of training. Currently only 4% of active physicians have obtained such a waiver. So what practical steps can we take to mitigate this crisis?

**Strategies to prevent or reduce OUD in non-pregnant women**

Prevention of OUD should be the primary focus of gynecological pain relief prescribing strategies. Acute pain associated with gynecological procedures may be amenable to nerve blocks and non-opioid analgesics. When opioids are required postoperatively, provide no more than a 3-day supply of an intermediate-release agent at the lowest effective dose. Prescriptions for > 7 days should rarely be required. In the setting of chronic pain (e.g., due to endometriosis), opioid prescriptions should be the last resort and administered only after a careful risk-benefit analysis. In such an evaluation, the physician should be reminded that systematic reviews have failed to demonstrate a benefit to opioid therapy in chronic pain management but do...
demonstrate an increased risk of OUD, overdose and other harms. Thus, alternative treatments such as hormonal therapy, physical therapy, exercise, alternative medicine, behavioral therapy, nonsteroidal anti-inflammatory drugs (NSAIDs) or surgery should be considered depending on the etiology. If, after exhausting all other alternatives, opioids are indicated, the following steps are recommended by the Centers for Disease Control and Prevention (CDC):  

1. Opioid therapy should be considered only if benefits, in terms of pain relief and function, outweigh risks. 
2. Before initiating opioid treatment, clinicians should establish treatment goals and treatment should only be continued if there is clinically meaningful improvement in pain and function that outweighs risks. 
3. Before initiating, and periodically while administering opioid treatment, clinicians should review risks and benefits. 
4. When initiating opioid therapy for chronic pain, clinicians should prescribe intermediate-release opioids and NOT extended-release (long-acting) agents which have greater risk of respiratory arrest. 
5. Clinicians should prescribe the lowest effective dose and carefully reassess evidence of benefit when doses ≥ 50 morphine milligram equivalents (MME)/day are required; clinicians should avoid doses ≥ 90 MME/day. 
6. Since long-term opioid use often begins with treatment of acute pain, adhere to the opioid prescribing recommendations made above for acute pain management (lowest dose, intermediate-release formulations, ≤ 3 day duration). 
7. Reassess benefits and harms within 1 to 4 weeks of starting treatment and every 3 months thereafter while treatment is continued. 
8. Before starting, and periodically during continuation of opioid therapy, reassess risk factors for possible harm and consider offering naloxone when factors are present that increase risk of overdose (e.g., therapy ≥ 50 MME/day or concomitant benzodiazepine therapy). 
9. Clinicians should review a patient’s history of controlled substance prescriptions using their state’s prescription drug monitoring program (PDMP) data (http://www.pdmpassist.org/content/state-profiles) to determine whether she is receiving opioid dosages that put her at risk for an overdose. Review PDMP data when starting opioids for chronic pain and every 3 months while on therapy. 
10. When prescribing opioids for chronic pain obtain urine drug testing before initiating treatment and consider annual testing to assess for prescribed medications as well as other controlled prescriptions and illicit drugs. 
11. Avoid prescribing concomitant benzodiazepines for patients on opioids because of their synergistic effects promoting respiratory arrest. 
12. Arrange for MAT with behavioral therapy for patients with OUD. 

**Strategies to prevent or reduce OUD in pregnant women** 
There are multiple risks to OUD in pregnancy. Untreated addiction to illicit opioids is associated with lack of prenatal care, risk of infectious disease, criminal activity and arrest, maternal trauma, loss of child custody, depression, under-nutrition, increased risk of fetal growth restriction, placental abruption, stillbirth and intrauterine passage of meconium. Neonatal abstinence syndrome (NAS) is a result of in utero opioid exposure, and subsequent post-delivery withdrawal is characterized by excessive crying, increased muscle tone, tremors, sweating, poor feeding, sleep disturbances and gastrointestinal dysfunction. The occurrence of NAS syndrome increased 5-fold between 2000 and 2012. 

As in the case of non-pregnant women, the best strategy to prevent occurrence of OUD in pregnant and postpartum women is to minimize or eliminate exposure to opioids in the acute pain setting. In my experience, it is rarely necessary to prescribe opioids after discharge following a vaginal delivery. If there are complications such as severe perineal trauma necessitating opioid therapy, limit duration to ≤ 3 days of a low-dose intermediate-release agent. Similarly, I rarely send patients home on opioids after an uncomplicated cesarean delivery, but again if wound complications necessitate such therapy, it should be limited to ≤ 3 days of a low-dose intermediate-release agent. As an alternative I would prescribe NSAIDs. 

For pregnant women with preexisting OUD, MAT with methadone or buprenorphine is the preferred management strategy since MAT protects the fetus from repeated withdrawal, ensures the woman stays engaged in the health care system, avoids infectious and other risks of illicit opioid use, and promotes prenatal care. Buprenorphine may be the preferred MAT agent. First, it is a partial agonist lowering abuse potential and making overdose less likely. Second, while methadone can only be dispensed by licensed opioid treatment facilities, buprenorphine can be dispensed in an office setting provided the physician has obtained a DEA waiver. Third, Buprenorphine may be more effective and also appears to induce mild-
er NAS. Finally, the combination of buprenorphine and naloxone, designed to reduce the potential for intravenous abuse, appears safe to continue as MAT in pregnancy, though additional studies are needed before recommending its initiation during pregnancy.

There is a growing consensus that MAT with either methadone or buprenorphine is preferable to medically supervised withdrawal in pregnancy because of the high relapse rates (60% to 90%) associated with withdrawal. If MAT is unavailable or if a pregnant woman insists on medically supervised withdrawal, it should occur in an inpatient setting under the care of a physician expert in this area.

Women on long-acting naltrexone therapy to maintain abstinence who conceive pose a dilemma. The impact of such therapy on the fetus and pregnancy are largely unknown, although the largest study shows no apparent risk. Conversely, risk of relapse after discontinuing this agent is clearly increased. Thus, a detailed discussion with the pregnant patient is needed. A recent Committee Opinion by the American College of Obstetricians and Gynecologists (ACOG) provides the following advice:

1. Conduct early universal screening for OUD and other substance abuse, ideally at the first prenatal visit, followed by a brief intervention (e.g., short conversation, feedback and advice), and referral for MAT to improve maternal and infant outcomes (SBIR).
2. Universal screening should rely on validated screening tools, such as questionnaires (e.g., 4Ps, NIDA Quick Screen, and CRAFFT for women 26 years or younger; see Committee Opinion for descriptions of these tools [9]).
3. For chronic pain, avoid or minimize use of opioids. Review alternative therapies such as nonpharmacologic approaches (e.g., exercise, physical therapy, behavioral therapy), and non-opioid pharmacologic treatments (e.g., short term acetaminophen therapy or NSAIDs < 28 weeks).
4. For pregnant women with OUD, MAT is recommended over medically supervised withdrawal.
5. Infants born to women who used opioids during pregnancy should be monitored by a pediatric care provider for NAS.
6. Given the unique needs of pregnant women with OUD, consider modifying elements of prenatal care (e.g., expanded sexually transmitted infection testing, providing additional ultrasound examinations to rule out fetal growth restriction, and initiating consultations as needed).
7. Before prescribing opioids, ensure opioids are appropriately indicated; discuss risks and benefits of use; review treatment goals; rule out history of substance use and review PDMP to determine whether patients have received prior opioid prescriptions.
8. Breastfeeding should be encouraged for women on MAT, who are not using illicit drugs, and who have no other contraindications, such as HIV infection. Women should be counseled about the need to suspend breastfeeding in the event of a relapse.
9. Provide postpartum psychosocial support services, including referral to treatment and relapse prevention programs.
10. Contraceptive counseling and provision.

Take-home message

The opioid crisis has finally garnered the attention of federal and state governments, which have implemented much-needed policies such as state prescription drug monitoring programs, improved funding for treatment centers, and increased emergency access to naloxone and anti-abuse medications. However, the best strategy to end this scourge remains prevention. Because prescriptions for opioid analgesia remain the major gateway of abuse, physicians, and particularly ob/gyns must strive to avoid their use altogether for chronic pain management and minimize their use for acute pain management. When opioids are indicated for management of chronic pain in non-pregnant women, CDC guidelines should be followed. In pregnant and postpartum women, again prevention is the key with avoidance of any opioid prescription upon discharge following either vaginal or cesarean delivery. If opioids are indicated after either gynecological or obstetrical surgery, the lowest dose of an intermediate-release formulation should be given for ≤ 3 days. Finally, for pregnant women with an OUD, the optimal approach involves MAT with either methadone or buprenorphine.
Everything she needs with the services you expect.

Women’s Health Service Spectrum

- **CERVICAL CANCER SCREENING & STDs**
  - NuSwab® Vaginitis Portfolio: Age-based test protocol for cervical cancer and STD screening
  - HPV E6/E7 QuantaSURE®
  - BRCAssure®: Gene mutation analysis for hereditary breast and ovarian cancer
  - VistaSeq™ Hereditary Cancer Panel – A 27-gene assay for genetic mutations known to be associated with hereditary cancer syndromes
  - Ovarian Malignancy Risk (ROMA®)
  - Serial Monitoring Graphs

- **REPRODUCTIVE ENDOCRINOLOGY**
  - Specialized hormone assays with extensive age-related reference intervals

- **CARRIER SCREENING**
  - Full-service Genetic Testing
  - Next Generation Sequencing
  - Reveal® SNP Microarray Testing
  - Noninvasive Prenatal Test Options

- **PREGNATAL GENETICS**
  - VistaSeq SM Hereditary Cancer Panel – A 27-gene assay for genetic mutations known to be associated with hereditary cancer syndromes

- **ONCOLOGY MARKERS**
  - Ovarian Malignancy Risk (ROMA®)
  - Serial Monitoring Graphs

- **ACCESS TO SCIENTIFIC EXPERTS**
  - Access to scientific experts with extensive age-related reference intervals

- **DEDICATED SERVICE TEAM**

- **MATERNAL-FETAL MEDICINE**
  - Specialized Thrombophilia and Coagulation Profiles

- **DONOR TESTING**
  - FDA-registered Donor Testing including West Nile Virus

- **INFECTIOUS DISEASE**
  - HCV Test Portfolio
  - HIV-1/O/2 Cascade, 4th Generation

For more information about LabCorp tests and services, visit www.labcorp.com.
The opioid crisis: Prenatal and postnatal care
Recent data support treating opioid use in pregnant patients with MAT

by AGATHA S. CRITCHFIELD, MD, AND WENDY F. HANSEN, MD

The nation is in the midst of an opioid crisis and the statistics are staggering. The Centers for Disease Control and Prevention (CDC) reports that 2 million Americans are addicted to opioids.1 Opioid use in pregnancy has mirrored the general population, increasing each year.2 The escalation of use in pregnancy has brought a concurrent rise in the rates of infants born with Neonatal Abstinence Syndrome (NAS) and a tragic increase in overdose deaths. Opioid Use Disorder (OUD) is a medical condition characterized by a problematic pattern of opioid use that causes clinically significant impairment or distress (Table 1). It is sometimes referred to as opioid use or dependence.1 Ob/gyns are on the front lines of this epidemic and have a responsibility to recognize, treat, refer and advocate for the pregnant women with OUD. Understanding the biology, epidemiology, evaluation, and current data regarding effective treatment options during pregnancy is necessary in order to have a framework for treating this complex disease.

Opioid MOA
Opioids have a powerful effect on the brain - both positive and negative. Opioids are natural or synthetic chemicals that interact with mu receptors in nerve cells in the gastrointestinal tract, spinal cord and the brain, thereby reducing feelings of pain.3 This class of drugs includes the illegal drug heroin, synthetic opioids such as fentanyl, and pain medications available legally by prescription, such as oxycodone, hydrocodone, codeine, morphine, and many others. Although these drugs are generally considered safe when taken for a short time and as prescribed by a physician, the individual response to them varies markedly. Although not completely understood, there is great heterogeneity in mu receptor structure, functional activation and localization within the cells and regions of the brain.4 This diversity may, in part, account for the varied responses seen clinically. In addition, opioids are also known to disrupt the neuronal machinery of the brain-reward center. When in balance, the cells in the ventral tegmental area (VTA) produce dopamine and release it into the nucleus accumbens (NAC), giving rise to feelings of pleasure. Feedback from the prefrontal cortex back to the VTA helps us overcome drives to obtain pleasure through actions that may be unsafe or unwise. However, this feedback has been noted to be dysregu-
Bio-Oil® is a skincare oil that helps improve the appearance of scars, stretch marks and uneven skin tone. It contains natural oils, vitamins and the breakthrough ingredient PurCellin Oil™. For comprehensive product information and results of clinical trials, please visit bio-oil.com. Bio-Oil is the No.1 selling scar and stretch mark product in 24 countries. $11.99 (60 mL).
OPIOID CRISIS: PRENATAL AND POSTNATAL

PEER-REVIEWED

Opioid Use Disorder Diagnostic Criteria*

A problematic pattern of opioid use leading to clinically significant impairment or distress, as manifested by at least 2 of the following, occurring within a 12-month period:

1. Opioids are often taken in larger amounts or over a longer period than was intended
2. There is a persistent desire or unsuccessful efforts to cut down or control opioid use
3. A great deal of time is spent in activities necessary to obtain the opioid, use the opioid, or recover from its effects
4. Craving, or a strong desire or urge to use opioids
5. Recurrent opioid use resulting in a failure to fulfill major role obligations at work, school, or home
6. Continued opioid use despite having persistent or recurrent social or interpersonal problems caused or exacerbated by the effects of opioids
7. Important social, occupational, or recreational activities are given up or reduced because of opioid use
8. Recurrent opioid use in situations in which it is physically hazardous

9. Continued opioid use despite knowledge of having a persistent or recurrent physical or psychological problem that is likely to have been caused or exacerbated by the substance

10. Tolerance, as defined by either of the following:
   a. A need for markedly increased amounts of opioids to achieve intoxication or desired effect
   b. A markedly diminished effect with continued use of the same amount of an opioid

Note: This criterion is not considered to be met for those taking opioids solely under appropriate medical supervision

11. Withdrawal, as manifested by either of the following:
   a. The characteristic opioid withdrawal syndrome (refer to Criteria A and B of the criteria set for opioid withdrawal)
   b. Opioids (or a closely related substance) are taken to relieve or avoid withdrawal symptoms


The National Institute of Drug Abuse (NIDA) reports that 20% to 30% of patients prescribed opioids for chronic pain misuse them. About 10% of those prescribed opioids for chronic pain will develop OUD. An estimated 5% who misuse prescription opioids will transition to heroin. Of those currently using heroin, 80% started their addiction by misusing prescription opioids.

OUD and consequent overdose deaths have reached an all-time high. In February 2018, the National Institutes of Health reported that 115 deaths occurred daily because of opioid overdose. The CDC estimates that 64,070 people living in the United States died from overdoses (all kinds) in 2016, an increase from 52,404 overdose deaths in 2015. Fentanyl was the number one cause fueling this dramatic increase and responsible for almost 17,000 deaths. Drug overdose is now the leading cause of accidental death (categorized as poisonings at the CDC) in the United States, surpassing motor vehicle crashes in 2011. Although death is a tragic outcome and an important metric, the societal cost is far broader, affecting families, children, the workforce, penal system, healthcare and communities. NIDA estimates that the financial cost is over $600 billion each year.

Diagnosing and treating OUD in pregnancy

Clinical colleagues in psychiatry have given us a new definition, framework and context for assessment of OUD with the publication of the Diagnostics and Statistical Manual 5 (DSM-5) in 2013. The longstanding model and language of substance abuse and dependence have been largely replaced by a single disorder along a continuum of mild to severe. The current language
used to describe a substance problem was updated to reflect changing patterns of abuse. Criteria were changed to better account for cultural and socioeconomic effects on populations (Table 1).

Treatment for OUD in pregnancy must include a multifaceted, comprehensive approach as behavioral interventions, psychosocial support and medication administration have been shown to improve maternal and neonatal outcomes. Pharmacotherapy for treatment of OUD (referred to as medication-assisted therapy [MAT]) has been utilized in pregnancy since the 1970s. Initially this was achieved with methadone and later with buprenorphine-based products. The benefits of MAT use in pregnancy stem from avoidance of symptomatic withdrawal. When cyclic use and withdrawal from illicitly obtained opioids is controlled, patients have the opportunity to establish and maintain medical and prenatal care and to address comorbid conditions. This reduction in medical and social risks associated with substance use in pregnancy leads to improved social, obstetric, and neonatal outcomes.

While a review of behavioral interventions is beyond the scope of this article, we will review currently available pharmacotherapies for pregnant women with OUD, and briefly discuss accumulated evidence regarding Medication-Assisted Withdrawal (MAW).

**Methadone.** Methadone is a full agonist of the μ-opioid receptor and has been utilized since the 1970s as the standard treatment for OUD in pregnancy. It is dispensed on a daily basis by registered comprehensive addiction treatment programs. Currently, it is not legal for physicians outside of such licensed treatment facilities to prescribe methadone to treat OUD (although the drug can be prescribed on an inpatient basis for continuation or initiation of MAT). All providers should be aware that potential significant medication interactions exist with methadone – including, but not limited to, some nucleoside reverse transcriptase inhibitors and non-nucleoside reverse transcriptase inhibitors, antiretroviral medications, protease inhibitors, tricyclic antidepressants or rifampin. In addition, there is a risk of maternal respiratory depression and QTc prolongation. Some data suggest that physiologic changes in pregnancy may require dose adjustments. This is not universal, however, and should be based on evidence of withdrawal rather than provided reflexively. Other studies have supported the use of split dosing with methadone to reduce maternal symptoms of withdrawal.

**Buprenorphine.** Buprenorphine is a partial agonist of the μ-opioid receptor, thereby giving it an improved safety profile. It decreases the activity of full opioid agonists (e.g., methadone, heroin, morphine, oxycodone). Accumulated recent evidence supports use of buprenorphine in pregnancy and it is available as either a mono-product (buprenorphine alone, Subutex) or as a combined product with naloxone (buprenorphine/naloxone, e.g., Suboxone). The naloxone component is not active if taken in the proper fashion (sublingually); however, a patient will experience significant withdrawal symptoms if she injects the medication (naloxone is an opioid antagonist that will displace opioids from receptors). For that reason, the combined product is used to prevent improper intravenous use of the buprenorphine. Historically, providers have had concerns

---

**TABLE 2 Methadone vs Buprenorphine in Pregnancy**

<table>
<thead>
<tr>
<th>Patient preference</th>
<th>Methadone</th>
<th>Buprenorphine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provided daily in licensed methadone clinics</td>
<td>Provided in office setting by licensed physician</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Risk of overdose mortality</th>
<th>Higher</th>
<th>Lower (but not absent)</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Risk of drug interaction</th>
<th>Higher</th>
<th>Lower (but not absent)</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Risk of neonatal abstinence syndrome</th>
<th>Equal</th>
<th>Equal</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Duration of neonatal abstinence syndrome</th>
<th>Longer</th>
<th>Shorter</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Breastfeeding consideration</th>
<th>Safe (assuming no other contraindications)</th>
<th>Safe (assuming no other contraindications)</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Neurodevelopmental outcome in exposed children</th>
<th>Favorable</th>
<th>Less long-term information</th>
</tr>
</thead>
</table>

Avoiding complications in endoscopic surgery

Planning up front for an endoscopic gynecologic surgical procedure is the best way to prevent an injury or complication.

by JAVIER F. MAGRINA, MD, AND MEGAN N. WASSON, DO

We all want to perform surgery and have no complications. But if you operate and for long enough, you will have complications. Recognizing that unfortunate truth mandates preparation for injury prevention.

Why do complications occur?

Poor knowledge of anatomy, distractions, being above one’s limits of expertise, inadequate preparation for a case, overconfidence, being in the learning curve of new technology or surgical technique, not knowing how to properly use an instrument, being in a rush, inadequate or inappropriate tissue dissection, and inability to recognize different tissues or structures are all familiar causes that may lead to visceral injuries.

If you want to avoid injuries, avoid what is listed above.

At the end of every operation, check for injuries to the bladder, ureters, rectum, sigmoid, and small bowel. Dictate the findings in the operative report. Intraoperative recognition of an intestinal injury is a blessing compared to a late diagnosis with full blown peritonitis. There are no excuses for preventable complications. An additional few minutes spent dissecting and clearly identifying the bladder, rectum, or ureters is more rewarding and much shorter than 10 to 45 minutes necessary to repair any of these structures. The time is extended even further if another surgeon is requested.

Laparoscopic mortality and its major causes: Entry injuries

Laparoscopic mortality is directly related to the type of injury. Major vascular injuries and unrecognized intestinal injuries are associated with the highest mortality: 9% to 17% for vascular and 3.2% for unrecognized intestinal injuries. The riskiest time for vascular and intestinal injuries is at closed...
Severe maternal morbidity affects over 60,000 women each year\(^1\)

Every 10 minutes a woman in the US nearly dies of pregnancy-related complications\(^1\)

Start with IM and transition to Oral Tablets\(^*\)

Ensure your patients are protected from Hospital to Home

\(^*\)In appropriate patients who are at risk of PPH.

INDICATIONS

Methergine® (methylergonovine maleate) is indicated for routine management of uterine atony, hemorrhage and subinvolution of the uterus following delivery of placenta and for control of uterine hemorrhage in the second stage of labor following delivery of the anterior shoulder.

IMPORTANT SAFETY INFORMATION

Methergine Tablets are contraindicated for patients with the following conditions: hypertension, toxemia, pregnancy, and hypersensitivity.

WARNINGS

General: This drug should not be administered I.V. routinely because of the possibility of inducing sudden hypertensive and cerebrovascular accidents. If I.V. administration is considered essential as a lifesaving measure, Methergine (methylergonovine maleate) should be given slowly over a period of no less than 60 seconds with careful monitoring of blood pressure. Intra-arterial or periarterial injection should be strictly avoided. Caution should be exercised in presence of impaired hepatic or renal function.

Breast-Feeding: Mothers should not breast-feed during treatment with Methergine. Milk secreted during this period should be discarded. Methergine may produce adverse effects in the breast-feeding infant. Methergine may also reduce the yield of breast milk. Mothers should wait at least 12 hours after administration of the last dose of Methergine before initiating or resuming breast feeding.

Coronary Artery Disease: Patients with coronary artery disease or risk factors for coronary artery disease (e.g. smoking, obesity, diabetes, high cholesterol) may be more susceptible to developing myocardial ischemia and infarction associated with methylergonovine-induced vasospasm.

Medication Errors: Inadvertent administration of Methergine to newborn infants has been reported. In these cases of inadvertent neonatal exposure, symptoms such as respiratory depression, convulsions, cyanosis and oliguria have been reported. Usual treatment is symptomatic. However, in severe cases, respiratory and cardiovascular support is required. Methergine has been administered instead of vitamin K and Hepatitis B vaccine, medications which are routinely administered to the newborn. Due to the potential for accidental neonatal exposure, Methergine injection should be stored separately from medications intended for neonatal administration.

PRECAUTIONS

General: Caution should be exercised in the presence of sepsis, obliterative vascular disease. Also use with caution during the second stage of labor. The necessity for manual removal of a retained placenta should occur only rarely with proper technique and adequate allowance of time for its spontaneous separation.

Drug Interactions: There have been rare reports of serious adverse events in connection with the coadministration of certain ergot alkaloid drugs (e.g. dihydroergotamine and ergotamine) and potent CYP 3A4 inhibitors, resulting in vasospasm leading to cerebral ischemia and/or ischemia of the extremities.

Caution should be exercised when Methergine® Tablets are used concurrently with beta-blockers. Concomitant administration with beta-blockers may enhance the vasoconstrictive action of ergot alkaloids.

ADVERSE REACTIONS

The most common adverse reaction is hypertension associated in several cases with seizure and/or headache. Hypotension and anaphylaxis has also been reported. Cerebrovascular accident, paraesthesia, ventricular fibrillation, ventricular tachycardia, angina pectoris, atrioventricular block were also reported post-marketing. Safety and effectiveness in pediatric patients have not been established.

Please note that this information is not comprehensive. See the full Prescribing Information at www.methergine.com

You are encouraged to report negative side effects of prescription drugs to the FDA. Visit www.fda.gov/medwatch, or call 1-800-FDA-1088, or contact Lupin Pharmaceuticals, Inc. at 1-800-399-2561.

References:


©2017 Lupin Pharmaceuticals, Inc. 111 South Calvert Street, Baltimore, MD 21202
All rights reserved. Methergine is a registered trademark of Novartis AG. PP-METH-US-0032
**METHYLERGONOVINE MALEATE TABLETS**

**Brief Summary:** Consult Full Prescribing Information for complete product information.

**INDICATIONS AND USAGES**

Methylergonovine Maleate is a semi-synthetic ergot alkaloid used for the prevention and control of postpartum hemorrhage. It is used following delivery of placenta, for routine management of uterine atony, hemorrhage, and subinvolution of the uterus as well as for control of uterine hemorrhage in the second stage of labor following delivery of the anterior shoulder.

**CONTRAINDICATIONS**

Hypertension, toxemia, pregnancy, and hypersensitivity are contraindications to Methylergonovine Maleate Tablets.

**WARNINGS**

General: This drug should not be administered intravenously routinely because of the possibility of inducing sudden hypertensive and cerebrovascular accidents. If intravenous administration is considered essential as a lifesaving measure, methylergonovine maleate should be given slowly over a period of no less than 60 seconds with careful monitoring of blood pressure. Intravenous or perianastomotic injection should be strictly avoided. Caution should be exercised in presence of impaired hepatic or renal function.

Breast-Feeding: Mothers should not breast-feed during treatment with Methylergonovine Maleate Tablets, USP. Milk secreted during this period should be discarded. Methylergonovine Maleate Tablets, USP may produce adverse effects in the breast-feeding infant. Methylergonovine Maleate Tablets, USP may also reduce the yield of breast milk. Mothers should wait at least 12 hours after administration of the last dose of Methylergonovine Maleate Tablets, USP before initiating or resuming breast-feeding.

Coronary Artery Disease: Patients with coronary artery disease or risk factors for coronary artery disease (e.g., smoking, obesity, diabetes, high cholesterol) may be more susceptible to developing myocardial ischemia and infarction associated with methylergonovine-induced vasospasm.

**Medication Errors:** Inadvertent administration of Methylergonovine Maleate Tablets, USP to newborn infants has been reported. In these cases of inadvertent neonatal exposure, symptoms such as respiratory depression, convulsions, cyanosis, and oliguria have been reported. Usual treatment is symptomatic. However, in severe cases, respiratory and cardiovascular support is required. Methylergonovine Maleate Tablets, USP has been administered instead of vitamin K and Hepatitis B vaccine, medications which are routinely administered to the newborn. Due to the potential for accidental neonatal exposure, methylergonovine maleate should be stored separately from medications intended for neonatal administration.

**PRECAUTIONS**

General: Caution should be exercised in the presence of sepsis, obliterative vascular disease. Also use with caution during the second stage of labor. The necessity for manual removal of a retained placenta should occur only rarely with proper technique and adequate allowance of time for its spontaneous separation.

Drug Interactions

CYP3A4 Inhibitors (e.g., Macrolide Antibiotics and Protease Inhibitors): There have been rare reports of severe adverse events in connection with the coadministration of certain ergot alkaloid drugs (e.g., dihydroergotamine and ergotamine) and potent CYP3A4 inhibitors, resulting in vasospasm leading to cerebral ischemia and/or ischemia of the extremities. Although there have been no reports of such interactions with methylergonovine alone, potent CYP3A4 inhibitors should not be coadministered with methylergonovine. Examples of some of the more potent CYP3A4 inhibitors include macrolide antibiotics (e.g., erythromycin, troleandomycin, clarithromycin), HIV protease or reverse transcriptase inhibitors (e.g., ritonavir, indinavir, nefdinavir, delavirdine) orazole antifungals (e.g., itraconazole, voriconazole). Less potent CYP3A4 inhibitors should be administered with caution. Less potent inhibitors include saquinavir, nefazodone, fluconazole, grapefruit juice, fluoxetine, fluvoxamine, zileuton, and clotrimazole. These lists are not exhaustive, and the prescriber should consider the effects on CYP3A4 of other agents being administered with methylergonovine.

CYP3A4 Inducers: Drugs (e.g., nevirapine, rifampicin) that are strong inducers of CYP3A4 are likely to decrease the pharmacological action of Methylergonovine Maleate Tablets, USP. Beta-Blockers: Caution should be exercised when Methylergonovine Maleate Tablets, USP is used concurrently with beta-blockers. Concomitant administration with beta-blockers may enhance the vasoconstrictive action of ergot alkaloids.

Anesthetics: Anesthetics like halothan and methoxyfluran may reduce the oxytocic potency of Methylergonovine Maleate Tablets, USP.

**ADVERSE REACTIONS**

The most common adverse reaction is hypertension associated in several cases with seizure and/or headache. Hypotension has also been reported. Abdominal pain (caused by uterine contractions), nausea and vomiting have occurred occasionally. Rarely observed reactions have included: acute myocardial infarction, transient chest pains, vasocostriction, vasospasm, coronary arterial spasm, bradycardia, tachycardia, dyspnea, hæmaturia, thrombophlebitis, water intoxication, hallucinations, leg cramps, dizziness, tinnitus, nasal congestion, diarrhea, diaphoresis, palpitation, rash, and foul taste. There have been rare isolated reports of anaphylaxis, without a proven causal relationship to the drug product.

Nervous System Disorders: Cerebrovascular accident, paraesthesia.

Cardiac Disorders: Ventricular fibrillation, ventricular tachycardia, angina pectoris, atrioventricular block.

Drug Abuse and Dependence

Methylergonovine maleate has not been associated with drug abuse or dependence of either a physical or psychological nature.

**OVERDOSAGE**

Symptoms of acute overdose may include: nausea, vomiting, abdominal pain, numbness, tingling of the extremities, rise in blood pressure, in severe cases followed by hypotension, respiratory depression, hypothermia, convulsions, and coma.

Because reports of overdosage with methylergonovine maleate are infrequent, the lethal dose in humans has not been established. The oral LD50 (in mg/kg) for the mouse is 187, the rat 93, and the rabbit 4.5. Several cases of accidental methylergonovine maleate injection in newborn infants have been reported, and in such cases 0.2 mg represents an overdose of great magnitude. However, recovery occurred in all but one case following a period of respiratory depression, hypothermia, hypotonia with jerking movements, and convulsions. Also, several children 1-3 years of age have accidentally ingested up to 10 tablets (2 mg) with no apparent ill effects. A postpartum patient took 4 tablets at one time in error and reported paresthesias and clamminess as her only symptoms.

Treatment of acute overdose is symptomatic and includes the usual procedures of: 1. Removal of offending drug by inducing emesis, gastric lavage, catharsis, and supportive diuresis. 2. Maintenance of adequate pulmonary ventilation, especially if convulsions or coma develop. 3. Correction of hypotension with pressor drugs as needed. 4. Control of convulsions with standard anticonvulsant agents. 5. Control of peripheral vasospasm with warmth to the extremities if needed.

You are encouraged to report negative side effects of prescription drugs to the FDA. Visit www.fda.gov/medwatch, or call 1-800-FDA-1088, or call Lupin Pharmaceuticals, Inc. at 1-800-399-2561.

Please note that this information is not comprehensive. Please see the full Prescribing Information at www.methergine.com.
entry: 83% of major vascular injuries\(^1\) and 55% of intestinal injuries occur at closed entry.\(^2\) For this reason, closed entry with the Veress needle and initial trocar insertion must be performed by expert surgeons or trainees under their direct supervision.

Once an entry major vascular injury is under control, remember to perform a thorough inspection of the entire gastrointestinal tract, since 50% of such injuries are associated with intestinal injuries. It is a simple fact: the bowel is in between the abdominal wall and the retroperitoneal vessels.

**Avoidance of mortality at entry**

The open technique of creating a transumbilical 1-cm incision and using a blunt trocar is not associated with entry deaths.\(^1\) Proper technique mandates elevating the umbilicus when making the skin and fascial incision, since aortic injuries, not lethal, have been described when this was not done.

Intestinal injuries are not reduced with the open technique, but they are promptly recognized. Remember that intestinal adhesions are present in 27% of patients with a previous laparoscopy and 80% are at the umbilicus.\(^2\)

If you use the Veress needle and closed trocar insertion, you need to increase the distance from the entry point to the aorta, which is 0.4, 2.4, and 2.9 cm in normal, overweight, and obese patients, respectively.\(^3\) Elevate the umbilicus, insert the Veress needle at 45 to 90 degrees according to normal to obese body mass index, and ensure that the pressure is < 10 mmHg. Inflate the abdomen to 25 mmHg, place traction on the umbilicus and insert the optical trocar at 45 degrees towards the pelvis with the patient in supine position. Immediately check for any injury below the umbilicus. Once all trocars are in place, reduce the intra-abdominal pressure to your working level, and introduce the endoscope through another trocar site and inspect the umbilical area for unrecognized intestinal injury.

If you like the Palmer point entry site, the patient must be in supine position and a nasogastric tube must have decompressed the stomach to prevent gastric injury. The distance to the aorta is 10 cm\(^3\) but the stomach and spleen are at risk.

There should never be an intestinal or major vessel injury with insertion of secondary trocars as they must always be inserted under direct visualization.

**Prevention of bladder injury**

A vaginal probe or a manipulator with a vaginal ring is necessary for safer bladder dissection and identification of the cervicovaginal junction. A distended bladder is useful if the margins are unclear. We use a 3-way Foley catheter in all patients to distend the bladder with water whenever necessary during the operation or to check its integrity at the end.

Bladder dissection is always performed in the midline of the vesicovaginal space in the absence of adhesions, and for at least 1 cm past the cervico-
vaginal junction or the planned colpotomy site, and then developed laterally.

In the presence of adhesions, typically from a cesarean scar, bladder dissection is started lateral, right or left of the scar where there are no adhesions, and with a distended bladder (Figure 1).

Prevention of ureteral injury

There is no other proven method for avoidance of ureteral injury than ureter identification during surgery. If the ureters are not identified, there is a high risk (88%-97%) of unrecognized injury. Remember that ureteral jets at cystoscopy are present with ureteral thermal injuries, and lack of ureteral jets is only indicative of ureteral entrapment or transection, and uncommonly of renal agenesis, atrophy, or insufficiency.

Ureteral stents are not needed in the presence of normal anatomy. In scarred retroperitoneum, they are useful to recognize ureter transection, but not to identify them.

However, given a tubular structure difficult to recognize, instrument palpation of a ureteral stent will prevent its transection.

With normal pelvic anatomy, can all ureteral injuries at endoscopic hysterectomy be prevented?

The answer is yes. At the level of the ovarian vessels, creating a peritoneal window between the vessels superiorly and the ureter inferiorly will guarantee ureter safety when sealing the ovarian vessels. At the cardinal ligaments, 1 out of 8 patients are at ureter injury risk because the ureters are < 5 mm from the lateral cervical wall. Because laparoscopic and robotic instruments are 5 and 8 mm in diameter, respectively, their use may result in some type of ureteral injury in such patients (Figure 2).

The uterine artery is the reason for approaching the ureter to the lateral cervical wall. Cephalad displacement of the uterus with a uterine manipulator in such a situation does not increase the distance of the ureters to the cervix (Figures 3 A and B). Division of the uterine artery at its intersection with the ureter liberates the ureter from the arterial embrace and allows its lateral displacement, preventing injury when securing the uterine vessels or dividing the cardinal ligaments (Figure 4).

Intestinal injury

Most injuries occur at entry, whether at laparoscopy (55%) or during robotics (67%). There are no deaths if such injuries are recognized, but the rate of mortality is notable at 1 in 31 (3.2%) for unrecognized bowel injuries, which occur in 13% of patients.

Simple rules for prevention of intestinal injuries

At entry, when a patient has a history of adhesions or previous laparoscopy, use the open technique and elongate the transumbilical incision if necessary for adhesiolysis. A pre-operative abdominal wall ultrasound may identify areas of “fixed” bowel and “clear” areas for entry. A closed or open entry at Palmer point is another consideration with the measures outlined above.

During surgery

Displace the entire small bowel and as much of the sigmoid as possible in the abdominal cavity with adequate Trendelenburg. A redundant sigmoid can be mobilized out of the pelvis with a suture encompassing its mesentery and the peritoneum lateral to the psoas muscle.

Most intestinal injuries during surgery are a result of enterolysis. Safe enterolysis requires at least 3 instruments: one for traction, another for counter traction, and a third one for the division or removal of the adhesions. Use sharp
WE HELP MOMS RULE.

WIC is the nation’s most successful public health nutrition program. We provide healthy food, nutrition education, and breastfeeding support to 8 million income-eligible pregnant women, moms of infants, and kids up to 5 years old.

YOUR PATIENTS MAY QUALIFY FOR WIC BENEFITS.
Ask them to visit us online or call to find out.

SignUpWIC.com
1-844-599-9714

USDA is an equal opportunity provider, employer, and lender. © 2016 National WIC Association. “WIC” is a registered trademark of the U.S. Department of Agriculture. All rights reserved.
dissection and avoid the “pulling” technique. The use of cold scissors and acceptance of manageable bleeding is preferable to thermal injury. Minimize the use of short pulses of monopolar coagulation when performing enterolysis.

Bowel preparation is not helpful for avoiding injuries. It should be abandoned except in rare situations.

Steam generated by a standard bipolar instrument, noticed as blanching of the tissue, may cause a thermal injury up to 1 to 2 cm away from the application site if the instrument is applied long enough. Use short applications to allow cooling of the tissues. Vessel sealers are preferable due to their increased safety profile as compared to bipolar instruments.

Rectal injury

A rectal probe and a vaginal probe or vaginal ring of your preference will transform a difficult rectovaginal dissection into a safer and easier one. A rectal probe improves identification of the outer limits of the rectal and sigmoidal walls by palpation and by visualizing its movement within their lumen.

Obliteration of the cul-de-sac due to fixation of the rectosigmoid to the posterior cervical wall is common with cul-de-sac endometriosis. Some simple rules apply in that situation.

1 The same rules for cesarean scar apply here. Start the dissection lateral, right or left, to the fixed rectosigmoid, and dissect the free rectovaginal space, and then proceed to safely dissect the rectosigmoid from its attachments to uterus or cervix.

2 If the above approach is impossible, proceed with dissection into the uterine or cervical wall instead of the rectosigmoid, leaving a shaving of the cervix attached to the rectosigmoid, which can be safely removed later.

3 If a hysterectomy is planned, another alternative is to perform a colpotomy starting at the anterior vagina and dividing the posterior vaginal wall intravaginally under direct visual control. Then dissect the rectovaginal space distal to the colpotomy and once the uterus is separated from the vagina proceed to safely dissect the attached rectosigmoid from the cervix in an antegrade or retrograde fashion.
Background
I am as tormented by suboptimal laparoscopic views as I am about greasy fingerprints on my glasses and it is with this hate-inspired passion that I evaluated Buffalo Filter’s LaparoVue® Visibility System.

Design/Functionality
The LaparoVue® Visibility System is a single-use, disposable system designed to eliminate fogging while cleaning laparoscopes and trocars during a procedure. The system is actually three-fold: a hub with warming and cleaning ports, 2 VueTip™ trocar swabs and a microfiber cleaning cloth. The meat of the system is a molded silicone, battery-powered box with 2 ports (1 for warming and white balancing, 1 for cleaning and defogging) and a detachable scope cradle. The battery provides the energy for both the warming unit and projecting LED light that accentuates the ports. The base of the hub is detachable to cradle the scope horizontally while it is being warmed. Both ports have flexible seals that accommodate scopes from 3 mm to 12 mm without an adapter. The 2 VueTip™ trocar swabs are plunger-like, radiopaque swabs designed to fit into 5-mm and 12-mm trocars. Finally, the microfiber cleaning cloth is...a microfiber cleaning cloth.

In testing in the OR, the LaparoVue’ Visibility System was excellent. Mindlessly easy to use, it kept my laparoscopes defogged and smudge-free and provided a good platform on which to rest the scopes while they were not in use. In short, it did exactly what it was supposed to do and did it very well.

Innovation
As much as I liked LaparoVue®, it is hard to give the engineers at Buffalo Filter too much ingenuity credit since this system is simply an improved D-HELP (now, ClearifyTM from Medtronic, LLC). With regard to the improvements, Buffalo Filter did a nice job fine-tuning this product but the real innovation points still have to go to the D-HELP peeps for coming up with the original idea.

Value
I am somewhat biased against single-use devices. Their cost never goes down with amortization and creating more medical waste landfill is not a good idea. However, there is little point in spending a fortune on an expensive laparoscopy system only to have condensation and drops of blood and fat blur your 4K picture. For small cases, the LaparoVue® is probably not worth it. But, for more complex procedures it seems like short money.

Summary
Consistent, high-quality imaging is essential for laparoscopic procedures. As optical technology evolves, advances in both resolution and lighting will likely offer future surgeons pictures that will make current technology seem like black and white TV. Regardless of how it’s done, each OR team needs an efficient system to keep their scopes clean. For quick cases, a moist sponge is probably fine. For longer, more complex cases, the LaparoVue® is worth trying.

The views of the author are personal opinions and do not necessarily represent the views of Contemporary Ob/Gyn.

Dr. Greenberg is Chief, Division of Gynecology, Brigham & Women’s Hospital, and Associate Professor, Harvard Medical School, Boston. He has no conflicts of interest to report with regard to the content of this review.
How to prepare for postpartum hemorrhage

Lapses in safety culture play a significant role in maternal mortality.

by GARY A. DILDY, MD, FACOG, CPHQ, CPPS

“Obstetrics is bloody business.”

Introduction

Postpartum hemorrhage (PPH) is estimated to occur in 3% of US deliveries¹ and is probably the most common life-threatening emergency encountered by obstetricians. In contrast to other serious obstetric conditions encountered less frequently (e.g., hypertensive crisis, sepsis, cardiac disease, pulmonary embolism, amniotic fluid embolism), PPH will likely be managed by obstetricians on a regular, perhaps weekly or monthly basis. The aim of this paper is not to outline a specific medical-surgical algorithm for managing PPH, but rather to give an overview for system-wide preparedness that should be considered in planning to mitigate this frequent, potentially life-threatening, obstetrical emergency.

Defining PPH

There are a multitude of definitions for PPH in the medical literature. When interpreting published reports on PPH, it is important to recognize these differences and keep in mind that population-based studies often rely upon ICD codes, which themselves do not incorporate a quantitative definition. Recently the American College of Obstetricians and Gynecologists’ (ACOG) reVITALize program, ² which aims to standardize clinical terms, defined PPH as a cumulative blood loss ≥ 1,000 mL, or blood loss accompanied by signs and symptoms of hypovolemia, within 24 hours after the birth process. This definition is also used in the recently updated 2017 ACOG “Postpartum Hemorrhage” Practice Bulletin #183.³ Going forward, the development of “core outcome sets” to define critical clinical parameters in research should serve to accelerate discovery and improvements in PPH management.⁴

Scope of the problem

Obstetric hemorrhage is the leading cause of global maternal mortality.³ In a chart review of 95 maternal deaths among 1.5 million deliveries from 2000 to 2006, Clark and colleagues found PPH to be the third leading cause of maternal death, behind complications
of preeclampsia and amniotic fluid embolism. Multiple studies from various developed countries including the United States have reported increasing trends in PPH over the last several decades. In this country, all-cause maternal mortality is increasing, bringing with it an increase in PPH-related maternal mortality and severe morbidity, much of which is preventable.

**PPH-related mortality and Its root causes**

It is evident from published studies that the majority of PPH-related maternal deaths are preventable with standard obstetrical care. A report from North Carolina (1995-1999) estimated that PPH deaths were avoidable in 93% of cases, and a study from a large US hospital system (2000-2006) estimated that 73% of PPH deaths were avoidable with standard care. Such findings have been confirmed in studies published from other industrialized countries. Of the commonest causes of contemporary maternal mortality, PPH is probably the most preventable. In Clark and Hankins’ commentary, “Preventing maternal death: 10 clinical diamonds,” 6 clinical diamonds are directed specifically to PPH mortality.

Common root causes of preventable PPH-related maternal mortality are outlined in Table 1. Typically, some or all of the response cascade to significant bleeding is delayed to the point where irreversible cardiovascular collapse and coagulopathy occur. These steps in managing PPH may not always occur in a serial fashion, sometimes requiring simultaneous or parallel deployment in accelerated severe cases. The problem typically begins with failure to identify significant bleeding (quantifying blood loss), changes in vital signs (hypotension, tachycardia, oliguria), calling for help (second physician, anesthesiologist), preparation of blood products (type & crossmatch), administration of appropriate blood products (massive transfusion protocol), and assessment of essential laboratory parameters (hemoglobin, prothrombin time/partial prothrombin time, fibrinogen, potassium, calcium) during resuscitation. An omission or delay at any of these steps may result in unsuccessful resolution of this common obstetrical emergency. With massive fluid and blood component replacement, careful monitoring for not just anemia and coagulopathy, but also potentially lethal cardiac pro-arrhythmic electrolyte imbalances (i.e., hyperkalemia and hypocalcemia) are critical; the use of established protocols may serve to prompt appropriately-timed assessments.

Often these failures are the result of system deficiencies in the design and model of care in that hospital. The patient is dependent upon her clinical providers, who are dependent upon hospital services, all of which are dependent upon the system’s safety culture. The efficient and successful performance of the providers within the system clinical environment is greatly impacted by the culture of quality and safety set forth by administration, physician and nursing leadership. Systems with a “just culture” environment encourage transparency and benefit by learning from system deficiencies and provider errors. Quality and safety initiatives are dependent upon strong leadership, time-consuming, costly, and require ongoing maintenance and refinement. There is a wide range of evolution in adopting these initiatives across obstetrical units nationwide; some facilities are far further down the

<table>
<thead>
<tr>
<th><strong>TABLE 1 Common Root Causes of Preventable Postpartum Hemorrhage</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Common errors in management of PPH often involve failure or delay In:</strong></td>
</tr>
<tr>
<td>- Identifying clinically significant hemorrhage</td>
</tr>
<tr>
<td>- Recognizing maternal vital signs consistent with hypovolemia and hemorrhagic shock</td>
</tr>
<tr>
<td>- Using alternative uterotonic agents other than oxytocin</td>
</tr>
<tr>
<td>- Calling for help, notifying unit managers, anesthesiology, second surgeon</td>
</tr>
<tr>
<td>- Moving the patient to an OR for balloon tamponade and/or surgical procedures</td>
</tr>
<tr>
<td>- Typing, cross-matching, ordering and administering blood products</td>
</tr>
<tr>
<td>- Administering components only after large volumes of packed red blood cells transfused</td>
</tr>
<tr>
<td>- Ordering laboratory assessment of hematologic, coagulation &amp; electrolyte status</td>
</tr>
<tr>
<td>- Adequate and clear communication between/among disciplines &amp; services</td>
</tr>
</tbody>
</table>

PPH, postpartum hemorrhage; OR, operating room
path than others. It is believed that investment in quality and safety initiatives will ultimately reduce avoidable harm (thus reduce liability), reduce costs (thus increase value of care and revenue), and ultimately benefit all involved in the provision of medical care, from patient, to providers, to payers and society. Data indicate such an effect when systems are adequately prepared. Development and adoption of clinical service guidelines (e.g., quantifying blood loss, massive transfusion protocol) and prospective monitoring of events (i.e., event debriefings, quality metric dashboard) will serve to refine processes and prevent future delays in provision of complex, life-saving care.

“All obstetric units and practitioners must have the facilities, personnel, and equipment in place to properly in place to manage this emergency [postpartum hemorrhage] properly.”
–ACOG Practice Bulletin #76 October 2006

**Designated levels of maternity care**

Across the United States there are > 3,000 hospitals that provide maternity services for approximately 4 million births per annum. Clinical capabilities range widely, from small community hospitals without 24/7 anesthesiology and blood banking services, to specialized quaternary-care “Percreta Centers” which manage deliveries at the highest risk for exsanguination and maternal death. Every center providing obstetric care, however, should be prepared to recognize PPH, initiate basic treatment of the underlying cause, and have a plan in place to transfer patients, if indicated, to a facility with the appropriate level of care. While many patients who develop

PPH do not have identifiable pre-labor risk factors, some will be readily identified as high-risk (e.g., placenta previa with prior cesarean) and should be referred for transfer of care well prior to anticipated delivery. Development of designated levels of maternity care will serve to reduce preventable severe maternal morbidity and mortality, by timely referral to an appropriately equipped center for management of at-risk and complex cases.14

**Guidelines, protocols, policies and material**

National medical organization guidelines have evolved from simple recommendations for treatment of a given condition to a more integrated systems approach to prevention, management, and ongoing improvement. With regard to PPH, development of institutional guidelines, protocols and policies should address such issues as general PPH management, massive blood transfusion, and patient transport to a higher level of care. Protocols for specific emergencies such as amniotic fluid embolism (AFE) have also been advocated.15 Some specific considerations for PPH preparation include:

**SYSTEMATIC ESTIMATION OF BLOOD LOSS**

It is perplexing that historically, many inpatient hospital intake/output (I/O) flow sheets have captured oral intake, intravenous intake, urine output, and emesis, but not quantitative blood loss, especially in the obstetric setting where blood loss is the norm and excessive blood loss is not uncommon. Obstetric blood loss is often underestimated16 and simple education can improve blood loss estimates. Efforts to quantify blood loss, whether by active subjective assessment or gravimetric methods, are increasingly being adopted by obstetric units, some incorporating assessments into the electronic medical record on a per hour and/or per shift basis.

**MATERNAL EARLY WARNING SYSTEM**

In 2012 the UK National Health System adopted the Modified Early Obstetric Warning System (MEOWS) into its maternal safety standards.18 A prospective validation of MEOWS found that 30% of patients triggered evaluation and 13% experienced a complication, predicting maternal morbidity with 89% sensitivity and 79% specificity.19 In the United States, the National Partnership for Maternal Safety proposed Maternal Early Warning Criteria,20 thresholds including heart rate (HR) < 50 or > 120 beats/minute, systolic blood pressure (SBP) < 90 or > 160 mmHg, diastolic blood pressure > 100 mmHg, respiratory rate < 10 or > 30 breaths/minute, oxygen saturation < 95%, and urine output.
They see YOU as their primary care provider

ARE YOU CHECKING IF THEY NEED VACCINES?

The Vaccine Education Center at Children’s Hospital of Philadelphia is a national and international program that provides science-based information and resources about vaccines across the lifespan.

Let us be your source for:
- Patient resources
- Up-to-date information
- Answers to questions

Find out more and get a free booklet about adult vaccine needs:

vaccine.chop.edu/obgyn
< 35 mL/hour for ≥ 2 hours. Other parameters, such as the shock index (SI), calculated as HR/SBP, and delta-SI (i.e. current SI minus baseline SI), are promising physiologic parameters for such systems of maternal surveillance and deserve further research.21

HEMORRHAGE CART
Obstetric hemorrhage carts are useful in prompt mobilization of equipment necessary to treat PPH, including transfusion lines, surgical instruments, sutures, tamponade balloons and other material such as consent forms, algorithms, and checklists.12 Given the logistics of requesting equipment in emergency conditions, a well-equipped and maintained obstetric hemorrhage cart can serve to avoid treatment delays per evidence-based guidelines. Such preparation can be carried further, with specialty percreta centers stocking operating rooms with “percreta carts” containing a more elaborate array of instrumentation for these complicated cases.22

UTERINE BALLOON TAMponade
Use of a uterine-specific balloon catheter to control PPH was first described in 1951 by Holtz.23 Over the past 2 decades, uterine tamponade by various balloon devices (some US Food and Drug Administration-approved for specific use) has gained popularity due to ease of use and high success rates.24,25 Current ACOG guidelines support uterine balloon tamponade (UBT) in management of PPH (ACOG Practice Bulletin #183), stating “…it is important for institutions to adopt an approach and train personnel in this approach.” A population-based retrospective cohort study of 72,529 women found that incidence of invasive procedures (i.e., pelvic vessel ligation, arterial embolization, hysterectomy) following vaginal delivery was significantly lower in institutions that routinely used UBT compared to those that did not.26

UTERINE COMPRESSION SUTURE
Since the original report by B-Lynch in 1997,27 a variety of uterine compression suture procedures have been described for control of PPH at laparotomy. The reported success rates of these procedures to control PPH are generally well over 75%28 and the procedures are technically quick and simple. The only disadvantage is that laparotomy is required, which is of course not an issue at the time of cesarean. This author finds the B-Lynch procedure easiest to perform, and preferable to other techniques that may directly oppose the anterior and posterior uterine walls in such a way that uterine synechiae may become a concern.

THROMBOELASTOGRAPHY
Point-of-care testing for hemostatic function can be performed by thromboelastography (TEG) and an adaptation called rotational thromboelastometry (ROTEM). Both TEG and ROTEM, as a single test, provide information regarding clot initiation, strength, and lysis, allowing for a more tailored transfusion response. Some obstetrical units have incorporated TEG/ROTEM into their massive transfusion protocols.29

TRANEXAMIC ACID (TXA)
The landmark 2017 WOMAN trial was a multinational, randomized, double-blind, placebo-controlled trial of women with a clinical diagnosis of PPH after vaginal birth or caesarean section.30 From 2010 to 2016, a total of 20,060 women were assigned to receive either 1 g IV TXA or matching placebo, in addition to usual PPH care. Death due to bleeding was significantly reduced in women given TXA, especially if given within 3 hours of birth. Thromboembolic events did not differ significantly between groups. TXA appears to be beneficial in treating PPH and should be integrated into hospital PPH guidelines; the role of prophylactic TXA deserves further study.31

“Identify specific triggers for responding to changes in the mother’s vital signs and clinical condition and develop and use protocols and drills for responding to changes, such as hemorrhage and pre-eclampsia. Use the drills to train staff in the protocols, to refine local protocols, and to identify and fix systems problems that would prevent optimal care.”
–The Joint Commission Sentinel Event Alert Issue 44 “Preventing Maternal Death” January 2010

Preparation and teamwork
Management of PPH is a team effort. Depending upon complexity, other disciplines such as Gynecologic Oncology, Urology, Hematology and Critical Care specialists are required. Efficient teamwork requires planning and ongoing practice, much like any complex group effort such as seen in athletic team events, aviation, musical concerts or military operations.

EDUCATION
Multiple sources of online material devoted to management of PPH are available for individual or group education (Table 2). The “Obstetric Hemorrhage Bundle” prepared by the Council on Patient Safety in Women’s Health Care
How do I approach working locum tenens?
How can I find the best assignment for me?
Who will pay for my malpractice?
Who can guide me through the process?
Who provides the best support?

The answer:
Weatherby Healthcare.

weatherbyhealthcare.com
comprehensively addresses PPH readiness, recognition, prevention, response, reporting, and systems learning. This material is an invaluable resource to reduce patient risk and improve outcomes; bundles are also available for other high-risk clinical conditions. The Advanced Practice Strategies (APS) GNOSIS for Obstetrics, available by subscription, provides assessment of learner baseline knowledge and judgement, and tailors individualized learning paths in areas requiring supplemental education.

**SIMULATION**
Simulation in healthcare has dramatically evolved in recent years, but is not a novel idea, as illustrated by Babcock’s 1924 publication advocating drills for managing intraoperative cardiopulmonary collapse. A joint publication in 2011 from ACOG, the Society for Maternal-Fetal Medicine (SMFM) and other organizations advocates integration of simulation as part of a comprehensive strategy to improve obstetrical outcomes. Evidence that the practice of simulation in the obstetric arena improves maternal-fetal outcomes continues to accrue.

**DEBRIEFINGS AND REVIEW**
Maternal mortality is just the “tip of the iceberg” and is a rare occurrence at any obstetric unit in industrialized countries. Severe maternal morbidity (i.e., 4 or more units of red blood cells, intensive care unit admission) is significantly more common and provides an opportunity for retrospective review in order to improve clinical processes, structure and outcomes. A consensus statement from ACOG, SMFM, AWHONN and the Joint Commission recommends that all cases of severe maternal morbidity, whether sentinel events or not, undergo a thorough and credible multidisciplinary comprehensive review. Structured team debriefings are an excellent starting point for the review process.

CONTINUED ON PAGE 31
A rectum filled with air and submerged in a pelvis filled with water will identify full thickness rectal wall defects. A methylene blue enema will identify a blue rectal mucosa in an almost full-thickness type of injury. In any case, you must clamp the sigmoid upstream with an atraumatic forceps before testing for leaks.

**Major vascular injury prevention**

Prevention of injury of large vessels must be the most important goal of all endoscopic surgeons because such injuries are associated with major blood loss, high mortality, and permanent sequelae. In our institution, a blood loss of 165 mL/minute or higher dictates the start of massive blood transfusion protocol. Acute blood loss of that magnitude, if long enough, is usually associated with disseminated intravascular coagulation (DIC), further compounding the problem. For prevention of entry injury, see above.

**Prevention during surgery**

About 20% of major vessel injuries occur during surgery, especially lymphadenectomies, and they are associated with a high mortality of 12.5%.1

Awareness of the location of major vessels must be a constant thought. Any dissection must be kept away from the large vessels, placing the organ in the center of the pelvis, away from the lateral pelvic walls.

When the dissection is near major vessels, the dissecting instrument must be directed opposite to the vessels in case of loss of control of the instrument.

**Anterior abdominal wall nerve and vascular injury prevention**

Placement of the lower quadrant trocars superior to the anterior-superior iliac spine will avoid nerve injury, since the ilioinguinal and iliohypogastric nerves emerge inferior to that anatomical site. Insertion of the lower quadrant trocars lateral to the rectus muscles will avoid injury to the inferior epigastric vessels, since they curve below the muscle and up to 6 cm from the midline.7

**Other situations in which to avoid injury**

**Insulation failures**

Insulation failures are more common with robotic instruments.8 They are responsible for vessel injury and unrecognized bowel injury. Routine testing for insulation failures should be mandatory at all facilities using electrosurgical instruments.

**Removal and insertion of instruments**

Removal and insertion of instruments should always be performed under direct visual control, more so in robotics since the trocars are cephalad or lateral to the umbilical camera. The same rules apply when removing or inserting sutures with needles.

Loss of the visual of a robotic instrument may result in injury from undue movements while attempting to bring it to the field due to the lack of tactile feedback. The da Vinci Xi system provides yellow chevron lines which provide an approximate location of the instrument. With other da Vinci systems, removal of the instrument, if not holding tissue, and safe visual reinsertion is an effective solution.

**DISCLOSURES**

The authors report no potential conflicts of interest with regard to this article.

**FOR REFERENCES VISIT**

contemporaryobgyn.net/avoid-complications
Opioid crisis

about providing the combined product in pregnancy; however, accumulating data support use of buprenorphine/naloxone in pregnancy. In our own OUD in pregnancy program, we utilize the combined product.

Buprenorphine can be prescribed by specially licensed physicians in private office settings. Currently available evidence suggests that, while the absolute risk of developing NAS remains the same (approximately 50% of infants), those infants exposed prenatally to buprenorphine (rather than methadone) will experience NAS that is shorter and easier to treat. No long-term neurodevelopmental outcome data are yet available. Providers should be aware that buprenorphine is rarely associated with hepatotoxicity and that concurrent use of benzodiazepines (or other sedatives such as alcohol) significantly increases risk of overdose. It should be noted that polysubstance abuse is extremely common. As such, providers should be aware of the potential need for concurrent evaluation and treatment for other substance use disorders.

Providers interested in learning more about buprenorphine licensing are encouraged to visit https://www.samhsa.gov/medication-assisted-treatment/buprenorphine-waiver-management

For a comparison of methadone vs buprenorphine, see Table 2.

Medication-assisted withdrawal (MAW).

This approach involves stabilizing a patient with OUD with opioids (often methadone or buprenorphine) and subsequent slow, tapered withdrawal of that medication. Historically, MAW was discouraged in pregnancy due to concerns about fetal stress. However, recent data indicate that slow, controlled MAW is unlikely to be associated with poor obstetric outcomes. Regardless, the concern for maternal relapse rates remains high and long-term maternal complication and relapse rates have not been evaluated. For that reason, for pregnant women with OUD, MAT remains the recommended therapy of choice.

Delivery and postpartum care

Women on MAT should have their medication doses continued through their labor and postpartum courses. Epidural and spinal anesthesia are appropriate unless contraindicated. Patients maintained on methadone for MAT should NOT receive partial opioid agonist-antagonists such as butorphanol, nalbuphine, or pentazocine because that may precipitate withdrawal. Postoperative pain can be successfully treated with acetaminophen, nonsteroidal anti-inflammatory drugs and full agonist opioids such as oxycodone) as needed. Many patients with a history of OUD experience hypersensitivity to pain and poor pain tolerance although that most often occurs in the first 24 hours post-cesarean—when it can be expected that patients may require extra pain medication (up to 50% more). There is no evidence to support increased incidence of relapse in patients on MAT who receive properly prescribed opioid medications for pain control.

As long as no contraindications exist, breastfeeding should be encouraged. The benefits to both mother and infant are numerous, including improvement in NAS.

Upon discharge and in follow-up, careful communication with the prescribing provider and psychosocial support services are essential.

Infant Care

Neonatal abstinence syndrome (NAS) is the postnatal withdrawal syn-

### Table 3: Common Misconceptions Surrounding Pregnancy and Medication-Assisted Therapy (MAT)

<table>
<thead>
<tr>
<th>Common Misconception</th>
<th>Reasoning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients may not take buprenorphine/naloxone (ie Suboxone/Zubsolv) during pregnancy</td>
<td>FALSE</td>
</tr>
<tr>
<td>Medication-assisted therapy must be stopped in order to achieve pain control with opioids (e.g. after cesarean section)</td>
<td>FALSE</td>
</tr>
<tr>
<td>Patients with a history of opioid use disorder cannot be treated postoperatively with opioids for pain control because they will relapse</td>
<td>FALSE</td>
</tr>
<tr>
<td>Patients on medication-assisted therapy cannot breastfeed</td>
<td>FALSE</td>
</tr>
</tbody>
</table>

**Common Misconceptions Reasoning**

- **Patients may not take buprenorphine/naloxone (ie Suboxone/Zubsolv) during pregnancy**
  - FALSE  
  - Accumulating evidence supports use of combined products in pregnancy

- **Medication-assisted therapy must be stopped in order to achieve pain control with opioids (e.g. after cesarean section)**
  - FALSE  
  - Pain control can be achieved with full opioid agonists despite taking medication-assisted therapy

- **Patients with a history of opioid use disorder cannot be treated postoperatively with opioids for pain control because they will relapse**
  - FALSE  
  - When prescribed for pain control, there is no evidence to suggest increased risk of relapse

- **Patients on medication-assisted therapy cannot breastfeed**
  - FALSE  
  - Breastfeeding has been shown to improve neonatal outcomes
OPIOID CRISIS: PRENATAL AND POSTNATAL

Peer-Reviewed

An opioid crisis experienced by infants who are exposed to opioids, either illicit or prescribed. While NAS is generally considered to be less severe in infants exposed to prescribed MAT, published rates vary (30%-80%). Symptoms usually evolve over 12 to 72 hours (up to 120 hours). Development and severity of NAS likely depends on the interaction of several factors including substance exposure/timing, gestational age, genetic/epigenetic factors, smoking, polysubstance use and/or other medications. Development of NAS does not appear to be related to the dose of MAT that patients are prescribed.

Many hospitals have protocols for observation and treatment of NAS. While usually treated pharmacologically, NAS is also treated with adjunctive, non-pharmacologic methods such as massage. Rooming-in has been shown to both decrease NAS rates and improve maternal-neonatal bonding. Breastfeeding is associated with improved bonding, decreased rates of NAS, less need for medication and shorter hospital stays.

Conclusion

In July 2017 in response to the opioid crisis, Dr. Nora Volkow (NIDA Director) and Dr. Francis Collins (NIH Director) jointly published a special report in The New England Journal of Medicine outlining major strategic initiatives intended to focus research on new therapies for treatment of overdose along with new therapies that target the neurobiology of chronic pain and addiction.

In summary, what one may take from this call to action is that all hands must be “on deck” as we move forward into the future. Public and private funding sources must partner and all clinicians, including ob/gyns, must embrace the consideration of new treatment options for OUD, even in pregnant and parenting women, as research becomes available. This includes the possibility of new formulations of existing medications, novel modulation of the brain-reward circuitry or vaccines for substances of abuse. As ob/gyns in 2018, our response to this crisis must be to understand the powerful effect of opiates, become good stewards of our prescribing privilege and understand the resources available in our communities for evaluation and treatment.

DISCLOSURES

The authors report no potential conflicts of interest with regard to this article.

FOR REFERENCES VISIT

contemporaryobgyn.net/opioid-pregnancy

Prepare for postpartum hemorrhage

CONTINUED FROM PAGE 28

QUALITY METRICS

Tracking of process and outcome metrics is a fundamental component of a hospital’s quality program. Using a modified Delphi procedure, Woiski and colleagues developed a set of guideline-based quality indicators to measure guideline adherence in PPH care. From 69 extracted recommendations, 50 were selected and translated into 22 quality indicators on professional performance and organization of PPH care. Such PPH-related metrics should be considered for integration into a hospital’s or system’s quality and patient safety metric dashboard.

Conclusion

The majority of PPH-related maternal deaths and many severe maternal morbidities are avoidable with provision of timely interventions. From the glass-half-full perspective, significant outcome improvements can be readily accomplished with individual and institutional preparations for this common obstetrical emergency.

DISCLOSURE

Dr. Dildy is co-inventor of the Belfort-Dildy Obstetrical Tamponade System, assigned to B&D Medical Development LLC (Park City, UT) of which he is a manager. The system is manufactured and marketed by Clinical Innovations, LLC (Murray, UT) as the ebbTM Complete Tamponade System for use in treating postpartum hemorrhage.

FOR REFERENCES VISIT

contemporaryobgyn.net/pph-preparation

WE WANT TO HEAR FROM YOU!

Let us know what you thought of this month’s maternal mortality feature. Or tell us about your experience with maternal mortality and what you learned from it.

Email Dr. Carolyn Zelop at drzelop@ubm.com and COG.editorial@ubm.com
postpartum hemorrhage is a serious but frequently unavoidable complication of childbirth, and although the patient had an unfortunate outcome, the obstetrician met the standard of care in the management of her labor and delivery. According to the expert, the obstetrician was attentive, was present at appropriate intervals throughout labor, and there was no point where a different decision should have been made. The expert maintained that the obstetrician allowed the patient to have input in the decisions as to how her labor was managed, which is appropriate as long as the physician is comfortable that it is not compromising the safety of the mother or baby. The length of labor and the fact that the baby was large did increase the risk of postpartum uterine atony; however, in most cases this does not occur, and it can occur without these risk factors. The expert concluded that management of the complication was appropriate and prevented potentially life-threatening bleeding.

**THE VERDICT** The jury returned a defense verdict.

**Bowel perforations after laparoscopy**

In 2013, a 73-year-old woman underwent laparoscopic surgery to address pelvic pain. The procedure involved lysis of adhesions of soft tissue and removal of a fibroid mass and was performed by her gynecologist. The day following surgery the patient developed septic shock and it was determined this was a result of 2 perforations of the small intestine. She underwent 9 operations that involved removal of fluid that accumulated in her abdomen and applications of 2 skin grafts that covered her abdominal surgical wounds. She was hospitalized for 84 days and underwent 47 nonsurgical procedures during her convalescence. Two years later she underwent surgical repair of a large ventral hernia which she claimed was a result of the original perforations. She claimed she suffered from residual disfigurement of her abdomen, that she had diminished ambulatory ability, and her limitations had necessitated hiring workers to maintain the properties she owned as a landlord.

The patient sued all those involved with the original operation and her postsurgical care. She claimed the perforations occurred during the laparoscopy, they were not recognized in a timely manner, and that the delay led to all the complications and further surgeries. The plaintiff’s counsel discontinued the claims against the 3 postsurgical gynecologists and the doctors’ employer. The trial proceeded against the remaining defendants, arguing that timely intervention would have prevented the patient’s sepsis and its residual effects. They also contended that laparoscopic surgery was unnecessary, claiming the patient’s age and comorbidities contraindicated performance of the surgery, and that the procedure was not a reliable means of addressing the pain that she was experiencing.

Defense counsel contended that the surgery was an appropriate means of addressing the patient’s underlying condition. They also claimed that her perforations developed after the surgery had been completed, and they contended that the perforations were timely detected. After deliberating for 2 hours at the conclusion of an 8-day trial, the jury rendered a mixed verdict: it determined that the resident did not fail to timely diagnose the complications of the laparoscopic surgery, that the surgery was an appropriate means of addressing her underlying condition, and that the 2 treating gynecologists did fail to timely diagnose the operative complications.

**THE VERDICT** The jury found that the patient’s damages totaled $1,234,298.28.

**Ureter damage during hysterectomy**

A 43-year-old woman underwent a hysterectomy, performed by her gynecologist. She had a history of multiple sclerosis but was in remission at the time of the operation. The woman sued the gynecologist claiming that during the procedure he injured her ureter and this required additional surgery which she claimed caused permanent incontinence. Had the gynecologist performed the initial operation properly, she alleged the second operation would not have been necessary and would not have caused the permanent injury.

The gynecologist denied any error during the hysterectomy and argued that kinking caused the need for the second operation, and the resulting incontinence was due to the pre-existing multiple sclerosis.

**THE VERDICT** After deliberating 2 hours at the conclusion of a 4-day trial, a $700,000 verdict was returned. This award included $500,000 economic damages, and $200,000 non-economic damages.
Content Licensing for Every Marketing Strategy

Marketing solutions fit for:
Outdoor | Direct Mail | Print Advertising | Tradeshow/POP Displays | Social Media | Radio & TV

Leverage branded content from Contemporary OB/GYN to create a more powerful and sophisticated statement about your product, service, or company in your next marketing campaign. Contact Wright’s Media to find out more about how we can customize your acknowledgements and recognitions to enhance your marketing strategies.

For information, call Wright’s Media at 877.652.5295 or visit our website at www.wrightsmedia.com
At Ob Hospitalist Group, we are obstetricians like you. We share your values, and we speak your language. As the nation’s largest OB hospitalist employer, we offer an enviable work/life balance, leadership opportunities, generous benefits and unparalleled resources and support. Explore your new career options today - contact our clinical recruitment team at Recruiting@OBHG.com.

Reach your target audience. **Our audience.**

Women’s health professionals. Contact me today to place your ad.

Joanna Shippoli
Account Manager
440-891-2615
joanna.shippoli@ubm.com

Narrow your candidate search to the best.

Place a recruitment ad in Contemporary OB/GYN.

Joanna Shippoli
National Account Manager, Healthcare Careers
(440) 891-4569 • joanna.shippoli@ubm.com

Central California Practice Opportunity

Visalia OB/GYN Medical Associates, Inc is seeking a full time obstetrician/gynecologist who is board eligible or board certified to participate fully in our group practice.

Our practice of four physicians, 1 CNM, and 1 FNP is located in Visalia, California.

Excellent salary and benefit package.

The right candidate will be well-trained, enthusiastic, personable, and dedicated to providing quality care.

Please contact Sue Sharpe at 559-302-3212 or submit CV to hr@visaliaobgyn.org

Get a Life. Follow your passion.
Content Licensing for Every Marketing Strategy

Leverage branded content from *Contemporary OB/GYN* to create a more powerful and sophisticated statement about your product, service, or company in your next marketing campaign. Contact Wright’s Media to find out more about how we can customize your acknowledgements and recognitions to enhance your marketing strategies.

For more information, call Wright’s Media at 877.652.5295 or visit our website at www.wrightsmedia.com
Intermountain Healthcare needs OB/GYNs in multiple cities throughout Utah. Contact: Physician Recruiting, 800-888-3134, physicianrecruit@imail.org, http://physicianjobsutah.org

McLeod Health
The Choice for Medical Excellence

1 hour from SC Coast - Hospital Employed

OB/GYN Opening - McLeod Health

Join established & mature practice with existing patient base in a thriving area. Great schedule, 1:6 call! McLeod Regional Medical Center, a Regional Perinatal Center for northeastern SC, houses the regions only NICU and PICU with spacious labor and delivery suites, excellent pre-term labor and high risk pregnancy care. High risk gynecologic surgery performed here with access to daVinci Si and daVinci Xi robots.

Competitive Salary! Paid Vacation Time, Health Benefits, Physician Retirement Plans, Paid Malpractice, CME Allowance, Signing Bonus and Relocation Allowance!

McLeod Health is a private, non-profit institution founded in 1906 with nearly 850 physicians, 8,500 employees, and 7 hospital campus locations with over 900 beds system wide.

We are a constantly growing community with a bustling downtown, 1-hour drive to the beach and 2 hours to Charleston, SC. Affordable lifestyle, low traffic and crime, coupled with great amenities and schools make Florence an excellent place to work and live!

Please email caroline.jones@mcleodhealth.org or call at 843-777-5870.

McLeod Health is a private, non-profit institution founded in 1906 with nearly 850 physicians, 8,500 employees, and 7 hospital campus locations with over 900 beds system wide.

We are a constantly growing community with a bustling downtown, 1-hour drive to the beach and 2 hours to Charleston, SC. Affordable lifestyle, low traffic and crime, coupled with great amenities and schools make Florence an excellent place to work and live!

Please email caroline.jones@mcleodhealth.org or call at 843-777-5870.

To learn more about these and other opportunities, contact Heather Scott at 954.835.2844, heather_scott@teamhealth.com, or www.teamhealth.com.

Repeating an ad ENSURES it will be seen and remembered!
A 35-year-old woman was admitted to the hospital in labor at 41 weeks gestation. Nine hours later she was examined by her obstetrician who noted she was 8 cm dilated and -1 station. Three hours later an artificial rupture of membranes was performed, and 2 hours later an examination revealed no change in her cervix. The obstetrician reviewed the options, including epidural and a cesarean. It was decided that an intrauterine pressure catheter (IUPC) would be inserted and oxytocin augmentation started. Four hours later the patient was completely dilated and the head was at +1 station. An hour later she began pushing, and 2 ½ hours later the obstetrician noted no further progression and recommended a cesarean. An hour later no progress had been made and a cesarean was performed for delivery of a 9 1/2 lb infant. The uterus was closed with good homeostasis noted; however, uterine atony persisted which did not respond to multiple doses of medications or uterine massage, and hemorrhaging continued. Sutures were unsuccessful and the obstetrician called for assistance from another obstetrician. They performed ligation of the utero-ovarian ligaments, further suturing, and ovarian-artery ligation, which did not stop the hemorrhaging. The decision was made to proceed to hysterectomy. During the procedure, the left ovary tore and was removed. Following the hysterectomy, the patient recovered fully.

The patient and her husband sued the obstetrician, her practice, and the hospital involved with the delivery. They alleged the obstetrician was negligent in allowing the labor to continue too long, using oxytocin for an extended period, allowing the patient to push for several hours, and that she should have realized the infant was too large to deliver vaginally. The expert witness opined that stimulation of contractions for so many hours without progress created an unacceptably high risk of uterine atony and led to a non-reversible atonic state after delivery, causing the patient to lose her uterus and, thus, the ability to carry another pregnancy. At trial the patient and her husband talked about their intentions to have additional children and discussed how difficult it was that their only child would grow up without a sibling.

The obstetrician denied that she was negligent, and her expert witness testified that hemorrhage results in cesarean hysterectomy.

Allegations included extended use of oxytocin and allowing labor to continue too long.

**Analysis**

In obstetric malpractice cases involving hemorrhage as a complication after delivery, the usual issues in the case are risk of the complication, informed consent, and, of course, recognition and management of the complication. While hemorrhage is always a risk in any delivery, some specific situations would require informing the patient of an increased risk, but most postpartum hemorrhages (PPH) are not predictable prior to labor and delivery. When it happens, however, it may become the subject of a medical malpractice lawsuit. Avoiding some of the common errors in management of PPH, as described in the article on hemorrhage in this issue (“How to prepare for postpartum hemorrhage,” page 32) and providing complete documentation of measures taken in managing this life-threatening complication can certainly aid in defending these cases.

Ms Collins is an attorney specializing in medical malpractice in Long Beach, California. She can be reached at dawnctfree@gmail.com.
Follow the bubbles with ULTRASOUND to determine tubal patency

FemVue delivers a consistent pattern of saline and air, appearing as bubbles under ultrasound, to evaluate tubal patency.

Large meta-analysis showed the diagnostic accuracy of Sono HSG and fluoroscopic HSG was comparable with no significant difference in performance of the two tests.

A complete in-office fertility assessment with existing ultrasound equipment, expands practice services and saves patient time and expense.

To schedule a FemVue training call 877-336-2562 or visit www.femvue.com

Best Practices in the Management of Complications following Early Pregnancy Loss
Best Practices in the Management of Complications following Early Pregnancy Loss

FACTORIES & DISCLOSURES

PANELISTS

Jay S. Cohen, MD, FACOG, is a board-certified ob/gyn who has been in practice for 27 years. He is currently medical director of the Envision Physician Services Women’s HealthCare Division, Clinical Research, Discovery Clinical Research, and Memorial Regional clinic-based practices. Dr. Cohen has published in scientific journals including American Journal of Obstetrics and Gynecology, Current Medical Research and Opinion, and Southern Medical Journal. In addition, he maintains an extensive clinical practice and has served as a board member with the William Little OB/GYN Society, the American Cancer Society (ACS) Breast Task Force, and the West Broward, Florida, unit of the ACS. Dr. Cohen has been a principal investigator of more than 100 clinical trials focused on women’s healthcare.

Eve Espey, MD, MPH, is professor and chair of the Department of Obstetrics & Gynecology and family planning fellowship director at the University of New Mexico. She is immediate past president of the Society of Family Planning and is the medical advisory committee chair for the National Campaign to Prevent Teen and Unplanned Pregnancy. Additionally, Dr. Espey serves as chair of the American College of Obstetricians and Gynecologists Working Group on Long Acting Reversible Contraception (LARC) and has participated in international family planning consulting. Dr. Espey has led projects in reducing maternal mortality from obstetric hemorrhage and implementing immediate postpartum LARC in hospitals throughout the state of New Mexico. She has authored numerous articles focused on contraception, abortion, and medical education and has presented locally, regionally, and nationally on these topics.

Richard S. Legro, MD, is interim chair and professor in the Department of Obstetrics and Gynecology at Penn State University College of Medicine in Hershey, Pennsylvania. Dr. Legro is a former president of the Androgen Excess-PCOS Society, has served on the American Society for Reproductive Medicine’s board of directors, and is currently secretary-treasurer of the Endocrine Society. His research and clinical practice are primarily focused on the diagnosis, treatment, and genetic/environmental causes of polycystic ovary syndrome. He has designed and led numerous multicenter comparative effectiveness infertility trials in the United States and China. He has published more than 250 articles in medical journals and books in the field of reproductive endocrinology and lectured extensively throughout the world in this area.

Maria I. Rodriguez, MD, MPH, is an assistant professor of obstetrics and gynecology at the Oregon Health and Science University (OHSU) School of Medicine as well as the medical director for the state of Oregon’s Title X program. She completed medical school and residency at OHSU and a fellowship in family planning at the University of California San Francisco. As part of her fellowship, she completed a Master’s in Public Health at Cal-Berkeley. Following her fellowship, she spent 5 years working for the Department of Reproductive Health and Research at the World Health Organization in Geneva, Switzerland. Dr. Rodriguez’s research focuses on the intersection of medicine, policy, and economics. She is specifically interested in generating information to help guide evidence-based reproductive health policy both domestically and internationally. Dr. Rodriguez is currently looking at the impact of healthcare reform in Oregon on family planning services, including an evaluation of direct provision of hormonal contraception by pharmacists.

Learning Objectives

- Identify the clinical findings that are either diagnostic or suggestive of an early pregnancy loss
- Discuss the overall prevalence of hemorrhage, infection, and uterine perforation following early pregnancy loss
- Assess the potential impact of the most common complications following early pregnancy loss
- Analyze the pros and cons of specific uterotonic agents commonly used to treat hemorrhage following early pregnancy loss

Disclosures

All faculty, planning committee members, editors, managers, and other individuals who are in a position to control content are required to disclose any relevant relationships with any commercial interests related to this activity. The existence of these interests or relationships is not viewed as implying bias or decreasing the value of this publication. Disclosures are as follows:

Jay S. Cohen, MD, FACOG, has affiliations with Myriad, Lupin Pharmaceuticals, and PerkinElmer (consultant).

Eve Espey, MD, MPH, has disclosed that she has no relevant financial relationships specific to the subject matter within the last 12 months.

Richard S. Legro, MD, has affiliations with Bayer, AbbVie, Fractyl, Ogeda and Midlenda Therapeutics (consultant).

Maria I. Rodriguez, MD, MPH, has affiliations with Teva and Lupin Pharmaceuticals (consultant).

Scott Kober, MBA (medical writer), has disclosed that he has no relevant financial relationships specific to the subject matter within the last 12 months.

Commercial Support

This educational supplement was developed by Contemporary Ob/Gyn with support from Lupin Pharmaceuticals.
Early pregnancy loss is estimated to occur in 10% to 20% of all clinically recognized pregnancies, with about 80% occurring during the first trimester. Although serious complications following early pregnancy loss are rare, it is nonetheless important for practicing ob/gyns to be thoroughly prepared to manage specific sequelae that may arise. In this supplement, four physician experts discuss strategies to help identify and manage some of the more common complications related to early pregnancy loss that may help avoid downstream morbidity.

Overview of Early Pregnancy Loss

**CONTEMPORARY OB/GYN: How is early pregnancy loss defined?**
Dr. Jay S. Cohen: According to the most recent practice bulletin from the American College of Obstetricians and Gynecologists, early pregnancy loss is defined as “a nonviable, intrauterine pregnancy with either an empty gestational sac or a gestational sac containing an embryo or fetus without fetal heart activity within the first 12 1/7 weeks of gestation.” There are some providers who will use an alternate definition, claiming that early pregnancy loss is a loss at ≤ 12 1/7 weeks of gestation that includes both intentional and unintentional pregnancy termination. I have seen other definitions that will include losses at up to 20 weeks of pregnancy. Early pregnancy loss is a term that many ob/gyns will use in a general sense. It can include a miscarriage, a blighted ovum, an incomplete abortion, an elective termination, and so on.

**CONTEMPORARY OB/GYN: What are some of the potential risk factors of nonintentional early pregnancy loss?**
Dr. Richard Legro: A history of early pregnancy loss is the most notable risk factor for future loss. Other risk factors include thrombophilies—most commonly antiphospholipid syndrome—paternal or maternal genetic abnormalities that may be passed on during pregnancy, and preexisting conditions such as untreated diabetes or untreated thyroid disease. Advancing age and obesity can also increase the risk of early pregnancy loss.

There is likely also an infectious etiology to some early pregnancy losses. There are some providers who will use an alternate definition, claiming that early pregnancy loss is a loss at ≤ 12 1/7 weeks of gestation that includes both intentional and unintentional pregnancy termination. I have seen other definitions that will include losses at up to 20 weeks of pregnancy. Early pregnancy loss is a term that many ob/gyns will use in a general sense. It can include a miscarriage, a blighted ovum, an incomplete abortion, an elective termination, and so on.

**CONTEMPORARY OB/GYN: What are the most important considerations when evaluating a woman for possible early pregnancy loss?**
Dr. Maria I. Rodriguez: It’s essential to establish the correct diagnosis to determine whether you are looking at an early, normal intrauterine pregnancy or a nonviable intrauterine pregnancy, as well as to assess for risk of ectopic pregnancy. There are diagnostic criteria that were published by the Society of Radiologists in Ultrasound Multispecialty Panel on Early First Trimester Diagnosis of Miscarriage and Exclusion of a Viable Intrauterine Pregnancy in 2013 that can be used as a guide (Table 1). These criteria can be used to definitively determine whether a clinician is or is not looking at a nonviable pregnancy.

**Table 1 Guidelines for Transvaginal Ultrasonographic Diagnosis of Pregnancy Failure in a Woman with an Intrauterine Pregnancy of Uncertain Viability**

<table>
<thead>
<tr>
<th>FINDINGS DIAGNOSTIC OF PREGNANCY FAILURE</th>
<th>FINDINGS SUSPICIOUS FOR, BUT NOT DIAGNOSTIC OF, PREGNANCY FAILURE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crown—rump length ≥ 7 mm and no heartbeat</td>
<td>Crown—rump length &lt; 7 mm and no heartbeat</td>
</tr>
<tr>
<td>Mean sac diameter ≥ 25 mm and no embryo</td>
<td>Mean sac diameter 16–24 mm and no embryo</td>
</tr>
<tr>
<td>Absence of embryo with heartbeat ≥ 11 days after a scan that showed gestational sac with yolk sac</td>
<td>Absence of embryo with heartbeat 7–13 days after a scan that showed gestational sac without yolk sac</td>
</tr>
<tr>
<td>Absence of embryo with heartbeat 7–10 days after a scan that showed gestational sac with yolk sac</td>
<td>Absence of embryo with heartbeat 7–10 days after a scan that showed gestational sac with yolk sac</td>
</tr>
<tr>
<td>Absence of embryo ≥ 6 wk after last menstrual period</td>
<td>Absence of embryo ≥ 6 wk after last menstrual period</td>
</tr>
<tr>
<td>Empty amnion (amnion seen adjacent to yolk sac, with no visible embryo)</td>
<td>Empty amnion (amnion seen adjacent to yolk sac, with no visible embryo)</td>
</tr>
<tr>
<td>Enlarged yolk sac (&gt; 7 mm)</td>
<td>Enlarged yolk sac (&gt; 7 mm)</td>
</tr>
<tr>
<td>Small gestational sac in relation to size of embryo (&lt; 5-mm difference between mean sac diameter and crown—rump length)</td>
<td>Small gestational sac in relation to size of embryo (&lt; 5-mm difference between mean sac diameter and crown—rump length)</td>
</tr>
</tbody>
</table>

**Source:** Doublet PM, et al. Society of Radiologists in Ultrasound Multispecialty Panel on Early First Trimester Diagnosis of Miscarriage and Exclusion of a Viable Intrauterine Pregnancy.

**CONTEMPORARY OB/GYN: How do you balance the fragile emotional nature of these women with the need to perform a thorough examination?**
Dr. Legro: For any woman who experiences a pregnancy loss, regardless of how long the pregnancy went, it’s a traumatic event. It’s important from a clinical standpoint that physicians not discount or downplay the loss or tell the patient: “Oh, that was what we call a biochemical pregnancy loss. That doesn’t really count.” Because to the woman and the couple, when they see that positive pregnancy test, their expectation is that it is going to be a healthy. You can get pregnant again.” This is a huge error, because regardless of whether the loss was in the first or second trimester, for these patients, it’s a loss, and it needs to be dealt with as such. It’s important not to patronize
patients in the first trimester, as grieving is a natural part of the process. It’s important to let women who have suffered an early pregnancy loss know two things—first, that they are not alone, and second, that they didn’t do anything wrong. Many women will blame themselves for the loss, and it’s vital to reassure them that is not the case.

Dr. Espey: Most women with an early pregnancy loss want an accurate diagnosis as quickly as possible. In my experience, most women don’t have qualms about having a transvaginal ultrasound or a pelvic exam when needed to determine what’s happening. Many ob/gyns develop a standard speech for women with a pregnancy loss because we see so many of them. It’s so important for the language in that speech to address women’s common concerns and to be sensitive to a woman’s emotions.

Assessment and Management of Hemorrhage Following Early Pregnancy Loss

CONTEMPORARY OB/GYN: How common is hemorrhage in women following early pregnancy loss? What are some of its common causes?

Dr. Legro: Hemorrhage occurs following approximately 1% of all early pregnancy losses. It is most common following surgically induced abortion of a nonviable pregnancy. Other common causes include uterine structural abnormalities such as leiomyomas or submucous fibroids that invade the uterine cavity.6 These abnormalities may predispose the patient to incomplete evacuation of the products of conception or uterine perforation.

Women who are taking nonsteroids during their pregnancy and suffer an early pregnancy loss may also be at higher risk of hemorrhage, as are women with an inherited or acquired coagulopathy.7

CONTEMPORARY OB/GYN: How is postprocedural hemorrhage defined? How do you assess its severity?

Dr. Espey: The standard guidance is that a woman should call or come to the office/emergency room if she is soaking through 2 or more large pads an hour for 2 consecutive hours.1 This is not a tremendously scientific calculation of blood loss, but it is an attempt to give guidance that likely indicates excessive bleeding. We know that a little blood can go a long way. For example, if 4 drops of blood go into the toilet bowl, it can appear like a scary amount when it’s really not a significant amount of bleeding. That’s why we tend to go with soaking pads when talking to our patients. Many women who opt for expectant or medical management following an early pregnancy loss will bleed more than they do during an average period, but do not need procedural intervention.

CONTEMPORARY OB/GYN: When, if ever, will you use a uterotonic prophylactically in a woman at high risk of early pregnancy loss?

Dr. Cohen: In a woman for whom I’m worried about bleeding or one who is anemic—especially if the uterus feels somewhat boggy and there is no evidence of infection—I will often send her home with oral methylergonovine maleate or, in some cases, misoprostol.

With methylergonovine maleate, I will typically instruct them to take 0.2 mg every 8 hours for 3 to 5 days. If they suffered the pregnancy loss early in the first trimester, I will limit it to 3 days. If it was somewhere after 12 weeks, I will have them take it for 5 days. As an alternative, misoprostol—which is only formally approved by the U.S. Food and Drug Administration for reducing the risk of NSAID (nonsteroidal antiinflammatory drugs, including aspirin)—induced gastric ulcers in patients at high risk of complications from gastric ulcer as well as patients at high risk of developing gastric ulceration, such as patients with a history of ulcer—can be given intravaginally at a dose of 400 to 800 mg with a repeat dose given 24 to 36 hours after the initial dose.

Giving patients a uterotonic prophylactically provides added assurance to clinicians, because these women are no longer going to be under your direct observation once they go home and there are limited side effects associated with the use of uterotonics, especially methylergonovine maleate.

CONTEMPORARY OB/GYN: What precautions do you take for women who have traveled hours from their home for an elective termination to prevent potential postprocedural hemorrhagic complications?

Dr. Rodriguez: I always make sure women have access to a phone, will have a support person with them, and have our contact information saved for any questions or concerns. I will sometimes give oral methylergonovine maleate after their surgical procedure is complete, especially if they are at increased gestational age, have had above-average blood loss during the procedure, or had a low initial blood count. I will typically instruct them to take the drug for 3 days following the procedure.

Dr. Espey: We send every woman home with a phone number or a pager. Our department is also fortunate to have someone on reproductive health call 24/7 to address any issues related to a medical abortion, a surgical abortion, or miscarriage management.

For women who travel long distances to come to our clinic, I make sure that they are familiar with the emergency services available in their home community at short notice. There are times when I am really concerned about a specific woman’s recovery and will arrange for overnight housing nearby as a precaution. If a bleeding complication is going to happen, it usually happens right away.

CONTEMPORARY OB/GYN: What are the pros and cons of specific uterotonics commonly used to treat hemorrhage following early pregnancy loss?

Dr. Cohen: I don’t use intramuscular (IM) carboprost tromethamine in women who have suffered an early pregnancy loss, so it really comes down to a discussion of misoprostol versus methylergonovine maleate for me. My personal feeling is that the oral formulation of methylergonovine maleate is a big advantage in the outpatient setting. In women who suffer a hemorrhage following early pregnancy loss, my concern with intravaginal misoprostol is that it may wash out with the bleeding.8 Sublingual or oral misoprostol can avoid this problem, of course, though I feel there are still advantages with methylergonovine maleate.

The side-effect profile of misoprostol is well documented and includes nausea, vomiting, diarrhea, fever, and chills.9,10 Studies have shown that methylergonovine maleate has fewer associated side effects in the treatment of hemorrhage.11,12 It is worth noting, however, that methylergonovine maleate is contraindicated in women who are hypertensive.13 Another advantage of methylergonovine maleate is that it is easy to convert a patient from an IM dose given in the office to the oral dose at home. If you initiate the drug under your supervision, it should give you more confidence that it will be tolerated by the patient throughout the full course of treatment.

CONTEMPORARY OB/GYN: How do you tailor the use of specific therapies that may be used to treat hemorrhage following early pregnancy loss?
Dr. Rodriguez: If it’s a patient who suffered a loss in the first trimester, oxytocin is unlikely to be effective because the patient’s receptors are not fully developed, so that is not a good option prior to about 18 or 20 weeks of pregnancy. As with Dr. Cohen, I will usually start with oral methylergonovine maleate because it is known to be safe and effective and has a rapid onset of action. I will secondarily use misoprostol, though it typically takes a little longer to take effect compared to methylergonovine maleate. I also sometimes worry that, because misoprostol may cause fever in some women, they will mistake their symptoms for a possible infection and unnecessarily exacerbate their concerns.[8]

Dr. Espey: Although not a uterotonic, there may be a future for tranexamic acid in women with early pregnancy loss. It has been shown to help prevent control bleeding in women with postpartum hemorrhage without higher risk of severe adverse events including thrombotic events within 3 months of delivery.[14,15] I do not personally have any experience with tranexamic acid in women who suffer an early pregnancy loss complicated by hemorrhage, but it is something else to consider for research in the future.

CONTEMPORARY OB/GYN: How is the mechanism of action of misoprostol different than methylergonovine maleate, and why is that important in the treatment of hemorrhage post early pregnancy loss?

Dr. Cohen: Methylergonovine maleate causes smooth muscle contraction, so we know that it will contract the uterus, although clinicians need to be careful as that can cause an elevation in blood pressure.[1] Misoprostol is a prostaglandin used for conditions such as gastric ulcers and, off-label, for other issues in the genital area.[6,12] It can ripen or soften the uterus as well as cause contraction of its smooth muscles.

CONTEMPORARY OB/GYN: What are potential secondary measures in case bleeding is excessive or refractory to massage and uterotonics? Is hysterectomy ever indicated?

Dr. Legro: In the first trimester, it’s very rare that uterotonics will not effectively control hemorrhagic bleeding. Additional treatments are often adapted from the treatment of postpartum hemorrhage and include off-label administration of tranexamic acid or insertion of a uterine balloon catheter to try to tamponade the bleeding. In severe, life-threatening cases of postpartum hemorrhage, there have been reports of hypogastric artery ligation to decrease blood flow, though I would think that would be extremely rare in women with an early pregnancy loss.[16] An emergency hysterectomy, of course, should be a last-resort option and only after other causes, including an acquired coagulopathy from hemorrhage, have been considered and treated.

CONTEMPORARY OB/GYN: How soon do you see a patient back in your office after treatment for postprocedural hemorrhage?

Dr. Rodriguez: For a patient whose hemorrhage has resolved without complications, I will typically see her back 2 weeks after her initial visit to see how she is doing, reconfirm some of the counseling points I emphasized, and answer any questions she has about a return to fertility.

Dr. Espey: One of my goals is to reduce the post-traumatic stress of going through a miscarriage, so I actually try to avoid having women who suffer an early pregnancy loss come back into the office when possible. Many women want to avoid being back in the medical office where they learned about their miscarriage, had a D&C or, although rarely, a bleeding or infection complication. It can be a trigger for all the upsetting emotions that they had during that visit. Of course, I will check in with them in case there is a need for an in-person follow-up, but it is not always necessary.

Assessment and Management of Infection Following Early Pregnancy Loss

CONTEMPORARY OB/GYN: How common is infection in women following early pregnancy loss? What are the most common causes?

Dr. Rodriguez: The prevalence is rather low, typically occurring in less than 1% of all early pregnancy losses, although the prevalence is considerably higher in women who have a surgical procedure but do not receive prophylactic antibiotics.[1]

CONTEMPORARY OB/GYN: How does excessive bleeding impact risk of infection?

Dr. Espey: Any time there is instrumentation of the uterus, for example, when a balloon is inserted to tamponade hemorrhagic bleeding, the possibility of infection is increased. Incomplete evacuation of the products of conception would also increase the risk of infection. Unlike postpartum hemorrhage, uterine atony is a rare complication of early pregnancy loss, so while it can occur, it is rare.

CONTEMPORARY OB/GYN: How can risk of infection be minimized following early pregnancy loss?

Dr. Cohen: There are some basic recommendations I provide my patients with: pelvic rest, postoperative antibiotics if necessary, no baths or swimming for 7 to 14 days, no intercourse. It’s important to emphasize the importance of adherence to these recommendations to limit infection risk.

CONTEMPORARY OB/GYN: What proactive measures, if any, can be taken before a surgical procedure following early pregnancy loss to minimize risk of further postoperative complications?

Dr. Cohen: When surgical manipulation is necessary that will require insertion of an instrument into the uterine cavity to remove tissue, I will typically give patients a prophylactic antibiotic to minimize risk of infection. These are typically young, healthy women, and the last thing any of us want is for them to get an infection that may lead to future infertility.

Assessment and Management of Uterine Perforation Following Early Pregnancy Loss

CONTEMPORARY OB/GYN: How common is uterine perforation following D&C for early pregnancy loss?

Dr. Espey: It’s an even rarer complication than hemorrhage or infection, occurring in < 0.1% of procedures.

CONTEMPORARY OB/GYN: Are there any risk factors that make uterine perforation more likely?
Dr. Legro: Uterine perforation is most common in women with cervical stenosis or nulliparas who have had an early pregnancy loss since their cervixes have never fully dilated and they would have narrower cervical canals than women who have previously given birth. Perforations occur most commonly when the cervix is dilated to allow passage of a curette or a suction curette to evacuate the uterus. However, structural abnormalities of the uterus as noted previously or excessive flexion of the uterus can also predispose to perforation.

CONTEMPORARY OB/GYN: What are the most typical signs and symptoms of possible uterine perforation?

Dr. Cohen: Most commonly, a woman will present with pain, bleeding, or a fever. Timing of symptom onset following a D&C can vary depending on the location of the perforation. A perforation in the middle of the uterus, for example, will bleed less than a perforation toward the outer portions.

It is important to make sure the bowel is not involved in these cases. I have seen a variety of significant perforations during the course of my career. I even remember a patient whose appendix was pulled out during a suction D&C. That patient became septic and was extremely critical.

CONTEMPORARY OB/GYN: How is uterine perforation typically treated?

Dr. Cohen: Patients can typically be observed until symptoms resolve. There may be some cases when you’ll want to order an ultrasound to ensure that there is no retained tissue of conception. In patients for whom you are worried about excessive bleeding, you can admit them to the hospital for closer monitoring. I think the most important thing is to have in mind the gestational age and the feedback from your pelvic exam before passing any instruments through the cervix, so that you are aware of the depth at which they should be passing. The typical sign of a uterine perforation is that when you place the uterine sound, it goes considerably farther than you think it should based on the patient’s gestational age. Sometimes, you will also have more bleeding than you think you should or the patient will have more pain afterward upon recovering from anesthesia.

Dr. Espey: I am finding that increasingly, particularly in the first trimester, we proceed with laparoscopy instead of immediate laparotomy following cases of uterine perforation. I have now been involved in more than one case of outpatient uterine perforation where we performed laparoscopy to identify the perforation and treat, if needed; for example, by removing omentum from the uterus. We observed the patient to ensure there was no bleeding and then had a minimally invasive surgeon run the bowel to ensure no injury. Of course, there are cases in which the patient is unstable and requires laparotomy.

CONTEMPORARY OB/GYN: This has been a terrific discussion, and we want to thank you all for your insights. I hope that our audience is able to take away some helpful information from our discussion to inform their practice’s approach to management of complications related to early pregnancy loss.

REFERENCES

13. Methergine (methylergometrine maleate) 0.2 mg tablets prescribing information. Baltimore, MD: Lupin Pharma, 2016.