



Childbearing at Risk



chapter 19

Nursing Management of Pregnancy at Risk: Pregnancy-Related Complications

Key TERMS

abortion
abruptio placenta
clonus
ectopic pregnancy
eclampsia
gestational trophoblastic disease
gestational hypertension
high-risk pregnancy
hydramnios
hyperemesis gravidarum
oligohydramnios
multiple gestation
placenta previa
preeclampsia
preterm labor
premature rupture of membranes (or PROM)
tocolytic

Learning OBJECTIVES

After studying the chapter content, the student should be able to accomplish the following:

1. Define the key terms.
2. Identify common factors that might place a pregnancy at high risk.
3. Outline nursing management for the pregnant woman experiencing vaginal bleeding.
4. Describe the psychosocial impact of gestational diabetes and needed educational components for the woman and her family.
5. Summarize the management of preeclampsia, eclampsia, and HELLP syndrome.
6. Identify factors in a woman's prenatal history that place her at risk for preterm labor and/or premature rupture of membranes (PROM).
7. Explain the pathophysiology of hydramnios and subsequent management.
8. Formulate a teaching plan for maintenance of health for pregnant women experiencing a high-risk pregnancy.



WOW

*Detours and bumps along the road of life can be managed,
but many cannot be entirely cured.*

Most individuals view pregnancy as a natural process with a positive outcome—that of the birth of a healthy newborn. Unfortunately, conditions can occur that possibly result in negative outcomes for the fetus, mother, or both. A **high-risk pregnancy** is one in which a condition exists that jeopardizes the health of the mother, her fetus, or both. The condition may be the sole result of the pregnancy or it may be a condition that existed before the woman became pregnant.

Approximately one in four pregnant women is diagnosed with complications or is considered high risk (Youngkin & Davis, 2004). Women who are considered high risk have a higher incidence of morbidity and mortality compared with mothers in the general population. In addition, the risk status of a woman and her fetus can change during the months of her pregnancy, with a number of problems occurring during labor, birth, or afterward, even in women without any known previous antepartal risk. Examples of high-risk conditions include gestational diabetes and ectopic pregnancy. These conditions are specifically addressed in Healthy People 2010 (see Healthy People 2010: National Health Goals Related to High-Risk Pregnancy). Early identification of the woman at risk is essential to ensure that appropriate interventions can be

instituted promptly, increasing the opportunity to change the course of events and provide a positive outcome.

The term *risk* may mean different things to different groups. For example, healthcare professionals may focus on the disease processes and treatment to prevent complications. Nurses may focus on nursing care and on the psychosocial impact to the woman and her family. Insurance companies may concentrate on the economic issues related to the high-risk status, whereas the woman's attention may be focused on her own needs and those of her family. Together, working as a collaborative team, the ultimate goal of care is to ensure the best possible outcome for the woman, her fetus, and her family.

Risk assessment begins with the first antepartal visit and continues with each subsequent visit because additional factors may be identified in later visits that were not apparent during earlier visits. For example, as the nurse and client develop a trusting relationship, previously unidentified or unsuspected factors (such as drug abuse or intimate partner violence) may be revealed. Through education and support, the nurse can encourage the client to inform her healthcare provider of these concerns, and necessary interventions or referrals can be made.

Diverse factors must be considered when determining a woman's risk for adverse pregnancy outcomes (Gupton, Heaman, & Cheung, 2001). A comprehensive approach to high-risk pregnancy is needed, and the factors associated with them are grouped into broad categories based on threats to health and pregnancy outcome. Current categories of risk are biophysical, psychosocial, socio-demographic, and environmental (Gilbert & Harmon, 2003) (Box 19-1).

This chapter describes the major conditions related directly to the pregnancy that can complicate a pregnancy, possibly affecting maternal and fetal outcomes. These include bleeding during pregnancy (spontaneous abortion, ectopic pregnancy, gestational trophoblastic disease [GTD]), cervical insufficiency, placenta previa, and abruptio placenta), hyperemesis gravidarum, gestational hypertension, HELLP syndrome, gestational diabetes, blood incompatibility, hydramnios and oligohydramnios, multiple gestation, premature rupture of membranes (PROM), and preterm labor. Chapter 20 addresses preexisting conditions that can complicate a woman's pregnancy.

HEALTHY PEOPLE 2010

National Health Goals Related to High-Risk Pregnancy

Objective	Significance
Decrease the proportion of pregnant women with gestational diabetes	Will help to promote proper prepregnant and pregnancy glycemic control; foster careful perinatal obstetric monitoring, thereby helping to reduce perinatal death and congenital abnormalities
Reduce ectopic pregnancies	Will help to reinforce the importance of good nutrition during pregnancy as paramount in increasing better pregnancy outcomes
	Will help to focus attention on the need for initiating prenatal care early and for continued monitoring throughout pregnancy, thus helping to decrease maternal mortality related to ectopic pregnancies through early detection

Source: U.S. DHHS, 2000.

Bleeding During Pregnancy

Bleeding any time during pregnancy is serious and potentially life-threatening. Bleeding can occur early or late in the pregnancy and may result from numerous conditions. Conditions commonly associated with early bleeding (first

BOX 19-1

FACTORS PLACING A WOMAN AT RISK DURING PREGNANCY

Biophysical Factors

- Genetic conditions
- Chromosomal abnormalities
- Multiple pregnancy
- Defective genes
- Inherited disorders
- ABO incompatibility
- Large fetal size
- Medical and obstetric conditions
- Preterm labor and birth
- Cardiovascular disease
- Chronic hypertension
- Incompetent cervix
- Placental abnormalities
- Infection
- Diabetes
- Maternal collagen diseases
- Pregnancy-induced hypertension
- Asthma
- Postterm pregnancy
- Hemoglobinopathies
- Nutritional status
- Inadequate dietary intake
- Food fads
- Excessive food intake
- Under- or overweight status
- Hematocrit value less than 33%
- Eating disorder

Psychosocial Factors

- Smoking
- Caffeine
- Alcohol
- Drugs
- Inadequate support system
- Situational crisis
- History of violence
- Emotional distress
- Unsafe cultural practices

Sociodemographic Factors

- Poverty status
- Lack of prenatal care
- Age younger than 15 years or older than 35 years
- Parity—all first pregnancies and more than five pregnancies
- Marital status—increased risk for unmarried
- Accessibility to health care
- Ethnicity—increased risk in nonwhite women

Environmental Factors

- Exposure to
- Infections
 - Radiation
 - Pesticides
 - Illicit drugs
 - Industrial pollutants
 - Secondhand cigarette smoke
 - Personal stress (Gilbert & Harmon, 2003; Lee, 2003; Mattson & Smith, 2004; Verklan & Walden, 2004)

half of pregnancy) include spontaneous abortion, ectopic pregnancy, and GTD. Conditions associated with late bleeding include placenta previa and abruptio placenta, which usually occur after the 20th week of gestation.

Spontaneous Abortion

An **abortion** is the loss of an early pregnancy, usually before week 20 of gestation. Abortion can be spontaneous or induced. A spontaneous abortion refers to the loss of a fetus resulting from natural causes—that is, not elective or therapeutically induced by a procedure. The term *miscarriage* is often used by nonmedical people to denote an abortion that has occurred spontaneously. A miscarriage can occur during early pregnancy, and many women who miscarry may not even be aware that they are pregnant. About 80% of spontaneous abortions occur within the first trimester.

The overall rate for spontaneous abortion in the United States is reported as 15 to 20% of recognized pregnancies in the United States. However, with the development of highly sensitive assays for hCG levels that detect pregnancies prior to the expected next menses, the inci-

dence of pregnancy loss increases significantly—to about 60 to 70% (Puscheck & Pradhan, 2004).

Causes

The causes of spontaneous abortion are varied and often unknown. The most common cause for first trimester abortions is fetal genetic abnormalities, usually unrelated to the mother. Those occurring during the second trimester are more likely to have maternal causes, such as incompetent cervix, congenital or acquired anomaly of the uterine cavity, hypothyroidism, diabetes mellitus, chronic nephritis, use of crack cocaine, lupus, and acute infection such as rubella virus, cytomegalovirus, herpes simplex virus, bacterial vaginosis, and toxoplasmosis (Marchiano, 2004).

Spontaneous abortions may be classified into six categories based on the signs and symptoms exhibited. These categories include threatened abortion, inevitable abortion, incomplete abortion, complete abortion, missed abortion, and habitual abortion (Table 19-1).

Nursing Management

Nursing management of the woman with a spontaneous abortion focuses on psychological support for the family

Table 19-1 Categories of Abortion

Category	Assessment Findings	Diagnosis	Treatment
Threatened abortion	Vaginal bleeding (often slight) early in a pregnancy No cervical dilation or change in cervical consistency Mild abdominal cramping Closed cervical os No passage of fetal tissue	Vaginal ultrasound to confirm if sac is empty Declining maternal serum hCG and progesterone levels to provide additional information about viability of pregnancy	Conservative supportive treatment Possible reduction in activity in conjunction with nutritious diet and adequate hydration
Inevitable abortion	Vaginal bleeding (greater than that associated with threatened abortion) Rupture of membranes Cervical dilation Strong abdominal cramping Possible passage of products of conception	Ultrasound and hCG levels to indicate pregnancy loss	Vacuum curettage if products of conception are not passed, to reduce risk of excessive bleeding and infection Prostaglandin analogs such as misoprostol to empty uterus of retained tissue (only used if fragments are not completely passed)
Incomplete abortion (passage of some of the products of conception)	Intense abdominal cramping Heavy vaginal bleeding Cervical dilation	Ultrasound confirmation that products of conception still in uterus	Client stabilization Evacuation of uterus via dilation and curettage (D&C) or prostaglandin analog
Complete abortion (passage of all products of conception)	History of vaginal bleeding and abdominal pain Passage of tissue with subsequent decrease in pain and significant decrease in vaginal bleeding	Ultrasound demonstrating an empty uterus	No medical or surgical intervention necessary Follow-up appointment to discuss family planning
Missed abortion (nonviable embryo retained in utero for at least 6 weeks)	Absent uterine contractions Irregular spotting Possible progression to inevitable abortion	Ultrasound to identify products of conception in uterus	Evacuation of uterus (if inevitable abortion does not occur): suction curettage during first trimester, dilation and evacuation during second trimester Induction of labor with intravaginal PGE2 suppository to empty uterus without surgical intervention
Habitual abortion	History of three or more consecutive spontaneous abortions Not carrying the pregnancy to viability or term	Validation via client's history	Identification and treatment of underlying cause (possible causes such as genetic or chromosomal abnormalities, reproductive tract abnormalities, chronic diseases or immunologic problems) Cervical cerclage in second trimester if incompetent cervix is the cause

experiencing an acute loss and grief. In addition, women need reassurance that spontaneous abortions usually result from an abnormality and that their actions did not cause the abortion.

When a pregnant woman calls and reports vaginal bleeding, she must be seen as soon as possible by a health care professional to ascertain the etiology. Varying degrees of vaginal bleeding, low back pain, abdominal cramping, and passage of products of conception tissue may be reported. Ask the woman about the color of the vaginal bleeding (bright red is significant) and the amount—for example, question her about the frequency with which she is changing her peripads (saturation of one peripad hourly is significant). Also, obtain a description of any other signs and symptoms the woman may be experiencing, along with a description of their severity and duration. It is important to remain calm and listen to the woman's description.

Assessment

When the woman arrives and is admitted, the priorities are to assess her vital signs, amount and color of the bleeding, and current pain rating on a scale of 1 to 10 points. Also, evaluate the amount and intensity of the woman's abdominal cramping or contractions, and assess the woman's level of understanding about what is happening to her.

Nursing Interventions

Ongoing assessment is essential for the woman experiencing a spontaneous abortion. Nursing care focuses on monitoring the amount of vaginal bleeding through pad counts, observing for any passage of products of conception tissue, and providing pain management to address the cramping discomfort. In addition, the nurse plays a major role in providing emotional support to the woman and her family.

Keep in mind that the woman's emotional reaction may vary depending on her desire for this pregnancy and her available support network. Provide both physical and emotional support. In addition, prepare the woman and her family for the assessment process, and answer her ongoing questions regarding what is happening.

Offering a factual explanation about some of the causes of spontaneous abortions can assist the woman to understand what is happening and perhaps allay her fears and guilt that she did something to cause this pregnancy loss. Assist in preparing the woman for procedures and treatment such as surgery to evacuate the uterus or medications such as misoprostol or PGE₂. If the woman is Rh negative and not sensitized, expect to administer RhoGAM within 72 hours after the abortion is complete. See Drug Guide 19-1 for more information about these medications.

Most women will experience an acute sense of loss and go through a grieving process with a spontaneous abortion. Providing sensitive listening, counseling, and anticipatory guidance to the woman and her family will allow them to verbalize their feelings and ask questions concerning future pregnancies.

The grieving period may last as long as 2 years after a pregnancy loss, with each person grieving in his or her own way. Encourage friends and family to be supportive, but give the couple space and time to work through their loss. Referral to a community support group for parents who have experienced a miscarriage can be very helpful during this grief process.

Ectopic Pregnancy

Normally, implantation of the fertilized ovum occurs in the uterus. An **ectopic pregnancy** is any pregnancy in which the fertilized ovum implants outside the uterine cavity. The most common site for implantation is the fallopian tubes, but some ova may implant in the cornua of the uterus, ovary, cervix, or abdominal cavity (Fig. 19-1) (Sepilian & Wood, 2004). Unfortunately, none of these anatomic sites can accommodate placental attachment or a growing embryo. Thus, the potential for rupture and hemorrhage exists. A ruptured ectopic pregnancy is a true medical emergency. It is a potentially life-threatening condition and involves pregnancy loss. It is the leading cause of maternal mortality in the first trimester and accounts for 10 to 15% of all pregnancy-related deaths (Sepilian & Wood, 2005).

Ectopic pregnancies occur from 1 in every 40 to 1 in every 100 pregnancies in the United States (Marchiano, 2004). Their incidence has increased dramatically in the past few decades as a result of improved diagnostic techniques, such as more sensitive beta-hCG assays and the availability of transvaginal ultrasound (Chen, 2004).

Causes

Ectopic pregnancies usually are caused by conditions that obstruct or slow the passage of the fertilized ovum through the fallopian tube to the uterus. This may be a physical blockage in the tube, or failure of the tubal epithelium to move the zygote (the cell formed after the egg is fertilized) down the tube into the uterus. In the general population, most cases are the result of tubal scarring secondary to pelvic inflammatory disease. Organisms such as *Neisseria gonorrhoeae* and *Chlamydia trachomatis* preferentially attack the fallopian tubes, producing silent infections. Even with early treatment, tubal damage can occur. Other contributing factors include

- Previous ectopic pregnancy
- History of STIs
- Endometriosis
- Previous tubal or pelvic surgery
- Infertility and infertility treatments, including use of fertility drugs
- Uterine abnormalities such as fibroids
- Presence of intrauterine device (IUD)
- Use of progestin-only mini pill (slows ovum transport)
- Postpartum or postabortion infection
- Increasing age older than 35 years
- Cigarette smoking (Owen, 2003)

Drug Guide 19-1 Medications Used With Spontaneous Abortions

Drug	Action	Indications	Nursing Implications
Misoprostol (RU 486; Cytotec)	Stimulates uterine contractions to terminate a pregnancy	Evacuate the uterus after abortion to ensure passage of all the products of conception	Monitor for side effects such as diarrhea, abdominal pain, nausea, vomiting, dyspepsia Assess vaginal bleeding and report any increased bleeding, pain, or fever Monitor for signs and symptoms of shock, such as tachycardia, hypotension, anxiety
PGE ₂ , dinoprostone (Cervidil, Prepidil Gel, Prostin E2)	Stimulates uterine contractions, causing expulsion of uterine contents	Expel uterine contents in fetal death, missed abortion during second trimester, or to efface and dilate the cervix in pregnancy at term	Bring gel to room temperature before administering Avoid contact with skin Use sterile technique to administer Keep client supine 30 minutes after administering Document time of insertion and dosing intervals Remove insert with retrieval system after 12 hours or at the onset of labor Explain purpose and expected response to client
Rh (D) immunoglobulin (Gamulin, HydroRho-D, RhoGAM)	Suppresses immune response of nonsensitized Rh-negative patients who are exposed to Rh-positive blood	Prevent isoimmunization in Rh-negative women exposed to Rh-positive blood after abortions, miscarriages, and pregnancies	Administer intramuscularly in deltoid area Give only MICRhoGAM for abortions and miscarriages < 12 weeks unless fetus or father is Rh negative (unless patient is Rh positive, Rh antibodies are present) Educate woman that she will need this after subsequent deliveries if newborns are Rh positive; also check lab study results prior to administering the drug

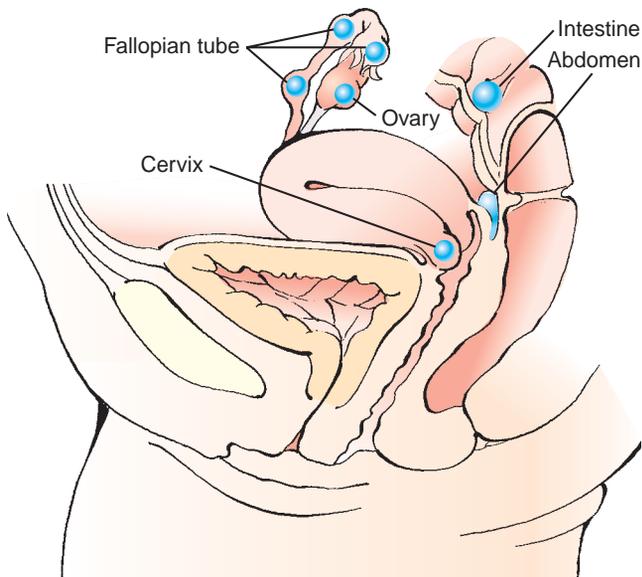
Clinical Manifestations

Although onset may vary, clinical manifestations of an unruptured ectopic pregnancy usually begin at about the seventh or eighth week of gestation. A missed menses, adnexal fullness, and tenderness may indicate an unruptured tubal pregnancy. As the tube stretches, the pain increases. The hallmark of ectopic pregnancy is abdominal pain with spotting within 6 to 8 weeks after a missed menses. Other symptoms include breast tenderness, nausea, and low back pain. Pain may be unilateral, bilateral, or diffuse over the abdomen.

If rupture or hemorrhaging occurs before successfully treating the pregnancy, symptoms may worsen and include severe, sharp, and sudden pain in the lower abdomen as the tube tears open and the embryo is expelled into the pelvic cavity; feelings of faintness; referred pain to the shoulder

area indicating bleeding into the abdomen caused by phrenic nerve irritation; hypotension; marked abdominal tenderness with distension; and hypovolemic shock.

The use of transvaginal ultrasound to visualize the misplaced pregnancy and low levels of serum beta-hCG assist in diagnosing an ectopic pregnancy. The ultrasound determines whether the pregnancy is intrauterine, assesses the size of the uterus, and provides evidence of fetus viability. Absence of an intrauterine gestational sac is diagnostic of ectopic pregnancy (Baines, 2003). In a normal intrauterine pregnancy, beta-hCG levels typically double every 2 to 4 days. Therefore, low beta-hCG levels are suggestive of an ectopic pregnancy or impending abortion. Other tests may be done to rule out other conditions such as spontaneous abortion, ruptured ovarian cyst, appendicitis, and salpingitis.



● Figure 19-1 Ectopic pregnancy: possible sites for implantation.

Treatment

The therapeutic management of ectopic pregnancy depends on whether the tube is intact or has ruptured. Historically, the treatment of ectopic pregnancy was limited to surgery, but medical therapy is currently available.

If the fallopian tube is still intact, medical management becomes an option. To be eligible for medical therapy, the client must be hemodynamically stable, with no signs of active bleeding in the peritoneal cavity, and the mass (which must measure less than 4 cm as determined by ultrasound) must be unruptured (Valley & Fly, 2005). The potential advantages include avoidance of surgery, the preservation of tubal patency and function, and a lower cost. Methotrexate, prostaglandins, misoprostol, and actinomycin have all been used in the medical (non-surgical) management of ectopic pregnancy (Youngkin & Davis, 2004).

Methotrexate, the agent most commonly used, is a folic acid antagonist that inhibits cell division in the developing embryo. It typically has been used as a chemotherapeutic agent in the treatment of leukemias, lymphomas, and carcinomas. It has been shown to produce results similar to that for surgical therapy, in terms of high success rate, low complication rate, and good reproductive potential (Simpson, 2002). Adverse effects associated with methotrexate include nausea, vomiting, stomatitis, diarrhea, gastric upset, increased abdominal pain, and dizziness. Prior to receiving the single-dose intramuscular injection to treat unruptured pregnancies, the woman should be counseled on the risks, benefits, adverse effects, and the possibility of failure of medical therapy, which would result in tubal rupture, necessitating surgery (Sepilian & Wood, 2005). The woman is then instructed to return weekly for follow-up lab studies for the next several weeks until beta-hCG titers decrease.

Surgical management for the unruptured fallopian tube might involve a linear salpingostomy to preserve the tube—an important consideration for the woman wanting to preserve her future fertility.

With a ruptured ectopic pregnancy, surgery is necessary as a result of possible uncontrolled hemorrhage. A laparotomy with a removal of the tube (salpingectomy) may be necessary. With earlier diagnosis and medical management, the focus has changed from prevention of maternal death to facilitating rapid recovery and preserving fertility.

Regardless of the treatment approach (medical or surgical), the woman's beta-hCG level is monitored until it is undetectable to ensure that any residual trophoblastic tissue that forms the placenta is gone. Also, all Rh-negative unsensitized clients are administered Rh immunoglobulin to prevent isoimmunization in future pregnancies.

Nursing Management

The woman with an ectopic pregnancy requires support throughout diagnosis, treatment, and aftercare. If surgery is needed, close assessment and monitoring of the client's vital signs, bleeding (peritoneal or vaginal), and pain status are critical to identify hypovolemic shock that may occur with tubal rupture. The client often experiences a great deal of pain. Administer analgesics as ordered to promote comfort and relieve discomfort from abdominal pain. If the woman is treated medically on an outpatient basis, it is important to outline the signs of ectopic rupture (severe, sharp, stabbing, unilateral abdominal pain; vertigo/fainting; hypotension; and increased pulse) and advise the woman to seek medical help immediately.

Prepare the client physiologically and psychologically for surgery or any procedure. Provide a clear explanation of the expected outcome. Astute vigilance and early referral will help reduce short- and long-term morbidity.

A woman's psychological reaction to an ectopic pregnancy is unpredictable. However, it is important to recognize she has experienced a pregnancy loss in addition to undergoing treatment for a potentially life-threatening condition. It can be difficult for the woman to comprehend what has happened to her because events occur so quickly. In the woman's mind, she had just started a pregnancy and now it has ended abruptly. Assist her with bringing this experience more into reality by encouraging the woman and her family to express their feelings and concerns openly, and validating that this is a loss of pregnancy and it is okay to grieve over the loss.

Provide emotional support, spiritual care, client education, and information about community support groups available (such as Resolve through Sharing) as the client grieves the loss of her unborn child and comes to terms with the medical complications of the situation. Acknowledge the client's pregnancy and allow her to discuss her feelings about what the pregnancy means. Also, stress the need for follow-up blood testing for several weeks to monitor hCG

titers until they return to zero, indicating resolution of the ectopic pregnancy. Additionally, discuss her feelings and concerns about her future fertility and provide teaching about the need for using contraceptives at this time for at least three menstrual cycles to allow time for her reproductive tract to heal and tissue to be repaired. Include the woman's partner in this discussion to make sure there is understanding by both parties regarding what has happened, what intervention is needed, and what the future holds for both of them regarding childbearing.

Prevention of ectopic pregnancies through screening and client education is essential. Many can be prevented by avoiding those conditions that might cause scarring of the fallopian tubes. Such prevention education may include

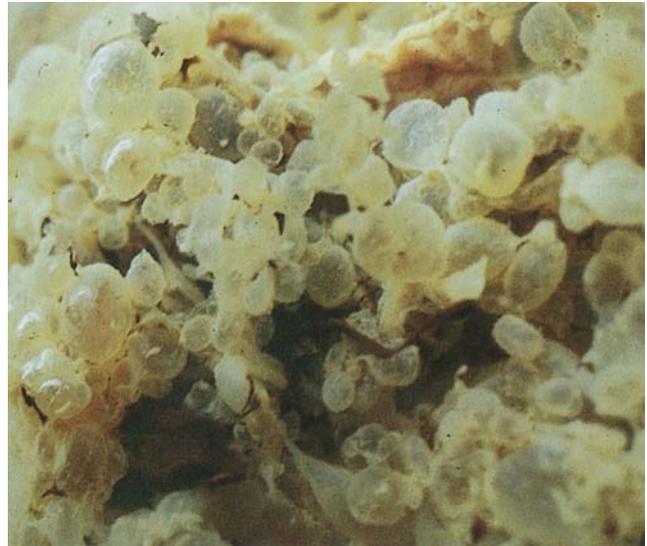
- Reducing risk factors such as sexual intercourse with multiple partners or intercourse without a condom
- Avoiding contracting STIs that lead to pelvic inflammatory disease (PID)
- Obtaining early diagnosis and adequate treatment of STIs
- Avoiding the use of an IUD as a contraceptive method to reduce the risk of repeat ascending infections responsible for tubal scarring
- Using condoms to decrease the risk of infections that cause tubal scarring
- Seeking prenatal care early if pregnant to confirm location of pregnancy

Gestational Trophoblastic Disease

Gestational trophoblastic disease (GTD) comprises a spectrum of neoplastic disorders that originate in the human placenta. Gestational tissue is present, but the pregnancy is not viable. The incidence is about 1 in 1000 pregnancies (Cunningham, Gant, Leveno, Gilstrap, Hauth, & Wenstrom, 2005). The two most common types are hydatidiform mole (partial and complete) and choriocarcinoma.

The hydatidiform mole is a benign neoplasm of the chorion in which chorionic villi degenerate and become transparent vesicles containing clear, viscid fluid. Hydatidiform mole is classified as complete or partial, distinguished by differences in clinical presentation, pathology, genetics, and epidemiology (Gerulath, 2002). The complete mole develops from an “empty egg,” which is fertilized by a normal sperm (46 all-paternal chromosomes). The embryo dies early, no circulation is established, and no embryonic tissue is found. The complete mole is associated with the development of choriocarcinoma. The partial mole has a triploid karyotype (69 chromosomes), because two sperm have provided a double contribution by fertilizing the ovum (Fig. 19-2).

Having a molar pregnancy (partial or complete) results in the loss of the pregnancy and the possibility of developing choriocarcinoma, a chorionic malignancy from the trophoblastic tissue.



● Figure 19-2 Complete hydatidiform mole.

Consider THIS!

We had lived across the dorm hall from each other during nursing school, but really didn't get to know each other except for a casual hello in passing. When we graduated, Rose went to work in the emergency room and I in OB. We saw each other occasionally in the employee cafeteria, but a quick hello was all that was usually exchanged. I heard she married one of the paramedics who worked in the ER and was soon pregnant. I finally got to say more than hello when she was admitted to the OB unit bleeding during her fourth month of pregnancy. What was discovered was gestational trophoblastic disease and not a normal pregnancy. I remember holding her in my arms as she wept. She was told she had a complete molar pregnancy after surgery, and she would need extensive follow-up for the next year. I lost track of her that summer as my life became busier. Around Thanksgiving time, I heard she had died from choriocarcinoma. I attended her funeral, finally, to get the time to say a final hello and good-bye, but this time with sadness and tears.

Thoughts: Rose was only 26 years old when she succumbed to this very virulent cancer. I think back and realize I missed knowing this brave young woman and wished that I had taken the time to say more than hello. Could her outcome have been different? Why wasn't it recognized earlier? Did she not follow up after her diagnosis? I can only speculate regarding the whom, what, and where. She lived a short but purposeful life, and hopefully continued research will change other women's outcomes in the future.

Causes

The exact cause of molar pregnancies is unknown, but recent research is looking into a genetic basis for it. Studies

have revealed some remarkable features about molar pregnancies. They

- Have the ability to invade into the wall of the uterus
- Can metastasize to other organs
- Recur in subsequent pregnancies
- Can develop into choriocarcinoma, a virulent cancer
- Occur more in Asia (1 in 120 pregnancies) compared with the United States (1 in 1000 pregnancies)
- Are influenced by nutritional factors, such as protein deficiency
- Tend to affect older women more than younger women

Clinical Manifestations

Clinical manifestations of GTD are very similar to that of spontaneous abortion at about 12 weeks of pregnancy. Signs and symptoms of a molar pregnancy include

- Report of early signs of pregnancy, such as amenorrhea, breast tenderness, fatigue
- Brownish vaginal bleeding/spotting
- Anemia
- Severe morning sickness resulting from high hCG levels
- Fluid retention and swelling
- Larger size uterus when compared with that for pregnancy dates
- Expulsion of grapelike vesicles possibly occurring in some women
- Extremely high hCG levels present; no single value considered diagnostic
- Early development of **preeclampsia**, which usually is not present until after 24 weeks
- Absence of fetal heart rate or fetal activity
- Ultrasonic evidence of characteristic molar pattern

The diagnosis is made by visualizing the characteristic appearance of the vesicular molar pattern in the uterus via transvaginal ultrasound and high levels of hCG.

Treatment

Treatment consists of immediate evacuation of the uterine contents as soon as the diagnosis is made and long-term follow-up of the client to detect any remaining trophoblastic tissue that might become malignant. Dilation and suction curettage are used to empty the uterus. The tissue obtained is sent to the laboratory for analysis to evaluate for choriocarcinoma. Serial levels of hCG are used to detect residual trophoblastic tissue for 1 year. If any tissue remains, hCG levels will not regress. Because of this cancer risk, the client is advised to receive extensive follow-up therapy for the next 12 months. The follow-up protocol may include

- Baseline hCG level, chest radiograph, and pelvic ultrasound
- Weekly serum hCG levels until it drops to zero and remains at that level for 3 consecutive weeks, then

monthly for 6 months, then every 2 months for the remainder of the year

- Chest radiograph every 6 months to detect pulmonary metastasis
- Regular pelvic examinations to assess uterine and ovarian regression
- Systemic assessments for symptoms indicative of lung, brain, liver, or vaginal metastasis
- Strong recommendation to avoid pregnancy for 1 year because the pregnancy can interfere with the monitoring of hCG levels
- Use of reliable contraceptive (Gilbert & Harmon, 2003)

Nursing Management

Nursing management of the woman with GTD focuses on educating her about the potential risk of cancer that may develop after a molar pregnancy and the strict adherence needed for the follow-up program. The woman must understand the necessity for the continued follow-up care regimen to improve her chances of future pregnancies and to ensure her continued quality of life.

Assessment

The nurse plays a crucial role in identifying and bringing this condition to the attention of the health care provider based on sound knowledge of the typical clinical manifestations and through astute antepartal assessments. Assess the woman for potential clinical manifestations at each antepartal visit.

Nursing Interventions

After GTD is diagnosed, the nurse needs to educate the client about the condition and appropriate interventions that may be necessary to save her life. Explain each phase of treatment accurately and provide support for the woman and her family as they go through the grieving process. Prepare the woman physically and psychologically for D&C as indicated.

To aid the client and her family in coping with the loss of the pregnancy and the possibility of a cancer diagnosis, use the following interventions:

- Listen to their concerns and fears.
- Allow them time to grieve for their pregnancy loss.
- Acknowledge their loss and sad feelings (say you are sorry for their loss).
- Encourage them to express their grief; make it okay for them to cry.
- Provide them with as much factual information as possible to help them make sense of what is happening.
- Enlist support from additional family and friends as appropriate, and with the client's permission.

As with any facet of health care, the nurse needs to keep current on the latest research and new therapies. Inform the client about her follow up care, which will prob-

ably involve a close clinical surveillance for approximately 1 year, and reinforce its necessity in monitoring the client's condition. Serial serum beta-hCG levels are used to detect residual trophoblastic tissue. Continued high or increasing hCG titers are abnormal and need further evaluation.

Anticipate the use of chemotherapy, such as methotrexate, which may be started as prophylaxis. Inform the client about the need for using a reliable contraceptive to prevent pregnancy for 1 year. A positive pregnancy test would interfere with tracking of the serial beta-hCG levels used to identify a potential malignancy. Stress the need for client cooperation and adherence to the plan of therapy throughout this year-long follow-up.

Cervical Insufficiency

Cervical insufficiency describes a weak, structurally defective cervix that spontaneously dilates in the absence of contractions in the second trimester, resulting in the loss of the pregnancy. The incidence of cervical insufficiency is less than 1% and ranges in estimation from 1 in 500 to 1 in 2000 pregnancies, accounting for approximately 20 to 25% of midtrimester losses (Ahn & Hibbard, 2003).

Causes

Cervical insufficiency may result from an in utero exposure to diethylstilbestrol (DES), which was commonly used for the treatment of recurrent pregnancy loss until the mid-1970s; an acquired cause, such as trauma to the cervix from previous gynecologic or obstetric procedures (cone biopsy, D&C); damage to the cervix from a previous difficult birth (cervical lacerations from forceps); increased uterine volume (multiple gestation, hydramnios); or unknown reasons (Creasy, Resnik, & Iams, 2004).

Clinical Manifestations

Commonly, with cervical insufficiency, the woman will report a pink-tinged vaginal discharge or an increase in pelvic pressure. History may reveal a previous loss of pregnancy around 20 weeks. Cervical dilation also occurs. Continuation leads to rupture of the membranes, release of amniotic fluid, and uterine contractions, subsequently resulting in delivery of the fetus, often before the time of viability.

Treatment

The diagnosis of cervical insufficiency remains difficult in many circumstances. The cornerstone of diagnosis is a history of midtrimester pregnancy loss associated with painless cervical dilatation without evidence of uterine activity. Close surveillance of cervical length with transvaginal ultrasound is typically started around 20 weeks' gestation. Regular evaluations are performed (particularly in women with pelvic pressure, backache, or increased mucoid discharge) every few days to avoid missing rapid changes in

cervical dilation or until the trend in cervical length can be characterized (Ressel, 2004).

Cervical shortening occurs from the internal os outward and can be viewed on ultrasound as *funneling*. The amount of funneling can be determined on ultrasound by dividing funnel length by cervix length. A cervical length less than 25 mm is abnormal between 14 weeks and 24 weeks, and increases the risk of preterm labor. The most common time at which a short cervix or funneling develops is 18 to 22 weeks, so ultrasound screening should be performed during this interval (Berghella, 2004).

Management for cervical insufficiency has been treated in a variety of ways: bed rest; pelvic rest; avoidance of heavy lifting; or surgically, via a procedure of a cervical cerclage in the second trimester. Cervical cerclage involves using a heavy purse-string suture to secure and reinforce the internal os of the cervix (Fig. 19-3).

According to ACOG (2003a), if a short cervix is identified at or after 20 weeks with absence of infection (chorioamnionitis), the decision to proceed with cerclage should be made with caution; there have been limited numbers of well-designed randomized studies to support its efficacy. Suture displacement, rupture of membranes, and chorioamnionitis are the most common complications associated with cerclage placement, and incidence varies widely in relation to timing and indications for the cerclage (Ressel, 2004). The optimal timing for cerclage removal is unclear, according to ACOG (2003a).

Nursing Management

Nursing management related to women with cervical insufficiency involves taking a very thorough history to be alert to any risk factors that might have a bearing on this pregnancy—previous cervical trauma, preterm labor, fetal loss in second trimester, or previous surgeries or procedures involving the cervix. Monitor the woman very closely for signs of preterm labor: backache, increase in vaginal discharge, rupture of membranes, and uterine contractions. Provide emotional and educational support to allay the couple's anxiety about the well-being of their fetus. Continuing surveillance throughout the pregnancy is important to promote a positive outcome for the family.



● Figure 19-3 Cervical cerclage.

Placenta Previa

Placenta previa is a bleeding condition that occurs during the last two trimesters of pregnancy. Placenta previa literally means “afterbirth first” and defines a condition in which the placenta implants over the cervical os. It may cause serious morbidity and mortality to fetus and mother. It complicates approximately 5 of 1000 births or 1 in every 200 pregnancies and is associated with potentially serious consequences from hemorrhage, abruption (separation) of the placenta, or emergency cesarean birth (Joy & Lyon, 2004).

Placenta previa is generally classified according to the degree of coverage or proximity to the internal os as follows (Fig. 19-4):

- Total placenta previa—occurs when the internal cervical os is completely covered by the placenta
- Partial placenta previa—occurs when the internal os is partially covered by the placenta
- Marginal placenta previa—occurs when the placenta is at the margin or edge of the internal os
- Low-lying placenta previa—occurs when the placenta is implanted in the lower uterine segment and is near the internal os but does not reach it

Causes

The exact etiology of placenta previa is unknown. Placenta previa is initiated by implantation of the embryo in the lower uterus. With placental attachment and growth, the cervical os may become covered by the developing placenta. Placental vascularization is defective, allowing the placenta to attach directly to the myometrium (accreta), invade the myometrium (increta), or penetrate the myometrium (percreta).

The condition may be multifactorial and is associated with the following risk factors:

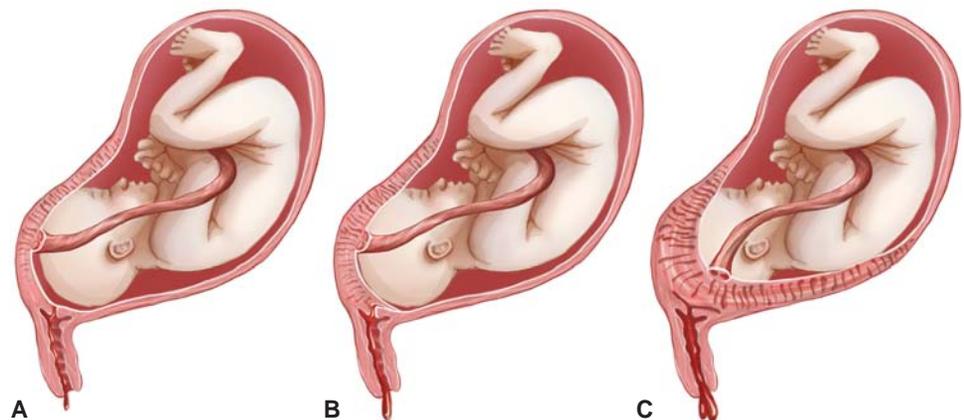
- Advanced maternal age (more than 30 years old)
- Previous cesarean birth

- Multiparity
- Uterine insult or injury
- Cocaine use
- Prior placenta previa
- Male infants (Thompson, 2005)
- African-Americans and Asian cultural groups (Ko & Yoon, 2005)
- Multiple gestations
- Previous induced abortion
- Previous myomectomy to remove fibroids
- Smoking (Ko & Yoon, 2005)

Clinical Manifestations

The classical clinical presentation is painless, bright-red vaginal bleeding occurring during the second or third trimester. The initial bleeding is not usually profuse and it ceases spontaneously, only to recur again. The first episode of bleeding occurs (on average) at 27 to 32 weeks' gestation, and contractions may or may not occur with the bleeding. The bleeding is thought to arise secondary to the thinning of the lower uterine segment in preparation for the onset of labor. When the bleeding occurs at the implantation site in the lower uterus, the uterus is unable to contract adequately and stop the flow of blood from the open vessels. Typically with normal placental implantation in the upper uterus, minor disruptive placental attachment is not a problem, because there is a larger volume of myometrial tissue able to contract and constrict bleeding vessels. The client's uterus is soft and nontender on examination. Auscultation of fetal heart tones is within normal parameters, and fetal distress usually is not present unless a cord accident occurs or vaginal blood loss has been heavy enough to induce maternal shock or placenta abruption (Gaudier, 2003).

To validate the position of the placenta, a transvaginal ultrasound is done. In addition, MRI may be ordered in preparing for delivery because it allows identification of placenta accreta, increta, or percreta in addition to



● Figure 19-4 Classification of placenta previa. (A) Marginal. (B) Partial. (C) Complete.

Marginal

Partial

Complete

placenta previa. These placental abnormalities, although rare, carry a very high morbidity and mortality rate, necessitating a possible hysterectomy at delivery.

Treatment

The treatment depends on the extent of bleeding, the amount of placenta over the cervical os, whether the fetus is developed enough to survive outside the uterus, the position of the fetus, the parity for the mother, and the presence or absence of labor (Gaudier, 2003).

If the mother and fetus are both stable, therapeutic management may involve expectant (or wait-and-see) care. This care can be carried out in the home or on an antepartal unit in the healthcare facility. If there is no active bleeding and the client has readily available access to reliable transportation, is able to maintain bed rest in the home setting, and has the ability to comprehend instructions, expectant care at home is appropriate. However, if the client requires continuous care and monitoring and is not able to comply with needed home care requirements, the antepartal unit is the best environment.

Nursing Management

Whether the care setting is in the client's home or in the healthcare facility setting, the nurse focuses on monitoring the maternal–fetal dyad status, assessing for signs and symptoms of vaginal bleeding and fetal distress, and providing support and education to the client and her family members, including what events and diagnostic studies are being performed. For the majority of women, a cesarean birth will be planned. See Nursing Care Plan 19-1 for application of the nursing process for the woman with placenta previa.

Assessment

Assessing the woman's degree of vaginal bleeding is paramount. Estimate and document the amount of bleeding. Perform a peripad count on an ongoing basis, making sure to report any changes in amount or frequency to the healthcare provider. If the woman is experiencing active bleeding, prepare for blood typing and crossmatching in the event a blood transfusion is needed.

Assess fetal heart rates via Doppler to detect fetal distress. Monitor the woman's cardiopulmonary status, reporting any difficulties in respirations, changes in skin color, or complaints of difficulty breathing. Have oxygen equipment readily available should fetal or maternal distress develop.

If the woman has an IV inserted, inspect the IV site frequently. Alternately, anticipate the insertion of an intermittent IV access device such as a saline lock, which can be used if quick access is needed for fluid restoration and infusion of blood products.

Assess the woman's level of understanding regarding the condition of placenta previa and associated procedures and treatment plan. Doing so is important to prevent con-

fusion and gain the woman's cooperation. Provide information related to the condition and make sure that all information related is consistent with information from the primary care provider.

If the woman will require prolonged hospitalization or home bed rest, assess the physical and emotional impact that this may have on her. Evaluate the woman's coping mechanisms to aid in determining how well she will be able to adjust to and cooperate with the treatment plan. In addition to emotional impact with prolonged bed rest, thoroughly assess the woman's skin to prevent skin breakdown and to help alleviate the woman's discomfort secondary to limited physical activity.

Nursing Interventions

The following interventions would be appropriate for the woman with placenta previa regardless of the setting:

- Monitoring amount of blood loss, pain level, and uterine contractility
- Assessing maternal vital signs frequently
- Ascertaining the client's understanding and implications of this condition
- Monitoring the results of all laboratory testing, such as CBC, type and crossmatch, coagulation studies
- Providing emotional support and listening to her fears of the unknown
- Explaining assessments and treatment measures needed
- Assisting the client to remain on bed rest with bathroom privileges
- Counseling the client and family about all activities and interventions
- Providing opportunities for distraction—educational videos, arts and crafts, computer games, reading books
- Instructing the client to assess fetal activity via “kick counts” daily
- Acting as a client advocate in obtaining information for the family
- Monitoring the woman's coping ability to comply with activity restrictions
- Preventing any vaginal examinations from being performed, which might disrupt the placenta and cause hemorrhage
- Evaluating fetal heart rate via an external monitor or Doppler
- Encouraging a balanced, nutritious diet with plenty of fluid intake
- Administering Rh immunoglobulin if the client is Rh negative at 28 weeks' gestation
- Preparing the client for cesarean birth when necessary
- Informing the client and family of any status change that requires intervention
- Monitoring tocolytic medication if prevention of preterm labor is needed
- Educating the client regarding risk of reoccurrence of this condition

Nursing Care Plan 19-1

Overview of the Woman With Placenta Previa

Sandy, a 39-year-old G5, P4, multigravida client at 32 weeks' gestation, was admitted to the labor and birth suite with sudden vaginal bleeding. Sandy had no further active bleeding and did not complain of any abdominal discomfort or tenderness. She did complain of occasional "tightening" in her stomach. Her abdomen palpated soft. Fetal heart rates were in the 140s with accelerations with movement. She was placed on bed rest with bathroom privileges. Ultrasound identified a low-lying placenta with a viable, normal-growth fetus. She was diagnosed with placenta previa and admitted for observation and surveillance of fetal well-being. Her history revealed two previous cesarean births, smoking half a pack of cigarettes per day, and endometritis infection after birth of her last newborn. Additional assessment findings included painless, bright-red vaginal bleeding with initial bleeding ceasing spontaneously; irregular, mild, and sporadic uterine contractions; fetal heart rate and maternal vital signs within normal range; fetus in transverse lie; anxiety related to the outcome of pregnancy; and expression of feelings of helplessness.



Nursing Diagnosis: Ineffective tissue perfusion (fetal and maternal) related to blood loss

Outcome identification and evaluation

Client will maintain adequate tissue perfusion as evidenced by stable vital signs, decreased blood loss, few or no uterine contractions, normal fetal heart rate patterns and variability, and positive fetal movement

Interventions with rationales

Establish intravenous access to allow for administration of fluids, blood, and medications as necessary
 Obtain type and crossmatch for at least 2 U blood products to ensure availability should bleeding continue
 Obtain specimens as ordered for blood studies, such as CBC and clotting studies to establish a baseline and use for future comparison
 Monitor output to evaluate adequacy of renal perfusion
 Administer IV fluid replacement therapy as ordered to maintain blood pressure and blood volume
 Palpate for abdominal tenderness and rigidity to determine bleeding and evidence of uterine contractions
 Institute bed rest to reduce oxygen demands
 Assess for rupture of membranes to evaluate for possible onset of labor
 Avoid vaginal examinations to prevent further bleeding episodes
 Complete an Rh titer to identify need for RhoGAM
 Avoid nipple stimulation to prevent uterine contractions
 Continuously monitor for contractions or PROM to allow for prompt intervention
 Administer tocolytic agents as ordered to stall preterm labor
 Monitor vital signs frequently to identify possible hypovolemia and infection
 Assess frequently for active vaginal bleeding to minimize risk of hemorrhage
 Continuously monitor fetal heart rate with electronic fetal monitor to evaluate fetal status
 Assist with fetal surveillance tests as ordered to aid in determining fetal well-being

(continued)

Overview of the Woman With Placenta Previa (continued)

Outcome identification and evaluation

Interventions with rationales

- Observe for abnormal fetal heart rate patterns, such as loss of variability, decelerations, tachycardia, *to identify fetal distress*
- Position patient in side-lying position with wedge for support *to maximize placental perfusion*
- Assess fetal movement *to evaluate for possible fetal hypoxia*
- Teach woman to monitor fetal movement *to evaluate well-being*
- Administer oxygen as ordered *to increase oxygenation to mother and fetus*

Nursing Diagnosis: Anxiety related to threats to self and fetus

Client will experience a decrease in anxiety as evidenced by verbal reports of less anxiety, use of effective coping measures, and calm demeanor

- Provide factual information about diagnosis and treatment, and explain interventions and the rationale behind them *to provide client with understanding of her condition*
- Answer questions about health status honestly *to establish a trusting relationship*
- Speak calmly to patient and family members *to minimize environmental stress*
- Encourage the use of past effective techniques for coping *to promote relaxation and feelings of control*
- Acknowledge and facilitate the woman's spiritual needs *to promote effective coping*
- Involve the woman and family in the decision-making process *to foster self-confidence and control over situation*
- Maintain a presence during stressful periods *to allay anxiety*
- Use the sense of touch if appropriate to convey caring and concern
- Encourage talking as a means to release tension

Abruptio Placenta

Abruptio placenta refers to separation of a normally located placenta after the 20th week of gestation and prior to birth, producing hemorrhage. It is a significant cause of third trimester bleeding with a high mortality rate. It occurs in about 1% of all pregnancies throughout the world (Gaufberg, 2004). The overall fetal mortality rate for placenta abruption is 20% to 40%, depending on the extent of the abruption. This is caused by the insult of the abruption itself and by issues related to prematurity when early birth is required to alleviate maternal or fetal distress. Maternal mortality is approximately 6% in abruptio placenta and is related to cesarean birth and/or hemorrhage/coagulopathy (Deering & Satin, 2004).

Abruptio placenta is a major medical emergency. It requires rapid, effective interventions to prevent maternal and fetal morbidity and mortality.

Causes

The etiology of this condition is unknown. Several risk factors are associated with it, such as maternal smoking, extremes of age (<20 years or >35 years old), poor nutrition, multiple gestation, excessive intrauterine pressure caused by hydramnios, hypertension, prior abruption in a previous pregnancy, severe trauma (such as an auto accident or injury secondary to intimate partner violence), cocaine and methamphetamine abuse, alcohol ingestion, and multiparity (Chen, 2004). Other notable risk factors include male fetal gender, chorioamnionitis, prolonged

premature ruptured membranes (>24 hours), oligohydramnios, preeclampsia, and low socioeconomic status (Deering & Satin, 2004).

Clinical Manifestations

Abruptio placenta is classified according to the extent of separation and the amount of blood loss from the maternal circulation. Classifications include

- Mild (grade 1)—minimal bleeding (<500 mL), marginal separation (10–20%), tender uterus, no coagulopathy, no signs of shock, no fetal distress
- Moderate (grade 2)—Moderate bleeding (1000–1500 mL), moderate separation (20–50%), continuous abdominal pain, mild shock
- Severe (grade 3)—absent to moderate bleeding (>1500 mL), severe separation (>50%), profound shock, agonizing abdominal pain, and development of disseminated intravascular coagulopathy (DIC) (Gilbert & Harmon, 2003)

Abruptio placenta also may be classified as partial or complete, depending on the degree of separation. Alternately, it can be classified as concealed or apparent, by the type of bleeding (Fig. 19-5).

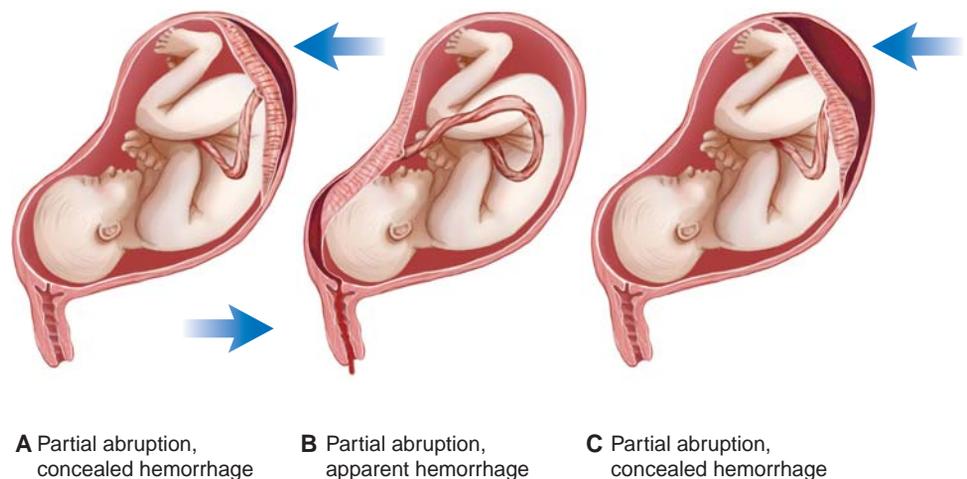
As the placenta separates from the uterus, hemorrhage ensues. It can be apparent, appearing as vaginal bleeding, or it can be concealed. Classic manifestations include painful, dark-red vaginal bleeding (port wine color); “knife-like” abdominal pain; uterine tenderness; contractions; and decreased fetal movement. Vaginal bleeding is present in 80% of women diagnosed with abruptio placenta and may be significant enough to jeopardize both maternal and fetal health within a short time frame. The remaining 20% of abruptions are associated with a concealed hemorrhage and the absence of vaginal bleeding. Decreased fetal movement may be the presenting complaint resulting from fetal jeopardy or fetal death (Deering & Satin, 2004).

Laboratory and diagnostic tests may be helpful in diagnosing the condition and guiding management. These studies may include

- CBC—determines the current hemodynamic status; however, it is not reliable for estimating acute blood loss
- Fibrinogen levels—typically are increased in pregnancy (hyperfibrinogenemia); thus, a moderate dip in fibrinogen levels might suggest coagulopathy (DIC) and, if profuse bleeding occurs, the clotting cascade might be compromised
- Prothrombin time (PT)/activated partial thromboplastin time (aPTT)—determines the client’s coagulation status, especially if surgery is planned
- Type and crossmatch—determines blood type if transfusion is needed
- Kleihauer–Betke test—detects fetal RBCs in the maternal circulation, determines the degree of fetal–maternal hemorrhage, helps calculate the appropriate dosage of RhoGAM to give for Rh-negative clients
- Ultrasound—helps to diagnose quickly the etiology of bleeding and visualize active or concealed hemorrhage, aids in identifying retroplacental hematoma
- Nonstress test—demonstrates findings of fetal jeopardy manifested by late decelerations or bradycardia
- Biophysical profile—used to evaluate clients with chronic abruption, provides information about possible fetal compromise by a low score (<6 points) (Cavanaugh, 2003)

Treatment

Treatment of abruptio placenta is designed to assess, control, and restore the amount of blood lost; to provide a positive outcome for both mother and newborn; and to prevent coagulation disorders, such as DIC (Box 19-2). Emergency measures include starting two large-bore IV lines with normal saline or lactated Ringer’s solution to combat hypovolemia, obtaining blood specimens for evaluating hemodynamic status values and for typing and



● **Figure 19-5** Classifications of abruptio placenta. (A) Partial abruption with concealed hemorrhage. (B) Partial abruption with apparent hemorrhage. (C) Complete abruption with concealed hemorrhage.

A Partial abruption, concealed hemorrhage

B Partial abruption, apparent hemorrhage

C Partial abruption, concealed hemorrhage

BOX 19-2

DISSEMINATED INTRAVASCULAR COAGULATION

DIC is a bleeding disorder characterized by an abnormal reduction in the elements involved in blood clotting resulting from their widespread intravascular clotting (O'Toole, 2005). This disorder can occur secondary to abruptio placenta.

Simply, the clinical and pathologic manifestations of DIC can be described as a loss of balance between the clot-forming activity of thrombin and the clot-lysing activity of plasmin. Therefore, too much thrombin tips the balance toward the prothrombic state and the client develops clots. Alternately, too much clot lysis (fibrinolysis) results from plasmin formation and the client hemorrhages. Small clots form throughout the body, and eventually the blood-clotting factors are used up, rendering them unavailable to form clots at sites of tissue injury. Clot-dissolving mechanisms are also increased, which result in bleeding, which can be severe.

DIC can be stimulated by many factors including sepsis, malignancy, and obstetric conditions such as placenta abruption, missed abortion or retained dead fetus, amniotic fluid embolism, and eclampsia.

Laboratory studies assist in the diagnosis and include

- Decreased fibrinogen and platelets
- PT and aPTT times
- Positive D-dimer tests and fibrin (split) degradation products, which uncover objective evidence of the simultaneous formation of thrombin and plasmin (NANDA, 2005).

crossmatching, and frequently monitoring fetal and maternal well-being. After determining the severity of abruption, and appropriate blood and fluid replacement is given, cesarean birth is done immediately if fetal distress is evident. If the fetus is not in distress, close monitoring continues, with delivery planned at the earliest signs of fetal distress. Because of the possibility of fetal blood loss through the placenta, a critical care neonatal team should be available during the birth process to assess and treat the newborn immediately for shock, blood loss, and hypoxia.

If the woman develops DIC, treatment focuses on determining the underlying cause of DIC and correcting it. Replacement therapy of the coagulation factors is achieved by transfusion of fresh frozen plasma along with cryoprecipitate to maintain the circulating volume and provide oxygen to the cells of the body. Prompt identification and early intervention are essential for a woman with acute DIC associated with abruptio placenta to resolve DIC and possibly save the woman's life.

Nursing Management

Abruptio placenta warrants immediate care to provide the best outcome for both mother and fetus.

Assessment

The nurse's role in the assessment of the woman presenting with abdominal pain and/or experiencing vaginal bleeding is critical. An accurate assessment forms the basis of medical management and intervention, especially in a concealed hemorrhage in which the extent of bleeding is not recognized. Vital signs can be within normal range, even with significant blood loss, because a pregnant woman can lose up to 40% of her total blood volume without showing signs of shock (Gilbert & Harmon, 2003).

Nursing assessment includes

- Assessing all women for risk factors that might cause abruption of the placenta: hypertension, drug use, membrane status, smoking, etc.
- Assessing maternal level of consciousness and signs of shock
- Monitoring the fetal heart rate continuously electronically
- Assessing pain type, onset, and location
- Assessing for abdominal tenderness, pain, and rigidity
- Monitoring uterine contractions by frequent palpation

Nursing Interventions

When the woman arrives to the labor and birth suite, place the woman on strict bed rest and in a left lateral position to prevent pressure on the vena cava. This position provides uninterrupted perfusion to the fetus. Expect to administer oxygen therapy via nasal cannula to ensure adequate tissue perfusion.

Additional nursing interventions include

- Monitoring hourly intake and output after insertion of indwelling urinary (Foley) catheter
- Obtaining maternal blood pressure, pulse, respirations, and pulse rate; and assessing pain level every 15 to 60 minutes, depending on maternal stability and amount of blood loss
- Observing for changes in vital signs suggesting hypovolemic shock and reporting them immediately
- Observing and recording amount and time of bleeding every 30 minutes
- Initiating an IV line with a large-bore catheter and documenting fluid intake to prevent fluid overload
- Avoiding vaginal examinations until placenta previa is ruled out
- Administering pain medication as ordered
- Monitoring uterine contractions for increased rigidity and tenderness
- Monitoring the amount and nature (dark or bright red) of vaginal bleeding
- Evaluating the fundal height (increasing size would indicate bleeding)
- Observing for signs of DIC—bleeding gums, tachycardia, and petechiae—and administering blood products if DIC is apparent
- Observing for fetal distress and tetanic contractions on monitor

- Using pulse oximetry to monitor oxygen saturation levels of circulating blood
- Answering questions about fetal health status in an honest manner
- Acknowledging and facilitating the client's spiritual and cultural needs
- Communicating empathy and understanding of the client's experience, and providing emotional support throughout this frightening time
- Remaining with the couple and acknowledging their emotions and fears
- Providing the couple with factual information about projected management
- Explaining thoroughly the care needed so they will know what to expect
- Informing the client and family about diagnostic tests and surgery
- Preparing the client and family for the possibility of cesarean birth
- Reducing family anxiety by reassuring fetal well-being as appropriate based on test results
- Helping the family to deal with loss or with infant in the intensive care unit

Although abruptio placenta is not a preventable condition, client education is important to help reduce the risk for this condition. Educational topics would include encouraging the woman to avoid drinking, smoking, or using drugs during pregnancy, and to obtain rehabilitation services to eliminate drug abuse prior to the pregnancy; to seek early and continuous prenatal care; to recognize diabetes and hypertension early so that treatment can be started; to identify intimate partner abuse to prevent further abuse; and to receive prompt health care if any symptoms are present in the future.

Hyperemesis Gravidarum

Approximately 80% or more women experience nausea and vomiting during their pregnancy (Edelman & Logan, 2004). The term *morning sickness* is often used to describe this condition when symptoms are relatively mild. Such symptoms usually disappear after the first trimester. This mild form mostly impacts the quality of life of the woman and her family, whereas the severe form—hyperemesis gravidarum—results in dehydration, electrolyte imbalance, and the need for hospitalization (Koren & Maltepe, 2004).

Unlike morning sickness, **hyperemesis gravidarum** is a complication of pregnancy characterized by persistent, uncontrollable nausea and vomiting before the 20th week of gestation. This complication can lead to dehydration, acid–base imbalances, electrolyte imbalances, and weight loss. If it continues, it jeopardizes fetal well-being (Green & Wilkinson, 2004).

The incidence of hyperemesis is estimated to occur in approximately 1% of pregnant women. The prevalence

increases in molar and multiple pregnancies. Its peak incidence occurs between 8 weeks and 12 weeks of pregnancy, usually resolving by week 16 (Garcia, 2003).

Causes

The cause of nausea and vomiting is unknown. Although theories abound, few studies have produced scientific evidence that determine the etiology of this condition. It is likely that multiple factors contribute to it.

Elevated levels of hCG are present in all pregnant women during early pregnancy, usually declining after 12 weeks. This corresponds to the usual duration of morning sickness. In hyperemesis gravidarum, the hCG levels are often higher and extend beyond the first trimester. Symptoms exacerbate the disease. Decreased fluid intake and prolonged vomiting cause dehydration; dehydration increases the serum concentration of hCG, which in turn exacerbates the nausea and vomiting—a vicious cycle. A few other theories that have been proposed to explain its etiology include

- Endocrine theory—high levels of hCG and estrogen during pregnancy
- Metabolic theory—vitamin B6 deficiency
- Psychological theory—psychological stress increasing the symptoms

Regardless of etiology, the client with hyperemesis gravidarum is extremely uncomfortable.

Risk factors associated with hyperemesis gravidarum include young age, nausea and vomiting with previous pregnancy, history of intolerance of oral contraceptives, multiple gestation, emotional or psychological stress, gastroesophageal reflux disease, primigravida status, obesity, hyperthyroidism, and *Helicobacter pylori* seropositivity (Swearingen, 2004).

Clinical Manifestations

Symptoms of hyperemesis gravidarum include, but are not limited to, disturbed nutrition, severe vomiting, electrolyte imbalance, ketosis, acetonuria, and weight loss greater than 5% of body mass. If it progresses untreated, it may cause neurologic disturbance, renal damage, retinal hemorrhage, or death (Christopher, 2003). In addition, it is exhausting and emotionally distressing.

Other common symptoms include ptyalism (excessive salivation), fatigue, weakness, and dizziness. Additionally, sleep disturbance, depression, anxiety, irritability, mood changes, and decreased ability to concentrate can add to the woman's emotional distress (Michellini, 2004).

The results of diagnostic studies may provide clues to the severity of the disorder: These may include

- Liver enzymes—elevations of aspartate aminotransferase (AST) and alanine aminotransferase (ALT) usually present

- CBC—elevated levels of RBCs and hematocrit denoting dehydration
- Urine ketones—positive when the body breaks down fat to provide energy in the absence of inadequate intake
- Blood, urea, nitrogen (BUN)—increased in the presence of salt and water depletion
- Urine specific gravity—greater than 1.025, possibly indicating concentrated urine linked to inadequate fluid intake or excessive fluid loss
- Serum electrolytes—decreased levels of potassium, sodium, and chloride resulting from excessive vomiting and loss of hydrochloric acid in stomach (Swearingen, 2004)

Treatment

Conservative management in the home is the first line of treatment for the woman with hyperemesis gravidarum. This usually focuses on dietary and lifestyle changes.

If conservative management fails to alleviate the client's symptoms, and nausea and vomiting continue, hospitalization is necessary to reverse the effects of severe nausea and vomiting.

On admission to the hospital baseline, blood tests are ordered to assess the severity of the client's dehydration, electrolyte imbalance, ketosis, and malnutrition. Parenteral fluid and drug therapy are ordered to rehy-

drate and reduce the symptoms. The first choice for fluid replacement is generally 5% dextrose in lactated Ringer's solution with vitamins and electrolytes added. Oral food and fluids are withheld for the first 24 to 36 hours to allow the GI tract to rest. Antiemetics may be administered orally, rectally, or intravenously to control the nausea and vomiting. Because the woman is initially considered "NPO," no food or fluids orally, her medication is administered parenterally or rectally until she is stabilized.

If the client does not improve after several days of bed rest, "gut rest," IV fluids, and antiemetics, total parenteral nutrition or percutaneous endoscopic gastrostomy tube feeding is instituted to prevent malnutrition.

The FDA has not approved any drugs for the treatment of nausea and vomiting in pregnancy, but the risk of administration must be balanced against the sequelae of prolonged starvation and dehydration. Finding a drug that works for any given client is largely a matter of trial and error. A client for whom one drug is ineffective may be helped by another class of drugs with a different mechanism of action. Promethazine (Phenergan) and prochlorperazine (Compazine) are among the older preparations usually tried first. If they fail to relieve symptoms, newer drugs such as ondansetron (Zofran) may be tried. Most drugs are given parenterally or rectally (Garcia, 2003) (see Drug Guide 19-2).

Drug Guide 19-2 Medications Used for Hyperemesis Gravidarum

Drug	Action	Indications	Nursing Implications
Promethazine (Phenergan)	Diminishes vestibular stimulation and acts on the chemoreceptor trigger zone (CTZ)	Symptomatic relief of nausea and vomiting, and motion sickness	Be alert for urinary retention, dizziness, hypotension, and involuntary movements Institute safety measures to prevent injury secondary to sedative effects Offer hard candy and frequent rinsing of mouth for dryness
Prochlorperazine (Compazine)	Acts centrally to inhibit dopamine receptors in the CTZ and peripherally to block vagus nerve stimulation in the GI tract	Controls severe nausea and vomiting	Be alert for abnormal movements and for neuroleptic malignant syndrome such as seizures, hyper-/hypotension, tachycardia, and dyspnea Assess mental status, intake/output Caution patient not to drive as a result of drowsiness or dizziness Advise to change position slowly to minimize effects of orthostatic hypotension
Ondansetron (Zofran)	Blocks serotonin peripherally, centrally, and in the small intestine	Prevents nausea and vomiting	Monitor for possible side effects such as diarrhea, constipation, abdominal pain, headache, dizziness, drowsiness, and fatigue Monitor liver function studies as ordered

Sources: Skidmore-Roth, 2005; Spratto & Woods, 2005.

Few women receive complete relief of symptoms from any one therapy. Complementary treatments appeal to many to help supplement traditional ones. More popular therapies include acupressure, massage, therapeutic touch, ginger, and the wearing of seabands to prevent nausea and vomiting. Recent research has reported a positive effect of using acupressure over the Neiguan point on the wrist by Sea-bands to control nausea and vomiting associated with pregnancy (Steele et al., 2001).

Nursing Management

By the time clients are admitted to the hospital, many are exhausted, frustrated, and anxious. Nursing care focuses on providing comfort and emotional support to these distraught clients. Offer reassurance that all interventions are directed toward promoting positive pregnancy outcomes for both the woman and her fetus. Providing information about the expected plan of care may help to alleviate the client's anxiety. Attempting to provide the client a sense of control may help her overcome the feeling that she is "losing it" resulting from this condition.

Assessment

Nursing assessment related to hyperemesis gravidarum would begin with identifying the duration and course of the woman's nausea and vomiting, medications or treatments used and their efficacy, and specific signs and symptoms experienced. This information will help establish a baseline to make progressive comparisons of the current situation. Additional assessments will focus on identifying signs and symptoms of fluid and electrolyte imbalances and nutritional deficiencies by assessing the woman's mucus membranes for dryness, skin turgor for dehydration, low blood pressure, signs of weakness, and weight loss since this condition started. Additionally, assess for

- Anorexia, indigestion, abdominal pain or distension, and passage of blood or mucus rectally
- Daily weight, comparing prepregnancy weight with current weight to determine total loss
- Dietary intake by requesting a diet recall for past week
- Activity tolerance through job activities or daily exercise routine
- Knowledge of basic four food group and typical consumption patterns that may or may not trigger GI distress
- Intake and output for the previous 24 hours
- Type and amount of nutritional supplements taken
- Laboratory and diagnostic test results to validate dehydration and electrolyte imbalances
- Pain-precipitating factors the woman may be experiencing
- Client's perception of situation and future needs
- Support systems available to the client that can offer help

Nursing Interventions

Nursing interventions focus on controlling the woman's nausea and vomiting, promoting adequate nutrition,

improving the client's fluid and electrolyte balance, and providing comfort and support during this time. The following interventions may be included:

- Administer antiemetics as ordered and assess their effectiveness.
- Administer and maintain IV fluid and electrolyte replacements as ordered; monitor rate and sites of IV therapy to prevent complications.
- Monitor intake and output, including oral food and fluid intake when allowed.
- Evaluate the results of laboratory studies to determine effectiveness of treatment.
- Provide physical comfort measures, including environmental, hygiene (such as keeping the area free from pungent odors), and oral care.
- Reassure the client that treatment plan is in the best interest for the family unit.
- Encourage therapeutic lifestyle changes, such as avoiding stressors and fatigue that may trigger nausea and vomiting.
- Offer ongoing support and encouragement, empowering the client and her family with knowledge and choices.
- Involve the client and family in all decisions concerning care.
- Listen to concerns and feelings, and answer all questions asked honestly.
- Educate about the probable etiology of her condition and treatment options (see Teaching Guidelines 19-1).
- Refer the client to a spiritual leader or counseling as needed.



TEACHING GUIDELINES 19-1

Teaching to Minimize Nausea and Vomiting

- Avoid noxious stimuli—such as strong flavors, perfumes, or strong odors such as frying bacon—that might trigger nausea and vomiting.
- Avoid tight waistbands to minimize pressure on abdomen.
- Eat small, frequent meals throughout the day—six small meals.
- Separate fluids from solids by consuming fluids in between meals.
- Avoid lying down or reclining for at least 2 hours after eating.
- Use high-protein supplement drinks.
- Avoid foods high in fat.
- Increase your intake of carbonated beverages.
- Increase your exposure to fresh air to improve symptoms.
- Eat when you are hungry, regardless of normal mealtimes.
- Drink herbal teas containing peppermint or ginger.
- Avoid fatigue and learn how to manage stress in life.
- Schedule daily rest periods to avoid becoming overtired.
- Eat foods that settle the stomach, such as dry crackers, toast, or soda

- Arrange for possible home care follow-up and reinforce home care on discharge to ensure understanding.
- Refer to local or national support organizations for additional information.
- Collaborate with community resources to ensure continuing care.

Gestational Hypertension

Gestational hypertension is characterized by hypertension without proteinuria after 20 weeks of gestation and a return of the blood pressure to normal postpartum. Previously, gestational hypertension was known as pregnancy-induced hypertension or toxemia of pregnancy, but these terms are no longer used. Gestational hypertension is clinically characterized by a blood pressure of 140/90 mmHg or more, on two occasions at least 6 hours apart (Youngkin & Davis, 2004). Gestational hypertension can be differentiated from *chronic hypertension*, which appears before the 20th week of gestation; or hypertension before the current pregnancy, which continues after giving birth.

Gestational hypertension is the leading cause of maternal death in the United States and the most common complication reported during pregnancy. Hypertension complicates 12 to 20% of pregnancies and has increased steadily, approximately 30 to 40% since 1990 for all ages, races, and ethnic groups (Martin et al., 2002). The highest rates of occurrence in women are those who are younger than 20 years and older than 40 years old (Mattson & Smith, 2004).

Classifications

The classification system used in the United States is based on reports from ACOG (2002) and the National High Blood Pressure Education Program (2000). Hypertension may be a preexisting condition (chronic hypertension) or it

may present for the first time during pregnancy (gestational hypertension). Regardless of its onset, it jeopardizes the well-being of the mother as well as the fetus. The classification of hypertensive disorders in pregnancy currently consists of four categories, as described in Table 19-2.

Gestational hypertension can be classified as preeclampsia or **eclampsia**. Each is associated with specific criteria. Preeclampsia is clinically defined as a blood pressure greater than 140/90 mmHg after 20 weeks' gestation plus proteinuria (300 mg/24 hours or greater than 1+ protein on a dipstick sample of urine collected at random) (Bridges, Womble, Wallace, & McCartney, 2003). With *severe preeclampsia*, the blood pressure is higher than 160/110 mmHg on two occasions at least 6 hours apart. Proteinuria is greater than 500 mg in 24-hour urine collection, and oliguria (<500 mL in 24 hours) is present. Other symptoms that also present in severe preeclampsia include pulmonary edema or thrombocytopenia with or without liver damage, cerebral or visual disturbances, epigastric or right upper quadrant pain, and fetal growth restriction (Johnson, 2003). Eclampsia is the onset of seizure activity or coma in the woman diagnosed with preeclampsia, with no history of preexisting pathology, that can result in seizure activity (ACOG, 2002).

Causes

Gestational hypertension remains an enigma. The condition can be devastating to both the mother and her unborn child, and yet the etiology still remains a mystery to medical science, despite decades of research. Many different theories regarding it exist, but none have truly explained the widespread pathologic changes that result in pulmonary edema, oliguria, seizures, thrombocytopenia, and abnormal liver enzymes (Sibai, 2003). Despite the results of several research studies, the use of aspirin or supplementation

Table 19-2 Classification of Hypertensive Disorders

Type	Description
Gestational hypertension	Blood pressure elevation (140/90 mmHg) identified after midpregnancy without proteinuria
Preeclampsia	Pregnancy-specific syndrome occurring after 20 weeks' gestation with gestational hypertension plus proteinuria
Eclampsia	Seizure state in a woman with preeclampsia that cannot be attributed to any other cause
Chronic hypertension	Hypertension prior to the pregnancy or diagnosed before week 20 of gestation
Transient hypertension	Hypertension without preeclampsia at the time of birth, during labor, or within 24 hours postpartum; resolution within 12 weeks postpartum to normotensive blood pressure levels
Chronic hypertension with preeclampsia	Chronic hypertension with new proteinuria or exacerbation of previously controlled blood pressure, or proteinuria, thrombocytopenia, or elevated liver enzymes

Adapted from ACOG, 2002, and Blackburn, 2003.

with calcium, vitamins C and E, magnesium, zinc, or fish oils has not proved to prevent this destructive condition.

Factors associated with an increase risk for developing gestational hypertension have been identified and include

- Primigravida status
- History of preeclampsia in a previous pregnancy
- Excessive placental tissue, as is seen in women with GTD and multiple gestations
- Family history of preeclampsia (mother or sister)
- Lower socioeconomic group
- History of diabetes, hypertension, or renal disease
- Women with poor nutrition
- African-American ethnicity
- Age extremes of younger than 17 years or older than 35 years old
- Obesity (Green & Wilkinson, 2004)

Pathophysiologic Events

Vasospasm and hypoperfusion are the underlying mechanisms involved with this disorder. Several other changes are associated with gestational hypertension. Endothelial injury occurs, leading to subsequent platelet adherence, fibrin deposition, and the presence of schistocytes (fragment of an erythrocyte). Generalized vasospasm results in elevation of blood pressure and reduced blood flow to the brain, liver, kidneys, placenta, and lungs. Decreased liver perfusion leads to impaired liver function and subcapsular hemorrhage. This is demonstrated by epigastric pain and elevated liver enzymes in the maternal serum. Decreased brain perfusion leads to small cerebral hemorrhages and symptoms of arterial vasospasm such as headaches, visual disturbances, blurred vision, and hyperactive deep tendon reflexes (DTRs). A thromboxane/prostacyclin imbalance leads to increased thromboxane (potent vasoconstrictor and stimulator of platelet aggregation) and decreased prostacyclin (potent vasodilator and inhibitor of platelet aggregation), which contribute to the hypertensive state. Decreased kidney perfusion reduces GFR, resulting in decreased urine output and increased serum levels of sodium, BUN, uric acid, and creatinine, which further increases extracellular fluid and edema. Increased capillary permeability in the kidneys allows albumin to escape, which reduces plasma colloid osmotic pressure and moves more fluid into extracellular spaces, and leads to pulmonary edema and generalized edema. Poor placental perfusion resulting from prolonged vasoconstriction helps to contribute to intrauterine growth restriction, premature separation of the placenta (abruptio placenta), persistent fetal hypoxia, and acidosis. In addition, hemoconcentration (resulting from decreased intravascular volume) causes increased blood viscosity and elevated hematocrit (ACOG, 2002).

Clinical Manifestations

The significant signs of gestational hypertension—proteinuria and hypertension—occur without the woman's

awareness. Unfortunately, by the time symptoms are noticed, gestational hypertension can be severe. The absolute blood pressure (value that validates elevation) of 140/90 mmHg should be obtained on two occasions 6 hours apart to be diagnostic of gestational hypertension.

Proteinuria develops later than hypertension and is defined as 300 mg or more of urinary protein per 24 hours or more than 1+ protein by chemical reagent strip or dipstick of at least two random urine samples collected at least 6 hours apart with no evidence of UTI (ACOG, 2002). Although edema is not a cardinal sign of preeclampsia, weight should be monitored frequently to identify sudden gains within a short time span. Current research relies less on the classic triad of symptoms (hypertension, proteinuria, and edema or weight gain) and more on decreased organ perfusion, endothelial dysfunction (capillary leaking and proteinuria), and elevated blood pressure as key indicators (Mattson & Smith, 2004).

Preeclampsia is characterized by generalized vasospasm, a decrease in circulating blood volume, and an activation of the coagulation system. Clinically, these changes present as hypertension and decreased perfusion to the placenta, kidneys, liver, and brain (National High Blood Pressure Education Program, 2000). The fetus can be severely affected by poor perfusion, especially to the uterus and thus the placenta.

Preeclampsia is categorized as mild or severe, or as complicated by the HELLP syndrome (discussed later in this chapter). In mild preeclampsia, the diastolic blood pressure is less than 100 mmHg, proteinuria is 1 or 2+ protein by dipstick, many women will demonstrate edema in the face and hands, and weight gain is noted. Mild preeclampsia can progress rapidly to the more severe form. Preeclampsia can place the woman at risk for eclampsia, abruptio placenta, DIC, liver and/or renal failure, pulmonary edema, and cerebral hemorrhage (Brooks, 2005). Women who have progressed to severe preeclampsia may present with any of the following:

- Diastolic blood pressure of 110 mmHg or higher
- Proteinuria less than 5 g protein excreted in a 24-hour specimen or a persistent greater than 2+ or 3+ on a dipstick measurement
- Increased hematocrit, creatinine, and uric acid levels
- Thrombocytopenia with a platelet count less than 100,000 platelets/mm³
- Oliguria of less than 400 mL in 24 hours
- Epigastric or right upper quadrant pain linked to swelling of hepatic capsule
- Cerebral or visual disturbances—altered level of consciousness, headache, blurred vision, and scotomata (blind spots)
- Hyperreflexia of DTRs
- Markedly elevated liver enzymes
- Pulmonary edema with cyanosis
- Fetal growth restriction (ACOG, 2002; Sibai, 2003)

Table 19-3 compares mild and severe preeclampsia.

Table 19-3 Comparison of Clinical Manifestations: Mild vs. Severe Preeclampsia

Clinical Picture	Mild	Severe
Blood pressure, mmHg	140/90	160/110+
Urine for protein	2+	3+ to 4+
Urinary output, mL/hour	>30	<20
Pulmonary edema	Negative	Can be present
HELLP syndrome	Negative	Can be present

Eclampsia describes a condition during which a woman with preeclampsia develops seizures or goes into a coma. Its development is a major concern because maternal–fetal mortality or morbidity is very high. Signs and symptoms of eclampsia include tonic–clonic seizure activity, headache, hyperactive reflexes, marked proteinuria, generalized edema, visual disturbances, and right upper quadrant pain or epigastric pain. Twenty-five percent of eclampsia cases occur prenatally, 50% occur during labor, and 25% occur during the postpartal period (Fugate & Chow, 2004).

Eclampsia can lead to cerebral hemorrhage, pulmonary edema, and renal failure, and is associated with HELLP syndrome (Morgan, 2002). It develops after the 20th week of gestation and is considered a complication of severe preeclampsia. Eclampsia is a Greek word, meaning “bolt from the blue,” which describes this condition well. The woman may have one or more seizures, generally lasting 60 to 75 seconds. The mechanisms leading to the development of seizures in women with eclampsia may include cerebral edema, ischemia, hemorrhage, or vasospasm. Severe headache and hyperreflexia are typically clinical precursors of eclamptic seizures (Longo, Dola, & Pridjian, 2003).

Although preeclampsia is not preventable, theoretically eclampsia should be preventable by identifying most cases of preeclampsia and swiftly delivering the newborn before seizures start.

Treatment

Antepartum Management

Conservative strategies for mild preeclampsia are used if the woman exhibits no signs of renal or hepatic dysfunctions or coagulopathy. A woman with mild elevations in blood pressure may be placed on rest at home. She is encouraged to rest as much as possible in the lateral recumbent position to improve uteroplacental blood flow, reduce her blood pressure, and promote diuresis. In addition, frequency of antepartal visits and diagnostic testing—such as CBC, clotting studies, liver enzymes, and platelet

levels—will increase. The woman will be asked to monitor her blood pressure daily (every 4–6 hours while awake) and report any increased readings, amount of protein found in urine using a dipstick, and weight gain. Daily fetal movement counts also are implemented. If there is any decrease in movement, the woman needs to be evaluated by her health care provider that day. A balanced, nutritional diet with no sodium restriction is advised. In addition, she is encouraged to drink six to eight 8-oz glasses of water daily.

If home management fails to reduce the blood pressure, admission to the hospital is warranted and the treatment strategy is individualized based on the severity of the condition and gestational age at the time of diagnosis. During the course of hospitalization, the woman with mild preeclampsia is monitored closely for signs and symptoms of severe preeclampsia or impending eclampsia (e.g., persistent headache, hyperreflexia). Blood pressure measurements are frequently recorded along with daily weights to detect excessive weight gain resulting from edema. Fetal surveillance is instituted in the form of daily fetal movement counts, nonstress testing, and serial ultrasounds to evaluate fetal growth and amniotic fluid volume to confirm fetal well-being. Expectant management usually continues until the pregnancy reaches term, the fetal lung maturity is documented, or complications develop that warrant immediate birth (Morley, 2004).

Severe preeclampsia may develop suddenly and bring with it high blood pressure of more than 160/110 mmHg, proteinuria of more than 5 g in 24 hours, oliguria of less than 400 mL in 24 hours, cerebral and visual symptoms, and rapid weight gain. This clinical picture signals severe preeclampsia, and immediate hospitalization is needed. After the woman is hospitalized for management of severe preeclampsia, the course of treatment is highly individualized and based on disease severity and fetal age. Birth of the infant is the only cure, because preeclampsia depends on the presence of trophoblastic tissue. Therefore, the exact age of the fetus is assessed to determine viability.

Severe preeclampsia is treated aggressively, because hypertension poses a serious threat to mother and fetus. The goal of care is to stabilize the mother–fetus dyad and prepare for birth. Therapy focuses on controlling hypertension, preventing seizures, preventing long-term morbidity, and preventing maternal, fetal, or newborn death (Mattson & Smith, 2004). Intense maternal and fetal surveillance starts when the mother enters the hospital and continues throughout her stay.

Eclamptic seizures are life-threatening emergencies and require immediate treatment to decrease maternal morbidity and mortality. In the woman who develops an eclamptic seizure, the convulsive activity begins with facial twitching followed by generalized muscle rigidity. Respirations cease for the duration of the seizure, resulting from muscle spasms, thus compromising fetal oxygenation. Coma usually follows the seizure activity with respiration resuming.

As with any seizure, the initial management is to clear the airway and administer adequate oxygenation. Positioning the woman on her left side and protecting her from injury during the seizure are key. Suction equipment must be readily available to remove secretions from her mouth after the seizure is over. IV fluids should be administered after the seizure at a rate to replace urine output and additional insensible losses. Fetal heart rate is monitored closely. Magnesium sulfate is administered intravenously to decrease and prevent further seizures from occurring. Hypertension is controlled with administration of antihypertensive medications. After the seizures are controlled, stability of the woman is assessed and birth via induction or cesarean birth is planned (Brooks, 2004).

Intrapartum Management

Intrapartum management of a woman with mild preeclampsia focuses on prevention of disease progression by frequent, consistent monitoring of blood pressure. On admission to the labor and birth suite, baseline vital signs, weight, DTRs, fetal heart rate, edema amount and location, proteinuria, and lung sounds are determined. Recent laboratory test results also are reviewed.

A quiet environment is important to minimize the risk of stimulation and to promote rest. IV magnesium sulfate is infused to prevent any seizure activity, along with antihypertensives if blood pressure values begin to elevate. Calcium gluconate is kept at the bedside in case the magnesium level becomes toxic. Continued close monitoring of neurologic status is warranted to detect any signs or symptoms of hypoxemia, impending seizure activity, or increased intracranial pressure. An indwelling urinary (Foley) catheter usually is inserted to allow for accurate measurement of urine output.

Intrapartum management of a woman with severe preeclampsia presents a challenge for the entire health-care team. Oxytocin is used to stimulate uterine contractions, and magnesium sulfate is infused to prevent seizure activity. Oxytocin and magnesium sulfate can be given simultaneously via infusion pumps to ensure both are administered at the prescribed rate. The client is evaluated closely for magnesium toxicity. If at all possible, a vaginal delivery is preferable to a cesarean birth. PGE2 gel may be used to ripen the cervix. A cesarean birth may be performed if the client is seriously ill. A pediatrician/neonatologist must be available in the birthing room to care for the newborn. A newborn whose mother received high doses of magnesium sulfate needs to be monitored for respiratory depression, hypocalcemia, and hypotonia (Shennan, 2003).

Postpartum Management

Postpartum management of the client with preeclampsia or eclampsia continues until discharge. During this time, the woman is monitored as closely as before because her condition can still deteriorate. This risk can be enhanced

by normal postpartum diuresis, which decreases the level of magnesium, subsequently leading to seizures. Usually the client improves rapidly, but still needs careful monitoring. Infusion of magnesium sulfate continues for at least 24 to 48 hours to prevent seizure activity. Frequent close surveillance of the client for signs of preeclampsia-eclampsia is continued in conjunction with routine postpartum assessments. Special attention should be paid to the fundal assessment because magnesium sulfate inhibits uterine tone, placing the client at risk for postpartum hemorrhage. Close surveillance after birth is critical because many complications, such as acute renal failure, pulmonary edema, seizures, liver failure, DIC, or cerebral hemorrhage, can occur. There is a direct correlation between severity of the disease and the length of time for recovery (Gilbert & Harmon, 2003).

Nursing Management

Assessment

Preventing hypertension-induced complications in pregnancy requires nurses to use their assessment, advocacy, and counseling skills. Assessment begins with the accurate measurement of the client's blood pressure at each encounter. In addition, nurses need to assess for subjective complaints that may indicate progression of the disease—visual changes, severe headaches, unusual bleeding or bruising, or epigastric pain (Peters & Flack, 2004).

Take a thorough history during the first antepartal visit to identify those women at risk for preeclampsia. In addition, complete a nutritional assessment that includes the woman's usual intake of protein, calcium, daily calories, and fluids. Women at risk for preeclampsia require more frequent prenatal visits throughout their pregnancy, and they require teaching about problems so that they can report them promptly.

At every antepartal visit, assess the fetal heart rate with a Doppler device, obtain maternal blood pressure, check a clean-catch urine specimen for protein using a dipstick, obtain the client's weight (noting gain since last visit and amount), and assess for amount and location of edema. Asking questions such as "Do your rings still fit on your fingers?" or "Is your face puffy when you get up in the morning?" will help to determine whether fluid retention is present or if the woman's status has changed since her last visit.

The supine pressor test, or *rollover test*, can be given between 28 weeks and 32 weeks' gestation. It is a screening tool to help identify asymptomatic clients who will likely develop preeclampsia. With this test, blood pressure is obtained at the brachial artery with the woman in the lateral recumbent position. She is then asked to roll over onto her back and her blood pressure is measured immediately and again in 5 minutes. An increase of 20 mmHg or greater in diastolic blood pressure is a positive indicator of potential preeclampsia (Harvey, 2004).

The *tolerance-hyperbaric test* (THT) is a more sensitive test that can detect gestational hypertension and preeclampsia risk at an earlier time than when clinical signs appear. This test can be done during the first trimester to identify a woman's risk for the development of preeclampsia, thus allowing for early intervention. The woman wears a portable blood pressure cuff and monitor, which records intermittent blood pressure readings during a 48-hour period. The THT compares actual recordings with the expected variation in blood pressure, allowing for detection of those women whose blood pressure is repeatedly outside the expected range (Hermida & Ayala, 2003).

In addition, blood pressures must be carefully and consistently measured to be meaningful. Obtain all measurements with the woman in the same position (blood pressure is highest in the sitting position and lowest in the side-lying position) and by using the same technique (automated vs. manual). This standardization in position and technique will yield the most accurate readings for determining treatment decisions (Bridges et al., 2003).

The woman with severe preeclampsia or who develops eclampsia is hospitalized. Nursing assessments are carried out frequently to monitor disease progress and the client's response to the therapy. These include assessing for edema, and evaluating the woman's overall health status, DTRs, and results of laboratory studies.

Assess edema for distribution, degree, and pitting. Document your findings and identify whether the edema is dependent or pitting. Dependent edema is present on the lower half of the body if the client is ambulatory, where hydrostatic pressure is greatest. It is usually observed in the feet and ankles or in the sacral area if the client is on bed rest.

Pitting edema is edema that leaves a small depression or pit after finger pressure is applied to a swollen area (Lowdermilk & Perry, 2004). Record the depth of pitting demonstrated when pressure is applied. Although subjective, the following is used to record relative degrees:

- 1+ pitting edema = 2-mm depression into skin; disappears rapidly
- 2+ pitting edema = 4-mm skin depression; disappears in 10 to 15 seconds
- 3+ pitting edema = 6-mm depression into skin; lasts more than 1 minute
- 4+ pitting edema = 8-mm depression into skin; lasts 2 to 3 minutes

If the client is receiving magnesium sulfate to suppress or control seizures, assess DTRs to determine the effectiveness of therapy. Clients with preeclampsia commonly present with hyperreflexia. Severe preeclampsia causes changes in the cortex, which disrupts the equilibrium of impulses between the cerebral cortex and the spinal cord. Brisk reflexes (hyperreflexia) are the result of an irritable cortex and indicate central nervous system involvement (Nick, 2003). Diminished or absent reflexes occur when the client develops magnesium toxicity. Because magnesium is a potent neuromuscular blockade, the afferent and efferent nerve pathways do not relay messages properly and hyporeflexia develops. Common sites used to assess DTRs are biceps reflex, triceps reflex, patellar reflex, Achilles reflex, and plantar reflex. Nursing Procedure 19-1 highlights the steps for assessing the patellar reflex.

The National Institute of Neurological Disorders and Stroke (NINDS), a division of the National Institutes

Nursing Procedure 19-1

Assessing the Patellar Reflex

Purpose: To Evaluate for Nervous System Irritability Related to Preeclampsia

1. Place the woman in the supine position (or sitting upright with the legs dangling freely over the side of the bed or examination table).
2. If lying supine, have the woman flex her knee slightly.
3. Place a hand under the knee to support the leg and locate the patellar tendon. It should be midline just below the knee cap.
4. Using a reflex hammer or the side of your hand, strike the area of the patellar tendon firmly and quickly.
5. Note the movement of the leg and foot. A patellar reflex occurs when the leg and foot move (documented as 2+).
6. Repeat the procedure on the opposite leg.



Table 19-4 Grading Deep Tendon Reflexes

Description of Finding	Grade
Reflex absent, no response detected	0
Hypoactive response, diminished	1
Reflex in lower half of normal range	2
Reflex in upper half of normal range	3
Hyperactive, brisk, clonus present	4

Sources: Dillon, 2003; Nick, 2003; and Seidel, Ball, Dains, & Benedict, 2003.

of Health, published a scale in the early 1990s that, although subjective, is used widely today. It grades reflexes from 0 to 4+. Grades 2+ and 3+ are considered normal whereas grades 0 and 4 may indicate pathology (Table 19-4). Because these are subjective assessments, to improve communication of reflex results it is recommended that condensed descriptor categories such as absent, average, brisk, or **clonus** be used, rather than numeric codes (Nick, 2003).

Clonus is the presence of rhythmic involuntary contractions, most often at the foot or ankle. Sustained clonus confirms central nervous system involvement. Nursing Procedure 19-2 highlights the steps when testing for ankle clonus.

Also assess the woman for signs and symptoms of pulmonary edema, such as crackles and wheezing heard on auscultation, dyspnea, decreased oxygen saturation levels, cough, neck vein distention, anxiety, and restlessness (Mattson & Smith, 2004).

Assess fetal well-being continuously via electronic fetal monitoring, noting trends in baseline rate and presence or absence of accelerations or decelerations.

Nursing Interventions for Preeclampsia

Preeclampsia can have a rapid onset and quick progression. Be sure that all women are taught the signs and symptoms of preeclampsia and know how to contact their healthcare professional for immediate evaluation.

Home care can be offered to many women if their condition is mild and they have a good understanding of the disease process, are stable, have no abnormal laboratory test results, and demonstrate good fetal movement (see Teaching Guidelines 19-2). The home care nurse makes frequent visits and follow-up phone calls to assess the woman's condition, to assist with scheduling periodic evaluations of the fetus (such as nonstress tests), and to evaluate any changes that might suggest a worsening of the woman's condition.

Early detection and management of mild preeclampsia is associated with the greatest success in reducing progression of this condition. As long as the client carries out the guidelines of care as outlined by the health care provider, and she remains stable, home care can continue to maintain the pregnancy until the fetus is mature. If disease progression occurs, hospitalization is required.

Nursing Interventions for Severe Preeclampsia

To achieve a safe outcome for the fetus, prepare the woman for possible testing to evaluate fetal status as preeclampsia progresses. These may include the nonstress test, serial ultrasounds to track fetal growth, amniocentesis to deter-

Nursing Procedure 19-2

Testing for Ankle Clonus

Purpose: To Evaluate for Nervous System Irritability Related to Preeclampsia

1. Place the woman in the supine position.
2. Dorsiflex the foot and then quickly release it.
3. Watch for the foot to rebound smoothly against your hand. If the movement is smooth, then clonus is not present; if the movement is jerky and rapid, clonus is present.
4. Repeat on the opposite side.





TEACHING GUIDELINES 19-2

Teaching for the Woman With Mild Preeclampsia

- Rest in a quiet environment to prevent cerebral disturbances.
- Drink 8 to 10 glasses of water daily.
- Consume a balanced, high-protein diet including high-fiber foods.
- Obtain intermittent bed rest to improve circulation to the heart and uterus.
- Limit your physical activity to promote urination and subsequent decreased in blood pressure.
- Enlist the aid of your family so that you can obtain appropriate rest time.
- Perform self-monitoring as instructed, including
 - Taking your own blood pressure twice daily
 - Checking and recording weight daily
 - Performing urine dipstick twice daily
 - Recording the number of fetal kicks daily
- Contact the home health nurse if any of the following occurs:
 - Increase in blood pressure
 - Protein present in urine
 - Gain of more than 1 lb in 1 week
 - Burning or frequency when urinating
 - Decrease in fetal activity or movement
 - Headache (forehead or posterior neck region)
 - Dizziness or visual disturbances
 - Increase in swelling in hands, feet, legs, and face
 - Stomach pain, excessive heartburn, or epigastric pain
 - Decreased or infrequent urination
 - Contractions or low back pain
 - Easy or excessive bruising
 - Sudden onset of abdominal pain
 - Nausea and vomiting

mine fetal lung maturity, Doppler velocimetry to screen for fetal compromise, and biophysical profile to evaluate ongoing fetal well-being (London, Ladewug, Ball, & Bindler, 2003).

Other laboratory tests may be performed to monitor the disease process and to determine if it is progressing into HELLP syndrome. These include liver enzymes such as lactic dehydrogenase (LDH), ALT, and AST; chemistry panel, such as creatinine, BUN, uric acid, and glucose; CBC, including platelet count; coagulation studies, such as PT, PTT, fibrinogen, and bleeding time; and a 24-hour urine collection for protein and creatinine clearance.

In addition, the following are appropriate when caring for the woman with severe preeclampsia:

- Maintain the client on complete bed rest in the left lateral lying position.
- Monitor intake and output every hour.

- Closely monitor for signs of labor.
- Administer fluid and electrolyte replacements as ordered based on laboratory test results.
- Give sedatives as ordered to encourage quiet bed rest.
- Offer a high-protein diet with 8 to 10 glasses of water daily.
- Administer glucocorticoid treatment as ordered to enhance fetal lung maturity
- Give parenteral magnesium sulfate as ordered to prevent seizures and lower blood pressure.
- Have calcium gluconate (antidote) readily available for magnesium toxicity.
- Administer antihypertensives as ordered to reduce blood pressure (see Drug Guide 19-3).
- Perform continuous electronic fetal monitoring to assess fetal well-being. Observe for signs of fetal distress and report immediately.
- Provide a quiet, darkened room to stabilize the client.
- Institute and maintain seizure precautions, such as padding the side rails and having oxygen, suction equipment, and call light readily available to protect the client from injury.
- Continue assessing edema and DTRs.
- Monitor vital signs, fetal heart rate, vision, and level of consciousness. Report any changes and any complaints of headache or visual disturbances.
- Prepare for labor induction if condition warrants.
- Keep client and family informed of condition and provide necessary education regarding course of treatment.
- Provide emotional support for the client and family.

With magnesium sulfate administration, the client is at risk for magnesium toxicity. Closely assess the client for signs and symptoms of toxicity, including absent or weak DTRs, respirations less than 12 breaths/minute, diminished level of consciousness, drowsiness, and urinary output of less than 30 mL/hour. Also monitor serum magnesium levels. Although exact levels may vary among agencies, serum magnesium levels ranging from 4 to 7 mEq/L are considered therapeutic, whereas levels more than 8 mg/dL are generally considered toxic. As levels increase, the woman is at risk for severe problems:

- 10 mEq/L, possible loss of DTRs
- 15 mEq/L, possible respiratory depression
- 25 mEq/L, possible cardiac arrest (Yankowitz, 2004)

Severe preeclampsia is very frightening for the client and her family, and most expectant mothers are very anxious about their own health status as well as that of the fetus. Use light touch to comfort and reassure her that the necessary actions are being completed to help allay anxiety. Actively listening to her concerns and fears, and communicating them to her health care provider is important in keeping lines of communication open. Offering praise for small accomplishments can provide positive reinforcement of behaviors to be continued.

Drug Guide 19-3 Medications Used With Preeclampsia and Eclampsia

Drug	Action	Indications	Nursing Implications
Magnesium sulfate	Blockage of neuromuscular transmission, vasodilation	Prevention and treatment of eclamptic seizures, reduction in blood pressure in preeclampsia and eclampsia	Administer IV loading dose of 4–6 g over 30 minutes, continue maintenance infusion of 2–4 g/hour as ordered Monitor serum magnesium levels closely Assess DTRs and check for ankle clonus Have calcium gluconate readily available in case of toxicity Monitor for signs and symptoms of toxicity, such as flushing, sweating, hypotension, and cardiac and central nervous system depression
Hydralazine hydrochloride (Apresoline)	Vascular smooth muscle relaxant, thus improving perfusion to renal, uterine, and cerebral areas	Reduction in blood pressure	Administer 5–10 mg by slow IV bolus every 20 minutes Use parenteral form immediately after opening ampule Withdraw drug slowly to prevent possible rebound hypertension Monitor for adverse effects such as palpitations, headache, tachycardia, anorexia, nausea, vomiting, and diarrhea
Labetalol hydrochloride (Normodyne)	Alpha 1 and beta blocker	Reduction in blood pressure	Be aware that drug lowers blood pressure without decreasing maternal heart rate or cardiac output Administer IV bolus dose of 10–20 mg and then administer IV infusion of 2 mg/minute until desired blood pressure value achieved Monitor for possible adverse effects such as gastric pain, flatulence, constipation, dizziness, vertigo, and fatigue
Nifedipine (Procardia)	Calcium channel blocker/dilation of coronary arteries, arterioles, and peripheral arterioles	Reduction in blood pressure, stoppage of preterm labor	Administer 10 mg orally for three doses and then every 4–8 hours Monitor for possible adverse effects such as dizziness, peripheral edema, angina, diarrhea, nasal congestions, cough
Sodium nitroprusside	Rapid vasodilation (arterial and venous)	Severe hypertension requiring rapid reduction in blood pressure	Administer via continuous IV infusion with dose titrated according to blood pressure levels Wrap IV infusion solution in foil or opaque material to protect from light Monitor for possible adverse effects, such as apprehension, restlessness, retrosternal pressure, palpitations, diaphoresis, abdominal pain
Furosemide (Lasix)	Diuretic action, inhibiting the reabsorption of sodium and chloride from the ascending loop of Henle	Pulmonary edema	Administer via slow IV bolus at a dose of 10–40 mg over 1–2 minutes Monitor urine output hourly Assess for possible adverse effects such as dizziness, vertigo, orthostatic hypotension, anorexia, vomiting, electrolyte imbalances, muscle cramps, and muscle spasms

Nursing Interventions for Eclampsia

Eclamptic seizures are generalized and typically start with facial twitching. The body then becomes rigid, in a state of tonic muscular contraction. The clonic phase of the seizure finds the client alternating contraction and relaxation of all body muscles. Respirations stop during seizure activity and resume shortly after it ends. Client safety is the primary concern during eclamptic seizures. If possible, turn the client to her side and remain with her. Make sure that the side rails are up and padded. Dim the lights and keep the room quiet. Box 19-3 presents a helpful acronym to use when intervening with a woman who is experiencing an eclamptic seizure.

Document the time and sequence of events as soon as possible. After the seizure activity has ceased, suction the nasopharynx as necessary and administer oxygen. Continue the magnesium sulfate infusion to prevent further seizures. Ensure continuous electronic fetal monitoring, evaluating fetal status for changes. Also assess the client for uterine contractions. After the client is stabilized, delivery should be planned as soon as possible to reduce the risk of perinatal mortality.

Nursing Interventions during the Postpartum Period

Postpartum management of the woman with gestational hypertension continues until discharge. Usually the client improves rapidly, but still needs careful monitoring. Continue assessing her for signs and symptoms of preeclampsia/eclampsia for at least 48 hours. Expect to

BOX 19-3

ACRONYM FOR INTERVENING IN ECLAMPSIA

Use the following acronym to help guide interventions for the woman with eclampsia:

- S**—Safety: Place client in lateral position with side rails up; remain with client throughout seizure activity.
- E**—Establish and maintain airway: Turn client's head to side; elevate head of bed 30°; provide 100% oxygen via facial mask
- I**—IV bolus: Administer ordered magnesium sulfate, 4- to 6-g loading dose over 15 minutes, followed by 2 to 3 g/hour; if seizure reoccurs, give 2 g over 3 to 5 minutes
- Z**—Zealous observation: Document seizure activity, auras, and responses
- U**—Uterine activity: Observe for signs of precipitous labor or placental abruption
- R**—Rapid resuscitation: Prepare client for further sedation and possible mechanical ventilation in face of continued seizure activity
- E**—Evaluate fetus: Monitor fetus for nonreassuring patterns and appropriately intervene (Curran, 2003)

continue to administer magnesium sulfate infusion for 24 hours to prevent possible seizure activity, and monitor serum magnesium levels for possible toxicity.

Assess vital signs at least every 4 hours along with routine postpartum assessments—fundus, lochia, breasts, bladder, bowels, and emotional state. Pay special attention when performing the fundal assessment and assessing lochia. Magnesium sulfate inhibits uterine tone, placing the client at risk for postpartum hemorrhage. Monitor urine output closely. Diuresis is a positive sign that, along with a decrease in proteinuria, signals resolution of the disease.

HELLP Syndrome

HELLP is an acronym for hemolysis, elevated liver enzymes, and low platelets. HELLP syndrome occurs in about 20% of pregnant women diagnosed with severe preeclampsia. Although it has been reported as early as 17 weeks' gestation, most of the time it is diagnosed between 22 weeks and 36 weeks' gestation (Kidner & Flanders-Stepans, 2004). This devastating maternal hypertensive complication results in multisystem changes that can rapidly cascade into organ failure and death.

Causes

The exact etiology of HELLP syndrome is unclear. The hemolysis that occurs is termed *microangiopathic hemolytic anemia*. It is thought to happen when RBCs become fragmented as they pass through small, damaged blood vessels. Elevated liver enzymes are the result of reduced blood flow to the liver secondary to obstruction from fibrin deposits. Hyperbilirubinemia and jaundice result from liver impairment. Low platelets result from vascular damage, which are the result of vasospasm, and platelets aggregate at sites of damage, resulting in thrombocytopenia in multiple sites (Murray & McKinney, 2006).

Clinical Manifestations

Signs and symptoms of HELLP syndrome include

- Nausea (with or without vomiting)
- Malaise
- Epigastric pain
- Upper right quadrant pain
- Demonstrable edema
- Hyperbilirubinemia
- Laboratory data
 - Low hematocrit that is not explained by any blood loss
 - Elevated LDH (liver impairment)
 - Elevated AST (liver impairment)
 - Elevated ALT (liver impairment)
 - Elevated BUN
 - Elevated bilirubin level
 - Elevated uric acid and creatinine levels (renal involvement)
- Low platelet count of less than 100,000 cells/mm³

A diagnosis of HELLP syndrome is made based on laboratory test results. HELLP syndrome leads to an increased maternal risk for developing liver hematoma or rupture, stroke, cardiac arrest, seizure, pulmonary edema, DIC, subendocardial hemorrhage, adult respiratory distress syndrome, renal damage, sepsis, hypoxic encephalopathy, and maternal or fetal death (Kidner & Flanders–Stepans, 2004).

Treatment

The treatment for HELLP syndrome is based on the severity of the disease, gestational age of the fetus, and the condition of the mother and fetus. The client should be admitted or transferred to a tertiary center with a neonatal intensive care unit available. In addition, additional treatments include magnesium sulfate, antihypertensives, and correction of the woman's coagulopathies that accompany HELLP syndrome. After this syndrome is diagnosed and the woman's condition is stable, birth of the infant is indicated.

Magnesium sulfate is used prophylactically to prevent seizures. Antihypertensives such as hydralazine or labetalol are given to control blood pressure. Blood component therapy—such as fresh frozen plasma, packed RBCs, or platelets—is transfused to address the microangiopathic hemolytic anemia. Delivery may be delayed up to 96 hours to administer dexamethasone (Decadron) to stimulate fetal lung maturation in the preterm fetus.

All women experiencing this syndrome need to be counseled about its high rate of reoccurrence (25%) in subsequent pregnancies (Harvey, 2004).

Nursing Management

Nursing management of the woman diagnosed with HELLP syndrome is the same as that for the woman with severe preeclampsia. Systematic assessments are important, with the frequency of assessments dictated by the woman's condition and response to therapy.

Gestational Diabetes

Gestational diabetes is a condition involving glucose intolerance that occurs during pregnancy. It is discussed in greater detail in Chapter 20.

Blood Incompatibility

Blood incompatibility most commonly involves blood type or the Rh factor. Blood type incompatibility, also known as *ABO incompatibility*, is not as severe a condition as Rh incompatibility, because most antibodies to A and B antigens are IgM antibodies, which do not cross the placenta. It rarely causes significant hemolysis, and antepartum treatment is not warranted. Usually, the mother is blood type O, with anti-A and anti-B antibodies in her

serum; the infant is blood type A, B, or AB. The incompatibility arises as a result of the interaction of antibodies present in maternal serum and the antigen sites on the fetal RBCs. However, documentation of blood type (type O of the mother and type A or B of the father) at the first prenatal visit is important to note. After birth, the newborn will need careful evaluation and possible intervention for hyperbilirubinemia if the incompatibility manifests itself with jaundice.

Rh incompatibility is a condition that develops when a woman with Rh-negative blood type is exposed to Rh-positive blood cells and subsequently develops circulating titers of Rh antibodies. Individuals with Rh-positive blood type have the D antigen present on their RBCs, whereas individuals with an Rh-negative blood type do not. The presence or absence of the Rh antigen on the RBC membrane is genetically controlled.

In the United States, 15% of the population lack the Rh surface antigen on the erythrocyte and are considered Rh negative. The vast majority (85%) of individuals are considered Rh positive.

The most common cause of Rh incompatibility is exposure of an Rh-negative mother to Rh-positive fetal blood during pregnancy or birth, during which erythrocytes from the fetal circulation leak into the maternal circulation. After a significant exposure, alloimmunization or sensitization occurs. As a result, maternal antibodies are produced against the foreign Rh antigen. Rh sensitization occurs in approximately 1 in 1000 births to Rh-negative women (Hait, 2004).

Theoretically, fetal and maternal blood does not mix during pregnancy. In reality, however, small placental accidents (transplacental bleeds secondary to minor separation), abortions, ectopic pregnancy, abdominal trauma, trophoblastic disease, amniocentesis, placenta previa, or abruptio placenta allow fetal blood to enter the maternal circulation and initiate the production of antibodies to destroy Rh-positive blood. The amount of fetal blood necessary to produce Rh incompatibility varies. In one study, less than 1 mL Rh-positive blood was shown to result in sensitization of women who are Rh negative (Salem, 2005).

Once sensitized, it takes approximately a month for Rh antibodies in the maternal circulation to cross over into the fetal circulation. In 90% of cases, sensitization occurs during delivery (Neal, 2001). Thus, most firstborn infants with Rh-positive blood type are not affected because the short period from first exposure of Rh-positive fetal erythrocytes to the birth of the infant is insufficient to produce a significant maternal IgG antibody response.

The risk and severity of alloimmune response increases with each subsequent pregnancy involving a fetus with Rh-positive blood. A second pregnancy with an Rh-positive fetus often produces a mildly anemic infant, whereas succeeding pregnancies produce infants with more serious hemolytic anemia.

Nursing Management

At the first prenatal visit, all women should have their blood type and Rh status determined. While taking a history, note any reports of previous events involving hemorrhage to delineate risk for prior sensitization. When the client's history reveals an Rh-negative mother who may be pregnant with an Rh-positive fetus, an antibody screen (indirect Coombs test) is done to determine whether the woman has developed isoimmunity to the Rh antigen. This test detects unexpected circulating antibodies in a woman's serum that could be potentially harmful to the fetus (Schnell, Van Leeuwen, & Kranpitz, 2003). If the indirect Coombs test is negative (meaning no antibodies present), then the woman is a candidate for RhoGAM. If the test is positive, RhoGAM is of no value because isoimmunization has occurred. In this case, the fetus is carefully monitored for hemolytic disease.

The incidence of isoimmunization has declined dramatically as a result of prenatal and postnatal RhoGAM administration after any event in which blood transfer may occur. The standard dose is 300 µg, which is effective for 30 mL fetal blood. Rh immunoglobulin helps to destroy any fetal cells in the maternal circulation before sensitization occurs, thus inhibiting maternal antibody production. This provides temporary passive immunity, thereby preventing maternal sensitization. The current recommendation is that every Rh-negative nonimmunized woman receives RhoGAM at 28 weeks' gestation and again within 72 hours after giving birth. Other indications for RhoGAM include

- Ectopic pregnancy
- Chorionic villus sampling
- Amniocentesis
- Prenatal hemorrhage
- Molar pregnancy
- Maternal trauma
- Percutaneous umbilical sampling
- Therapeutic or spontaneous abortion
- Fetal death
- Fetal surgery (Youngkin & Davis, 2004)

Despite the availability of RhoGAM and laboratory tests to identify women and newborns at risk, isoimmunization cases remain a serious clinical reality that continues to contribute to perinatal and neonatal mortality. Nurses, as client advocates, are in a unique position to make sure test results are brought to the health care provider's attention so appropriate interventions can be initiated. In addition, nurses must stay abreast of current literature and research regarding isoimmunization and its management. Stress to all women that early prenatal care can help identify and prevent this condition. Nurses can make a tremendous impact to ensure positive outcomes for the greatest possible number of pregnancies through education.

Hydramnios

Amniotic fluid develops from several maternal and fetal structures, including the amnion, chorion, maternal blood, fetal lungs, GI tract, kidneys, and skin. Any alteration of one or more of the various sources will alter the amount of amniotic fluid. **Hydramnios**, also called *polyhydramnios*, is a condition in which there is too much amniotic fluid (>2000 mL) surrounding the fetus between 32 and 36 weeks. It occurs in approximately 3% to 4% of all pregnancies and is associated with fetal anomalies of development (Creasy et al., 2004). It is associated with poor fetal outcomes because of the increased incidence of preterm births, fetal malpresentation, and cord prolapse.

Causes

There are several causes of hydramnios. Generally, too much fluid is being produced, there is a problem with the fluid being taken up, or both. It can be associated with maternal disease and fetal anomalies, but it can also be idiopathic in nature. Common factors associated with hydramnios include

- Maternal diabetes
- Fetal esophageal atresia
- Fetal intestinal atresia
- Neural tube defects
- Multiple gestation
- Chromosomal deviations
- Fetal hydrops
- Central nervous defects
- Cardiovascular anomalies
- Hydrocephaly

Clinical Manifestations

With hydramnios, there is a discrepancy between fundal height and gestational age, or a rapid growth of the uterus is noted. The woman may complain of discomfort in her abdomen, such as being severely stretched and tight, and may also feel she is having uterine contractions resulting from overstretching of the uterus. She may experience shortness of breath resulting from pressure on her diaphragm and have edema in her lower extremities resulting from increased pressure on the vena cava. The fetal parts and heart rate are often difficult to obtain with the excess fluid present.

Diagnosis is made after a thorough history and physical examination with ultrasound by measuring pockets of amniotic fluid to estimate the total volume. In some cases, ultrasound is helpful in finding the etiology of hydramnios, such as multiple pregnancy or a fetal structural anomaly.

Treatment

Treatment may include close monitoring and frequent follow-up visits with the health care provider if the hydra-

mnios is mild to moderate. In severe cases in which the woman is in pain and experiencing shortness of breath, an amniocentesis or artificial rupture of the membranes is done to reduce the fluid and the pressure. A noninvasive treatment may involve the use of a prostaglandin synthesis inhibitor (indomethacin) to decrease amniotic fluid volume by decreasing fetal urinary output (Cunningham et al., 2005).

Nursing Management

Nursing management related to hydramnios focuses on ongoing assessment and monitoring of the woman for symptoms of abdominal pain, dyspnea, uterine contractions, and edema of the lower extremities. Explain to the woman and her family that this condition can cause her uterus to become overdistended and may lead to preterm labor and PROM. Outline the signs and symptoms of both conditions with instructions for the woman to contact her health care provider if they do occur. If a therapeutic amniocentesis is performed, assist the health care provider and monitor maternal and fetal status throughout for any changes.

Oligohydramnios

Oligohydramnios is a decreased amount of amniotic fluid (<500 mL) between 32 weeks and 36 weeks' gestation. This condition predisposes the fetus to increased risk of perinatal morbidity and mortality (Creasy et al., 2004). Reduction in amniotic fluid reduces the ability of the fetus to move freely without risk of cord compression, which increases the risk for fetal death and intrapartum hypoxia.

Causes

Oligohydramnios may result from several causes. Any condition that prevents the fetus from making urine or blocks it from going into the amniotic sac can lead to oligohydramnios. Factors associated with oligohydramnios include

- Uteroplacental insufficiency
- PROM prior to labor onset
- Hypertension of pregnancy
- Maternal diabetes
- Intrauterine growth restriction
- Postterm pregnancy
- Fetal renal agenesis
- Polycystic kidneys
- Urinary tract obstructions

Clinical Manifestations

Clinical manifestations associated with oligohydramnios may include leaking of amniotic fluid from the woman's vagina when the cause is rupture of the amniotic sac or suspected when the uterus is small for expected dates of gestation. Typically, the reduced volume of amniotic

fluid is identified on ultrasound because the woman may not present with any symptoms.

Treatment

The woman with oligohydramnios can be managed on an outpatient basis with serial ultrasounds and fetal surveillance through nonstress testing and biophysical profiles. As long as fetal well-being is demonstrated with frequent testing, no intervention is necessary. If fetal well-being is compromised, delivery is planned along with amnioinfusion (the transvaginal infusion of crystalloid fluid to compensate for the lost amniotic fluid). The infusion is administered in a controlled fashion to prevent overdistension of the uterus.

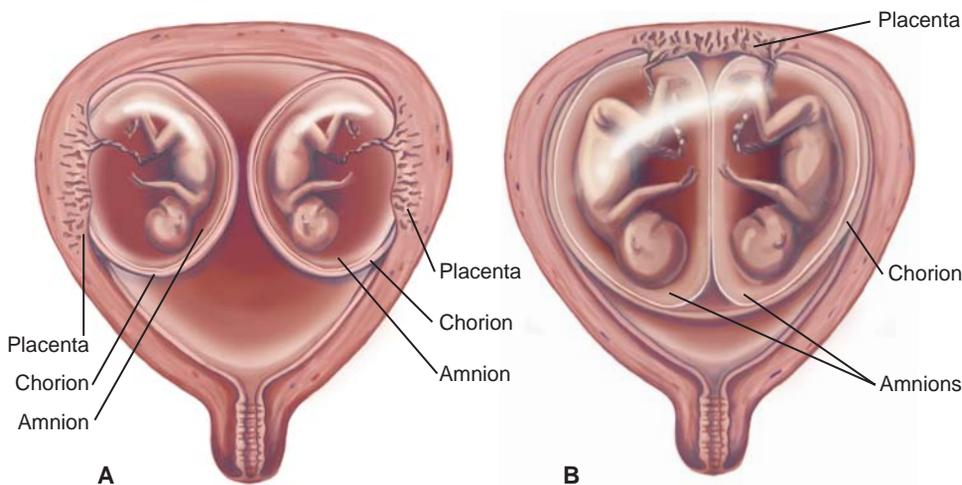
Nursing Management

Nursing management related to the woman with oligohydramnios involves continuous monitoring of fetal well-being during nonstress testing or during labor and birth by identifying nonreassuring patterns on the fetal monitor. Variable decelerations indicating cord compression is common. Changing the woman's position might be therapeutic in altering this fetal heart rate pattern. After the birth, evaluate the newborn for signs of postmaturity, congenital anomalies, and respiratory difficulty.

Multiple Gestation

Multiple gestation is defined as more than one fetus being born of a pregnant woman. This includes twins, triplets, and higher-order multiples such as quadruplets on up. In the past two decades, the number of multiple gestations in the United States has jumped dramatically because of the widespread use of fertility drugs, older women having babies, and assisted reproductive technologies to treat infertility. In the United States, the overall prevalence of twins is approximately 12 per 1000, and two thirds are dizygotic (Zach & Pramanik, 2005). The increasing number of multiple gestations is a concern because women who are expecting more than one infant are at high risk for preterm labor, hydramnios, hyperemesis gravidarum, anemia, preeclampsia, and antepartum hemorrhage. Fetal/newborn risks or complications include prematurity, respiratory distress syndrome, birth asphyxia/perinatal depression, congenital anomalies (central nervous system, cardiovascular, and GI defects), twin-to-twin transfusion syndrome (transfusion of blood from one twin [i.e., donor] to the other twin [i.e., recipient]), IUGR, and becoming conjoined twins (Zach & Pramanik, 2005).

The two types of twins are *monozygotic* and *dizygotic* (Fig. 19-6). Monozygotic twins develop when a single, fertilized ovum splits during the first 2 weeks after conception. Monozygotic twins also are called *identical twins*. Two sperm fertilizing two ova produce dizygotic twins, which are called *fraternal twins*. Separate amnions,



● **Figure 19-6** Multiple gestation with twins. **(A)** Monozygotic twins where the fetuses share one placenta, two amnions, and one chorion. **(B)** Dizygotic twins, where each fetus has its own placenta, amnion, and chorion.

chorions, and placentas are formed in dizygotic twins. Triplets can be monozygotic, dizygotic, or trizygotic.

Clinical Manifestations

Typically, with a multiple gestation, the woman's uterus is larger than that associated with her estimated date of birth. Anemia, fatigue, and severe nausea and vomiting also may be present. The diagnosis of a multiple gestation is typically made on ultrasound early in the pregnancy.

Treatment

From the point of confirmation on, the woman is followed with serial ultrasounds to assess fetal growth patterns and development. Biophysical profiles along with nonstress tests are ordered to determine fetal well-being. Many women are hospitalized in late pregnancy to prevent preterm labor and receive closer surveillance. During intrapartum, the woman is closely monitored, with a perinatal team available to assist after birth. Operative delivery is frequently needed, resulting from fetal malpresentation.

Nursing Management

Nursing management during the prenatal period focuses on education and support of the woman in areas of nutrition, increased rest periods, and close observation for pregnancy complications—*anemia, excessive weight gain, proteinuria, edema, vaginal bleeding, and hypertension*. Instruct the woman to be alert for and report immediately any signs and symptoms of preterm labor—*contractions, uterine cramping, low back ache, increase in vaginal discharge, loss of mucus plug, pelvic pain, and pressure*.

When the woman with a multiple gestation is admitted for labor and birth, expect to monitor fetal heart rates continuously. Prepare the woman for an ultrasound to assess the presentation of each fetus to determine the best delivery approach. Ensure that extra nursing staff and the perinatal team are available for any birth or newborn com-

plications. After giving birth, closely assess the woman for hemorrhage by frequently assessing uterine involution. Palpate the uterine fundus and monitor the amount and characteristics of lochia. Throughout the entire pregnancy, birth, and hospital stay, inform and support the woman and her family regarding potential concerns that might occur. Encourage them to ask questions and verbalize any fears and concerns.

Premature Rupture of Membranes

Premature rupture of membranes (PROM) is defined as the rupture of the bag of waters prior to the onset of true labor. It carries a number of associated conditions and complications, such as infection, prolapsed cord, abruptio placenta, and preterm labor. This is the single most common diagnosis associated with preterm births (Moos, 2004).

The terminology pertaining to PROM can be confusing. PROM is rupture of the membranes prior to the onset of labor and is used appropriately when referring to a woman who is beyond 37 weeks' gestation, has presented with spontaneous rupture of the membranes, and is not in labor. Related terms include preterm premature rupture of membranes (PPROM), which is defined as rupture of membranes prior to the onset of labor in a woman who is less than 37 weeks of gestation. Perinatal risks associated with PPRM may stem from immaturity, including respiratory distress syndrome, intraventricular hemorrhage, patent ductus arteriosus, and necrotizing enterocolitis. Recent studies have shown clear benefits of antibiotics to decrease neonatal morbidity associated with PPRM (Wilkes & Galan, 2004).

The incidence of PROM is approximately 10% of pregnancies (Wilkes & Galan, 2004). Prolonged rupture of membranes consists of rupture of membranes for more than 24 hours, and women are at increasing risk for infection (*chorioamnionitis, endometritis, sepsis, and neonatal*

infections) as the duration of rupture increases. The time interval from rupture of membranes to the onset of regular contractions is termed the *latent period*.

Cause

The exact mechanism of PROM is not known. However, various factors have been associated with the condition, including infection, increased uterine size (hydramnios, macrosomia, multifetal gestation), uterine and fetal anomalies, lower socioeconomic status, STIs, incompetent cervix, vaginal bleeding, and cigarette smoking during pregnancy. In many cases, however, PROM may occur in the absence of any recognized risk factors. Women who do not go into labor immediately are at increasing risk of infection as the duration of rupture increases. Chorioamnionitis, endometritis, sepsis, and neonatal infections are common sequelae.

Clinical Manifestations

The clinical picture presented by the woman with PROM may include labor symptoms (cramping, pelvic pressure, or back pain), history or symptoms of UTI (frequency, urgency, dysuria, or flank pain), history of or current symptoms of pelvic or vaginal infection (pain or vaginal discharge), and/or vital signs reflective of infection (temperature elevation and white blood cell elevation $> 18,000$ cells/mm³) (Mattson & Smith, 2004).

To determine the diagnosis of PROM, several procedures may be used: the Nitrazine test, fern test, or ultrasound. After the insertion of a sterile speculum, a sample of the fluid found in the vaginal area is obtained. With a Nitrazine test, pH of the fluid is tested; amniotic fluid is more basic (7.0) compared with normal vaginal secretions (4.5). Nitrazine paper turns blue in the presence of amniotic fluid. Unfortunately, many false positives can occur if blood, urine, semen, or antiseptic chemicals are also present. All will increase the pH.

For the fern test, a sample of vaginal fluid is placed on a slide to be viewed directly under a microscope. Amniotic fluid will develop a fern-like pattern when it dries, resulting from the amount of NaCl crystallization that occurs. If both previous tests are inconclusive, a transvaginal ultrasound can also be used to determine whether membranes have ruptured by demonstrating a decreased amount of amniotic fluid (oligohydramnios) in the uterus (Wilkes & Galan, 2004).

Treatment

Treatment of PROM typically depends on the gestational age. Under no circumstances is a digital cervical examination done until the woman enters active labor, to minimize infection exposure. If the fetal lungs are mature, induction of labor is initiated. PROM is not an indication, in and of itself, for surgical birth. If the fetal lungs

are immature, expectant management is carried out with adequate hydration, reduced physical activity, pelvic rest, and close observation for possible infection, such as with frequent monitoring of vital signs and checking the results of laboratory tests (e.g., the white blood cell count). Corticosteroids may be given to enhance fetal lung maturity, although this remains controversial.

Nursing Management

Nursing management of PROM usually depends on the gestational age and presence or absence of an intraamniotic infection (chorioamnionitis). An accurate assessment of the gestational age and knowledge of the maternal, fetal, and neonatal risks are essential to appropriate evaluation, counseling, and management of women with PROM.

Assessment

After obtaining the woman's medical and obstetric history, set up and perform fetal heart rate monitoring to check for fetal well-being, assess the woman's labor status, and conduct a vaginal examination to ascertain the cervical status in PROM. If PPROM exists, a sterile speculum examination is done rather than a digital cervical examination because it may diminish latency (period of time from rupture of membranes to birth) and increase newborn morbidity (Cunningham et al., 2005). Key assessment areas are highlighted in Box 19-4.

Assessing the characteristics of the amniotic fluid is important. Abnormal findings would include presence

BOX 19-4

KEY ASSESSMENTS WITH PREMATURE RUPTURE OF MEMBRANES

For the woman with PROM, the following assessments are essential:

- Determining the date, time, and duration of membrane rupture by client interview
- Ascertaining gestational age of the fetus based on date of mother's LMP, fundal height, and ultrasound dating
- Questioning the woman about possible history of or recent UTI or vaginal infection that might have contributed to PROM
- Assessing for any associated labor symptoms, such as back pain or pelvic pressure
- Assisting with or performing diagnostic tests to validate leakage of fluid, such as Nitrazine test, "ferning" on slide, and ultrasound
- Continually assessing for signs of infection including
 - Elevation of maternal temperature and pulse rate
 - Abdominal/uterine tenderness
 - Fetal tachycardia more than 160 bpm
 - Elevated white blood cell count and C-reactive protein
 - Cloudy, foul-smelling amniotic fluid

of meconium, minimal amount, and a foul odor. When meconium is present in the amniotic fluid, it typically indicates fetal distress related to hypoxia. Meconium stains the fluid yellow to greenish brown, depending on the amount present. A decreased amount of amniotic fluid reduces the cushioning effect, thereby making cord compression a possibility. A foul odor of amniotic fluid indicates infection.

Nursing Interventions

Nursing interventions for the woman with PROM or PPROM focus on infection prevention and identification of preterm labor contractions. The risk for infection is great, resulting from the break in the amniotic fluid membrane and its close proximity to vaginal bacteria. Therefore, monitor maternal vital signs closely. Be alert for a temperature elevation or an increase in pulse, which would indicate infection. Also monitor fetal heart rate, reporting any fetal tachycardia, which could indicate a maternal infection. Evaluate the results of laboratory tests such as a CBC. An elevation in white blood cells would suggest infection.

Additional nursing interventions include

- Administering antibiotics if ordered
- Monitoring fetal heart rate patterns continuously, reporting any variable decelerations suggesting cord compression
- Assisting with amnioinfusion to alter variable deceleration pattern per orders or according to institutional protocol
- Educating the woman and her partner on the purpose of the protective membranes and implications related to early rupture
- Continually informing the woman and her partner of planned interventions, including potential complications and required therapy
- Encouraging the client and her partner to verbalize feelings and concerns
- Preparing the woman for induction or augmentation of labor as appropriate if the woman is near term

Client education is key, especially if the woman is to be discharged home. This may be the case for the woman with PPROM. Therefore, teach the couple about the signs and symptoms of infection if the client is to be discharged home, including who and when to call for problems or concerns (see Teaching Guidelines 19-3).

Preterm Labor

Preterm labor is defined as the occurrence of regular uterine contractions accompanied by cervical effacement and dilation before 37 weeks' gestation. It occurs between 20 weeks and 37 weeks' gestation. Preterm births remain one of the most problematic situations contributing to perinatal morbidity and mortality in the world. According to the March of Dimes (March of



Teaching for the Woman With PPROM

- Monitor your baby's activity by performing fetal kick counts daily.
- Check your temperature daily and report any temperature increases to your healthcare provider.
- Watch for signs related to the beginning of labor. Report any tightening of the abdomen or contractions.
- Avoid any touching or manipulating of your breasts, which could stimulate labor.
- Do not insert anything into your vagina or vaginal area.
- Maintain any specific activity restrictions as recommended.
- Wash your hands thoroughly after using the bathroom and make sure to wipe from front to back each time.
- Keep your perineal area clean and dry.
- Take your antibiotics as directed if your healthcare provider has prescribed them.
- Call your health care provider with changes in your condition, including fever, uterine tenderness, feeling like your heart is racing, and foul-smelling vaginal discharge.

Dimes, 2005), one in eight infants born in the United States is born prematurely.

Preterm birth is one of the most common obstetric complications, and its sequelae have a profound effect on the survival and health of about one in every eight infants born in the United States annually (March of Dimes, 2004). The rate of preterm births in the United States has increased 27% in the past 20 years. Preterm births account for 75% of neurodevelopmental disorders and other serious morbidities, as well as behavioral and social problems. In addition, up to \$28 billion is spent on maternal and infant care related to prematurity (March of Dimes Birth Defects Foundation, 2003). Infants born prematurely also are at risk for serious sequelae such as respiratory distress syndrome, infections, congenital heart defects, thermoregulation problems that can lead to acidosis and weight loss, intraventricular hemorrhage, feeding difficulties resulting from diminished stomach capacity and underdeveloped suck reflex, and neurologic disorders related to hypoxia and trauma at birth (Newton, 2004). Although great strides have been made in neonatal intensive care, prematurity remains the leading cause of death within the first month of life and is the second leading cause of all infant deaths (March of Dimes, 2005).

Cause

The exact cause of preterm labor and birth is not known. Prevention is the goal. However, prevention of all preterm births is not possible because numerous risk factors exist.

Box 19-5 highlights some of the risk factors associated with preterm labor and birth.

Clinical Manifestations

Frequently, women are unaware that uterine contractions, effacement, and dilation are occurring, thus making early intervention and treatment ineffective in arresting preterm labor and preventing the birth of a premature infant. Recognizing preterm labor at an early stage requires that the expectant mother and her healthcare provider identify the subtle symptoms of preterm labor. These may include

- Change or increase in vaginal discharge
- Pelvic pressure (pushing down sensation)
- Low, dull backache
- Menstrual-like cramps
- Uterine contractions, with or without pain
- Intestinal cramping, with or without diarrhea (AAP & ACOG, 2003)

BOX 19-5

RISK FACTORS ASSOCIATED WITH PRETERM LABOR AND BIRTH

- African-American race (double the risk)
- Maternal age extremes less than 16 years and more than 40 years old
- Low socioeconomic status
- Alcohol or other drug use, especially cocaine
- Poor maternal nutrition
- Maternal periodontal disease
- Cigarette smoking
- Low level of education
- History of prior preterm birth (triples the risk)
- Uterine abnormalities, such as fibroids
- Low pregnancy weight for height
- Preexisting diabetes or hypertension
- Multiple gestation
- PROM
- Late or no prenatal care
- Short cervical length
- STIs: gonorrhea, *Chlamydia*, trichomoniasis
- Bacterial vaginosis (50% increased risk) (Newton, 2004)
- Chorioamnionitis
- Hydramnios
- Gestational hypertension
- Cervical insufficiency
- Short interpregnancy interval: less than 1 year between births
- Placental problems, such as placenta previa and abruption placenta
- Maternal anemia
- UTI
- Domestic violence
- Stress, acute and chronic (Moos, 2004)

Treatment

Predicting risk or preterm labor is only valuable if there is an available intervention that is likely to improve the situation and, according to ACOG, many factors should be considered before selecting an intervention. Many factors influence the decision to intervene when women present with symptoms of preterm labor, including the probability of progressive labor, gestational age, and the risks of treatment. ACOG (2003) recommends the following as guidelines:

- There are no clear “first-line” **tocolytic** drugs (drugs that promote uterine relaxation by interfering with uterine contraction) to manage preterm labor. Clinical circumstances and healthcare provider preference should dictate treatment.
- Antibiotics do not appear to prolong gestation and should be reserved for group B streptococcal prophylaxis in women in whom birth is imminent.
- Tocolytic drugs may prolong pregnancy for 2 to 7 days, which may allow for administration of steroids to improve fetal lung maturity and transporting the woman to a tertiary care center.

Despite the recommendations of ACOG (2003), health care providers continue to prescribe pharmacologic treatment for preterm labor at home and in the hospital setting. This treatment often includes oral or IV tocolytics and varying degrees of activity restriction. Antibiotics may also be prescribed to treat presumed or confirmed infections. Steroids may be given to enhance fetal lung maturity between 24 weeks and 34 weeks’ gestation. Commonly used tocolytics include

- Beta-adrenergics, such as ritodrine (Yutopar) and terbutaline (Brethine)
- Calcium channel blockers, such as nifedipine (Procardia)
- Prostaglandin synthetase inhibitors, such as indomethacin (Indocin; not used after 32 weeks’ gestation, because of its effects on the fetus)
- Magnesium sulfate, which reduces muscular ability to contract

Nursing Management

Nurses play a key role in reducing preterm labor and births to improve pregnancy outcomes for both mothers and their infants. Early detection of preterm labor is currently the best strategy to improve outcomes. Because of the numerous factors associated with preterm labor, it is challenging to identify and address all of them, especially when women experiencing contractions are frequently falsely reassured and not assessed thoroughly to determine the cause. This delay impedes initiation of interventions to reduce infant death and morbidity.

Preterm birth prevention programs for women at high risk have used self-monitoring of symptoms and patterns, weekly cervical examinations, telephone monitor-

ing, home visiting, and home uterine activity monitoring, alone or in combination, with mixed results (Weiss, Saks, & Harris, 2002).

Assessment

Signs and symptoms occurring between 20 weeks and 37 weeks of pregnancy that need to be assessed and evaluated further for preterm include

- Pelvic pressure (feels like the fetus is pushing down)
- Complaints of low, dull back pain
- Feelings of menstrual-like cramps
- Change or increase in vaginal discharge
- Heaviness or aching in the thighs
- Uterine contractions occurring every 10 minutes or more frequently
- Intestinal cramping, with or without diarrhea
- Fetal engagement into maternal pelvis
- Tachycardia (Freda & Patterson, 2004)

The diagnosis of preterm labor requires both uterine contractions and cervical change. The contractions must be persistent, such that four contractions occur every 20 minutes or eight contractions occur in 1 hour. Cervical effacement is 80% or greater and cervical dilation is greater than 1 cm (AAP & ACOG, 2003).

Diagnostic Methods

Currently, four tests are commonly used for preterm labor prediction: fetal fibronectin testing, cervical length evaluation by transvaginal ultrasound, salivary estriol, and home monitoring of uterine activity to recognize preterm contractions. Fetal fibronectin and cervical length examinations have a high negative predictive value and are thus better at predicting which pregnant women are unlikely to have a preterm birth as opposed to predicting those who will (Bernhardt & Dorman, 2004).

Other diagnostic testing used in preterm labor risk assessment include a CBC to detect the presence of infection, which may be a contributing factor to preterm labor; urinalysis to detect bacteria and nitrites, which are indicative of a UTI; and an amniotic fluid analysis to determine fetal lung maturity and presence of subclinical chorioamnionitis.

Fetal Fibronectin

Fetal fibronectin, a glycoprotein produced by the chorion, is found at the junction of the chorion and decidua (fetal membranes and uterus). It is present in cervicovaginal fluid prior to delivery, regardless of gestational age. It is not found in vaginal secretions unless there has been a disruption between the chorion and decidua. The test is a useful marker for impending membrane rupture within 7 to 14 days if the level increases to greater than 0.05 µg/mL. Conversely, if fetal fibronectin is not present, there is a 98% chance that the woman will not go into preterm labor (Schnell, Van Leeuwen, & Kranpitz, 2003).

A sterile applicator is used to collect a cervicovaginal sample during a speculum examination. The result is either positive (fetal fibronectin is present) or negative (fetal fibronectin is not present). Interpretation of fetal fibronectin results should always be used in conjunction with clinical findings and not used in isolation for preterm labor prediction.

Transvaginal Ultrasound

Transvaginal ultrasound of the cervix has been used as a tool to predict preterm labor in high-risk pregnancies and to differentiate between true and false preterm labor. Three parameters are evaluated during the transvaginal ultrasound: cervical length and width, funnel width and length, and percentage of funneling. Measurement of the closed portion of the cervix visualized during the transvaginal ultrasound is the single most reliable parameter for prediction of preterm delivery in high-risk women (Iams, 2003).

Cervical length varies during pregnancy. A cervical length of 3 cm or more indicates that delivery within 14 days is unlikely. Women with a short cervical length of 2.5 cm during the mid trimester have a substantially greater risk of preterm birth prior to 35 weeks' gestation (Iams & Creasy, 2004). As with fetal fibronectin testing, negative results can be reassuring and prevent unnecessary interventions (Abrahams & Katz, 2002).

Salivary Estriol

Salivary estriol is another biochemical marker that has been shown to increase before preterm labor. The woman can perform the test at home and send the sample to the lab. A value of estriol greater than 2.1 ng/mL is considered positive.

Observational studies have shown that maternal levels of estriol increase in their saliva and blood serum before the onset of spontaneous term and preterm labor. According to ACOG (2002), however, no current data support using salivary estriol screening as a strategy to identify or prevent preterm labor. The test carries a high percentage of false-positive results and has failed to establish its usefulness for anything more than investigational purposes (Ressel, 2004). Additional research is needed.

Home Uterine Activity Monitoring

Home monitoring of uterine activity can identify women in preterm labor at an early stage to reduce the rate of preterm birth (Moore, 2003). Home uterine activity monitoring does not prevent preterm labor or birth; it provides supplemental client education and clinical data for the healthcare provider in an effort to prolong gestation and maximize pregnancy outcomes through timely clinical interventions (Fig. 19-7). It involves client education, daily client assessment, data collection, data interpretation (Morrison et al., 2004).

The woman is asked to wear an ambulatory tocodynamometer and transmit data to the nurse or health-



● **Figure 19-7** The mother with preterm labor resting in bed at home.

care provider daily via telephone lines. Uterine and fetal activity data are transmitted to perinatal nurses who are available around-the-clock for detection of uterine contractions, in addition to picking up the fetal heart rate. Women are also asked to record uterine activity (uterine pressure, back pain, or cramps) they experience for an hour twice a day and then speak to a perinatal nurse who analyzes the results.

If the number of contractions exceeds a predetermined threshold, the woman drinks 8 to 12 oz of water, rests, empties her bladder, and then repeats uterine monitoring. This modality of screening remains somewhat controversial as to its real impact on preventing preterm birth.

Nursing Interventions

A reduction in the preterm birthrate cannot be achieved until there are effective strategies to predict risk for preterm birth as well as effective methods to prevent preterm births. Because the etiology is often multifactorial, an individualized approach is needed.

The signs or preterm labor are subtle and maybe disregarded by the client as well as the health care professional. Because risk assessment does not identify many women who will develop preterm labor, ensure that every pregnant woman receives basic education about preterm labor, including information about harmful lifestyles, the signs of genitourinary infections and preterm labor, and the appropriate response to these symptoms. Teach the client how to palpate for and time uterine contractions. Provide written materials to support this education at a level and in a language appropriate for the client. Also, educate clients about the importance of prenatal care, risk reduction, and recognizing the signs and symptoms of preterm labor. Teaching Guidelines 19-4 highlights important instructions related to preventing preterm labor.

Additional nursing interventions include the following activities:

TEACHING GUIDELINES 19-4

Teaching to Prevent Preterm Labor

- Avoid traveling for long distances in cars, trains, planes, or buses.
- Avoid lifting heavy objects, such as laundry, groceries, or a young child.
- Avoid performing hard, physical work, such as yard work, moving of furniture, or construction.
- Visit a dentist in early pregnancy to evaluate and treat periodontal disease.
- Enroll in a smoking cessation program if you are unable to quit on your own.
- Curtail sexual activity until after 37 weeks if experiencing preterm labor symptoms.
- Consume a well-balanced nutritional diet to gain appropriate weight.
- Avoid the use of substances such as marijuana, cocaine, and heroin.
- Identify factors and areas of stress in your life, and use stress management techniques to reduce them.
- If you are experiencing intimate partner violence, seek resources to modify the situation.

Recognize the signs and symptoms of preterm labor and notify your birth attendant if any occur:

- Uterine contractions, cramping, or low back pain
- Feeling of pelvic pressure or fullness
- Increase in vaginal discharge
- Nausea, vomiting, and diarrhea
- Leaking of fluid from vagina
- If you are experiencing any of these signs or symptoms, do the following:
 - Stop what you are doing and rest for 1 hour.
 - Empty your bladder.
 - Lie down on your side.
 - Drink two to three glasses of water.
 - Feel your abdomen and make note of the hardness of the contraction. Call your health care provider and describe the contraction as
 - Mild if it feels like the tip of the nose
 - Moderate if it feels like the tip of the chin
 - Strong if it feels like your forehead (Mattson & Smith, 2004)

- Assessing maternal and fetal vital signs frequently
- Stressing good hydration and consumption of a nutritious diet
- Advising against any activity, such as sexual activity or nipple stimulation, that might stimulate oxytocin release and initiate uterine contractions
- Encouraging clients to access their healthcare provider for reassurance
- Assessing stress levels of client and family, and making appropriate referrals

- Providing emotional support and client empowerment throughout
- Emphasizing the possible need more frequent supervision and office visits
- Raising public awareness of the problem of prematurity

Medication Administration

When preterm labor is identified because of PPROM or persistent uterine contractions accompanied by cervical change, treatment has commonly consisted of IV hydration, often accompanied by tocolytic therapy. Neither therapy has been shown to be effective for more than 48 hours. However, delaying birth for 48 hours allows time for the administration of corticosteroids to accelerate fetal lung maturity and client transfer to a medical facility where there is a neonatal intensive care unit (Newton, 2004).

Tocolytic Therapy

Tocolytics are agents that promote uterine relaxation by interfering with uterine contraction. Tocolytic therapy does not typically prevent preterm birth, but it may delay it. It is contraindicated for abruptio placenta, acute fetal distress or death, eclampsia or severe preeclampsia, active vaginal bleeding, dilation more than 6 cm, chorioamnionitis, and maternal hemodynamic instability (Harvey, 2003).

The decision to stop preterm labor is individualized, based on risk factors, extent of cervical dilation, membrane status, fetal gestational age, and presence or absence of infection. It is most likely ordered if preterm labor occurs before the 34th week of gestation, attempting to delay birth and thereby helping to reduce the severity of respiratory distress syndrome and other complications associated with prematurity. Medications most commonly used for tocolysis include magnesium sulfate, ritodrine (Yutopar), terbutaline (Brethine), indomethacin (Indocin), and nifedipine (Procardia). Ritodrine is the only FDA-approved agent for arresting preterm labor. The other drugs are used “off label.” This means they are effective for this purpose, but have not been officially tested and developed for this purpose by the FDA (Lowdermilk & Perry, 2004). All these medications have serious side effects and warrant close supervision when being administered (see Drug Guide 19-4).

Corticosteroids

Corticosteroids given to the mother in preterm labor can help prevent or reduce the frequency and severity of respiratory distress syndrome in premature infants delivered between 24 weeks and 34 weeks’ gestation. The beneficial effects of corticosteroids on fetal lung maturation have been reported within 48 hours of initial administration (Slattery & Morrison, 2002). These drugs require at least 24 hours to become effective, so timely administration is crucial.

Psychological Support

The birth of an preterm newborn can be a devastating event for family members, who may be faced with enor-

mous long-term health and social implications during childhood, and beyond. Nurses are on the front lines to provide this high-risk family with support, education, and expert nursing care.

Preterm labor and birth present multifactorial challenges for everyone involved with this crisis event. If the woman is restricted in her activities, additional stresses may be placed on the family, contributing to the crisis. Every case of spontaneous preterm labor is unique, requiring individualization of care in light of the clinical circumstances, and the full and informed consent of the woman and her partner. Half of all women who ultimately give birth prematurely have no identifiable risk factors. Nurses need to take all women’s complaints seriously and complete a thorough assessment to validate their etiology.

Work to ensure that all pregnant women have access to nurses who are sensitive to any complaint and are able to provide appropriate information and follow-up. Sensitivity to the subtle differences between normal pregnancy sensations and the prodromal symptoms of preterm labor is a key factor in ensuring timely access to care. Offer clarification and validation of their symptoms.

KEY CONCEPTS

- Identifying risk factors early on and ongoing throughout the pregnancy is important to ensure the best outcome for every pregnancy. Risk assessment should start with the first prenatal visit and continue with subsequent visits.
- The three most common causes of hemorrhage early in pregnancy (first half of pregnancy) are spontaneous abortion, ectopic pregnancy, and GTD.
- Ectopic pregnancies occur in about 1 in 50 pregnancies and have increased dramatically during the past few decades.
- Having a molar pregnancy results in the loss of the pregnancy and the possibility of developing choriocarcinoma, a chronic malignancy from the trophoblastic tissue.
- The classic clinical picture presentation for placenta previa is painless, bright-red vaginal bleeding occurring during the third trimester.
- Treatment of abruptio placenta is designed to assess, control, and restore the amount of blood lost; to provide a positive outcome for both mother and infant; and to prevent coagulation disorders.
- DIC can be described in simplest terms as a loss of balance between the clot-forming activity of thrombin and the clot-lysing activity of plasmin.
- Hyperemesis gravidarum is a complication of pregnancy characterized by persistent, uncontrollable nausea and vomiting before the 20th week of gestation.

Drug Guide 19-4 Medications Used With Preterm Labor

Drug	Action/Indication	Nursing Implications
Magnesium sulfate	Relaxes uterine muscles to stop irritability and contractions, to arrest uterine contractions for preterm labor (off-label use) Has aided in seizure prophylaxis and treatment of seizures in preeclamptic and eclamptic patients for almost 100 years (Rideout, 2005)	Administer intravenously with a loading dose of 4–6 g over 15–30 minutes initially, and then maintain infusion at 1–4 g per hour Assess vital signs and DTRs hourly; report any hypotension or depressed or absent DTRs Monitor level of consciousness; report any headache, blurred vision, dizziness, or altered level of consciousness Perform continuous electronic fetal monitoring; report any decreased fetal heart rate variability, hypotonia, or respiratory depression Monitor intake and output hourly; report any decrease in output (<30 mL/hour) Assess respiratory rate; report respiratory rate less than 12 breaths/minute; auscultate lung sounds for evidence of pulmonary edema Monitor for common maternal side effects including flushing, nausea and vomiting, drug mouth, lethargy, blurred vision, and headache Assess for complaints of nausea, vomiting, transient hypotension, lethargy Assess for signs and symptoms of magnesium toxicity, such as decreased level of consciousness, depressed respirations and DTRs, slurred speech, weakness, and respiratory and/or cardiac arrest Have calcium gluconate readily available at the bedside to reverse magnesium toxicity
Ritodrine (Yutopar)	Relaxes smooth muscles to calm the uterus, inhibits uterine activity to arrest preterm labor	Assess maternal vital signs frequently Monitor the woman for possible adverse effects including tachycardia, hypotension, palpitations, tremors, chest pain, hypokalemia, water retention, nausea, vomiting, diarrhea, hyperglycemia, decreased urinary output, and nervousness Monitor fetal status, being alert for tachycardia, heart failure, hyperglycemia, hypotension, and jaundice Be aware that side effects are dose related and will increase as dose is increased Perform cardiac assessment of woman to rule out preexisting cardiac disease and diabetes Perform continuous fetal monitoring Administer as IV infusion, at prescribed rate, increasing rate every 10–20 minutes as necessary; reduce rate gradually to lowest possible rate to stop contractions; maintain for 12–24 hours Expect to begin oral dose an hour before IV infusion is stopped; administer oral dose every 3–4 hours with meals Discontinue IV infusion if the following occur: maternal tachycardia >120 bpm, hypotension <90/60 mmHg, fetal heart rate >180 bpm, signs of maternal pulmonary edema Have propranolol (Inderal) available to reverse cardiac adverse effects

(continued)

Drug Guide 19-4 Medications Used With Preterm Labor (continued)

Drug	Action/Indication	Nursing Implications
Terbutaline sulfate (Brethine)	Relaxes smooth muscles to calm uterus, inhibits uterine activity to arrest preterm labor	<p>Be aware that this drug is usually effective in delaying birth for up to 48 hours (Rideout, 2005)</p> <p>Monitor the mother for possible adverse effects such as tachycardia, hypotension, palpitations, tremors, chest pain, hypokalemia, water retention, nausea, vomiting, diarrhea, hyperglycemia, decreased urinary output, and nervousness</p> <p>Assess fetal well-being, noting any possible adverse effects such as tachycardia, heart failure, hyperglycemia, hypotension, newborn jaundice</p> <p>Be aware that adverse effects are dose related and will increase as dose is increased</p> <p>Perform cardiac assessment of woman to rule out preexisting cardiac disease and diabetes</p> <p>Institute continuous fetal monitoring</p> <p>Assess vital signs frequently for changes</p> <p>Discontinue drug for the following: maternal tachycardia >120 bpm, hypotension <90/60 mmHg, fetal heart rate >180 bpm, signs of maternal pulmonary edema</p> <p>Have propranolol (Inderal) available to reverse cardiac adverse effects</p>
Indomethacin (Indocin)	Inhibits prostaglandins, which stimulate contractions; inhibits uterine activity to arrest preterm labor	<p>Continuously assess vital signs, uterine activity, and fetal heart rate</p> <p>Administer oral form with food to reduce GI irritation</p> <p>Do not give to women with peptic ulcer disease</p> <p>Schedule ultrasound to assess amniotic fluid volume and function of ductus arteriosus before initiation of therapy; monitor for signs of maternal hemorrhage</p> <p>Be alert for possible maternal adverse effects such as nausea, vomiting, heartburn, rash, prolonged bleeding time, oligohydramnios, and hypertension</p> <p>Monitor for possible fetal adverse effects including constriction of ductus arteriosus, premature ductus closure, necrotizing enterocolitis, oligohydramnios, and pulmonary hypertension</p>
Nifedipine (Procardia)	Blocks calcium movement into to muscle cells, inhibits uterine activity to arrest preterm labor	<p>Use caution if giving this drug with magnesium sulfate because of increased risk for hypotension</p> <p>Monitor blood pressure hourly if giving with magnesium sulfate; report a pulse rate >110 bpm</p> <p>Monitor for possible fetal effects such as decreased uteroplacental blood flow and fetal bradycardia, which can lead to fetal hypoxia</p> <p>Monitor for possible adverse effects, such as flushing of the skin, headache, transient tachycardia, palpitations, postural hypertension, peripheral edema, and transient fetal tachycardia</p>
Betamethasone (Celestone)	Promotes fetal lung maturity by stimulating surfactant production, prevents or reduces risk of respiratory distress syndrome and intraventricular hemorrhage in the preterm neonate less than 34 weeks' gestation	<p>Administer two doses intramuscularly 24 hours apart</p> <p>Monitor for possible maternal infection or pulmonary edema</p> <p>Educate parents about potential benefits of drug to preterm infant</p> <p>Assess maternal lung sounds and monitor for signs of infection</p>

- Gestational hypertension is the leading cause of maternal death in the United States and the most common complication reported during pregnancy.
- HELLP is an acronym for hemolysis, elevated liver enzymes, and low platelets.
- Rh incompatibility is a condition that develops when a woman of Rh-negative blood type is exposed to Rh-positive fetal blood cells and subsequently develops circulating titers of Rh antibodies.
- Hydramnios occurs in approximately 3 to 4% of all pregnancies and is associated with fetal anomalies of development.
- Nursing care related to the woman with oligohydramnios involves continuous monitoring of fetal well-being during nonstress testing or during labor and birth by identifying nonreassuring patterns on the fetal monitor.
- The increasing number of multiple gestations is a concern because women who are expecting more than one infant are at high risk for preterm labor, hydramnios, hyperemesis gravidarum, anemia, preeclampsia, and antepartum hemorrhage.
- Nursing care related to PROM centers around infection prevention and identification of preterm labor contractions.
- Early identification of preterm labor would allow for appropriate interventions that may prolong the pregnancy, such as transferring the woman to a facility with a neonatal intensive care unit for prenatal care, administering glucocorticoids to the mother to promote fetal lung maturity, and giving appropriate antibiotics to treat infections to arrest the labor process.
- It is essential that nurses teach all pregnant women how to detect the early symptoms of preterm labor and what to do if they experience contractions or cramping that does not go away.

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Web Resources

- American Academy of Pediatrics, www.aap.org
 American College of Obstetricians and Gynecologists, www.acog.org
 Association of Women's Health, Obstetric & Neonatal Nurses, www.awhonn.org
 March of Dimes, www.modimes.org
 Resolve through Sharing, www.ectopicpregnancy.com
 Sidelines High-Risk Pregnancy Support Office, www.sidelines.org

Chapter WORKSHEET

● MULTIPLE CHOICE QUESTIONS

- The nurse understands that the purpose of administering magnesium sulfate to a client with preeclampsia is to
 - Reduce central nervous system irritability to prevent seizures
 - Provide supplementation of an important mineral she needs
 - Prevent constipation during and after the birthing process
 - Decrease musculoskeletal tone to augment labor
- Which of the following women would the nurse identify as being at the greatest risk for preterm labor?
 - A woman who had twins in a previous pregnancy
 - A woman who lives in a big metropolitan city
 - A woman who works full-time as a computer programmer
 - A woman who has a history of preterm birth
- The signs and symptoms of abruptio placenta depend on the amount of placental separation and type of abruption. Which of the following would the nurse assess as a classic symptom?
 - Painless, bright-red bleeding
 - “Knife-like” abdominal pain
 - Excessive nausea and vomiting
 - Hypertension and headache
- Which of the following medications would the nurse expect the physician to order for tocolysis?
 - Diazepam (Valium)
 - Phenobarbital
 - Nifedipine (Procardia)
 - Butorphanol (Stadol)
- RhoGAM is given to Rh-negative women to prevent maternal sensitization from occurring. The nurse is aware that in addition to pregnancy, Rh-negative women would also receive this medication after which of the following?
 - Therapeutic or spontaneous abortion
 - Head injury from a car accident
 - Blood transfusion after a hemorrhage
 - Unsuccessful artificial insemination procedure

● CRITICAL THINKING EXERCISES

- Suzanne, a 16-year-old primigravida, presents to the maternity clinic complaining of continual nausea and vomiting for the past 3 days. She states she is approximately 15 weeks pregnant and she has been unable to hold anything down or take any fluids in without throwing up for the past 3 days. She reports she is dizzy and weak. On examination, Suzanne appears pale, anxious, mucus membranes are dry, skin turgor is poor, and her lips are dry and cracked.
 - What is your impression of this condition?
 - What risk factors does Suzanne have?
 - What intervention is appropriate for this woman?
- Betty, a 20-year-old African-American primigravida client, comes to the prenatal clinic for her first visit. She is 4 months pregnant based on dates. As the nurse assigned to her, you interview her and start to record her history as follows:
 - Is single, unmarried, lives with father of child
 - Smokes 1.5 packs of cigarettes a day
 - Works as a laborer in a nursery 12 hours daily
 - Quit high school in the ninth grade and has no plans to get GED
 - Eats poorly, is underweight for height, and is anemic
 - Reports she has frequent UTIs
 - Based on her history, what might this client be at risk for? Why?
 - What client education is needed at this visit?
 - What specific nursing interventions might help reduce her risk?

● STUDY ACTIVITIES

1. Identify a woman hospitalized on bed rest with preterm labor. Ask her about her experience associated with the hospitalization and how nurses could be helpful to her throughout her experience.
2. Ask a public health maternity nurse how the signs and symptoms of preterm labor are taught, and how effective they have been in reducing the incidence in their area.
3. Search the Internet for a Web site to help parents who have suffered a pregnancy loss and critique it for current information and audience level.
4. A pregnancy in which the blastocyst implants outside the uterus describes an _____ pregnancy.
5. The gravest complication of hydatidiform mole is the development of _____ afterward.
6. Discuss various activities a woman with a multiple gestation could engage in to help pass the time when ordered to be on bed rest at home for 2 months.
7. The type of medication used to stop preterm labor is called _____.