

Obstetric Emergencies

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First Trimester Emergencies

Evidence-Based Review of laboratory studies and imaging

Urine:

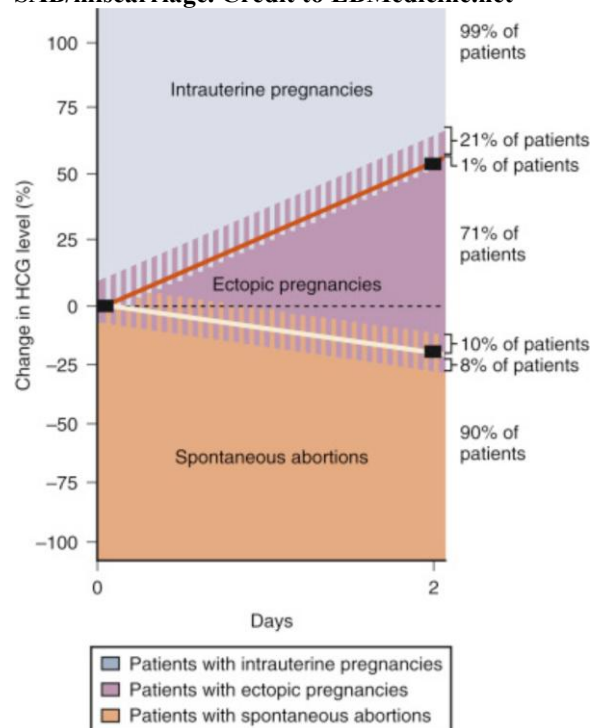
Pregnancy test: Urine tests for beta-human chorionic gonadotropin (B-hcg) turn positive at 20-50 mIU/mL. This level is associated with 6-8 days post fertilization.¹ The likelihood of false negative result is low, one study¹ showed that even with a 5-fold dilution of urine (by having 40 women drink 1L of water) there was no change in the sensitivity of the low Bhcg detection limits. However, there is caution when using higher threshold tests so you should understand the detection limits of the one your hospital uses. False positive tests are also a possibility secondary to the beta subunit of the amino acid sequence being the unit of measure. It can be seen in recent pregnancy loss, malignancy, syncytiotrophoblast hydatiform moles, and exogenous Bhcg use.²⁻³ Exogenous hcg can be involuntarily taken in weight loss supplements, or taken voluntarily for endogenous androgen production in athletes or hcg trigger injections for infertility treatments.³ Studies using serum or whole blood on point of care urine tests have shown promise, which is particularly helpful in critical patients that cannot give a urine sample easily. Two studies using Beckman Coulter ICON 25 tests showed that 2 drops of whole blood with a 10 minute wait time had similar accuracy to using urine samples.⁴⁻⁵

Serum:

Quantitative Bhcg: The first measurable finding in pregnancy is an elevated B-hCG level, produced by placenta after implantation of blastocyst around day 8 post conception.⁶ This test is also measured in

mIU/mL with <5mIU/mL is negative and >25 mIU/mL is positive. This becomes more important when evaluating for ectopic pregnancy by tracking 48-hour doubling and discriminatory zone for ultrasound assessment of intrauterine pregnancy.⁷⁻⁸ (Figure 1) Discriminatory zones will be discussed further in the ultrasound section.

Figure 1: Changes in hCG levels over 48 hours in patients with IUP, ectopic pregnancies, and SAB/miscarriage. Credit to EBMedicine.net²



Rhesus(Rh) factor: All pregnant women should have Rh status documented, which can include a historical value from a previous type and screen. However, if administering Rho(D) immune globulin (Rhogam), then a pre-administration type and screen must be obtained to assess whether alloimmunization occurred before or after treatment (if alloimmunization occurs). This is not going to change anything in the emergency department, but aids our obstetric colleagues with follow up decisions. If patient is Rh+, then there is no indication for Rhogam at any point. However, if patient is Rh-, then

discussion regarding Rhogam administration differs between trimesters and amount of bleeding. Data is unclear on administration during the first trimester.⁹ If there is severe bleeding and cramping, or if the patient is near the end of the first trimester, then risks of no administration outweighs side effects, and Rhogam should be given within 72 hours of bleeding onset. If there is minimal bleeding, no cramping, or patient is early in the first trimester, then there is minimal risk of alloimmunization. Fetal erythrocytes are not produced until 6-8 weeks gestation and fetal placental blood volume is 3mL at 12 weeks. Therefore, Rhogam has no role before 6 weeks gestation.¹⁰ Dosages differ along the gestational course: first trimester is 50mcg, second/third trimester is 300mcg. However, the most commonly available dosage is 300mcg, in a non-titratable vial, therefore you may need to administer the full 300mcg even when not indicated.

Ultrasound:

In order to define an intrauterine pregnancy, there must be either 1. Gestational sac with yolk sac, or 2. Embryo. There are concerns for error when evaluating with bedside ultrasound as you can mistake empty gestation sac (Image 1) and pseudogestational sac (Image 2) for a true gestational sac containing yolk sac (Image 3).¹¹⁻¹³ If there is difficulty obtaining images then use the B-hCG discriminatory zones. However, keep in mind that values used are variable depending on the source: emergency medicine teaching uses values from a 1994 study: 1500 mIU/mL for transvaginal imaging and confirmation of intrauterine pregnancy.¹⁴ However, a 2013 study summarized these values (Table 1). Therefore, it is important to take the entire clinical picture of the patient and not rely exclusively on laboratory values.

Table 1: Serum B-Human Chorionic Gonadotropin Levels and Predicted Probability of

Detection in Viable Intrauterine Gestations (n=366). Credit to Connolly et al 2013.⁷

	β-hCG Level for Given Predicted Probability (95% CI) of Visualizing Structure*				Highest β-hCG Where Structure Not Seen
	50%	90%	95%	99%	
Gestational sac	879 (553-1,310)	1,918 (1,368-3,970)	2,363 (1,641-5,201)	3,510 (2,294-8,910)	2,317
Yolk sac	1,826 (1,211-2,516)	5,412 (3,843-9,037)	7,832 (5,293-15,007)	17,716 (10,264-48,132)	9,975
Fetal pole	10,091 (7,753-12,619)	24,599 (20,120-31,982)	30,982 (25,021-41,374)	47,685 (37,346-66,919)	35,486

β-hCG, β-human chorionic gonadotropin; CI, confidence interval.
* Logistic regression model using fractional polynomials to quantify the association between serum β-hCG level and probability of visualizing each structure through transvaginal ultrasonography. Gestational sac and fetal pole modeled using β-hCG^{2.5}.

As the pregnancy progresses, if you encounter a patient without an established obstetrician but she is far enough in the pregnancy that transabdominal ultrasound will suffice, there are three different calculations used for dating. These calculations are biparietal diameter (BPD), Abdominal circumference (AC), Femur length (FL). Gestational age <20 weeks can use BPD and FL; gestational age >20 weeks can use BPD, AC, FL (Image 4).¹⁵ This generally becomes more important in 2nd trimester emergencies or trauma where dating is important in determining viability and next steps.

Image 1. Empty gestational sac. Image Courtesy Wu, TS, Pregerson B EP Monthly 2012.^P



Image 2: Pseudogestational Sac vs True Gestational Sac. Image courtesy Chakar B. 2020.^Q

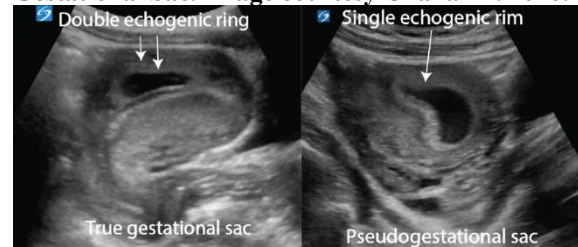
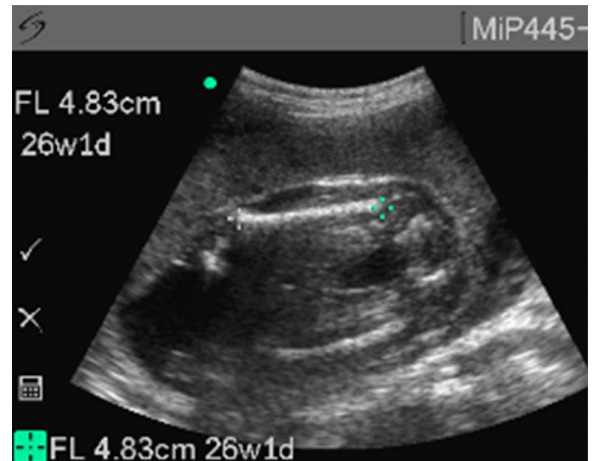
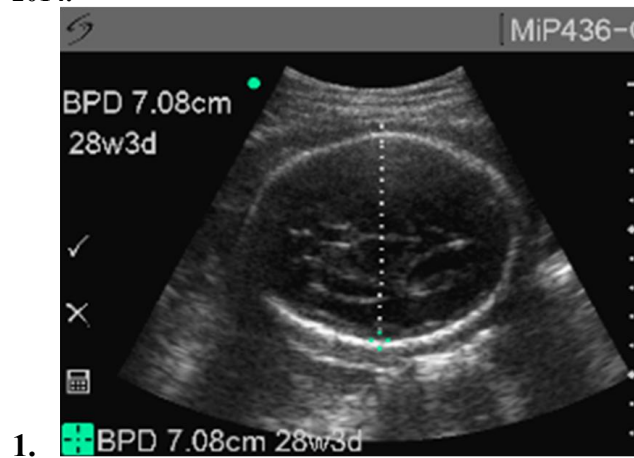


Image 3: Retroverted Uterus with Gestational Sac and Yolk Sac. Image courtesy Dewald et al 2021.^R

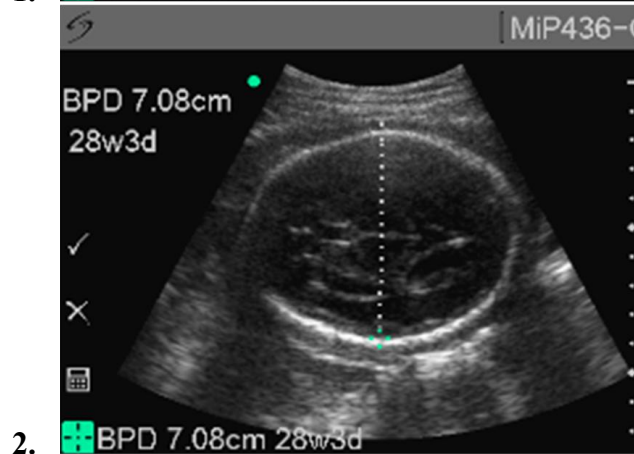


3. FL 4.83cm 26w1d

Image 4: Gestational Measurements: Biparietal Diameter (1), Abdominal Circumference (2), Femur Length (3). Image Courtesy Wylie, B et al 2014.^S



1. BPD 7.08cm 28w3d



2. BPD 7.08cm 28w3d

Imaging/Radiation doses in pregnancy:

Fetal radiation from X-ray and computed tomography (CT) in doses up to 1mGy are considered acceptable, however, larger doses double the risk of carcinogenesis. When larger doses are required, such as ruling out appendicitis in a pregnant patient, 10-50mGy fetal dosage results in a risk of cancer to one in 250.¹⁶ See Table 2 for a list of fetal radiation doses with different studies. Magnetic resonance imaging (MRI) is also associated with theoretical risks based on magnetic field, pulsed radiofrequency fields, and fast-acquisition sequences. The magnetic field required to produce images can cause cell migration, proliferation, and differentiation leading to miscarriage. The pulsed radiofrequency fields cause tissue heating potential and can affect organogenesis. The room temperature can be lowered to less diminish this effect.¹⁷ Finally, the risks of fast-acquisition sequences can damage the fetal ear due to high acoustic noise level, particularly after 24 weeks gestation. MR imaging is generally considered safe during pregnancy, however, there is not enough evidence on these potential risks. Therefore, have a discussion with the patient and the obstetric team regarding risks and benefits of obtaining imaging.

Table 2: Fetal Radiation Doses Associated with Common Radiographic Examinations. Image courtesy Trembley et al 2012.^T

Type of Examination	Fetal Dose* (mGy)
Very low-dose examinations (<0.1 mGy)	
Cervical spine radiography (anteroposterior and lateral views)	<0.001
Radiography of any extremity	<0.001
Mammography (two views)	0.001–0.01
Chest radiography (two views)	0.0005–0.01
Low- to moderate-dose examinations (0.1–10 mGy)	
Radiography	
Abdominal radiography	0.1–3.0
Lumbar spine radiography	1.0–10
Intravenous pyelography	5–10
Double-contrast barium enema	1.0–20
CT	
Head or neck CT	1.0–10
Chest CT or CT pulmonary angiography	0.01–0.66
Limited CT pelvimetry (single axial section through the femoral heads)	<1
Nuclear medicine	
Low-dose perfusion scintigraphy	0.1–0.5
Technetium-99m bone scintigraphy	4–5
Pulmonary digital subtraction angiography	0.5
Higher-dose examinations (10–50 mGy)	
Abdominal CT	1.3–35
Pelvic CT	10–50
¹⁸ F PET/CT whole-body scintigraphy	10–50

Note.—Annual average background radiation = 1.1–2.5 mGy, ¹⁸F = 2-[fluorine-18]fluoro-2-deoxy-D-glucose, PET = positron emission tomography.
^aFetal exposure varies with gestational age, maternal body habitus, and exact acquisition parameters (2,5,6,10–12).

Nonionic iodinated and gadolinium-based agents are water soluble and can cross the placental barrier via simple diffusion across the chorionic epithelium.¹⁸ Exposure gets increased as fetal kidneys filter the agent and pass it into the amniotic fluid through urine, which then gets swallowed by the fetus. Pregnant patients with impaired renal function result in higher levels due to longer circulation times.¹⁹ There has not been any mutagenic or teratogenic effects described after administration of iodinated contrast, however, it can potentially impact the neonatal thyroid gland. One study of 343 newborns exposed to single dose IV contrast given for suspicion of pulmonary embolism, only one infant had high TSH levels at birth but they self-corrected at day 6 of life.¹⁹ There is a lack of evidence regarding gadolinium-based contrast studies in humans, however, it has resulted in fetal loss in animal studies when given at elevated non-clinical doses.²⁰ The current recommendation from the radiological society is that gadolinium is unlikely to have adverse effect on the developing fetus but caution should be exercised when performing studies that require contrast for MR imaging (Table 3).

Table 3: Considerations and Recommendations for Use of Iodinated and Gadolinium-based Contrast Agents During Pregnancy and Lactation. Image Courtesy Trembley et al 2012.^T

Guideline	Iodinated Contrast Agents	Gadolinium-based Contrast Agents
Pregnancy		
Considerations	Data on fetal exposure to iodinated contrast agents are scarce No malformations or side effects have been reported in newborns Iodinated products given during pregnancy may induce neonatal hypothyroidism	Few studies have evaluated fetal exposure to gadolinium There have been no studies on long-term risks in humans Free gadolinium could potentially lead to neurotoxicity
Recommendations	Screening newborns for hypothyroidism during the 1st week of life is standard pediatric practice Iodinated contrast agents must be essential for making the diagnosis Informed consent as to the risks and benefits of the procedure is recommended Use of topical iodine is contraindicated	Consensus is that gadolinium should not be used during pregnancy unless the benefits outweigh the risks
Lactation		
Considerations	Dose of iodinated contrast agent in breast milk absorbed by the infant is 0.5% of the maternal dose Breast-feeding after the injection of iodinated contrast agent is safe	About 0.01% of the maternal gadolinium dose is excreted into breast milk Breast-feeding after the injection of gadolinium-based contrast agent is safe
Recommendations	Concerned mothers may be instructed to discard breast milk for 24 hours after injection to eliminate fetal exposure to contrast agent Use of topical iodine is contraindicated because free iodine excretion may induce neonatal hypothyroidism	Concerned mothers may be instructed to discard breast milk for 24 hours after injection to eliminate fetal exposure to contrast agent

Vaginal Bleeding/ Spectrum of Miscarriage

Pertinent history of the patient should include last menstrual period (LMP) or previous ultrasound (US) findings to estimate gestational dates, gravidity and parity (Parities by arrangement: T-P-A-L= term, pre-term, abortion, living), history of sexually transmitted infection (STI) or pelvic inflammatory disease (PID), leaking of fluid, urinary symptoms, fevers/chills, the duration, quantity, and associated symptoms of bleeding. Focused physical exam includes palpation of the abdomen for areas of pain (and if far enough along, palpation of uterine fundus), sclera and palms for signs of anemia, review of vital signs, pelvic exam assessing cervical os, looking for products of conception, quantifying blood in vaginal vault with active blood or products of conception through os, and assessing adnexal tenderness. If there are products of conception that can be safely obtained, consider sending to pathology for further analysis.

All vaginal bleeding in a first trimester patient falls within the spectrum of miscarriage. Differentiating types of

miscarriage then relies on factors such as cervical os changes, fetal pole or yolk sac seen on ultrasound, and presence of fetal heart tones. (Table 4) The risk of miscarriage is increased with age and risk in >40 years old is approximately 40%.²¹⁻²² Heavy bleeding with abdominal/pelvic cramping or pain increases odds ratio to 3.0 or approximately 11-18%.²³ Chromosomal abnormality of the fetus accounts for the majority of spontaneous miscarriage²⁴ and this should be communicated to the concerned or grieving patient to ensure there is no self-blame.

Table 4: Types of Miscarriage and Associated Physical Examination and Ultrasound Findings.
Credit to EBMedicine.net²

Type of Miscarriage/ Abortion	Cervical Os	IUP on Ultrasound?	De
Threatened	Closed	Yes	Va
Complete	Closed	No (but previously with IUP)	Pa
Missed	Closed	Crown-rump length of ≥ 7 mm without cardiac motion; other criteria exist as well ²³	A
Inevitable	Open	Yes	Ar
Incomplete	Open	Partially expelled	Ar
Septic	Any	Any	Int a

Threatened miscarriage with fetal cardiac activity on ultrasound can be counseled about the high likelihood of a normal pregnancy. However, keep in mind that 3.4% of those with spotting and 11-18% of those with heavier bleeding will end in miscarriage.²⁵ Therefore, have increased caution with patients who have a history of multiple miscarriages during discharge instruction discussions. These patients should be counseled on the adverse maternal and fetal outcomes that have been associated with early pregnancy vaginal bleeding: pre-term birth, low birth weight, and antepartum hemorrhage.²⁵ Many women will inquire on the indications for bed rest, however, there is minimal data regarding this topic. Therefore, instructions for minimal extraneous activity should be given until the patient has followed up with their Obstetrician.

Treatment and management of patients diagnosed with spontaneous abortion depends on multiple factors and a 2012 Cochrane review has shown that there is no superior treatment course for the stable patient: expectant management, medical management, or surgical management.²⁶ All unstable patients with significant blood loss, hemodynamic instability, or presence of infection require surgical management.

The decision for management should be made in conjunction with your obstetric colleagues, if available. However, a stable patient with diagnosed spontaneous abortion can undergo expectant management and expect complete expulsion within 5-7 days approximately 80% of the time.²⁶⁻²⁷ Bleeding precautions must be given to the patient, as many will experience moderate-to-heavy bleeding as there is slight increased risk of need for transfusion (1.4%) with expectant management.²⁶ A woman's health book cites two maxi pads per hour for two consecutive hours as excessive bleeding.²⁸

If the shared-decision making conversation results in the choice of medical management, then treatment can be initiated in the emergency department. Misoprostol is the most studied medication, with routes of vaginal, sublingual, or oral. Vaginal and sublingual routes have been shown to be more effective than oral administration, with sublingual causing increasing frequency of diarrhea.²⁹ The dosage is 800mcg and can be repeated between 3 hours and 7 days if there is incomplete expulsion, however, a large RCT showed complete expulsion by day 3 in 71% of women.³⁰ Lastly, surgical management is uterine evacuation via suction or sharp curettage. Two randomized controlled trials showed no difference in outcome of choosing medical or surgical management with approximately 91% and

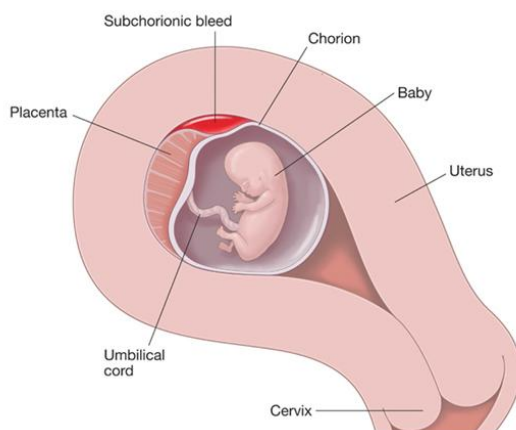
100% expulsion rates respectively by day seven.³¹⁻³² Regardless of treatment decision for the patient, remember that this is likely an emotionally charged situation so be patient, answer questions to the best of your ability, and provide resources as needed.

Subchorionic Hemorrhage

Chorion membranes enclose the embryo in the uterus and can partially detach leading to collection of blood beneath.³³ (Image 5). This is the most common (11%) cause of vaginal bleeding between 10-20 weeks gestation. Abdominal pain is absent in majority of patients. The outcome is dependent on the size, maternal age, and gestational age.³⁴ There is an association with increased risk of pregnancy loss, and earlier formation of the hematoma/hemorrhage has higher rates of spontaneous abortion.³⁵⁻³⁶ However, if the pregnancy progresses past week 20, the worry of adverse outcome greatly decreases and with close monitoring a majority of patients will go on to normal delivery.

Image 5: Subchorionic hemorrhage. Image courtesy A. Jonathon Dimes. B. Drs. Matozinho and Basilio

1.



2.



Ectopic Pregnancy

Pertinent history and physical are similar any patient presenting with vaginal bleeding and cramping with the inclusion of risk factors for ectopic pregnancy. Though most patients diagnosed with an ectopic pregnancy will not have risk factors, research into the topic has shown the following will increase risk of implantation outside of the uterus: history of salpingitis, pelvic inflammatory disease (PID), prior ectopic pregnancy, smoking greater than one pack per day, and presence of intrauterine device (IUD).³⁷⁻³⁸

Implantation of the ovum outside the endometrial cavity occurs in approximately two percent of pregnancies with 98% being in the fallopian tube and 80% requiring salpingectomy.³⁹ Heterotopic pregnancies can occur with or without the presence of assisted reproductive therapy (1:4,000-30,000) with the increased risk in those undergoing treatment.⁴⁰ Generally the concern for this diagnosis is raised when b-hcg levels are above the discriminatory zone but no intrauterine pregnancy is seen. However, cautionary tales have shown that even with deceptively low bhcg levels, the ectopic pregnancy can be far enough in gestation to rupture and cause hemorrhage. Syncytioblast cells grow less readily when implantation is outside the uterus leading to decreased production of the hormone

peptide.⁴¹ A pregnancy-related mortality study showed that 94% of ectopic related deaths are due to hemorrhagic shock, making this diagnosis one of the must-not-miss diagnoses of emergency medicine.⁴²

Involvement of the obstetrician should eventually happen in all cases; however, clinical stability of the patient should expedite consultation. Utilization of bedside ultrasound to assess for free intra-abdominal fluid in evaluation of the patient is extremely helpful. If free fluid is seen and there is increased concern for ruptured ectopic pregnancy without official ultrasound confirmation, then resuscitate the patient with intravenous (IV) fluids (IVF) or blood transfusion with O negative to stabilize patient until obstetrics can get the patient to the operating room.

The stable unconfirmed pregnancy location or known location unruptured ectopic patient does not always require surgical treatment and there are medical management options available. In the unknown location patient with stable vital signs, mild vaginal bleeding, and good social support/likely to follow up the patient can be discharged with instructions to follow up in OB clinic or ED in 48 hours for repeat blood and ultrasound. A portion of these patients are undergoing spontaneous abortion and should be given bleeding precautions. In the known-location unruptured ectopic patient medical management with IM methotrexate. Absolute contraindications for this route includes Bhcg <5000 mIU/mL (Odds ratio 5.45 for failure when >5000 mIU/mL), absence of fetal cardiac activity (odds ratio 9.1 for failure when cardiac activity present). Relative contraindications are immunodeficiency, any cytopenia, active pulmonary disease, active peptic ulcer disease, hepatic or renal dysfunction, and actively breast feeding.⁴³

Hyperemesis Gravidarum

History should include the onset of the nausea and vomiting, the presence of blood or bile, palliative treatments attempted, ability to tolerate oral intake, gestational week, previous surgeries, presence of abdominal pain, associated diarrhea, and urinary symptoms. Physical exam to assess hydration status, tenderness in abdomen including findings for cholecystitis or appendicitis.

Nausea and vomiting in pregnancy occurs in up to 85% of pregnancies with 3% of pregnancies being affected by the more severe hyperemesis gravidarum defined as intractable vomiting in pregnancy requiring hospitalization.⁴⁴⁻⁴⁵ Hyperemesis gravidarum is the second most common indication for hospitalization in women with successful pregnancies.⁴⁶ However, this is a diagnosis of exclusion and other etiologies of vomiting should be ruled out, especially in the presence of abdominal pain or cramping: cholelithiasis, cholecystitis, appendicitis, gastritis, peptic ulcer disease, bowel obstruction, ovarian cyst or torsion, colitis, diverticulitis, etc.

Ensure that you assess liver function for abnormalities, check glucose and other electrolyte abnormalities, anion gap acidosis, urinalysis. Generally hypokalemic, hyperchloremic acidosis is seen in conjunction with starvation ketosis. Fluids can be either D5NS or NS, however, a study showed greater symptomatic improvement at 6 and 12 hours with D5NS but no difference between the two at 24 hours.⁴⁴ If the patient cannot tolerate oral intake then vomiting can be treated with IV pyridoxine and Benadryl. If the patient can tolerate some po, then can treat with pyridoxine/doxylamine (25 mg/12.5mg), ginger capsule (250mg), and converting the prenatal vitamin to folate only vitamin supplement.⁴⁷ In severe cases,

Compazine or Phenergan can be used in the emergency department and outpatient settings. A 2016 systematic review showed a small increase in fetal cardiac abnormalities with Zofran-treated patients, so use with caution.⁴⁸

Asymptomatic Bacteriuria

Previous research and teachings taught that any pregnant female should be screened for asymptomatic bacteriuria as anatomic and physiologic changes during pregnancy cause an increase in urinary stasis and risk factors for development of pre-term labor and pyelonephritis. However, a 2016 systematic review found no association or benefit of treatment, while a 2015 multi-center cohort study resulted in data supporting increased risk of pyelonephritis with asymptomatic bacteriuria.⁴⁹⁻⁵⁰ Therefore, if the patient is having urinary symptoms, then there is obvious need for treatment, but the decision to treat asymptomatic bacteriuria may vary by provider. In the decision to treat, there are limited antibiotics that are approved in pregnancy and a 2015 Cochrane review showed that the shorter courses are less effective, therefore, a full 4-7 days is required.⁵¹ Cephalosporins, penicillins, and nitrofurantoin are all category B, however, ACOG states nitrofurantoin should be used in penicillin-allergic patients where “no other option is suitable.”⁵¹⁻⁵² Finally, all pregnant patients diagnosed with pyelonephritis require admission for treatment.⁵³

Trauma in Pregnancy

Traumatic injuries occur in 6-8% of all pregnancies and are the leading non-obstetric cause of death during pregnancy.⁵⁴ Motor vehicle accidents, domestic violence, and falls account for the majority of these injuries.⁵⁵ Health care providers must assess for traumatic injuries to both the mother and

the fetus, however it is important to remember that the best initial treatment for the fetus is optimum resuscitation of the mother.⁵⁶

The initial assessment of the pregnant patient should follow ATLS protocols. The primary survey starts with assessment of the airway, oxygenation, ventilation, and circulatory volume. Supplemental oxygen should be administered to maintain a saturation of 95%. If intubation and mechanical ventilation are required, it is important to maintain an appropriate PCO₂ for the patient's stage of pregnancy. The stimulatory effects of progesterone lead to an increased respiratory drive and respiratory alkalosis. During the late third trimester, a normal pCO₂ decreases to 30mmHg. A pCO₂ level of 40mmHg in such patients suggests impending respiratory failure. If chest tube placement is required, the insertion site may need to be more superior than in the non-pregnant patient depending on gestational age due to elevation of the diaphragm by the gravid uterus.⁵⁶⁻⁵⁷

An understanding of the cardiovascular and hematologic changes that occur during pregnancy is essential for providing adequate resuscitation. Pregnant patients develop increased cardiac output with baseline tachycardia and increased plasma volume with relative anemia. Blood loss of up to 1,500mL in pregnant patients may present without clinical signs of hypovolemia. If hypotension is present, the patient should be placed in the left lateral decubitus position as mechanical obstruction of the IVC by the gravid uterus in supine position can lead to supine hypotensive syndrome. If spinal precautions are indicated, the patient can be logrolled 15-30 degrees onto the left side. If hypotension persists, patient can be administered crystalloid fluid bolus. However if hemorrhage is suspected, O-negative blood should be administered immediately. An abrupt decrease in

intravascular volume leads to a profound increase in the uterine vascular resistance causing reduced fetal oxygenation even in the setting of stable maternal vital signs.⁵⁶⁻⁵⁷

Assessment of the fetus is a part of the secondary survey. Evaluating the height of the uterine fundus can be used to estimate gestational age and viability of the fetus. Some commonly used landmarks are the level of umbilicus and costal margin which correspond to the 20th and 34-36th weeks of gestation, respectively. Once the fundus reaches the level of the umbilicus, the fetus is likely viable. If maternal cardiac arrest occurs in a patient determined to be greater than 20 weeks gestation, a perimortem caesarean section should be considered if the procedure can be initiated within four minutes from the time of arrest. Fetal heart rate and contractions, if present, should be assessed by fetal cardiotocographic monitor. If this is not available, an ultrasound machine can be used to determine the fetal heart rate. The normal fetal heart rate ranges between 120 to 160 beats per minute.⁵⁶⁻⁵⁷

Life threatening traumatic obstetric diagnoses include placental abruption, premature labor, uterine rupture, amniotic fluid embolism, and maternal-fetal hemorrhage leading to potential alloimmunization. A Kleihauer-Betke test should be performed in all pregnant patients with blunt abdominal injury who are greater than 12 weeks gestation to detect presence of maternal-fetal hemorrhage. Rh immune globulin should be administered within 72 hours after the injury to protect against alloimmunization in Rh-negative patients. The appropriate dose is 300ug of Rh immune globulin per 30mL of maternal-fetal hemorrhage. The indications for obtaining a FAST exam, x-rays, and computed tomography are the same for both pregnant and non-pregnant patients. If indicated, the benefits of obtaining radiographic studies outweigh the potential radiation risk to the

fetus. In stable patients, magnetic resonance imaging can also be considered if readily available to avoid radiation exposure to the fetus. All pregnant trauma patients greater than 20 weeks gestation should have cardiotocographic monitoring for a minimum of six hours prior to discharge home.⁵⁶⁻⁵⁷

Resources for pregnancy loss

Gundersen Health System Resolve Through Sharing

(<http://www.gundersenhealth.org/resolve-through-sharing>)

- SHARE Organization (www.nationalshare.org)
- A Place to Remember (www.aplacetoremember.org)
- Babies Remembered (www.BabiesRemembered.org)
- Centering Corporation (www.centering.org)
- The Miscarriage App (a mobile phone application for iPhone and Android phones)
- Position Statements and Practice Guidelines for health care practitioners from the Pregnancy Loss and Infant Death Alliance (www.PLIDA.org)

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