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ЭКСТРАГЕНИТАЛЬНАЯ ПАТОЛОГИЯ И БЕРЕМЕННОСТЬ

**Учебно-методическое пособие для студентов 4 и 6 курсов
факультета по подготовке специалистов для зарубежных стран
медицинских вузов**

EXTRAGENITAL PATHOLOGY AND PREGNANCY

**Teaching workbook for 4th and 6th year students
of the Faculty on preparation of experts for foreign countries
of medical highest educational institutions**

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PREFACE

Extragenital pathology aggravates 40–50 % of all pregnancies. Pregnancy need to keep together an obstetrician and specialized professionals. In up to 12 weeks of gestation is necessary to solve the question of the possibility of prolongation of pregnancy. The manual focuses on diseases of the urinary and respiratory system, cardiovascular and endocrine pathology, as well as anemia and gastrointestinal disease

CHAPTER 1. RENAL AND URINARY TRACT DISEASES

Renal and urinary tract disorders are commonly encountered in pregnancy. Some precede pregnancy — one example being nephrolithiasis. In some women, pregnancy-induced changes may predispose to development or worsening of urinary tract disorders — an example is the markedly increased risk of pyelonephritis. Finally, there may be complications unique to pregnancy such as preeclampsia. With good prenatal care, most women with these disorders will likely develop no long-term serious consequences.

During pregnancy the kidneys become larger, dilatation of the renal calyces and ureters can be striking. Some dilatation develops before 14 weeks and likely is due to progesterone-induced relaxation of the muscular layers. More marked dilatation is apparent beginning in midpregnancy because of ureteral compression, especially on the right side. There is also some *vesicoureteral reflux* during pregnancy. An important consequence of these physiological changes is an increased risk of upper urinary infection, and occasionally erroneous interpretation of studies done to evaluate obstruction.

Pyelonephritis — the most common kidney disease and the second most common human diseases. Pyelonephritis is clinically diagnosed in 12 % of pregnant women, half of them there is an exacerbation of chronic pyelonephritis during pregnancy.

Predisposing factors for inflammatory diseases of the kidneys during pregnancy are:

1. Anatomical and topographical changes in the pelvis at the growing uterus:
 - compression of the ureter;
 - expansion of the upper ureter, pyelocaliceal system;
 - nephroptosis.
2. Hormonal influences help to reduce tone and hypokinesia of the ureter and renal pelvis.
3. Urodynamics factors: a vesico-ureteral reflux-junction, which leads to an ascending infection.

Causative agents of pyelonephritis: Escherichia coli, Proteus, Klebsiella. Enterobacter, Streptococcus, Staphylococcus, Candida. In recent years, the

occurrence of urinary tract infection role installed genital infections caused by anaerobic bacteria and urea- and mycoplasmas. Diabetics are especially susceptible to developing pyelonephritis.

Clinic of acute pyelonephritis. The disease begins acutely with nonspecific signs of intoxication: fever, headache, nausea, vomiting. Pain in the lumbar region, along the ureter is occur. Purulent pyelonephritis is accompanied by severe intoxication: tachycardia, fatigue, weakness, nausea, vomiting. It can be development of bacterial and toxic shock.

Laboratory parameters. In the blood count: leukocytosis — more than $11 \times 10^9/\text{ml}$ increase immature leukocytes (shift left), sometimes anemia (hemoglobin less than 100 g / l). In urinalysis: pyuria, bacteriuria, proteinuria (less than 1 g / l), hematuria.

Zimnitsky probe reveals izostenuria and nocturia.

Nechiporenko analysis — pyuria.

In urine culture can be revealed causing factor.

Treatment of acute pyelonephritis in pregnant

Treatment is carried out in the urological department. In case of other obstetrical problems — in the 2-nd obstetrical department (observational).

1. Position Bozeman 3–4 times a day to improve the flow of urine.

2. Diet, sour drink (cranberry juice)

3. Etiological treatment: antibacterial agents

— Penicillin or protected penicillines: amoxicillin, ampicillin+clavulonic acid 0.5 g 4 times a day, the daily dose of 2–3 grams within 7–10 days.

— Cephalosporin III generation: ceftriaxonum, cefuroxime 0.5–1.0 g 3–4 times a day (4–8 days).

— Macrolides: azythromycin 0.25 1 times daily (6 days).

— Derivatives of phosphonic acid (Fosfomycine).

4. Detoxification therapy — infusions of crystalloid solutions, dextrans.

5. Spasmolytics — drotaverinum.

6. Phytotherapy: cranberry, cowberry, kanephron, phytolysinum to increase the flow of urine.

!When serous and purulent pyelonephritis and violation of the passage of urine is shown catheterization of the ureters.

!Lack of effect of catheterization, antibacterial and pathogenetic therapy for 2–3 days (continued chills, fever, pain, growing signs of intoxication, worsen laboratory findings) suggest the development of purulent process in the kidney and the need for surgical treatment.

Allocate risk for patients with pyelonephritis:

Grade I — acute pyelonephritis caused during pregnancy. Pregnancy complicated by preeclampsia rarely.

Grade II — chronic uncomplicated pyelonephritis, which existed prior to pregnancy. Pregnancy complicated by preeclampsia in 25 % of patients, often intrauterine infection, preterm delivery.

Grade III — pyelonephritis with hypertension or azotemia or pyelonephritis of single kidney. Often develops severe preeclampsia, renal failure. Pregnancy should be discontinued.

Asymptomatic Bacteriuria

This refers to persistent, actively multiplying bacteria within the urinary tract in asymptomatic women. Its prevalence in non-pregnant women is 5 to 6 percent and depends on parity, race, and socio-economic status (Hooton and colleagues, 2000). The highest incidence is in African-American multiparas with sickle-cell trait, and the lowest incidence is in affluent white women of low parity. Because most women have recurrent or persistent bacteriuria, it frequently is discovered during prenatal care. The incidence during pregnancy is similar to that in non-pregnant women and varies from 2 to 7 percent.

Significance

If asymptomatic bacteriuria is not treated, approximately 25 percent of infected women will develop symptomatic infection during pregnancy. Eradication of bacteriuria with antimicrobial agents prevents most of these. The American Academy of Pediatrics and the American College of Obstetricians and Gynecologists (2007), as well as a U.S. Preventative Task Force (2006), recommend screening for bacteriuria at the first prenatal visit. Standard urine cultures may not be cost-effective when the prevalence is low, but less expensive screening tests such as the leukocyte esterase-nitrite dipstick are when the prevalence is 2 percent or less.

Treatment

— Penicillin or protected penicillines: amoxicillin, ampicillin+clavulonic acid 0.5 g 4 times a day, the daily dose of 2–3 grams with in 7–10 days.

— Cephalosporin of III generation: ceftriaxonum, cefuroxime 0.5–1.0 g 3–4 times a day duration 4–8 days.

— Macrolides: azithromycin 0.251 times daily — 6 days.

— Nitrofurantoin 100 mg at bedtime 10 days.

Urolithiasis and pregnancy.

Indications for surgical treatment:

1. Longtime of renal colic.
2. Obstructive anuria.
3. Attack of acute pyelonephritis, when by catheterization of the ureters can not restore urine flow.

Contraindications to maintain pregnancy:

1. Pyelonephritis of single kidney with symptoms of renal failure, hypertension.
2. Hypertensive and mixed forms of chronic glomerulonephritis.

3. Acute glomerulonephritis.
4. Azotemia regardless of the disease.
5. Congenital hydronephrosis, or appearing before pregnancy.
6. Hydronephrosis of the single kidney.
7. Polycystic kidney with minimal manifestations of renal failure.
8. Hypoplasia, anomalies of the kidney combined with pyelonephritis, hypertension, renal insufficiency.

General principles of management of pregnancy and delivery in renal disease

1. Clinical supervision obstetrician-gynecologist and therapist.
2. Urinalysis at least 1-2 times a month, a complete blood count 1 time per month, Nechiporenko and Zimnitskiy probes 1 time in 4 months, urine culture (bacteriological analysis) 1 time per month, examination by ophthalmologist and urologist 1 time in 4 months.
3. In the presence of white blood cells in the urine more than 15–20 or asymptomatic bacteriuria — more than 10^5 CFU/ l - hospitalization to observational unit.
4. Diet, herbal medicine.
5. Readjustment of infection's foci.
6. Vaginal delivery. For obstetric indications — caesarean section.
7. If there are indications for urological surgery, the surgery is performed first, then addressed the issue of the prolongation or termination of pregnancy.
8. After the birth prophylactics of suppurative complications. Children often can be with signs of IUI.

CHAPTER 2. DISEASES OF THE CARDIOVASCULAR SYSTEM AND PREGNANCY

According to the Centers for Disease Control and Prevention, heart disease is the leading cause of death in women who are 25 to 44 years old (Kung and colleagues, 2008). Cardiac disorders of varying severity complicate approximately 1 percent of pregnancies and contribute significantly to maternal morbidity and mortality rates. For example, Chang and co-workers (2003) reported that cardiomyopathy alone was responsible for 8 percent of 4200 pregnancy-related deaths in the United States from 1991 to 1999. In addition to maternal mortality, cardiac disorders accounted for 7.6 percent of severe obstetrical morbidities diagnosed during hospitalization for delivery in the United States from 1991 to 2003 (Callaghan and associates, 2008).

Physiological adaptation of the cardiovascular system during pregnancy:
— increased vascular network, as increasing body weight pregnant, appears fetoplacental circulation;

- increases the amount of circulating plasma by 30–50 %, reaching a maximum in 30–36 weeks;
- the heart minute volume increases with gestation 10–13 weeks, reaches a maximum of 26–29 weeks with initial volume exceeds 20–45 %;
- the load on the heart to the 25–30 week increased by 30–50 %, then gradually decreases and the time of delivery is returned to the original;
- heart rate rises to 86–88 per minute. In the period 16–24 weeks of biologically active substances have placenta depressor effect on blood pressure, there is a decrease. This may cause underestimation of the degree of hypertension. Progesterone helps to reduce vascular tone, giving the hypotensive effect and decrease in peripheral vascular resistance;
- raised diaphragm moves the axis of the heart, i.e., "lying heart." There is a functional systolic murmur, making it difficult to diagnose defects;
- during delivery contractions hemodynamic fluctuations is occur, there is a "load capacity" for the heart. In II stage of labor, especially in cesarean section after removal of the fetus, the uterus is sharply reduced in the blood stream receives about 800 ml of blood;
- labor pain and psycho-emotional reactions are accompanied by the release of catecholamines (adrenaline, noradrenaline).

Diagnostic Studies

In most women, noninvasive cardiovascular studies such as electrocardiography, echocardiography will provide data necessary for evaluation. In some situations, for example, suspected pulmonary embolism with biventricular dysfunction, CT angiography has become commonplace.

Clinical Classification of Heart Disease

There is no clinically applicable test for accurately measuring functional cardiac capacity. The clinical classification of the New York Heart Association (NYHA) was first published in 1928, and it was revised for the eighth time in 1979. This classification is based on past and present disability and is uninfluenced by physical signs.

- **Class I.** *Uncompromised — no limitation of physical activity:* these women do not have symptoms of cardiac insufficiency or experience anginal pain.
- **Class II.** *Slight limitation of physical activity:* these women are comfortable at rest, but if ordinary physical activity is undertaken, discomfort in the form of excessive fatigue, palpitation, dyspnea, or anginal pain results.
- **Class III.** *Marked limitation of physical activity:* these women are comfortable at rest, but less than ordinary activity causes excessive fatigue, palpitation, dyspnea, or anginal pain.
- **Class IV.** *Severely compromised — inability to perform any physical activity without discomfort:* symptoms of cardiac insufficiency or angina may develop even at rest. If any physical activity is undertaken, discomfort is increased.

Siu and associates (2001) expanded the NYHA classification and developed a scoring system for predicting cardiac complications during pregnancy. The system is based on their prospective analysis of 562 consecutive pregnant women with heart disease during 617 pregnancies in 13 Canadian teaching hospitals. Predictors of cardiac complications included the following:

- Prior heart failure, transient ischemic attack, arrhythmia, or stroke.
- Baseline NYHA class III or IV or cyanosis.
- Left-sided obstruction defined as mitral valve area less than 2 cm², aortic valve area less than 1.5 cm², or peak left ventricular outflow tract gradient above 30 mm Hg by echocardiography.
- Ejection fraction less than 40 percent.

The risk of pulmonary edema, sustained arrhythmia, stroke, cardiac arrest, or cardiac death was substantively increased with one of these factors and even more so with two or more factors.

Heart defects in pregnant women

For pregnancy the most dangerous heart defects, accompanied cyanosis, i.e. vices with a large discharge of blood through the existing defects of the venous to the arterial tree: triad, tetrad or pentad Fallot, complete transposition of the great vessels, defect of interventricular septum, and others. The forecast deteriorates pulmonary hypertension.

In recent years, an increasing number of patients with the operated heart. Mitral commissurotomy can only slow down the process of stenosis, many patients subsequently activated rheumatism. Therefore, pregnancy should be allowed in the period from 8 months to 2 years after mitral commissurotomy because in the first 8 months of operation result is not clear, and after two years increases the risk of restenosis. If the operated heart there is bacterial endocarditis, pregnancy should be terminated.

In patients with an implanted artificial valve sharply increases the risk of thrombosis, pregnancy is not recommended.

Palliative cardiac surgery, such as anastomosis with tetrad of Fallot, makes predictions of pregnancy and labour is very unfavorable.

Heart diseases pregnancy is contraindicated in the following cases:

1. Severe mitral stenosis, when the atrioventricular hole 1.5 cm in diameter or less.
2. Mitral valve insufficiency in the presence of heart failure or active rheumatic process, circulatory failure.
3. Severe aortic stenosis with evidence of myocardial insufficiency, cardiac enlargement.
4. Aortic valve insufficiency.
5. Complex congenital malformations.
6. Artificial valves.
7. Cardiomegaly.

8. High pulmonary hypertension.
9. The active phase of rheumatism.

Prenatal care in heart diseases

Women with severe heart disease will benefit immensely from counseling before deciding to become pregnant. Maternal mortality rates generally vary directly with functional classification, however, this relationship may change as pregnancy progresses.

1. The first hospitalization in the early stages of pregnancy to decide of the possibility of continuing the pregnancy.
2. Planned hospitalization in the period 29–32 weeks in a specialized cardiology hospital.
3. In the period of 37–38 weeks of hospitalization in preparation for delivery. Given obstetric indications must choose the method and timing of delivery.

General Management

In most instances, management involves a team approach with an obstetrician, cardiologist, anesthesiologist, and other specialists as needed. Cardiovascular changes likely to be poorly tolerated by an individual woman are identified, and a plan is formulated to minimize these. Special attention should be directed toward both prevention and early recognition of heart failure. The first warning sign is likely to be persistent basilar rales, frequently accompanied by a nocturnal cough. A sudden diminution in ability to carry out usual duties, increasing dyspnea on exertion, or attacks of smothering with cough are symptoms of serious heart failure. Clinical findings may include hemoptysis, progressive edema, and tachycardia.

Infection with sepsis syndrome is an important factor in precipitating cardiac failure. Moreover, bacterial endocarditis is a deadly complication of valvular heart disease. Each woman should receive instructions to avoid contact with persons who have respiratory infections, including the common cold, and to report at once any evidence for infection.

Cigarette smoking is prohibited, both because of its cardiac effects and its propensity to cause upper respiratory infections. Illicit drug use may be particularly harmful, an example being the cardiovascular effects of cocaine or amphetamines. In addition, intravenous drug use increases the risk of infective endocarditis.

Labor and Delivery

In general, vaginal delivery is preferred unless there are obstetrical indications for cesarean delivery. Induction is generally safe (Oron and colleagues, 2004). In some women, *pulmonary artery catheterization* may be indicated for hemodynamic monitoring.

During labor, the mother with significant heart disease should be kept in a semirecumbent position with lateral tilt. Vital signs are taken frequently between

contractions. Increases in pulse rate much above 100 bpm or respiratory rate above 24 per minute, particularly when associated with dyspnea, may suggest impending ventricular failure. If there is any evidence of cardiac decompensation, intensive medical management must be instituted immediately. It is essential to remember that delivery itself does not necessarily improve the maternal condition. Moreover, emergency operative delivery may be particularly hazardous. Clearly, both maternal and fetal status must be considered in the decision to hasten delivery under these circumstances. We can use cardiotonic drugs and exclude the pushings with vacuum-extractor.

Routinely cesarean section shown in the following cases:

1. The combined aortic and mitral valves.
2. Mitral stenosis.
3. Bacterial endocarditis.
4. Complications or unsatisfactory effect of surgical correction of heart defects.
5. Pulmonary edema transferred during pregnancy.

Analgesia and Anesthesia

Relief from pain and apprehension is important. Although intravenous analgesics provide satisfactory pain relief for some women, continuous epidural analgesia is recommended in most cases. The major problem with conduction analgesia is maternal hypotension. Hypotension can also be life-threatening with pulmonary hypertension or aortic stenosis because ventricular output is dependent on adequate preload. In women with these conditions, narcotic conduction analgesia or general anesthesia may be preferable.

For vaginal delivery in women with only mild cardiovascular compromise, epidural analgesia given with intravenous sedation often suffices. This has been shown to minimize intrapartum cardiac output fluctuations and allows vacuum-assisted delivery. Subarachnoid blockade is not generally recommended in women with significant heart disease. For cesarean delivery, epidural analgesia is preferred by most clinicians with caveats for its use with pulmonary hypertension. Finally, general endotracheal anesthesia with thiopental, succinylcholine, nitrous oxide, and at least 30-percent oxygen has also proved satisfactory.

Pregnancy and hypertension

In pregnant women is important not only the absolute values of blood pressure, but the degree of increase in blood pressure in relation to the original. On gestational hypertension indicates an increase in systolic blood pressure by 30 %, diastolic — 15 % relative to the pressure before pregnancy.

We can speak about hypertension in pregnant women if BP > 140/90 mm Hg before pregnancy or diagnosed before 20 weeks' gestation not attributable to gestational trophoblastic disease.

Hypertension is diagnosed empirically when appropriately taken blood pressure exceeds 140 mm Hg systolic or 90 mm Hg diastolic. Korotkoff phase V

is used to define diastolic pressure. In the past, it had been recommended that an incremental increase from midpregnancy values by 30 mm Hg systolic or 15 mm Hg diastolic pressure be used as diagnostic criteria, even when absolute values were below 140/90 mm Hg. These criteria are no longer recommended because evidence shows that such women are not likely to experience increased adverse pregnancy outcomes (Levine and co-workers, 2000; North and colleagues, 1999). That said, women who have a rise in pressure of 30 mm Hg systolic or 15 mm Hg diastolic should be seen more frequently.

Arterial hypertension and abrupt changes in blood pressure significantly alter the utero-placental circulation and increase the risk of premature detachment of normally situated placenta, bleeding, development of severe preeclampsia.

Pharmacologic treatment of hypertension in pregnancy

1st-line drug

Methyldopa 250 mg bid — 1 g tid

Agent of choice. Only drug with long-term follow-up of children that shows normal mental and physical development at 10 years. Major side effect is somnolence. Use with caution in patients with depression. Compatible with breast-feeding.

2nd-line drugs

Labetalol 100 mg bid — 500 mg tid

Use if methyldopa is not tolerated or not effective. Long record of use in pregnancy, but there is not as much data on long-term safety as there is for methyldopa. Short-term safety is equal to that of methyldopa. Compatible with breast-feeding.

Other β -blockers. Pindolol and oxprenolol are the preferred agents. There is concern regarding possible intrauterine growth restriction. Many β -blockers are compatible with breast-feeding; check specific agent.

Nifedipine — 30 mg qd — 60 mg bid.

Limited experience with use throughout pregnancy. Use as a tocolytic agent in third trimester produces no ill effects. Compatible with breast-feeding.

3rd-line drugs

Hydralazine 25 mg tid — 75 mg qid.

Extensive experience with use in pregnancy. Because it can cause reflex tachycardia, hydralazine has limited effectiveness as a single agent, but it is a good choice if a second drug is required. Compatible with breast-feeding.

Clonidine 0.05 mg bid — 0.4 mg bid.

As effective as methyldopa, but follow-up studies have associated this drug with night terrors in children. Concentrated in breast milk. No hypotension observed in infants, but other effects are not known.

Special indications

! Drugs to avoid

Angiotensin — Varies with agent.

Contraindicated except in extreme circumstances (eg, scleroderma converting crisis) because of their association with stillbirth and renal failure enzyme inhibitors in exposed fetuses.

Angiotensin II — Varies with agent

Experience with angiotensin II receptor antagonists in pregnancy is receptor limited, but they are likely to have effects similar those of the antagonists angiotensin-converting enzyme inhibitors.

Valvular Heart Disease

Rheumatic fever is uncommon in the United States because of less crowded living conditions, availability of penicillin, and evolution of nonrheumatogenic streptococcal strains. Still, it remains the chief cause of serious mitral valvular disease (O'Shea and Braunwald, 2008).

Mitral Stenosis

Rheumatic endocarditis causes three fourths of mitral stenosis cases. The normal mitral valve surface area is 4.0 cm^2 . When stenosis narrows this to less than 2.5 cm^2 , symptoms usually develop (Desai and colleagues, 2000). The contracted valve impedes blood flow from the left atrium to the ventricle. The most prominent complaint is dyspnea due to pulmonary venous hypertension and edema. Fatigue, palpitations, cough, and hemoptysis are also common.

With tight stenosis, the left atrium is dilated, left atrial pressure is chronically elevated, and significant passive pulmonary hypertension can develop. The increased preload of normal pregnancy, as well as other factors that increase cardiac output, may cause ventricular failure with pulmonary edema in these women who have a relatively fixed cardiac output. Indeed, a fourth of women with mitral stenosis have cardiac failure for the first time during pregnancy (Caulin-Glaser and Setaro, 1999). Because the murmur may not be heard in some women, this clinical picture may be confused with idiopathic peripartum cardiomyopathy (Cunningham and colleagues, 1986).

With significant stenosis, tachycardia shortens ventricular diastolic filling time and increases the mitral gradient. This increase raises left atrial and pulmonary venous and capillary pressures and may result in pulmonary edema.

The maternal prognosis is also related to functional capacity.

Management

Limited physical activity is generally recommended. If symptoms of pulmonary congestion develop, activity is further reduced, dietary sodium is restricted, and diuretic therapy is started (Siva and Shah, 2005). A β -blocker drug is usually given to blunt the cardiac response to activity and anxiety (Al Kasab and associates, 1990). If new onset atrial fibrillation develops, intravenous verapamil, 5 to 10 mg, is given, or electrocardioversion is performed. For chronic fibrillation, digoxin, a β -blocker, or a calcium-channel

blocker is given to slow ventricular response. Therapeutic anticoagulation with heparin is indicated with persistent fibrillation. Hameed and co-workers (2005) recommend heparinization with severe stenosis even if there is a sinus rhythm.

Labor and delivery are particularly stressful for women with symptomatic mitral stenosis. Pain, exertion, and anxiety cause tachycardia, with possible rate-related heart failure. Epidural analgesia for labor is ideal, but with strict attention to avoid fluid overload. Abrupt increases in preload may increase pulmonary capillary wedge pressure and cause pulmonary edema.

Mitral Insufficiency

When there is improper coaptation of mitral valve leaflets during systole, some degree of mitral regurgitation develops. This is eventually followed by left ventricular dilatation and eccentric hypertrophy. *Chronic mitral regurgitation* has a number of causes, including rheumatic fever, mitral valve prolapse, or left ventricular dilatation of any etiology — for example, dilated cardiomyopathy. Less common causes include a calcified mitral annulus, possibly some appetite suppressants, and in older women, ischemic heart disease.

Likewise, mitral regurgitation is well tolerated during pregnancy, probably because decreased systemic vascular resistance results in less regurgitation. Heart failure only rarely develops during pregnancy, and occasionally tachyarrhythmias need to be treated. Intrapartum prophylaxis against bacterial endocarditis may be indicated.

Mitral Valve Prolapse

This diagnosis implies the presence of a pathological connective tissue disorder — often termed *myxomatous degeneration* — which may involve the valve leaflets themselves, the annulus, or the chordae tendineae. Mitral insufficiency may develop. Most women with mitral valve prolapse are asymptomatic and are diagnosed by routine examination or while undergoing echocardiography. The small percentage of women with symptoms have anxiety, palpitations, atypical chest pain, and syncope. Those with redundant or thickened mitral valve leaflets are at increased risk for sudden death, infective endocarditis, or cerebral embolism (Braunwald, 2005). Looking at this another way, of 213 young women with documented ischemic strokes, only 1.9 percent had mitral valve prolapse compared with 2.7 percent of controls (Gilon and co-workers, 1999).

Pregnant women with mitral valve prolapse rarely have cardiac complications. In fact, pregnancy-induced hypervolemia may improve alignment of the mitral valve (Rayburn and colleagues, 1987). For women who are symptomatic, β -blocking drugs are given to decrease sympathetic tone, relieve chest pain and palpitations, and reduce the risk of life-threatening arrhythmias. Mitral valve prolapse with regurgitation or valvular damage is considered to be a moderate risk for bacterial endocarditis.

Peripartum Cardiomyopathy

Currently, this disorder is a diagnosis of exclusion following a contemporaneous cardiac evaluation of peripartum heart failure. In most aspects, it is similar to idiopathic dilated cardiomyopathy encountered in nonpregnant adults. Although the term peripartum cardiomyopathy has been used widely, there is very little evidence to support a unique pregnancy-induced cardiomyopathy. In 1997, the National Heart, Lung, and Blood Institute and the Office of Rare Diseases convened a workshop that established the following diagnostic criteria (Pearson and associates, 2000):

1. Development of cardiac failure in the last month of pregnancy or within 5 months after delivery.
2. Absence of an identifiable cause for the cardiac failure.
3. Absence of recognizable heart disease prior to the last month of pregnancy, and
4. Left ventricular systolic dysfunction demonstrated by classic echocardiographic criteria such as depressed shortening fraction or ejection fraction.

Although the workshop panel concluded that the disease is acute, rather than a preexisting one preceding pregnancy, at least three reports do not support idiopathic pregnancy-induced cardiomyopathy. Cunningham and associates (1986) carefully evaluated 28 women at Parkland Hospital with peripartum heart failure of obscure etiology who were initially thought to have idiopathic peripartum cardiomyopathy. In 21 of these, heart failure was found to be caused by hypertensive heart disease, clinically silent mitral stenosis, obesity, or viral myocarditis. Particularly important were the silent cardiomyopathic effects that even intermediate-duration chronic hypertension may have on ventricular function.

Arrhythmias

Both new and preexisting cardiac arrhythmias are commonly encountered during pregnancy, labor, delivery, and the puerperium (Gowda and associates, 2003). The mechanism(s) responsible for the increased incidence of arrhythmias during pregnancy is not well elucidated. According to Eghbali and associates (2006), adaptive electric cardiac remodeling of K^+ -channel genes may be key. Perhaps the normal but mild hypokalemia of pregnancy and/or the physiological increase in heart rate serve to induce arrhythmias (see Chap. 5, Cardiovascular System). Alternatively, their detection may be increased because of more frequent visits during prenatal care.

Bradyarrhythmias, including complete heart block, are compatible with a successful pregnancy outcome. Some women with complete heart block have syncope during labor and delivery, and occasionally temporary cardiac pacing is necessary (Hidaka and colleagues, 2006). In our experiences, as well as those of Jaffe and associates (1987), women with permanent artificial pacemakers usually tolerate pregnancy well. With fixed-rate devices, cardiac output apparently is increased by augmented stroke volume.

Tachyarrhythmias are relatively common and should prompt consideration of underlying cardiac disease.

Paroxysmal supraventricular tachycardia is encountered most frequently. Siu and associates (1997) followed 25 women who had supraventricular tachycardia diagnosed before pregnancy. Half of these women had *Wolff-Parkinson-White (WPW) syndrome*. Three of 12 women with WPW syndrome and six of 13 without the condition had supraventricular tachycardia during pregnancy. If vagal maneuvers do not stimulate conversion, treatment consists of adenosine followed by calcium-channel or β -blocking drugs (Delacr  tez, 2006). Our experiences are similar to those of others that adenosine is safe and effective for cardioversion in hemodynamically stable pregnant women (Chakhtoura and co-workers, 1998; Robins and Lyons, 2004). Although these drugs do not appear to harm the fetus, fetal bradycardia with adenosine has been described (Dunn and Brost, 2000).

Electrical cardioversion is not contraindicated in pregnancy, but vigilance is important.

Atrial flutter or fibrillation are more likely associated with underlying disease, such as thyrotoxicosis or mitral stenosis. Major complications include stroke (Ezekowitz and Levine, 1999). Thus, heparin is recommended by some if fibrillation is chronic and persists during pregnancy, especially if there is mitral stenosis (O'Gara and Braunwald, 2008). If atrial fibrillation is associated with mitral stenosis, pulmonary edema may develop in late pregnancy if the ventricular rate is increased.

Ventricular tachycardia is uncommon in healthy young women without underlying heart disease. Brodsky and associates (1992) described seven pregnant women with new-onset ventricular tachycardia and reviewed 23 reports. Most of these women were not found to have structural heart disease — in 14 tachycardia was precipitated by physical exercise or psychological stress. Abnormalities found included two cases of myocardial infarction, two of prolonged QT interval, and anesthesia-provoked tachycardia in another. They concluded that pregnancy events precipitated tachycardia and recommended β -blocker therapy for control. Occasionally *arrhythmogenic right ventricular dysplasia* will result in ventricular tachyarrhythmias (Lee and co-workers, 2006). For pregnant women requiring defibrillation for ventricular arrhythmias, Nanson and associates (2001) found that standard adult energy settings were adequate.

QT-interval prolongation may predispose individuals to a potentially fatal ventricular arrhythmia known as *torsades de pointes* (Roden, 2008). Two studies involving a combined total of 502 pregnant women with *long QT syndrome* both reported a significant increase in cardiac events postpartum but not during pregnancy (Rashba and colleagues, 1998; Seth and associates, 2007). They hypothesized that the normal increase in heart rate during pregnancy may be partially protective. Paradoxically, β -blocker therapy has been shown to

decrease the risk of torsades de pointes in patients with long QT syndrome and should be continued during pregnancy and postpartum (Gowda and colleagues, 2003; Seth and associates, 2007). Importantly, many medications, including some used during pregnancy such as erythromycin and clarithromycin, may predispose to QT prolongation (Al-Khatib and associates, 2003; Roden, 2004).

Cardiovascular diseases worsen the course of pregnancy. Pregnant women should be in specialized maternity institutions, members of the General Hospital.

CHAPTER 3. ENDOCRINE DISEASES

A variety of endocrine disorders can complicate pregnancy and vice versa. Diabetes mellitus is the most prevalent. Thyroid disorders are also common, and a number of less common endocrinopathies — for example, pheochromocytoma — can have devastating effects on pregnancy outcome. The pathogenesis of many endocrinopathies is disordered autoimmunity. And as with most organ-specific autoimmune disorders, clinical manifestations of endocrinopathies result from a complex interplay among genetic, environmental, and endogenous factors that activate the immune system against target cells (Weetman, 2004). In many cases, a nonspecific event such as a viral infection initiates an organ-specific response with subsequent immune-mediated glandular destruction. Also, studies implicating cells transferred between mother and fetus during pregnancy in development of autoimmune disease decades later represent a new investigative frontier (Muraji and associates, 2008; Rust and Bianchi, 2009).

Diabetes mellitus (DM) — a disease that is accompanied by chronic hyperglycemia due to lack of insulin in the body.

Absolute insulin deficiency, the pancreas produces it in small quantities;

Relative insulin deficiency, impaired tissue sensitivity to insulin at normal levels of secretion.

The frequency of diabetes 4–6 % of the population. Forecast to increase by 2 times.

Classification

Diabetes is now classified based on the pathogenic processes involved (Powers, 2008). Absolute insulin deficiency characterizes *type 1 diabetes*, whereas defective insulin secretion or insulin resistance characterizes *type 2 diabetes* (Table 1). The terms insulin-dependent diabetes mellitus (IDDM) and noninsulin-dependent diabetes mellitus (NIDDM) are no longer used. Age is also no longer used in classification, because pancreatic β -cell destruction can begin at any age. Most commonly, its onset is before age 30, but in 5 to 10 percent of affected individuals, onset is after age 30 years. Type 2 diabetes, although most typical with increasing age, also develops in obese adolescents.

Etiological Classification of Diabetes Mellitus

I. Type 1: β -Cell destruction, usually absolute insulin deficiency:

A. Immune-mediated.

B. Idiopathic.

II. Type 2: Ranges from predominantly insulin resistance to predominantly an insulin secretory defect with insulin resistance.

III. Other types:

A. Genetic mutations of β -cell function.

B. Genetic defects in insulin action.

C. Genetic syndromes – e.g., Down, Klinefelter, Turner.

D. Diseases of the exocrine pancreas — e.g., pancreatitis, cystic fibrosis.

E. Endocrinopathies – e.g., Cushing syndrome, pheochromocytoma, others.

F. Drug or chemical induced – e.g., glucocorticosteroids, thiazides, β -adrenergic agonists, others.

G. Infections – congenital rubella, cytomegalovirus, coxsackievirus.

IV. Gestational diabetes (GDM).

Adapted from Fauci AS, Braunwald E, Kasper DL, et al: *Harrison's Principles of Internal Medicine*, 17th ed., pp. 2275–2304. Copyright © 2008 The McGraw-Hill Companies, Inc.

Risks of GDM

1. Diabetes in parents or relatives.

2. A history:

a) in previous pregnancies, gestational diabetes;

b) premature infants, children with birth defects;

c) large fetus with a mass of more than 4 kg;

d) stillbirths;

e) polyhydramnios, spontaneous abortions.

3. Obesity (more than 20 % of ideal weight, hyperlipidemia).

4. Hypertension.

5. Age 35 years or more.

Carbohydrate metabolism during pregnancy in healthy women

In the first 16 weeks of pregnancy due to the arrival of glucose to the fetus in the serum level of fasting blood mother decreases to 3,05–3,6 mmol. In the second half of pregnancy, on the background of low fasting glucose, there diabetogenic factors: placental lactogen, prolactin, estrogen, progesterone, increased levels of ACTH, cortisol, growth hormone, have contra-insulin action + insulin degradation increases placental enzymes, insulin resistance appears

Clinic of DM

○ dry mouth;

○ thirst, drinking a lot of fluids;

- polyuria;
- increased or decreased appetite;
- weight loss;
- itchy skin.

Laboratory detected hyperglycemia, glucosuria.

Normal levels of blood glucose during pregnancy:

Fasting (basal) 3.3–4.4 mmol / L;

1 hour after the meal (prandial) — less than 7.6 mmol / L;

2 hours after eating (postprandial) — less than 6.7 mmol / l.

Two-step procedure: 50-g oral glucose challenge test (GCT), followed by a diagnostic 100-g oral glucose tolerance test for those meeting the threshold value in the GCT.

One-step procedure: Diagnostic 100-g oral glucose tolerance test performed on all subjects.

Glycosuria has no diagnostic value in pregnancy because a change filtration function of the kidneys.

Detection of HbA1c — glycosylated hemoglobin — more important is to determine the metabolic compensation of diabetes.

HbA1c is directly correlated with the concentration of glucose in the blood, and accurately reflects the chronic hyperglycemia (HbA1c level match the average level of blood glucose over the previous 3 months).

In healthy individuals it is 4–5.5 % of the total Hb in the blood;

Diabetes is diagnosed when $\text{HbA1c} \geq 6,5 \%$.

Diabetes during pregnancy

Up to 16 weeks stimulated glucose utilization by the action of estrogen and chorionic gonadotropin, which requires lower doses of insulin.

The second half of pregnancy. Increased activity of hormones and anti-insuline worse tolerance to carbohydrates, amplified diabetic complaints, increased levels of blood glucose, increased glycosuria may develop ketoacidosis. Necessary to increase insulin.

III trimester due to insulin production of fetal pancreas and reduce kontr-insuline hormone improves tolerance to carbohydrates, reduced blood glucose levels and the dose of insulin, but the risk of hyperplasia insular apparatus of the fetus and newborn hypoglycemia.

At birth in pregnant women with diabetes can be as high hyperglycemia, the state of acidosis and hypoglycemia.

In the first days postpartum glucose levels falling further to 4–5 days, than arise.

Complications of pregnancy in women with diabetes:

- ✓ the threatened abortion and premature birth;
- ✓ preeclampsia, resistant to therapy;
- ✓ polyhydramnios;
- ✓ fetoplacental insufficiency: hypoxia, antenatal death;

- ✓ urinary tract infections, vulvovaginitis;
- ✓ intrauterine infection;
- ✓ labor complications in diabetic patients;
- ✓ rupture of amniotic membranes (premature or early);
- ✓ weakness of uterine contractions;
- ✓ fetal hypoxia;
- ✓ development of clinically contracted pelvis;
- ✓ shoulder dystocia;
- ✓ development of endometritis after labor;
- ✓ birth injuries : mother and fetus;
- ✓ diabetic fetopathy.

Management of Pregnancy in diabetes

Women with diabetes: pregnancy should be planned with a mandatory training before it. It is important to manage pregnancy with a therapist, endocrinologist, ophthalmologist.

TASKS:

- Timely decision on the admissibility maintain pregnancy.
- Full compensation of diabetes by diet or insulin therapy. Blood glucose levels within 5,6–6,7 mmol / L is optimal.
- Prevention of pregnancy complications for both mother and fetus.
- Rational term and method of delivery.
- Specialized care for a newborn.
- Clinical examination of pregnant women with diabetes in the antenatal clinic.
- Joint monitoring of the obstetrician-gynecologist and endocrinologist at intervals: the first 20 weeks 1 time every 2 weeks, in the second half of pregnancy – weekly.
- Of additional tests when registering: weight, height, BMI, blood pressure in the horizontal and vertical positions, examination of the eye fundus with dilated pupils, HbA1c, daily blood glucose, creatinine, blood test for microalbuminuria, ketones in the urine.
- Monitor the status of the fetus: ultrasound screening period (11–12 weeks, 20–22 weeks), with Doppler ultrasound from 28 weeks every 2–3 weeks, from 28–30 weeks with CTG.
- Scheduled hospitalization of pregnant with diabetes.
- In the early term of pregnancy when diagnosed to decide a question - the possibility of prolongation of pregnancy, further examination, the appointment of insulin.
- At 20–24 weeks of pregnancy — correction of insulin dose, prevention and treatment of complications of diabetes, pregnancy.
- In the 34 weeks to correct insulin dose, monitor the status of the fetus, for term and variant of delivery.

Maternal and Fetal Effects

— Greater risk for fetal death, this danger is not apparent for those who have diet-treated postprandial hyperglycemia (Lucas and co-workers, 1993; Sheffield and associates, 2002).

— **Macrosomia** — Excessive fetal size can be problematic, and macrosomia is defined variably by different authors (figure 1). The perinatal goal is avoidance of difficult delivery due to macrosomia, with concomitant birth trauma associated with shoulder dystocia. Except for the brain, most fetal organs are affected by the macrosomia that commonly characterizes the fetus of a diabetic woman.

— Excessive fat deposition on the shoulders and trunk, which predisposes them to shoulder dystocia or cesarean delivery.



Source: Cunningham FG, Leveno KJ, Bloom SL, Hauth JC, Rouse DJ, Spong CY: *Williams Obstetrics*, 23rd Edition: <http://www.accessmedicine.com>
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Figure 1 — Macrosomy of newborn

This 6050-g macrosomic infant was born to a woman with gestational diabetes.

— Maternal obesity.

Contraindication to pregnancy in diabetic patients

Absolute:

- Proliferative retinopathy, hemophthalmus;
- Diabetic nephropathy 4–5 d., Chronic renal failure-terminal phase.

— The presence of insulin resistance and labile forms of diabetes with a tendency toward ketoacidosis, hypoglycemia.

— The combination of diabetes mellitus and active pulmonary tuberculosis.

— Ischemic heart disease: angina, heart attack in history.

Contraindication to pregnancy in diabetic patients

Relative

— Clinical and metabolic decompensation of diabetes.

— Ketosis during pregnancy.

— Type 1 diabetes for both parents.

— Joining intercurrent diseases (hepatitis, acute pneumonia).

— The combination of diabetes and Rh sensitization.

The principle of treatment of diabetes in pregnancy

Diet – low level of easily assimilable carbohydrates.

Insulin – human 0,6–1,2 IU/kg/day (under the endocrinologist supervising).

Therapy for prevent placental insufficiency.

Metabolic therapy: vitamin C, Pentoxifyllinum.

Non-medical therapy: physiotherapy, hyperbaric oxygen therapy.

! Hypoglycemic tablets are contraindicated.

Preference is given to a human insulin short and prolong-acting.

The insulin dose should be chosen depending on the levels of glucose with subsequent correction in the II and III trimester of pregnancy.

New technologies: Insulin Pump.

Terms of delivery in DM

Preterm delivery before 36 weeks if:

— Decompensation of diabetes.

— Repeated hypoglycemia.

— Progression of angiopathy.

— Severe preeclampsia.

— Rising polyhydramnios.

— Violation of fetal life, the threat of antenatal death.

! Delivery at 37 weeks — the best time, because full-term pregnancy, and at a later date increases the risk of metabolic disorders.

In the absence of pregnancy complications, full compensation of diabetes and good condition of the fetus-in 38–40 weeks.

Vaginal delivery

— Careful maturation of the cervix (vaginal prostin E2 gel).

— Scheduled delivery with early amniotomy, extensive use of spasmolytics.

- Prevention of fetal hypoxia.
- Functional assessment of the pelvis in the presence of a large fetus, preventing weakness of uterine activity.
- Beginning of II period with the oxytocin — for prevention of bearing-down weakness and shoulder dystocia.
- Prevention of decompensation of diabetes — glycemic control every 1–2 hours, using of 10 % glucose and insulin.

The indications for cesarean section

1. Birth way is not ready for immediate delivery.
2. Progression of angiopathy.
3. Labile form of diabetes and ketoacidosis.
4. Macrosomia of the fetus.
5. Subcompensated or decompensated fetal hypoxia.

The prognosis of the DM

The likelihood of diabetes in the next pregnancy is about 90 %.

After 2 years, 20 % of women with insulin-dependent GD becomes.

In 40–60 % of women with GD in the next 10-20 years developing type 2 diabetes.

Physiological changes in thyroid gland function.

Gestational Diabetes

- Develops during pregnancy.
- Risk factors: obesity, < 25 years, family history, chronic hypertension, previous gestational diabetes.
- Screening: between 24–28 weeks — 1 hour glucose challenge test (GCT) if 140 or above recommend 3 hour oral glucose tolerance test (OGTT).
- Increased for PIH and fetal macrosomia.

Therapeutic Management:

- Diet — 2200–2400 calories per day.
- Exercise — Moderate exercise for active women, regular activity for sedentary women.
- Blood glucose monitoring – if > 6.5 or PPBG > 120 start on insulin.
- Fetal surveillance — 28 weeks ultrasound, amniocentesis, NST, CST, BPP.

Insulin Therapy:

- First trimester – insulin needs lower.
- Second and Third trimester – increased insulin due to placental hormones.
- During labor – based on blood glucose levels.
- Post Partum – insulin not needed due to abrupt cessation of placental hormones.

Thyroid gland diseases

1. Overstimulation of the thyroid gland:
 - physiological decrease of TSH levels in the first half of pregnancy;
 - increase in the production of thyroid hormones.
2. Increased production of thyroxine-binding globulin in the liver:
 - improvements in the overall fraction of thyroid hormones;
 - increase in total thyroid hormones in pregnant.
3. Strengthening urinary iodine excretion and transplacental transfer of iodine. Development of relative iodine deficiency
4. Deiodination of thyroid hormones in the placenta ($T_4 = \text{reverse } T_3 + \text{iodine}$).

The influence of thyroid hormones on fetal development:

- differentiation of tissues;
- anabolic effect by increasing the rate of protein synthesis;
- activation of enzyme systems;
- increased oxidation and phosphorylation;
- effectiveness of tissue respiration;
- tissue growth;
- biochemical and morphological differentiation of fetal lung;
- postnatal maturation of the alveolar tissue of the newborn;
- accelerate the synthesis of transferrin;
- enhance iron absorption in the gastrointestinal tract;
- participate in immunogenesis;
- participation in the processes of ossification;
- formation and maturation of the brain.

Prevention of iodine deficiency in the Republic of Belarus:

- The use of iodized salt (mass prophylaxis).
- Using of potassium iodide (200 mg) before pregnancy and the whole pregnancy and lactation (group prevention).
- Assigning large doses of iodine in thyroid gland (individual prevention).

Complications of gestational thyrotoxicosis.

MOTHER: miscarriage, hypertensive forms of preeclampsia, placental abruption, anemia, heart failure, thyrotoxic crisis.

FETUS: a syndrome of growth retardation, malformations, stillbirths, fetal and neonatal hyperthyroidism.

Prenatal care in thyrotoxicosis

Severe form of toxic goiter — an indication for abortion up to 12 weeks.

In the mild form of the disease, pregnancy can be saved to the mandatory surveillance endocrinologist iodine-therapy.

With the average severity of diffuse or nodular hyperplasia with increased its function: termination of pregnancy or surgery at the end I trimester.

Hospitalization is required when joining obstetric complications.

Hypothyroidism

- anovulatory infertility;
- spontaneous abortions, stillbirths.

Fetus: Down syndrome, congenital malformations of the brain, severe disorders of the thyroid gland, congenital hypothyroidism, cretinism.

Uncompensated hypothyroidism — medical indication for termination of pregnancy up to 12 weeks.

If desired, save the woman's pregnancy, hormone replacement therapy with levothyroxine sodium.

NB! Screening newborns for congenital hypothyroidism.

Obesity

Excessive weight has become one of the major health problems in affluent societies. Because of its medical importance and its multifaceted effects on pregnancy, it is discussed separately in this chapter. There are many obesity-related diseases, including diabetes, heart disease, hypertension, stroke, and osteoarthritis. Together they result in a decreased life span. The worldwide diabetes epidemic that Bray (2003) predicted would follow the worldwide obesity epidemic has already begun. Obese women who become pregnant — and their fetuses — are predisposed to a variety of serious pregnancy-related complications. Long-term maternal effects include significant and increased rates of morbidity and mortality. Moreover, recent studies show that the offspring of obese women also suffer long-term morbidity.

Other morbidity associated with maternal obesity includes a higher incidence of failed trial of labor with a prior cesarean delivery (Bujold, 2005; Goodall, 2005; Hibbard, 2006; Robinson, 2005, and all their colleagues).

Obesity and hypertension are common cofactors in causing peripartum heart failure (Cunningham and associates, 1986). And obese women present anesthesia challenges that include difficult epidural and spinal analgesia placement and complications from failed or difficult intubations (Hood and Dewan, 1993).

Second-trimester dilatation and evacuation was reported to take longer and be more difficult in women whose BMI was 30 kg/m² or greater (Dark and co-workers, 2002).

Obese women are less likely to breast feed than normal-weight women (Li and colleagues, 2003). They also have greater weight retention 1 year after delivery (Catalano, 2007; National Research Council and Institute of Medicine, 2007; Rode and colleagues, 2005). Finally, there is evidence that quality-of-life measures are negatively affected by obesity during pregnancy (Amador and co-workers, 2008). La Coursiere and Varner (2009) found that postpartum depression was significantly increased in obese women and also in relation to the degree of obesity — class 1 (22.6 percent), class 2 (32.4 percent), and class 3 (40 percent).

Obesity is a consistent risk factor for preeclampsia (Cedergren, 2004; Jensen, 2003; Sebire, 2001; Weiss, 2004, and all their colleagues). In a review of studies that included more than 1.4 million women, O'Brien and associates (2003) found that the preeclampsia risk doubled with each 5 to 7 kg/m² increase in prepregnancy BMI.

Obesity is also associated with low-grade inflammation and endothelial activation. Endothelial activation also plays an integral role in preeclampsia (see Chap. 34, Endothelial Cell Activation). Wolf and co-workers (2001) linked these two conditions by providing intriguing evidence that inflammation may explain, at least partly, the association of obesity with preeclampsia. Ramsay and co-workers (2002) confirmed that obese pregnant women had significantly elevated serum levels of interleukin-6 and C-reactive protein as well as evidence of impaired endothelial function. These investigators found that obese gravid women had significantly higher levels of triglycerides, very-low-density lipoprotein cholesterol, insulin, and leptin compared with normal-weight pregnant woman.

CHAPTER 4. PULMONARY DISORDERS

A number of acute and chronic pulmonary disorders are encountered during pregnancy. The most common is asthma, which affects up to 4 percent of women. Together with community-acquired pneumonia, it accounted for almost 10 percent of nonobstetrical antepartum hospitalizations in one managed care plan (Gazmararian and colleagues, 2002). Acute and chronic lung disorders are superimposed upon several important adaptive changes of pulmonary physiology and function during pregnancy.

Asthma

Pregnancy outcomes in asthmatics have improved during the past 20 years. From his scholarly review of some recent studies, Dombrowski (2006) concluded that, unless there is severe disease, pregnancy outcomes are generally excellent. However, findings are not consistent between the studies. In some studies, there is a slightly increased incidence of preeclampsia, preterm labor, low-birthweight infants, or perinatal mortality. In another report, Getahun and associates (2006) found a small increase in the incidence of placental abruption and an increase in preterm rupture of membranes (Getahun and co-workers, 2007). But, in a recent European report, 37,585 pregnancies of women with asthma were compared with pregnant nonasthmatics. Risks of most obstetrical complications were not higher in asthmatic women, except depression, miscarriages, and cesarean delivery (Tata and co-workers, 2007).

Life-threatening complications from *status asthmaticus* include muscle fatigue with respiratory arrest, pneumothorax, pneumomediastinum, acute cor pulmonale, and cardiac arrhythmias. Maternal and perinatal mortality rates are substantively increased when mechanical ventilation is required.

Pneumonia

During influenza season, admissions for respiratory illnesses double compared with the remaining months (Cox and colleagues, 2006). Mortality from pneumonia is infrequent in young women, but during pregnancy severe pneumonitis with appreciable loss of ventilatory capacity is not as well tolerated (Laibl and Sheffield, 2006). This generalization seems to hold true regardless of the etiology of the pneumonia. Hypoxemia and acidosis are also poorly tolerated by the fetus and frequently stimulate preterm labor after midpregnancy. Because many cases of pneumonia follow viral upper respiratory illnesses, worsening or persistence of symptoms may represent developing pneumonia.

Any pregnant woman suspected of having pneumonia should undergo chest radiography.

Importantly, almost 7 percent of the women required intubation and mechanical ventilation.

Prematurely ruptured membranes and preterm delivery are common complications and are reported in up to a third of cases (Getahun and associates, 2007; Shariatzadeh and Marrie, 2006). Likely related are older studies reporting a twofold increase in low-birthweight infants (Sheffield and Cunningham, 2009).

Supportive treatment with antipyretics and bed rest is recommended for uncomplicated influenza. Rapid resistance of influenza A (H3N2) strains to *amantadine* or *rimantadine* in 2005 prompted the Centers for Disease Control and Prevention (2006) to recommend against their use. Instead, *neuraminidase inhibitors* were given within 2 days of symptoms onset for chemoprophylaxis and treatment of influenza A and B (see Chap. 58, Influenza). The drugs interfere with the release of progeny virus from infected host cells and thus prevent infection of new host cells (Moscona, 2005). *Oseltamivir* is given orally, 75 mg twice daily, or *zanamivir* is given by inhalation, 10 mg twice daily. The drugs shorten the course of illness by 1 to 2 days, and they may reduce the risk for pneumonitis. Our practice is to treat all pregnant women who are admitted for severe influenza whether or not pneumonitis is identified. There are few data on the use of these agents in pregnant women, but the drugs were not teratogenic in animal studies and are considered low risk (Briggs and colleagues, 2005).

Tuberculosis

Without antituberculosis therapy, pregnancy likely has adverse effects on the course of active tuberculosis (Anderson, 1997). Contemporaneous experiences are few, because chemotherapy has diminished severe disease. Outcomes are dependent on the site of infection and timing of diagnosis in relation to delivery. Jana and colleagues (1994) from India and Figueroa-Damian and Arrendondo-Garcia (1998) from Mexico City reported that active pulmonary tuberculosis was associated with increased incidences of preterm delivery, low-birthweight and growth-restricted infants, and perinatal mortality.

From her review, Efferen (2007) cited twofold increased rates of low-birthweight and preterm infants as well as preeclampsia. The perinatal mortality rate was increased almost tenfold. Adverse outcomes correlate with late diagnosis, incomplete or irregular treatment, and advanced pulmonary lesions.

Extrapulmonary tuberculosis is less common. Jana and co-workers (1999) reported outcomes in 33 pregnant women with renal, intestinal, and skeletal tuberculosis, and a third had low-birthweight newborns. Llewelyn and associates (2000) reported that 9 of 13 pregnant women had extrapulmonary disease associated with delayed diagnoses. Prevost and Fung Kee Fung (1999) reviewed 56 cases of tuberculous meningitis, which were associated with maternal death in a third. Other presentations have included cervical spine tuberculosis with paraplegia, widespread intraperitoneal tuberculosis simulating ovarian carcinomatosis and degenerating leiomyoma, and hyperemesis gravidarum from tubercular meningitis (Kutlu, 2007; Moore, 2008; Nanda, 2002; Sherer, 2005, and all their colleagues).

CHAPTER 5. ANEMIA

The frequency of anemia during pregnancy depends primarily on preexisting iron states and prenatal supplementation. It is more common among indigent women and influenced by dietary customs (American College of Obstetricians and Gynecologists, 2008).

Ren and colleagues (2007) found that a low first-trimester hemoglobin concentration increased the risk of low birth weight, preterm birth, and small-for-gestational age infants. In a study from Tanzania, Kidanto and co-workers (2009) reported that the incidence of preterm delivery and low birth weight was increased as the severity of anemia increased. They did not, however, take into account the cause(s) of anemia, which was diagnosed in almost 80 percent of their obstetrical population. Kadyrov and co-workers (1998) have provided evidence that maternal anemia influences placental vascularization by altering angiogenesis during early pregnancy.

A seemingly paradoxical finding is that healthy pregnant women with a higher hemoglobin concentration are also at increased risk for adverse perinatal outcomes (von Tempelhoff and colleagues, 2008). This may result from lower than average plasma volume expansion of pregnancy concurrent with normal red cell mass increase.

The two most common causes of anemia during pregnancy and the puerperium are iron deficiency and acute blood loss.

With the expansion of blood volume during the second trimester, iron deficiency is often manifested by an appreciable drop in hemoglobin concentration. In the third trimester, additional iron is needed to augment maternal hemoglobin and for transport to the fetus. Because the amount of iron diverted to the fetus is

similar in a normal and in an iron-deficient mother, the newborn infant of a severely anemic mother does not suffer from iron-deficiency anemia. Neonatal iron stores are related to maternal iron status and to timing of cord clamping.

Correction of anemia and restitution of iron stores can be accomplished with simple iron compounds—ferrous sulfate, fumarate, or gluconate — that provide approximately 200 mg daily of *elemental iron*.

CHAPTER 6. GASTROINTESTINAL DISORDERS

Gastritis and ulcer

Erosive ulcer disease more often involves the duodenum rather than the stomach in young women. Gastroduodenal ulcers in nonpregnant women may be caused by chronic gastritis from *H. pylori*, or they develop from use of aspirin or other nonsteroidal anti-inflammatory drugs. Neither is common in pregnancy (McKenna and colleagues, 2003; Weyermann and associates, 2003). Acid secretion is also important, and thus the efficacy of antisecretory agents (Suerbaum and Michetti, 2002). Gastroprotection during pregnancy is probably due to reduced gastric acid secretion, decreased motility, and considerably increased mucus secretion (Hyttén, 1991). Despite this, Cappell and Garcia (1998) theorize that ulcer disease may be underdiagnosed because of frequent treatment for reflux esophagitis.

Antacids are first-line therapy, and H₂-receptor blockers are prescribed for those who do not respond. Proton-pump inhibitors are effective, and at least two studies have shown no apparent teratogenic effects (Diav-Citrin and co-workers, 2005; Mahadevan and Kane, 2006). *Sucralfate* is the aluminum salt of sulfated sucrose that provides a protective coating at the ulcer base. Only approximately 10 percent of the aluminum salt is absorbed, and it is considered safe for pregnant women.

Appendicitis

Suspected appendicitis is one of the most common indications for abdominal exploration during pregnancy. Mazze and Källén (1991) reported this in approximately 1 in 1000 pregnant women in the Swedish registry of 720,000 pregnancies. Appendicitis was confirmed in 65 percent for an incidence of approximately 1 in 1500 pregnancies.

Pregnancy makes diagnosis of appendicitis more difficult. This is partly because nausea and vomiting accompany normal pregnancy. In addition, as the uterus enlarges, the appendix commonly moves upward and outward so that pain and tenderness are "displaced" (Baer and colleagues, 1932). These latter findings have been challenged (Mourad and associates, 2000). Another oft-stated reason is that some degree of leukocytosis accompanies normal pregnancy.

For all of these reasons, pregnant women — and especially those late in gestation — frequently do not have clinical findings "typical" for appendicitis. It commonly is confused with cholecystitis, preterm labor, pyelonephritis, renal colic, placental abruption, or degeneration of a uterine leiomyoma.

When appendicitis is suspected, treatment is prompt surgical exploration.

Before exploration, intravenous antimicrobial therapy is begun, usually with a second-generation cephalosporin or third-generation penicillin. Unless there is gangrene, perforation, or a periappendiceal phlegmon, antimicrobial therapy can usually be discontinued after surgery. Without generalized peritonitis, the prognosis is excellent. Seldom is cesarean delivery indicated at the time of appendectomy. Uterine contractions are common, and although some clinicians recommend tocolytic agents, we do not. De Veciana and colleagues (1994) reported that tocolytic use increased the risk for maternal pulmonary-permeability edema with sepsis syndrome

If appendicitis is undiagnosed before delivery, often when the large uterus rapidly empties, walled-off infection is disrupted, causing an acute surgical abdomen. New-onset appendicitis during the immediate puerperium is uncommon.

It is important to remember that puerperal pelvic infections typically do not cause peritonitis.

Appendicitis increases the likelihood of abortion or preterm labor, especially if there is peritonitis.

REFERENCES

1. *Baranouskaya, E.* Obstetrics: manual / E. Baranouskaya. — Minsk: Tesej, 2007. — 176 p.
2. Williams Obstetrics: 23rd Edition / F. G. Cunningham [et al.] — McGraw-Hill Companies, 2009. — 1404 p.
3. *Dutta, D. C.* Textbook of Obstetrics / D. C. Dutta. — New Central Book Agency, 2001. — 670 p.
4. *Bodyazhina, V. I.* Textbook of Obstetrics / V. I. Bodyazhina. — Mir Publishers, 1983. — 400 p.

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