Pregnancy Complications

Objectives

By the end of this chapter you should be able to

• Implement treatment for vaginal bleeding during pregnancy
• Assess and treat the patient with suspected ectopic pregnancy
• Understand the causes of disseminated intravascular coagulation in pregnancy
• Understand common etiologies of pelvic and abdominal pain in pregnancy
• Understand how to assess and transport the patient with hyperemesis gravidarum
• Recognize signs and symptoms of preeclampsia

CASE Study

Michael and Kayla arrived at the maternity unit to transport a pregnant woman with a life-threatening condition 300 miles to a hospital nearer her home. Because it was likely that her infant would require months of intensive care, delivery at a distant hospital would limit the time she could spend with the baby during his stay in the NICU.

Estella Alces had presented to the emergency department the night before and was discharged after evaluation. Estella was a 23-year-old primigravida at 30 weeks’ gestation who had recently immigrated to West Virginia from Argentina. She had driven 5 hours to go camping with friends when she developed substernal chest pain radiating to the
back. She had a history of symptomatic mitral valve prolapse and was on propranolol, a beta blocker. Upon arrival at the hospital, the ED evaluated her heart, lungs, and vital signs and found no pathology. She was normotensive and well oxygenated. The staff evaluated the well-being of her fetus and saw no abnormalities on the fetal heart tracing or sonogram. Her CBC was unremarkable except for moderate thrombocytopenia—her platelet count was 75,000 (normal is 150,000–450,000).

Dr. Presque, the on-call obstetrician, had been informed when the patient arrived, but after evaluating her symptoms the ED discharged the apparently healthy and now asymptomatic woman without further word to the obstetrician. The ED attending physician noted the thrombocytopenia and discharged her with a copy of her labs, advising her to share them with her own physician when she returned from vacation. He assumed that her blood work indicated gestational thrombocytopenia, a common and usually benign condition of pregnancy.

When Dr. Presque looked over her blood work the next morning, she was alarmed to see the low platelet count. She called the lab to ask whether it still had Estella's blood sample and whether enough blood remained to perform a hepatic function panel. A few hours later, the report showed that Estella had severely elevated liver enzymes. Dr. Presque and staff immediately began to make phone calls in hope of locating Estella so that she might return to the hospital.

Questions

1. What was Estella's diagnosis?
2. What are the signs and symptoms of this condition?
3. What could happen to Estella if she were not treated for this condition?
4. What should Michael and Kayla consider when transporting this patient?

Introduction

Most pregnancies proceed with only minor discomforts and concerns, but when serious complications do arise, it is often the EMS provider who is summoned. Prehospital care of the woman with a high-risk pregnancy involves requires rapid assessment, judicious management, and prompt transport to an appropriate health care institution. To achieve optimal outcomes for mother and fetus, the EMS professional must become familiar with the etiology, diagnosis, consequences, and management of the most common pregnancy complications.
Antepartal Bleeding—First Half of Pregnancy

Bleeding in early pregnancy does not always herald a miscarriage. Sometimes the bleeding proves to originate from the rectum or urinary tract rather than the vagina. Causes of vaginal bleeding in pregnancy include vaginal or cervical infection, cervical polyps, cervical cancer, cervical or vaginal trauma, ectopic pregnancy, and hydatidiform mole. A woman may spot after intercourse or after an office vaginal exam because even gentle cervical manipulation may rupture small blood vessels. A woman who fails to produce sufficient progesterone may experience vaginal bleeding—treatment with supplemental progesterone sustains the pregnancy until the placenta has matured and can manufacture adequate amounts. Implantation bleeding results from vascular disruption as the embryo burrows into the endometrial tissue. Implantation bleeding can be scanty or profuse; it often occurs 5–6 weeks after the last menstrual period and lasts a day or two.

Spontaneous Abortion

Spontaneous abortion is the clinical term for what is commonly termed a miscarriage. The usual definition is the loss of a pregnancy before the fetus reaches 20 weeks or 500 g. This boundary can blur in practice. It is common for dates to prove incorrect, and occasionally a baby weighing less than 500 g will survive.

It is difficult to determine what percentage of pregnancies end in spontaneous abortion. In about 30% of miscarriages, the woman is unaware that she is pregnant and experiences simply a delayed, heavy menstrual period. Ten to 17% of pregnancies spontaneously terminate between 4 and 20 weeks of gestation. Twenty-five to 50% of conceived embryos never implant. Forty-year-old women lose twice as many pregnancies as 20-year-old women.
Most women who suffer spontaneous abortion wonder whether they did something to cause it. In most situations, this is not the case unless they have exposed their fetuses to damaging drugs or toxins. About half of spontaneous abortions are due to chromosomal errors. Others are related to problems with maternal anatomy or hormones, or to maternal diseases such as diabetes, infections, placental abnormalities, uterine scarring, or immune dysfunction. Often the cause of a pregnancy loss will remain unknown.

Threatened Abortion

About one-third to one-half of women who experience vaginal bleeding in the first trimester will lose the pregnancy. Bleeding may be red (fresh) or brown (old), scanty or profuse. The patient may complain of cramping in the back or abdomen. Many women say that the accompanying pain equals or surpasses the contractions of labor. Always consider ectopic pregnancy a possibility unless the conceptus has been sonographically confirmed in the uterus.

Field treatment usually involves basic care and transport, but it is important to be vigilant for a decline in the patient’s condition. Most local protocols support the following management strategies:

- **Get a complete history, including a history of the present problems.** The OLDCART checklist works well for this purpose (see chapter 2). Could this be an ectopic pregnancy? If the patient is certain of her blood type, document this information and relay it to the hospital staff. If she is Rh-negative, she will need a shot of anti-D immunoglobulin (RhoGam); without it her body may manufacture antibodies that could attack the next fetus she conceives. Because the blood type of the fetus is usually unknown, RhoGam is given to all bleeding or miscarrying pregnant women with a negative Rh blood type.

- **Monitor vital signs carefully.** If the patient is bleeding significantly, frequent vital signs are necessary. If you suspect hypovolemia, take orthostatic vital signs by measuring her pulse and blood pressure in left lateral position, then in a high Fowler’s position or, better yet, standing. A 15-mmHg drop in the blood pressure and 20-beat-per-minute increase in the heart rate indicate that blood volume is significantly low. If your patient is volume-depleted, she may faint in an upright position, so keep her safety in mind at all times. If she shows signs of shock, orthostatic vital signs should not be obtained, and she should be kept flat and on her left side.

- **Watch for signs of shock.** If the patient is pale, clammy, and restless, treat her like any other patient in hypovolemic shock. Position her flat on her side, apply high-flow oxygen, and start at least one large-bore
IV of a crystalloid solution such as lactated Ringer’s or normal saline in a sizable vein—two if she is actively hemorrhaging. Second-trimester pregnancy losses carry a significant risk of severe hemorrhage.

- **Draw blood.** A blood draw in the field can expedite the processing of the patient’s lab work after she arrives at the hospital. Check your local protocols to determine whether it will be accepted by the lab.

- **Count pads to measure bleeding.** Blood loss may vary. To measure blood loss, look at the pads the patient has been discarding and determine their thickness and how saturated they are. If she is not wearing a pad, note whether blood has soaked through her underpants or outer clothing, whether it has soaked through the sheet or into the mattress, or whether it is enough to puddle on the floor. Often much of the evidence will have been flushed away before your arrival, so try to quantify any amount she lost in the toilet. Remember to consider other sources of blood in the toilet, such as hemorrhoids or rectal fissures. If she passed any clots or tissue, bring them along to the hospital.

  If she is passing large amounts of blood that does not clot, or if she is bleeding from other bodily orifices or her intravenous access sites, consider DIC (see later). DIC is most likely to occur with septicemia or with second-trimester abortion.

- **Fetal heart tones.** If you carry a Doppler on the ambulance, you can obtain fetal heart tones if the patient is beyond 12 weeks’ gestation. Heart tones can be difficult to find in the field, especially in the first half of pregnancy. The decision to auscultate heart tones in a patient less than 18–20 weeks should be weighed carefully. The presence or absence of fetal heart tones will not change your plan of care; if you fail to hear a heartbeat you will increase maternal anxiety.

- **Provide emotional support.** Losing a pregnancy can be frightening or heartbreaking, not only for the pregnant woman but also for her family and friends. Statements that acknowledge their feelings and show genuine concern are generally the most comforting. Explain procedures clearly and honestly, give the patient your focused attention, and listen to her concerns. Reassure her that bleeding and cramping do not necessarily mean that she is losing the pregnancy and that there is nothing that she could have done to prevent miscarriage.

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**Inevitable Abortion**

When abortion is certain to occur, it is termed inevitable. The woman reports abdominal or back pain and bleeding, and sometimes a gush of fluid from the vagina. This condition progresses to either complete abortion or incomplete abortion.
Complete Abortion

Complete abortion is the spontaneous loss of all of the **products of conception**, as evidenced by an empty uterus upon ultrasound exam. After the uterus is empty, bleeding should diminish. Most cases of complete abortion occur very early in pregnancy, and nature completes the process without incident.

Incomplete Abortion

In incomplete abortion, part of the products of conception is not expelled. Usually it is the placenta or part of the placenta that is retained. Bleeding can be profuse because the uterus is unable to clamp down and maintain hemostasis if placental fragments remain. The woman must have a dilation and curettage (D&C) operation to complete the process and stop the bleeding. See Figure 3-1.

Missed Abortion

In a missed abortion, the products of conception are retained in utero after the fetus has died. Expulsion occurs days or weeks later. The introduction of ultrasound has revealed that almost all spontaneous abortions present this way, making this term obsolete. A blighted ovum is a condition in which the gestational sac and placenta develop with no embryo.

Septic Abortion

In septic abortion, infection invades the uterine cavity during the abortion process. Septic abortion may occur after conception with an intrauterine device (IUD) in place; with prolonged, undiagnosed rupture of membranes; or after attempts by unqualified individuals to end a pregnancy. The woman presents with pain, fever, and foul-smelling vaginal discharge.

Elective Abortion

Elective abortion occurs when the woman chooses to end her pregnancy for nonmedical reasons. This is often documented as voluntary interruption of pregnancy (VIP). The EMS provider may encounter women
FIGURE 3-1
Types of spontaneous abortion.
(a) Threatened. (b) Inevitable. (c) Incomplete.

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experiencing complications of this procedure. About 88% of VIPs in the United States are performed during the first trimester, and nearly all are performed before 15 weeks of gestation, most by surgical suction. The procedure has a low rate of complications. When abortion is performed by a qualified provider, the mortality and morbidity risk to the mother is significantly less than her risk would be if she carried the pregnancy to term. There are currently several legal methods of abortion in the United States, and in 2000, the FDA approved a pharmacological means.

Surgical abortion is accomplished by opening the cervix and extracting the products of conception—fetus, amniotic sac, placenta, and other structures—with suction or curettage. Less commonly, abortion is accomplished by inducing labor later in gestation, but before viability. Abortion performed very early in pregnancy confers a much lower risk of complications than at later stages of gestation.

By FDA guidelines, medical (nonsurgical) abortion can be induced by a clinician with mifepristone (RU 486, or Mifeprax) orally no later than 49 days after the LMP. Mifepristone blocks the action of progesterone, a hormone necessary to maintain pregnancy. One to 3 days later, a dose of misoprostol (Cytotec, a prostaglandin) is administered. Abortion usually occurs within 4 hours, but may take 24 hours or longer. Medical abortion is 97% effective, is considered very safe to the mother's health, and allows the loss to take place in the privacy of the woman's own home.

All around the world, individuals without medical training induce abortion. Complications frequently follow and may be life threatening. Some procedures involve the insertion of a foreign body through the cervix, often a urinary catheter, which may cause hemorrhage or sepsis along with the loss of the pregnancy. If a rigid object is used, the uterus, bowel, or bladder may be perforated or otherwise damaged. Tablets of potassium permanganate have been inserted vaginally to produce abortion, resulting in deep vaginal ulcerations that bleed copiously. Chemicals or soap solutions have been forced into the uterus, sometimes causing emboli, hemolysis, and death.

Women who attempt to terminate a pregnancy by themselves or with unlicensed personnel are at great risk for serious complications. With the surge of interest in botanical medicines, herbal preparations such as pennyroyal, oil of juniper, and black and blue cohosh are widely available and hold some appeal for women seeking a “natural” means of abortion. Herbal abortifacients can cause incomplete abortion or bleeding and cramping without loss of pregnancy. Misoprostol is widely used as a gastrointestinal drug, and some women dose themselves to abort pregnancy without medical supervision. In most cases this practice causes incomplete abortion or failed abortion.
Despite the wide availability of elective abortion by various means, some women ask their partners or other parties to kick or punch their abdomens in an attempt (usually unsuccessful) to end an unwanted pregnancy. The resulting injuries are indistinguishable at first glance from those of unsolicited domestic violence. Of course in many cases these crude attempts at inducing abortion are by no definition consensual.

Vaginal bleeding and cramping, often with passage of blood clots and small bits of tissue, are the anticipated effects of medical abortion. The patient's bleeding will resemble a heavy period for about 2 days, then will subside to a lighter flow or spotting until 3–10 days after the procedure. One in 100 women, however, will experience prolonged or heavy bleeding that may necessitate an emergency response, and infection may occur. The woman with complications will likely need a surgical abortion to complete the process.

Treat the hemorrhaging elective abortion patient similarly to the woman with a profusely bleeding spontaneous abortion (see earlier). The patient may be reluctant to discuss her abortion with family members present and when questioned may not disclose the true reason for bleeding. She also may withhold information if her abortion was performed by nonmedical personnel or if she thinks that her caregivers do not approve of abortion.

The topic of abortion inspires strong emotions and judgments in many caregivers. As always, EMS professionals must remain supportive and act in the patient’s best interests regardless of the choices she has made.

Therapeutic Abortion

Therapeutic abortion is the termination of pregnancy when carrying to term would endanger the woman's health or result in an infant with profound anomalies. Therapeutic abortion may also end a pregnancy in which the fetus is not viable, such as one with severe deformities or metabolic defects incompatible with life. In the case of a woman who conceives a large number of embryos, the parents and physician may decide to abort several of the embryos to improve viability for those that remain, a procedure called selective reduction. Some authorities consider rape or incest grounds for therapeutic abortion.

Certain maternal conditions can prompt some women to consider therapeutic abortion, from severe hypertension and cardiac disease to
endocrine disorders, HIV, and coagulopathies. Invasive cervical cancer is treated with surgery or radiation, both of which will kill a previable fetus; but delaying treatment until the fetus is viable may result in the death of the mother. Therapeutic abortion is performed in the same manner as elective abortion and carries the same risks.

Hydatidiform Mole

Hydatidiform mole, known as a molar pregnancy or gestational trophoblastic disease, occurs with 1 in every 1,000 conceptions in the United States. Some parts of Asia have a rate that is significantly greater. In a complete molar pregnancy, conception involves a defective egg that has no nucleus, which is fertilized by two sperm or by a sperm that duplicates its own chromosomes. Consequently, there is no maternal genetic input and no embryo, only a malformed placenta that proliferates as rapidly growing, grapelike fluid-filled vesicles. See Figure 3-2.

A partial molar pregnancy usually begins when two sperm fertilize a normal egg. An embryo begins to develop, but soon dies, and the abnormal placental tissue fills and distends the uterus as with a complete mole.

In both kinds of molar pregnancy, the uterus becomes larger than expected for gestational dates. The molar tissue produces the pregnancy hormone hCG at a rate much greater than the placenta of a normal pregnancy, often triggering severe nausea and vomiting in the woman. The woman begins to experience vaginal bleeding, which is often the color of prune juice, but may be bright red. Sometimes the woman will show

FIGURE 3-2

Hydatidiform Mole.
The hydatidiform mole distends the uterus with thousands of fluid-filled vesicles.
Illustration by Bonnie U. Gruenberg.
signs of preeclampsia before 24 weeks. (In viable pregnancies, preeclampsia typically develops after this time.) A history of severe nausea and vomiting is common. About 10% show signs of hyperthyroidism—hypertension, warm skin, tremors, and tachycardia.

Treat the woman with suspected hydatidiform mole like any other woman in early pregnancy with vaginal bleeding. Diagnosis is made by ultrasound, and the mole is removed by surgical evacuation. Women who have had a molar pregnancy run a slight risk of later developing choriocarcinoma, an aggressive cancer of the uterus.

Ectopic Pregnancy

In a normal pregnancy, conception occurs in the fallopian tubes. Propelled by cilia, the dividing cell mass reaches the uterus within about a week. There it implants in thick, hormonally primed, vascular uterine tissue, the endometrium, and taps into the mother’s bloodstream for life support.

Ectopic pregnancy occurs when the embryo embeds somewhere outside the uterus (ectopic meaning “out of place”). The most common site is the fallopian tube (95%), but occasionally the embryo will implant on the ovary (4%), on the cervix (1%), or even in the abdominal cavity (<1%). See Figure 3-3. None of these structures is suitable for supporting a growing embryo, and the fragile, vascular fallopian tube is especially vulnerable. An embryo implanted in the thin wall of the tube outgrows the available space at about 6–8 weeks’ gestation, often causing the tube to rupture and creating the hemodynamic equivalent of a shotgun blast to the abdomen. Tubal rupture can initially present as a small tear in the tube with minimal pain and bleeding that grows gradually worse, or as massive hemorrhage into the woman’s abdominal cavity. Immediate surgery is usually indicated for ectopic pregnancy.

FIGURE 3-3
Ectopic Pregnancy.
The most common site of implantation for an ectopic pregnancy is in the fallopian tube. A tubal pregnancy is not viable and will endanger the mother’s life and future fertility if the fallopian tube ruptures.
Illustration by Bonnie U. Gruenberg
although early unruptured ectopics are often managed with embryo-killing medications such as methotrexate.

The incidence of ectopic pregnancy in the United States has tripled since 1970 to 1 in every 44 live births. It is the leading cause of first-trimester maternal death.

Some women are more susceptible to ectopic pregnancy. Scarred tubes with damaged cilia are less effective in moving an embryo to the uterus. Chlamydia, the most common sexually transmitted infection in the United States, and gonorrhea, another common STI, can scar the fallopian tubes. Other risk factors are previous pelvic or tubal surgery, prior ectopic pregnancy, history of infertility, smoking, maternal age over 35, the presence of an intrauterine device (IUD) for contraception, altered hormone levels, and congenital anomalies of the fallopian tubes. Only about half of women with ectopic pregnancy have one or more of the risk factors.

Tubal ligation is also a risk factor for ectopic pregnancy. Sterilization is the most popular method of contraception in the United States and around the world. Almost 50% of American women choose tubal ligation by the age of 44. Tubal ligation involves destruction of the fallopian tubes in some fashion. Sometimes an opening remains in the scarred tube, wide enough to let sperm through to fertilize the egg, but not large enough let the zygote pass to the uterus. The embryo implants in the tube, and ectopic pregnancy results. EMS providers should also be aware that women may experience ectopic pregnancy 10 years or more after tubal ligation. The woman may insist that she cannot be pregnant. Women who have undergone tubal reanastomosis (reversal of tubal ligation to achieve pregnancy) are also at greater risk for ectopic pregnancies.

Ectopic pregnancy is so potentially life threatening that the EMS provider should suspect this condition in any woman whose symptoms and history even remotely fit the clinical picture. To further complicate matters, the clinical picture is variable, and diagnosis may be difficult. Emergency room physicians fail to correctly diagnose ectopic pregnancy more than 40% of the time on the patient's first visit, and missed ectopic pregnancy is one of the leading causes of emergency physician malpractice lawsuits.

The woman with an ectopic pregnancy may not know that she is pregnant and may not show signs or symptoms of pregnancy. Ectopic pregnancy usually becomes symptomatic by 6–8 weeks of gestation, but can cause symptoms as early as 5 weeks' gestation or (rarely) as late as 14–16 weeks.

The classic presentation is a woman of childbearing age with a history of amenorrhea (cessation of menses) presenting with diffuse abdominal pain that later localizes as severe, knife-like pain on one side of the lower abdomen. A ruptured ectopic pregnancy rapidly progresses to hypovolemic shock with rapid, weak pulse; confusion and restlessness; pale, clammy skin; collapsed neck veins; and low blood pressure, sometimes
even syncope. Her abdomen is tender to palpation and may be rigid or distended. Rebound tenderness, nausea and vomiting, and diarrhea are often present. Free blood in the abdomen often irritates the phrenic nerve (which runs under the diaphragm) causing referred pain to the right shoulder. Sometimes (but not always) she may have vaginal bleeding with or preceding the other symptoms, but the degree of shock usually exceeds that accounted for by visible blood loss.

Many women with ectopic pregnancy, however, do not fit the classic picture. Some present with only syncope. Some experience little more than nausea and vomiting. Many look and feel fine except for unilateral pelvic pain. Some display only profound shock. Vital signs may be normal if rupture has not yet occurred. In most cases, pain onset is abrupt and severe; but in some cases, the woman may have chronic discomfort with irregular spotting for days before becoming acutely symptomatic. A rare finding is Cullen’s sign, a blue tint beneath the umbilicus indicating free blood in the abdomen. There may be few available clues to support a clinical impression of ectopic pregnancy, but any woman of childbearing age with the symptoms described should be presumed to have an ectopic pregnancy until proven otherwise.

Other problems can present similarly. Differential diagnoses include spontaneous abortion, ruptured ovarian cyst, appendicitis, salpingitis (infection of the fallopian tube), torsion (twisting) of the ovary, roundligament pain, torsion or degeneration of a uterine fibroid, kidney stone, abscess, and urinary tract infection.

Field treatment for a suspected ectopic pregnancy must be swift and efficient. Rapid transport to a hospital with the capacity for immediate surgery is essential. Bilateral intravenous lines should be established and isotonic crystalloid solution such as lactated Ringer’s or normal saline run at a rate consistent with the patient’s level of shock. Hospital laboratory studies may be expedited if the EMS crew draws blood while establishing intravenous access. The EMS provider should administer oxygen, initiate cardiac monitoring, and treat for shock.

Antepartal Bleeding—Second Half of Pregnancy

Placental Abruption

Also known as abruptio placentae, this condition occurs when the placenta prematurely separates partially or entirely from the uterine wall after 20 weeks of gestation. Abruption complicates 1 in 75–90 births and can be catastrophic. The ensuing hemorrhage carries a 20–35% mortality rate for the fetus (up to 100% if the placenta separates completely).
and can cause significant harm to the mother. Abruption may or may not present with vaginal bleeding—the blood may remain trapped behind the placenta and never leave the body.

Hypertension strongly predisposes pregnant women to placental abruption. Other risk factors include multiparity, age over 35, smoking, poor nutrition, cocaine use, and chorioamnionitis. Abruption is associated with overdistention of the uterus, as in the case of multiple pregnancy or polyhydramnios (increased amniotic fluid volume). Blunt external trauma, especially from motor vehicle accidents and maternal battering, is also an important cause of abruption. (See Trauma in Pregnancy, chapter 4.)

Presentation varies with degree and location:

- **Marginal abruption.** The edge of the placenta separates, causing bleeding that flows between the fetal membranes and the uterine wall and exits through the vagina. This presentation is called a revealed hemorrhage. The placenta may or may not continue to separate.

- **Central abruption.** The center of the placenta separates, but the margins remain intact. Free blood accumulates between the placenta and uterine wall, but none escapes to exit the vagina. This presentation is known as a concealed hemorrhage. Signs and symptoms usually include sharp, tearing pain; rigid, board-like abdomen; and change in uterine size and shape. See Figure 3-4.

- **Combined abruption.** This condition has features of both marginal and central abruptions; some of the blood escapes, and some remains hidden behind the placenta.

![Figure 3-4: Placental Abruption.](image)

A marginal placental abruption may result in vaginal bleeding. A central abruption may conceal blood loss within the uterus. Illustration by Bonnie U. Gruenberg.
- **Complete abruption.** Complete separation of the placenta causes profuse vaginal bleeding and shock while depriving the fetus of oxygen. Immediate surgery is necessary to save the life of the fetus.

  Signs and symptoms can vary from subtle to dramatic. Vaginal bleeding may be profuse, scanty, or nonexistent and may be dark or bright red. Abruption may be excruciating, uncomfortable, or painless. The patient may have contractions. With a concealed hemorrhage it is common for the uterus to remain very tender, rigid, and board-like between contractions; but if the placenta is on the posterior wall of the uterus, these signs may not be present. Sometimes with a concealed hemorrhage, the uterus may enlarge and change shape. Shock may be disproportionate to visible blood loss.

  Fetal movements often become less frequent or stop up to 12 hours before any obvious signs of abruption, but in a large, sudden abruption the woman may report violent fetal movement followed by stillness. Fetal heart tones may be faster than usual (above 160), bradycardic (under 120), generally within normal ranges with periodic decelerations, or absent. In a large abruption, only immediate surgery can save the baby from severe neurological damage or death. Chief risks to the mother are shock and disseminated intravascular coagulation (DIC).

  EMS field treatment for placental abruption consists of treatment for hypovolemic shock and rapid transport to a hospital with the capacity for immediate cesarean section. If the fetus is preterm, transport to a hospital with a neonatal intensive care unit if possible. Vital signs, fetal heart tones, and assessments of uterine tone, contractions, and vaginal bleeding should be performed frequently. Some providers mark the fundal height on the maternal abdomen with a pen in order to monitor changes caused by trapped blood.

  Bilateral large-bore intravenous lines should be established and blood drawn in accordance with local protocols to expedite hospital laboratory studies. The patient will need type and cross matching for blood products at the hospital and may require transfusion. Infuse normal saline or lactated Ringer’s at a rate consistent with her condition. If shock is developing, aggressive fluid therapy is indicated. High-flow oxygen and left lateral positioning may improve the delivery of oxygen to the fetus.

**Disseminated Intravascular Coagulation (DIC)**

DIC is a life-threatening derangement of the clotting cascade triggered by underlying disease or trauma. Obstetrical causes include abruptio placentae, eclampsia, intrauterine fetal demise, amniotic fluid embolism, septic shock, and trauma. Serious infections are the most common cause
of DIC. During DIC, the body forms and dissolves fibrin clots throughout the circulation, causing simultaneous uncontrolled bleeding and clotting. DIC begins when an event triggers the formation of innumerable microscopic clots throughout the body, which use up the clotting factors. The body responds by attempting to dissolve the unneeded clots. The by-products created by this widespread clot forming and clot dissolving interfere with the ability of the blood to coagulate, and the patient begins to hemorrhage.

The woman with DIC will present with bleeding from body orifices and breaks in the skin including venipuncture sites, nose, mouth, GI tract, and vagina. Bruising, purpura, and petechiae are commonly noted on the skin. DIC may lead to stroke, myocardial infarction, end-organ dysfunction, shock, and death. Definitive treatment in a hospital setting includes removing the cause, if possible, and transfusion of blood products. In some circumstances, DIC is treated with heparin to interrupt the clotting cascade.

Field treatment includes rapid transport with an advanced life support (ALS) crew to a hospital with the capacity to deal with a critically ill obstetrical patient. If the fetus is preterm, a hospital with a capable neonatal intensive care unit will give the baby a better chance of survival. EMS personnel should establish bilateral large-bore intravenous lines, draw blood for rapid laboratory tests upon arrival, administer high-flow oxygen, begin cardiac monitoring, and implement left lateral flat positioning. The crew member with the greatest skill in venipuncture should establish venous access to minimize skin punctures that may bleed profusely as DIC progresses, and isotonic crystalloid intravenous solution should be infused at a brisk rate as permitted by local protocols. Vital signs should be reassessed frequently along with fetal heart tones, uterine tone (Is it soft or rigid? Are contractions regular?), and vaginal bleeding.

**Placenta Previa**

Placenta previa is a condition in which the embryo implants in the lower uterine segment instead of the uterine fundus. At or near term, the placenta partially or completely covers the cervical os (cervical opening). When the cervix begins to thin and dilate in preparation for labor, placental villi are torn from the uterine wall, and bleeding results. There are three variations of this condition:

- **Marginal placenta previa.** The placenta encroaches on the edge of the cervical os. Marginal previa may resolve as the pregnancy progresses. See Figure 3-5.
- **Partial placenta previa.** The placenta partially covers the cervical os.
- **Total placenta previa.** The placenta occludes the cervical os. See Figure 3-6.
FIGURE 3-5
Marginal Placenta Previa.
A marginal placenta previa occurs when the edge of a low-lying placenta encroaches on the cervical os. Illustration by Bonnie U. Gruenberg

FIGURE 3-6
Complete Placenta Previa.
A complete placenta previa is implanted directly over the cervical os. Illustration by Bonnie U. Gruenberg
Placenta previa most commonly presents with painless bleeding that may be scanty or profuse. Sometimes it accompanies or is preceded by contractions. Typically, the first bleeding episode is slight, and each subsequent hemorrhage is more copious.

Even in the hospital, vaginal exams are not performed on women who present with third-trimester vaginal bleeding unless the placental location has been confirmed on ultrasound; if an examiner were to put a finger through the placenta, uncontrolled hemorrhage would result. The woman with placenta previa will probably undergo a cesarean delivery if she is near term. If the fetus is still immature and her bleeding is slight, her provider may admit her and observe for further bleeding while the fetus continues development. Occasionally the woman is discharged home and instructed to call if further bleeding occurs.

Field treatment for any vaginal bleeding in the second half of pregnancy calls for history and assessment (including serial vital signs and fetal heart tones), rapid transport, at least one large-bore intravenous line with isotonic crystalloid intravenous solution hanging (flow rate dependent on her condition and vital signs), transport in left lateral position, oxygen as indicated, and frequent reassessment.

Positive diagnosis of the source of vaginal bleeding can be made only by an obstetrical provider, usually in a hospital setting. In prehospital care, it is not necessary to distinguish between placental abruption and placenta previa. Field treatment is the same for either condition.

Pelvic and Abdominal Pain

The presence of pelvic pain does not necessarily herald loss of the pregnancy. Most pregnant women feel discomfort at various points in the pregnancy, and usually these aches and pains are inconsequential. In most cases, field care will consist of taking a good history, positioning for comfort, giving nothing by mouth, and perhaps establishing IV access and drawing blood. If a patient is hypovolemic, consider a fluid bolus. As always, follow local protocols.

A few of the most common etiologies follow.

Ligament Pain

Round ligaments are like stretchy guy wires that hold the uterus in position. They run from the lateral aspect of the uterus to the pubic bone bilaterally. During the second trimester, the uterus outgrows the pelvis
and falls forward, putting stress on these ligaments and causing crampy spasms on one side or the other of the pubic bone, along either or both sides of the uterus, and up to the level of the umbilicus. The right side is more commonly affected because the uterus rotates to the right as it grows. As the uterus continues to expand and have toning contractions, the ligaments continue to stretch. Round-ligament pain is one of the most common discomforts in pregnancy. The pain is sharp and can be severe, but it does not indicate any pathological process. It is often triggered by coughing or sudden movement. A woman can avoid triggering spasms by splinting the area with her hand when she moves suddenly. Sometimes she will find relief if she curls toward the pain and flexes her thigh on the painful side. Warm baths, application of heat, and wearing a maternity belt can improve symptoms.

Appendicitis

During pregnancy, the growing uterus displaces the appendix, and at term the appendix is located above the right iliac crest in most women. Appendicitis presents initially as epigastric or periumbilical pain in pregnant and nonpregnant women, but can later localize to either the right upper or lower quadrant. The patient with appendicitis may also complain of fever, chills, nausea and vomiting, rebound tenderness (test for increased pain with cough), and rigid abdomen.

Urinary Tract Infection

Pregnancy predisposes women to urinary tract infections, which can range from inconvenient to life threatening. Pregnancy hormones relax smooth muscle in the ureters, which can kink and allow urine to pool and support bacterial growth. Sometimes urinary tract infection mimics or triggers preterm labor.

Cystitis, or bladder infection, presents with frequent urination, lower pelvic cramping (especially while voiding), a burning sensation with urination, and sometimes a low-grade fever. Urine may be cloudy, bloody, or bad smelling.

Pyelonephritis, or kidney infection, is often preceded by a bladder infection and occurs in about 2% of pregnancies. Symptoms include sudden onset of high fever, shaking chills, hematuria, nausea, vomiting, urinary pain and urgency, flank or low back pain, costovertebral angle (CVA) tenderness, and malaise. During pregnancy the right side is most likely to be affected because the intestines push the uterus to the right and compress the right ureters and kidney.
Check for costovertebral angle (CVA) tenderness by firmly tapping down the back from scapula to pelvis with a closed fist. If the patient winces upon percussion of where her lower ribs meet the spine, she has CVA tenderness.

Sometimes the woman with pyelonephritis will experience swelling of the kidney and ureter that can reduce urine output and cause severe pain and even small bowel ileus. Pyelonephritis can also lead to preterm labor and life-threatening maternal sepsis. It is treated by intravenous antibiotics and bed rest in the hospital.

**Hydronephrosis and Renal Calculi**

Most cases of renal colic present in the second or third trimester of pregnancy. Hydronephrosis is fluid buildup in the kidneys when urine flow is obstructed in the urinary tract. Hydroureter is distention of the ureter with urine. During pregnancy, these conditions most commonly result from smooth muscle relaxation of the ureter due to progesterone and HCG, coupled with compression of the ureter at the pelvic brim by the heavy uterus, obstructing urine flow. Physiologic hydronephrosis and hydroureter of pregnancy is seen in 90% of pregnancies and is usually asymptomatic.

The woman with symptomatic hydronephrosis often presents similarly to the patient with pyelonephritis or renal calculi, exhibiting severe flank pain that may be acute or chronic, but usually without fever. If hydronephrosis threatens kidney function, the patient may require percutaneous or stent drainage. Rarely, hydronephrosis can exacerbate hypertension or cause renal failure.

Hydronephrosis can persist for months, sometimes causing intractable pain for the pregnant woman. Many patients are managed on narcotic medications and taught techniques to reduce pressure on the kidneys and ureters, such as urinating while positioned on hands and knees in a bathtub. Pain from hydronephrosis may increase if the condition worsens or if she develops a urinary tract infection.

Renal calculi can form in pregnant women and present as in non-pregnant patients, with a typical flank-loin-abdomen distribution and often with severe pain. Uncommonly, kidney stones can lead to premature labor or preeclampsia. Urinary obstruction with concurrent
infection is unusual, but carries a high risk of spontaneous abortion and premature labor.

Whereas calculi can affect either side, physiologic hydronephrosis is usually more pronounced on the right. Pain from appendicitis, cholecystitis, perforated intestine, preterm labor, and other conditions may present similarly in the pregnant women, so consider differential diagnoses carefully.

**Chorioamnionitis and Pelvic Inflammatory Disease**

When disease-causing microorganisms ascend from the vagina into the upper reproductive tract, they can cause infection in the mother, fetus, placenta, or membranes. **Chorioamnionitis**, or infection of the fetal membranes, is most likely to develop if the mother has had prolonged rupture of the amniotic sac. Ruptured membranes can present as a leak so subtle that the woman may not be aware of it or as an unmistakable gush. When the membranes are no longer intact, vaginal microorganisms may ascend and cause infection. Women who have undergone **cerclage** (a suture that secures the cervix in an attempt to prevent preterm delivery) are at higher risk for chorioamnionitis.

The woman with chorioamnionitis will present with abdominal pain, uterine tenderness, fever, foul-smelling vaginal discharge, and a generalized feeling of illness. The fetus usually shows signs of distress—often tachycardia—before the mother becomes symptomatic. Chorioamnionitis is always an emergency and is potentially life threatening to both mother and fetus. Chorioamnionitis may also contribute to cerebral palsy in the infant.

Pelvic inflammatory disease, or PID (infection of the upper genital tract), may also occur in pregnancy and is most commonly caused by chlamydia or gonorrhea. PID can be life threatening to the fetus.

**Cholecystitis/Cholelithiasis**

Gallstone formation is accelerated in pregnancy, and as many as 6% of pregnant women develop cholelithiasis (gallstones). Progesterone slows the emptying of the gallbladder, increases the proportion of cholesterol present in the bile, and the bile salt pool decreases. Symptoms are the same in pregnant and nonpregnant women, and include:

- Nausea
- Vomiting
- Right upper quadrant tenderness
• Lancing or cramping epigastric pain that radiates to the right upper quadrant, around the back, or to the right scapula
• Sudden onset of colicky pain or a deep ache, building to peak intensity in 15–60 minutes, then receding over several hours.

Symptoms are aggravated by eating a greasy meal, and pale or gray stools may occur if the bile duct is completely obstructed. Laparoscopic cholecystectomy (removal of the gallbladder) is sometimes performed in the first or second trimester but is usually avoided during the third trimester.

Other Pain

Pregnant women have intestinal gas or diarrhea cramps just like the rest of the population. A woman may have benign fibroid tumors within her uterus, which can cause bleeding and pain, especially if they become twisted. Any woman who has had uterine or abdominal surgery may have adhesions—scar tissue—that bind and anchor her organs painfully as they try to expand and shift position. Abdominal pain in a pregnant woman can indicate placental abruption, uterine rupture, preeclampsia, or trauma. Pancreatitis, peptic ulcer disease, gastric reflux, ruptured or twisted ovarian cysts, and degenerating fibroid tumors (leiomyomas) of the uterus can also cause abdominal pain.

Low Back Pain

Low back pain affects 50–90% of women during pregnancy, especially with prior history of back problems, lack of exercise, increasing parity and age, poor posture, or improper lifting. When the pregnant abdomen moves out of the pelvis, abdominal muscles become stretched and lose tone, and become less effective at maintaining neutral posture and stabilizing the pelvis. Elevated levels of the hormone relaxin, which loosens joints, increases mobility of the lumbar spine. The pregnant woman develops progressive lordosis, and her center of gravity shifts backward and down, increasing the workload of the muscles of the back.

The hormones of pregnancy transform the previously rigid pelvic joints into a series of hinges with the ability to stretch open during childbirth. These changes in the pelvis can cause back pain. The symphysis pubis widens throughout pregnancy, placing stress on the sacroiliac joints. Increased mobility of the sacroiliac joints can cause discomfort when the associated ligaments are stretched.

When evaluating the pregnant patient with back pain, always consider the possibility of hydronephrosis, pyelonephritis, pancreatitis,
pelvic deep vein thrombosis, or renal calculi. Preterm labor can present as back pressure or pain. Fever, sensory loss, motor weakness or paralysis, or incontinence may indicate a neurologic emergency.

**Syncope**

Syncope is not unusual in the pregnant patient, and it is a common reason for an emergency response. It is frequently caused by hypoglycemia, prolonged standing, orthostatic hypotension, vena caval compression from supine positioning, overheating, or a vagal response. Early in pregnancy consider ectopic pregnancy as an etiology. Syncope infrequently can be attributed to pathological conditions such as stroke or arrhythmia, long QT syndrome, hypertrophic cardiomyopathy, or Wolf Parkinson White syndrome. The syncopal patient may show brief tonic-clonic activity with bradycardia and hypotension, but quickly recovers. (A true seizure would be followed by a postictal state and would not show these cardiovascular changes.)

**Hyperemesis Gravidarum**

*Hyperemesis gravidarum* is severe, persistent nausea and vomiting with weight loss, dehydration, hypokalemia, or ketonuria. Unlike morning sickness, which is generally confined to the first trimester and does not often interfere with nutrition, hyperemesis can occur at any point in the pregnancy and can result in ketosis and dehydration.

Hyperemesis appears multifactorial. It can be related to vitamin B deficiency, endocrine imbalances such as hyperthyroidism, allergies, psychological disturbances, and conditions that increase the levels of human chorionic gonadotropin (hCG), for example, multiple gestation and hydatidiform mole. Severe cases can lead to hypokalemia that can disrupt kidney function and heart rhythm, hypovolemia and syncope from dehydration, acidosis or alkalosis, muscle wasting, and severe protein and vitamin deficiencies. Wernicke’s encephalopathy can uncommonly occur from severe thiamine deficiency, presenting with altered consciousness, double vision, constant eye movement, and poor muscle coordination. Hyperemesis gravidarum can cause irreversible metabolic changes or even death, but both are extremely uncommon.

Symptoms usually develop between 4 and 9 weeks’ gestation, and include

- Intractable vomiting.
- Poor appetite.
- Poor nutritional and fluid intake.
- Weight loss greater than 5% of prepregnant weight.
- Dehydration (dry mucous membranes, orthostatic hypotension, concentrated urine, possible syncope especially in hot weather, poor skin turgor).
- Ketonuria.
- Advanced cases may show jaundice, bleeding gums, peripheral neuropathy, arrhythmia, changes in level of consciousness.

Morning sickness is common in pregnancy and can make a woman feel unable to hold anything down, but it does not result in the dehydration, ketosis, and weight loss experienced in hyperemesis gravidarum. Differential diagnoses are infectious disease such as hepatitis, drug reaction, intestinal obstruction, peptic ulcer, food poisoning, diabetes, and gastroenteritis. Treatment involves intravenous rehydration and electrolyte, glucose, and vitamin administration with no oral intake for 48 hours. This regimen can be accomplished at the hospital or through home nursing services. Antiemetics are used to suppress nausea. After vomiting ceases, food is gradually reintroduced. Refractory cases may require nasogastric feedings or total parenteral nutrition.

Emergency medical personnel should focus on the ABCs when caring for the patient with hyperemesis gravidarum. Carefully assess the severity of her condition and consider other possible causes. Check glucose levels. If she is dehydrated, infuse lactated Ringer's or normal saline at a rate consistent with her condition. If she is severely affected, monitor for arrhythmias and be prepared for the possibility of coma. If she shows signs of Wernicke's encephalopathy, your medical control may advise intramuscular thiamine administration. If the patient is hypovolemic, position for shock—on her left side if pregnancy is advanced. Try to avoid exposing her to strong smells or excessive motion that may trigger vomiting, and maintain a clear airway if she does vomit.

Hypertensive Disorders

Pregnancy-Induced Hypertension (Preeclampsia)

Pregnancy-induced hypertension (PIH) is a widely studied and poorly understood condition that remains responsible for 15% of maternal deaths in the United States, second only to embolism. It involves systemic vasoconstriction that can lead to poor perfusion and eventually tissue ischemia, affecting placental blood flow and the maternal cardiovascular, renal, neurologic, hepatic, and hematologic systems. Often used synonymously with the term preeclampsia (and once called toxemia),
PIH complicates 6–8% of pregnancies and may be superimposed on underlying chronic hypertension. It is more common in African Americans, women with multiple gestation, teenagers of lower socioeconomic class, diabetics, and women over 35. Other maternal risk factors are nulliparity (or first baby with a new partner), family history of PIH, underlying chronic hypertension, chronic renal disease, and antiphospholipid syndrome (an autoimmune clotting disorder). The fetus of a woman with PIH may suffer growth restriction and hypoxia or experience the challenges of premature birth.

Dietary, immunological, genetic, and hemodynamic factors have been implicated in PIH, but researchers do not fully understand the disease or its etiology. Central to the condition is vasospasm, which leads to increased resistance to blood flow with resultant hypertension that can lead eventually to multisystem organ damage. Hypertension can lead directly to cardiac failure, brain hemorrhage, or pulmonary edema. Kidneys damaged by restricted blood flow are poor filters that allow proteins to escape the bloodstream while allowing toxins to remain; in some cases kidneys may fail altogether. A poorly perfused liver may produce fewer blood proteins, the lack of which allows fluid to escape from blood vessels and cause edema. Liver damage also elevates hormone and toxin levels (the liver metabolizes both) and interferes with clotting and other vital processes. Abnormal liver-function tests with elevation of liver enzymes are often seen with PIH, and occasionally the liver will become necrotic or rupture. Central nervous system involvement can cause convulsions, coma, altered mental status, and cortical blindness. The woman with PIH may experience significant third-spacing as fluid moves from her intravascular space to the interstitial space, causing edema and intravascular depletion. The woman may also experience placental abruption or DIC.

Preeclampsia is a condition classically distinguished by a triad of hypertension, proteinuria, and generalized edema developing in the second half of pregnancy; but symptoms can vary widely between individuals. Preeclampsia is a progressive disorder, and in its mild or early form symptoms can develop subtly and appear benign.

Hypertension in pregnancy is defined as a sustained elevation of blood pressure to 140/90 or above. Research once suggested that an increase of 30 mmHg systolic and 15 mmHg diastolic over baseline was diagnostic of PIH, but this concept is outdated. Generally, blood pressure elevation that begins after 20 weeks is considered preeclampsia. Hypertension before 20 weeks is usually a manifestation of preexisting chronic hypertension. The exception is the patient with hydatidiform mole—whereby the patient exhibits signs of preeclampsia during either the first or early in the second trimester.

Generalized edema may be present, but because edema is commonplace in pregnancy and one-third of women with preeclampsia
never demonstrate edema, the presence of edema is no longer seen as important to diagnosis. Proteinuria, measured routinely with a dipstick at office visits or more precisely though 24-hour urine collection, is not evaluated in the prehospital setting, but a reading of +2 or greater on dipstick or greater than 300 mg of protein in a 24-hour urine is significant.

While the woman with mild preeclampsia may be managed at home on bed rest, severe preeclampsia is an emergency situation. Severe preeclampsia may develop suddenly and presents with

- Hypertension with a systolic pressure of 160 mmHg or greater and a diastolic pressure of 110 mmHg or greater.
- Proteinuria. Abnormal amounts of protein in the urine.
- Oliguria. Urine is dark, concentrated, and scanty.
- Visual disturbances: Blurred or double vision, flashing lights, or spots before the eyes. Visual disturbances can indicate impending seizure. Loss of vision may precede cerebral hemorrhage.
- Hyperreflexia: Exaggerated patellar reflexes.
- Epigastric pain: Liver ischemia, swelling, or rupture can cause epigastric pain or tenderness in the right upper quadrant.
- Nausea and vomiting.
- Pulmonary edema.
- Poor blood clotting.
- Fetal distress or poor growth; decreased amniotic fluid.
- Headache: Can be bitemporal, frontal, occipital, or diffuse; but it is progressive and does not respond to over-the-counter remedies.
- Seizures (eclampsia).
- Anxiety, malaise, or restlessness.
- Cerebral hemorrhage.

The only cure for preeclampsia is delivery of the fetus. Some authorities advocate immediate induction if preeclampsia is severe, regardless of gestational age. Others support allowing pregnancy to continue in the hospital until the fetus demonstrates lung maturity, maternal or fetal distress develops, or a gestational age of 34 weeks is achieved.

Eclampsia

When preeclampsia progresses to seizures or coma, the condition is termed eclampsia. The usual presentation is tonic-clonic seizures lasting less than a minute following signs of severe preeclampsia. Partial seizures
or complex partial seizures also can occur, and some patients will move directly into coma without observed seizure. Coma can also result from a brain hemorrhage or brain swelling without hemorrhage.

Convulsions can occur antepartum, during labor, or postpartum. Most patients who develop eclampsia show marked edema, significantly increased blood pressure, and increased proteinuria prior to seizing; but up to 30% do not. Therefore, rather than trying to determine which patients are at the highest risk, the EMS professional should remain alert when transporting any preeclamptic woman.

**EMS Treatment and Transport of the Woman with PIH**

Preeclampsia and eclampsia are life threatening to both mother and fetus. It is important to take a comprehensive history, including assessment for the signs of severe preeclampsia mentioned earlier using the OLDCART checklist (see chapter 2), and to carefully document the information gleaned to serve as a baseline for hospital personnel.

Blood pressure can vary greatly with position. Pressure will usually diminish if she rests on her left side, and lower pressure increases perfusion of her organs and placenta. See Figure 3-7. Therefore, it is preferable to take a baseline blood pressure while she is seated, then to transport her on her left side with subsequent vital signs taken in that position, taking care to use the proper-sized cuff. See Figure 3-8. Document position with each blood pressure. Record the fetal heart tones, if taken. If she is complaining of dyspnea or coughing, assess for pulmonary edema and transport in Fowler’s position. Assess and document patellar reflexes.

![FIGURE 3-7](image)

**Left Lateral Position.**

Placental perfusion is maximized when the pregnant woman is in a left lateral position.

Photographed by Bonnie U. Gruenberg
Make an effort to reduce environmental stimulation in order to decrease the potential for seizures. The PIH patient should be transported without flashing lights or sirens. Dim the interior lights and speak quietly. Separate the patient from family members if they are agitating her.

Establish an intravenous line of normal saline and run it at a KVO (keep vein open) rate, and draw blood if required by protocol. Local medical control may order an antihypertensive medication to reduce her blood pressure. Magnesium sulfate is sometimes used in prehospital care of preeclampsia to raise the seizure threshold, and it is the anticonvulsant of choice in the hospital.

If the woman begins to seize, protect her from injury (as in any other seizure) and do not attempt to restrain her. Keep her airway clear. Some protocols allow the paramedic to administer a bolus of magnesium sulfate (2–5 g diluted in 50–100 ml normal saline given slow IV push) for eclampsia. Some protocols allow for diazepam (Valium) to stop the seizure, but apnea or cardiac arrest may result.
from rapid administration. Suctioning may be necessary to maintain the airway. Give oxygen to ensure adequate oxygenation, and support respirations in the unlikely event that spontaneous breathing does not resume when the seizure breaks. Monitor cardiac rhythm and vital signs.

The seizure will be followed by a postictal period, and she may become agitated as she regains consciousness. The provider should monitor the woman and fetus for signs of abruption following the seizure, including auscultating the fetal heart, checking for vaginal bleeding, and palpating the uterus for rigidity. Listen to the mother's lungs frequently, because aspiration and pulmonary edema commonly occur with eclampsia.

The woman with preeclampsia can decompensate rapidly, moving from mild, ambiguous symptoms to full-blown eclampsia, organ damage, and fetal death in a very short time. Keep potential complications in mind while treating her, and monitor for the earliest indication of decompensation, such as signs of abruption or central nervous system dysfunction. Monitor her level of consciousness—remembering that magnesium sulfate can make a woman groggy, cause slurred speech and affect muscle tone.

If you must assist delivery of a preeclamptic patient, remain vigilant for changes in her condition and take steps to keep her stimulation level and blood pressure as low as possible. Position her on her side for delivery, and do not coach forceful pushing or prolonged breath holding with each contraction. If a woman responds to natural urges, a woman will usually push frequently for very short intervals, as in defecation. This moves the baby down at a reasonable rate and results in better placental oxygenation and improved maternal blood pressure (see Pushing Techniques, chapter 6). Administer low-flow oxygen to maximize fetal oxygenation.

When attending the delivery of a patient with preeclampsia, the EMS provider remains vigilant for changes in her condition and keeps her stimulation level low. Position her on her left side for delivery, and discourage her from prolonged breath holding and forceful pushing. Instead, coach her to push in short grunts, as in defecation.

Because a woman with preeclampsia third-spaces fluids from her blood vessels to her interstitial spaces, she may not have the intravascular reserve to tolerate blood loss after delivery. Remember that a woman with PIH is at high risk for eclamptic seizures for 48 hours after delivery and occasionally may seize within 2 weeks postpartum.
HELLP Syndrome

The medical community has yet to agree on whether HELLP syndrome is a separate category of preeclampsia or a variant of severe preeclampsia. HELLP syndrome is a multiple-organ-failure syndrome that is life threatening to mother and fetus. Unlike preeclampsia, it is diagnosed only through laboratory studies. The acronym describes the physiologic

<table>
<thead>
<tr>
<th>Table 3-1</th>
<th>Danger Signs in Pregnancy and Possible Causes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sudden gush of fluid</td>
<td>Premature rupture of membranes, urinary incontinence, vaginal infection.</td>
</tr>
<tr>
<td>Vaginal bleeding</td>
<td>Placenta previa, placental abruption, bloody show, polyps, lesions of cervix or vagina. Sometimes a woman will spot after a recent vaginal exam or intercourse.</td>
</tr>
<tr>
<td>Abdominal pain</td>
<td>Preterm labor, placental abruption, appendicitis, round ligament pain, gallbladder, urinary tract infection, renal calculi, hydrourephrosis, pancreatitis.</td>
</tr>
<tr>
<td>Dizziness</td>
<td>Many causes, some of them benign. May relate to hypertension, medications, low blood sugar, or orthostatic hypotension.</td>
</tr>
<tr>
<td>Visual disturbances</td>
<td>Preeclampsia.</td>
</tr>
<tr>
<td>Severe vomiting</td>
<td>Hyperemesis gravidarum, gastroenteritis, or other gastrointestinal disorder. May occur with appendicitis, head injury, or other condition. Patient requires hospital evaluation if intake and output are poor.</td>
</tr>
<tr>
<td>Edema of hands, feet, or face</td>
<td>Preeclampsia. Pedal edema is often normal in pregnancy.</td>
</tr>
<tr>
<td>Severe headache</td>
<td>May be related to preeclampsia or may result from tension headache, migraine, or head injury.</td>
</tr>
<tr>
<td>Severe leg pain</td>
<td>Thrombophlebitis; or may be leg cramps.</td>
</tr>
<tr>
<td>Seizure</td>
<td>Preeclampsia; or may result from preexisting seizure disorder or head injury.</td>
</tr>
<tr>
<td>Epigastric pain</td>
<td>Preeclampsia, gallbladder inflammation, heartburn.</td>
</tr>
<tr>
<td>Reduced urine output</td>
<td>Preeclampsia, poor fluid intake, renal dysfunction.</td>
</tr>
<tr>
<td>Painful urination</td>
<td>Urinary tract infection, vaginal or vulvar infection.</td>
</tr>
<tr>
<td>Absence of or decrease in fetal movement</td>
<td>Fetal compromise or death, maternal distraction, medication, maternal obesity.</td>
</tr>
<tr>
<td>Preterm contractions</td>
<td>Premature labor; may also be triggered by urinary tract infection or dehydration, uterine irritability.</td>
</tr>
<tr>
<td>Elevated temperature, chills</td>
<td>Infection.</td>
</tr>
</tbody>
</table>
abnormalities that define the syndrome: Hemolysis, Elevated Liver enzymes, and Low Platelets.

The patient may present with the same symptoms as the preeclamptic—epigastric pain, chest pain or right upper quadrant pain, headache, nausea and vomiting, and malaise—but sometimes with very few physical manifestations. Sometimes HELLP syndrome will develop before signs of preeclampsia appear. The patient with HELLP syndrome is often transferred by ambulance from a community hospital to a tertiary-care facility, and in that case the EMS professional will know the diagnosis and laboratory findings. Otherwise, in the field, HELLP is indistinguishable from any other case of preeclampsia and sometimes not recognizable at all. Definitive treatment of antepartum HELLP involves delivery of the fetus, even if remote from term. Rarely, HELLP may develop postpartum.

Triaging the Pregnant Woman

Pregnancy alters the functioning of the healthy woman’s body and can worsen certain preexisting conditions. Some potentially life-threatening conditions occur only during pregnancy. Table 3-1 lists potential danger signs and symptoms and their possible etiologies.

Summary

While a majority of pregnancies proceed without complication, a significant percentage develop problems that could become life threatening. Many complaints are difficult to diagnose even in a hospital. Conditions such as urinary tract infections, deep vein thrombosis, and cholecystitis occur in the nonpregnant population, but pregnancy can increase both the incidence and severity of these problems. Disorders such as hyperemesis gravidarum and preeclampsia develop only in pregnant women. Because of the intimate connection between mother and fetus, most conditions that prove catastrophic to one party necessarily affect the life and well-being of the other.

Complications of pregnancy can present a formidable challenge in the field. The mastery of basic principles remains paramount. For the present discussion, the most important of these are

- Any female of apparent reproductive age may be pregnant.
- Any pregnancy may have undiagnosed complications or may become complicated without warning.
REVIEW QUESTIONS

1. Describe the signs and symptoms of placental abruption and how it can be differentiated from placenta previa.

2. Describe the field management of a patient with first trimester bleeding.

3. Describe potential complications of preeclampsia.

4. What are some nonobstetric causes of abdominal or pelvic pain that may be experienced by the pregnant patient?

5. List some conditions that present with similar signs and symptoms to ectopic pregnancy.