All the elective surgeries are to be avoided during pregnancy and pregnant women should undergo only emergency surgical interventions. Pregnancy is associated with different physiological changes in the organism, which should be taken into account in preoperative preparation of the pregnant women. Expanded body fluid volume leads to dilutional anemia, however other hematological disorders may be present as well. Extreme obesity is a frequent comorbidity, while hypertension is associated with the highest risks since it may lead to a life-threatening complication - eclampsia. As for other coexisting diseases, urinary tract infections and gestational diabetes are the most common as well as hyperthyroidism and other diseases that may also develop. The type and severity of the acute surgical disease, extensiveness of the planned surgery as well as the type of planned anesthesia to be applied, occasionally necessitate, depending on the gestational age, termination of pregnancy to be considered. Gynecological-obstetric consultations are mandatory in all surgical interventions planned in pregnant women.

Key words: preoperative preparation, pregnancy, eclampsia, gestational diabetes

INTRODUCTION

The main objective of preoperative preparation of patients is complication-free postoperative recovery. Almost all surgical procedures are associated with the risk of onset of intraoperative and/or postoperative complications, with some of them being unpredictable. Within the preoperative preparation the patient should be informed on all the possible risks of the surgical treatment. Careful preoperative assessment, based on the insight into patient’s history, physical examination, laboratory and other tests will help in reducing the risk and application of the appropriate preoperative prophylactic measures. After discussing potential risks and benefits of the proposed surgery, patient’s signed consent should be obtained in order to meet formal prerequisites for the surgery. According to the American College of Obstetricians and Gynecologists, the consent is the expression of respect for the patients.

It is estimated that in preparation of the surgical patients and establishment of diagnosis, 70% of the information is obtained from the history of disease, 20% based on the physical examination and 10% from the specific required laboratory tests.

Consultations with the gynecologist/obstetrician are mandatory within the preoperative preparations in order to obtain recommendations relevant for maternal and fetal conditions. It is essential to obtain all the available information from the patient. The former includes complete history of the current diseases, information on smoking, alcoholism, medications and drugs, as well as information on other chronic diseases involving cardiovascular, pulmonary, urinary, endocrine and central nervous systems as well as information on possible previous surgical procedures. Age of pregnancy and expected date of delivery (EDD) are to be determined. EDD may be determined with high precision by ultrasound examination performed in the first half of pregnancy. The attention must be paid to possible pregnancy-related complications, such as gestational diabetes, hyperthyroidism, hypertension and eclampsia, anemia and thrombocytopenia as well as to the fact that most of the drugs pass across the placental barrier, including anesthetics and other medications used in anesthesia, which may have adverse effects on the fetus and further course of pregnancy. Preoperative tests should include determination of hemoglobin and hematocrit values, complete blood count, electrolytes, glucose, blood urea and creatinine, urine analysis for the presence of glucose and proteins, as well as liver and lung function tests, electrocardiography, microscopic examination of the...
urine (urine culture) in order to detect asymptomatic bacteriuria. 

HEMATOLOGICAL DISORDERS IN PREGNANCY

Pregnancy is associated with expansion of the blood volume and at term, the volume is by 40-45% higher in comparison to the pre-pregnancy values. Accelerated hematopoiesis increases red blood cell volume by approximately 33%. Subsequently, expansion of the plasma volume is accompanied by physiological hemodilution, i.e., anemia, with fall of the hematocrit value. During pregnancy, red blood cell count ranges between 3.8 and 4.4x10^12/L, while white blood cell count ranges between 9 and 15x10^9/L. A left shift in the leukocyte formula is evidenced. Hemoglobin values range between 10 and 13g/100ml. Hematocrit values range from 30-39%, serum iron between 60 and 120 micrograms/100ml and platelet count between 140 and 400x10^9/L. This type of the dilutional, i.e., physiological anemia is the most prominent around the gestational week 30. However, true anemias may also develop during pregnancy, with hypochromic sideropenic anemia being the most common and hyperchromic megaloblastic being considerably less frequent.

Hypochromic hyposideremic anemia in pregnancy develops as a result of iron deficiency. Upon the preoperati ve examination major complaints of the anemic pregnant woman include rapid fatigue, weakness, malaise, palpitations and dizziness. Severe forms of the anemia may lead to premature delivery and intrauterine fetal growth retardation. In the second half of pregnancy iron dose of 6-7 mg per day is required. In case of hemoglobin level below 10.5g/100ml, serum iron below 90 micrograms/100ml and hematocrit less than 32%, daily iron dose of 60 to 120 milligrams will be required. The treatment includes diet rich in vitamins, iron and proteins. Iron preparations in the form of ferrous sulfates are applied at the dose of at least 300 mg/day. In severe forms of anemia appearing by the end of pregnancy the preoperative treatment may occasionally include red blood cell transfusion.

Hyperchromic megaloblastic or macrocytic anemia in pregnancy develops due to folic acid deficiency. Serum iron level in the peripheral blood is normal, however blood count is characterized by reduced red blood cell count and hemoglobin level, leukopenia, onset of macrocytes, lymphopenia, monocytopenia, thrombocytopenia and eosinophilia. The condition is treated by administration of folic acid in daily dose of 1 mg.

Thrombocytopenia is encountered in 7-8% of all pregnancies. Thrombocytopenia can result from a wide range of conditions with several of them being pregnancy-related. The normal range of platelets in nonpregnant women is 150,000-400,000/μL. Average platelet count in pregnancy is decreased (213,000/μL vs 250,000/μL). Change in platelet count is due to hemodilution, increased platelet consumption, and increased platelet aggregation driven by increased levels of thromboxane A2. Thrombocytopenia can be defined as platelet count less than 150,000/μL or platelet count below the 2.5th percentile for pregnant patients (116,000/μL). Classification of thrombocytopenia in pregnancy is arbitrary and not necessarily clinically relevant. Mild thrombocytopenia is 100,000-150,000/μL. Moderate thrombocytopenia is 50,000-100,000/μL. Severe thrombocytopenia is <50,000/μL. In normal pregnancies, 7.6% of women present with mild thrombocytopenia during pregnancy, and 65% of them will not be associated with any pathology. Any pregnant patient with a platelet count of less than 100,000/μL should undergo further clinical and laboratory assessment. Clinical assessment is the most important factor for the evaluation of a pregnant patient with thrombocytopenia. Bleeding associated with surgery is uncommon unless the platelet counts are lower than 50,000/μL. Clinically significant spontaneous bleeding is rare unless counts fall below 10,000/μL. The etiologic classification for thrombocytopenia can be divided into 3 broad categories:

1. Increased destruction,
2. Decreased production, and

Platelet destruction is more common in the obstetric practice.

Increased platelet destruction involves gestational thrombocytopenia and immune-related thrombocytopenia, including the following: Immune thrombocytopenic purpura (ITP), Systemic lupus erythematosus (SLE), Antiphospholipid syndrome, Connective tissue disorders, Drug-induced, HIV-related, Viral infections (e.g., Epstein-Barr virus), Lymphoma. Nonimmune-related thrombocytopenia may include the following: Preeclampsia/eclampsia, HELLP syndrome, Thrombotic thrombocytopenic purpura, Hemolytic uremic syndrome, Acute fatty liver of pregnancy, Heparin-induced thrombocytopenia, Vascular malformations, Hypersplenism.

Decreased platelet production may also be noted, and includes vitamin B-12 and folate deficiency, as well as bone marrow suppression that can be caused by the following: Drug-induced, Aplastic anemia, Paroxysmal nocturnal hemoglobinuria, Infection, Bone marrow infiltration (hematologic malignancy, nonhematologic malignancy).

Splanic sequestration may be caused by the following: Portal hypertension, Liver disease, Portal or hepatic vein thrombosis, Myeloproliferative disorders, Lymphoproliferative disorders, Storage disease (e.g., Gaucher disease), Infection (e.g., malaria).

The most common causes of thrombocytopenia in pregnancy are as follows: gestational thrombocytopenia (70%), preeclampsia (21%), immune thrombocytopenic purpura (3%), other (6%).

Gestational thrombocytopenia (GT)

The incidence of gestational thrombocytopenia is 8% of all pregnancies and accounts for more than 70% of cases of thrombocytopenia in pregnancy. The pathophysiology of gestational thrombocytopenia is unknown, but 2 main factors are associated with GT: Accelerated platelet activation is suspected to occur at placental circulation and accelerated consumption of platelets is due to the reduced lifespan of platelets during pregnancy.


The following may be noted: asymptomatic patient with no history of abnormal bleeding, mild thrombocytopenia (counts >70,000/µL), usually detected incidentally on routine prenatal screening, no specific diagnostic tests to definitively distinguish gestational thrombocytopenia from mild ITP, usually develops in the third trimester.

Clinical manifestations include the following: no pre-pregnancy history of low platelets or abnormal bleeding is noted, platelet counts normalize within 2-12 weeks following delivery, Burrows reported that all women with GT had normal or normalizing platelet counts by the seventh postpartum day. No pathological significance for the mother or fetus is noted. No risk for fetal hemorrhage or bleeding complications is observed.3

Immune thrombocytopenic purpura

ITP is also known as idiopathic thrombocytopenic purpura or autoimmune thrombocytopenic purpura (ATP). Incidence is 1 per 1000-10,000 pregnancies, and it accounts for 3% of all thrombocytopenic gravidas. Immunoglobulin G (IgG) antiplatelet antibodies recognize membrane glycoproteins and coat the platelets, which then are destroyed by the reticuloendothelial system, predominantly in the spleen. Antiplatelet antibodies may cross the placenta and cause significant fetal thrombocytopenia (<50,000/µL), which could result in bleeding complications in the neonate. Minor bleeding complications include purpura, ecchymoses, and melena. Major bleeding complications include intracranial hemorrhage leading to neurologic impairment or death.

ITP is a diagnosis of exclusion.

The following may be noted:

- Persistent thrombocytopenia (<100,000/µL), increased number of megakaryocytes in the bone marrow, exclusion of systemic disorders or medications/drugs, absence of splenomegaly
- Approximately 80% of cases are associated with antiplatelet antibodies, although these are not required for the diagnosis.

In clinical manifestations, the following may be noted: easy bruising, petechiae, epistaxis, and gingival bleeding, although some women are asymptomatic, significant hemorrhage is rare, even when counts fall to less than 20,000/µL.

Conclusions from many studies/reviews of ITP in pregnancy are as follows:

- The rate of severe neonatal thrombocytopenia is approximately 12%.
- Intracranial hemorrhage is rare (approximately 1%) and appears to be unrelated to the mode of delivery.
- Vaginal delivery never has been proven to cause intracranial hemorrhage.
- Cesarean delivery should be reserved for obstetrical indications only.
- Scalp sampling is unreliable, and the risks of PUBS appear to outweigh the risk of a vaginal delivery of an infant with thrombocytopenia.
- Neonatal platelet counts normally decrease, sometimes dramatically, for several days following delivery. This result may be due in part to the passage of IgG antiplatelet antibody in the breast milk, although breastfeeding is not contraindicated. Neonatal thrombocytopenia may lead to delayed postnatal intracranial hemorrhage. Notifying pediatrics of any parturient with maternal ITP is important so that neonatal platelet counts can be monitored closely.

Maternal treatment for ITP:

No treatment is necessary if platelet counts remain above 50,000/µL and the patient is asymptomatic. However, many physicians will treat for asymptomatic platelet counts of less than 50,000/µL, abnormal bleeding, or prior to invasive procedures such as cesarean delivery or regional anesthesia.

Below are recommended treatments for maternal thrombocytopenia due to ITP. While they all improve maternal platelet counts, none have been shown to adequately prevent or treat fetal/neonatal thrombocytopenia.

- With steroids (e.g., prednisone), the following is noted:
  - Response time is 3-7 days; maximum effect occurs by 2-3 weeks.
  - Approximately 70% of patients will respond, and 25% will enter complete remission.
  - Risks include hyperglycemia, fluid retention, and bone calcium loss.
- With intravenous immune globulin (IVIG), the following is noted:
  - IVIG works by binding to platelets, blocking the attachment of antiplatelet antibodies.
  - IVIG is ideal when time is inadequate for steroids to take effect (prior to surgery or low platelet counts with bleeding).
  - Response time is 6-72 hours.
  - Approximately 70% of patients will return to pretreatment levels within 30 days.
  - This treatment is very expensive.
- With anti-D immunoglobulin in Rh-positive, non-splenectomized women, the following is noted:
  - Anti-D immunoglobulin binds to maternal red blood cells and results in Fc receptor blockade. The spleen directs its phagocytic activity to the coated red cells rather than to antibody-coated platelets.
  - It is not useful in Rh-negative or splenectomized women.
  - Response time of anti-D immunoglobulin is 1-2 days, peak effect in 7-14 days, average duration 30 days.
  - Little data are available on the use of anti-D immunoglobulin in pregnant women; risk-benefit ratios need to be considered prior to its usage.
- With splenectomy, the following is noted:
  - Splenectomy removes the organ responsible for the destruction of IgG-coated platelets.
  - In nonpregnant women, splenectomy is used for patients who are unresponsive to IVIG.
• Splenectomy is usually avoided during pregnancy for technical reasons, although it remains an option in the first and second trimesters when ITP is severe (counts <10,000/µL) and the patient does not respond to steroids or IVIG.
• Complete remission occurs in two thirds of cases.
• Splenectomy does not have an impact on circulating antibodies that may still cross the placenta and cause neonatal thrombocytopenia.

With platelet transfusion, the following is noted:
• This is a temporary measure, which should be administered for life-threatening hemorrhage and should be available prior to surgery for patients with severe thrombocytopenia.
• Six to 10 units of platelets are usually administered at one time.
• Platelet counts normally rise by 10,000/µL for each unit of platelets transfused, but in ITP the rise is less pronounced due to destruction of donor platelets.

We have to know that gestational thrombocytopenia is the most common cause of thrombocytopenia during pregnancy (70%), but other underlying causes must be considered as well. A thorough history and physical examination is important to rule out other causes. Look at the remainder of CBC and smear to rule out pancytopenia and platelet clumping associated with pseudothrombocytopenia. If no antecedent history of thrombocytopenia is present and platelet counts are >70,000/µL, the condition is more likely to be GT. If platelet counts fall to <50,000/µL or if a preexisting history of thrombocytopenia is present, the condition is more likely to be ITP. Direct or circulating antiplauelet antibodies has no value in the workup of thrombocytopenia in pregnancy because they usually are nonspecific and will not distinguish GT from ITP. Cesarean deliveries for ITP or GT should be reserved for obstetrical indications only because vaginal delivery itself has not been demonstrated to be a cause for intracranial hemorrhage. Invasive procedures to determine fetal platelet counts (scalp sampling, PUBS) are no longer considered necessary for ITP, because an infant who is thrombocytopenic may be delivered vaginally. However, PUBS may still be of value in alloimmune thrombocytopenia to assess the severity of the condition and therapeutic response. With ITP, obtain cord blood at delivery (if possible) for platelet count and notify the pediatricians to assess neonatal platelet counts due to the risk for continued quantitative platelet decline and postnatal hemorrhage. For GT, document normalization of maternal platelet counts after delivery.

OBESITY

In a large number of pregnant women weight gain is unnecessary large, and thus many of them are obese and extremely obese. Body mass index (BMI) should be determined at the beginning of pregnancy and increase in body weight should be followed thereafter since calculation of BMI during pregnancy is imprecise. Obesity represents a preoperative risk factor due to possible difficulties related to intubation, slower and prolonged awakening from anesthesia caused by deposition of the anesthetic agents in the fatty tissue, while from the surgical point of view, interventions in such patients are more complications, since exposure of the organs and wound healing are more difficult, wound infections are more likely while early mobilization of patients is also more difficult.

HYPERTENSION, PREECLAMPSIA AND ECLAMPSIA

Hypertension is the most frequent accompanying disease in pregnancy. It requires particular attention since it may lead to preeclampsia and eclampsia, which are among the most severe complications that may result even in the lethal outcomes.

Hypertension in pregnancy is defined as either a systolic blood pressure of ≥140 mmHg or an increase of ≥30 mmHg from a baseline in the first half of pregnancy or a diastolic blood pressure of ≥90 mmHg or an increase of ≥15 mmHg from baseline in the first half of pregnancy. To meet strict criteria for hypertension in pregnancy, the elevated blood pressure must be observed on at least two occasions 6 hours apart.

Preeclampsia-eclampsia (P-E) emerges in approximately 7% of all late pregnancies being the major cause of the maternal mortality (in approximately 20% of cases).

Severe preeclampsia is associated with a BP of 160/110 mmHg or more on at least two occasions 6h apart, and proteinuria >5g in 24h. The main presenting feature is hypertension, with either proteinuria or edema or both. Maternal complications include eclampsia, cerebral hemorrhage, cerebral edema, left ventricular failure and renal failure. Eclampsia, a cerebral complication, is marked by the onset of convulsions. Cerebral Hemorrhage and cerebral edema are the most frequent causes of death in preeclampsia. Hypertensive disease is still the second most important cause of maternal mortality. A small group of patients have been described with the HELLP syndrome, which comprises preeclampsia in association with hemolysis, elevated liver enzymes, and a low platelet count.

In most of the hypertensive patients, delivery is the best option. In case that pregnancy must be terminated around the gestation week 24, which is rather infrequent, the fetal life is deliberately sacrificed since mother’s life is always given the priority.

Antihypertensive therapy is applied for protection of the pregnant women from cerebral hemorrhage. If prolonged treatment is needed, oral methyldopa is most commonly applied in daily dose of 0.25-2g divided in four doses. Methyldopa is a centrally acting adrenergic inhibitor, which reduces systemic vascular resistance. In preeclampsia, the most commonly used agent is hydralazine as a vasodilator, since it improves uteroplacental and renal blood flow. It may be applied orally, intramuscularly or intravenously. Daily dose must not exceed 200mg. Sodium nitroprusside is a potent vasodilator which is primarily used in emergency conditions or in cases when sudden rise of the arterial pressure must be controlled, such as upon intubation. It should be kept in mind that doses of 5-10mg/kg/min are safe as well as that they will not lead to maternal or fetal cyanide intoxication. Trimethaphan is a
ganglionic blocking agent highly useful in conditions of hypertensive crisis with brain edema and increased intracranial pressure since it does not lead to brain vasodilatation. Oral labetalol, non-selective beta-blocking agent with mild alpha-1-blocking effect has been also recently used.

It is given intravenously as an initial bolus of 5-10 mg, repeated at 5 min intervals up to 1mg/kg. Nifedipine, a calcium channel blocker, can be given orally or sublingually in dose of 5-10mg. Preoperative preparation of patients with pre-eclampsia or eclampsia is aimed at prevention and control of convulsions, improvement of organ perfusion, normalization of the arterial blood pressure and correction of coagulation-related problems. Magnesium sulfate (MgSO4) is a drug of choice for convulsions. The usual initial MgSO4 dose is 4g i.v. (20% solution). It should be applied slowly over the period longer than 5 minutes. Blood level of the drug is maintained by continuous i.v. infusion of 1-2g/h. Magnesium potentiates the intensity and duration of depolarizing and non-depolarizing muscle relaxants actions through reduction of quantity of acetylcholine released from the terminal portions of the motor nerves, also reducing sensitivity to acetylcholine and excitability of the skeletal muscle membrane.

In addition to antihypertensives and anticonvulsants, controlled fluid intake during the preoperative preparation is also important.

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Plasma volume may be decreased by up to 40% in severe hypertension cases. Despite sodium and water retention, the CVP is low or normal. This is in part due to an increased vascular permeability causing loss of fluid and protein from the circulation.

In addition to antihypertensives and anticonvulsants, controlled fluid intake during the preoperative preparation is also important.

Fluid administration in treatment of preeclampsia is essentially aimed at increase of the central venous pressure (CVP) and pulmonary capillary wedge pressure (PCWP) to normal values are well as to increase of diuresis up to 1ml/kg/h. Fluid administration leads to increase in cardiac index, reduction of the systemic vascular resistance and decrease of the mean arterial pressure. In order to prevent fluid overload, arterial pressure, diuresis and specific urinary gravity should be monitored, while in severe cases, particularly in presence of pulmonary edema, continuous CVP and PCWP monitoring are also required.

**HELP SYNDROME**

A rare complication of preeclampsia, it is characterized by Hemolysis, Elevated Liver enzyme activity and Low Platelet count (HELLP syndrome). Reported to occur in 5-10% patients with preeclampsia it carries a maternal mortality of 2-24% and a perinatal mortality of 8-40%. Preoperative abnormalities are: 1) the presence of preeclampsia or eclampsia is 100% although this is not always severe. 2) Upper abdominal pain (65%), nausea or vomiting (36%), headaches (31%) and visual disturbances (10%) are the commonest presenting complaints. Clinical signs include epigastric pain and tenderness, hypertensi-on, edema, proteinuria and bleeding. 3) Thrombocytopenia is present and hemolytic anemia is of the microangiopathic type. There is increased platelet consumption and a decreased lifespan. 4) Jaundice and disordered liver function. Rarely subcapsular hematoma or liver rupture has been reported. 5) Hypovolemia, decreasing urine output and increasing creatinine levels. 6) Other complications have included ARDS, acute renal failure and placental abruption. Death may occur from cardiorespiratory failure or intracerebral hemorrhage. 7) Abnormalities of coagulation, other than thrombocytopenia are not commonly observed. 8) Laryngeal edema may occur in severe cases.

Preoperative management: 1) investigations include Hb, white cell, platelet and reticuloocyte count, partial thromboplastin time, fibrinogen concentration, FDP, liver function tests, urea and electrolyte concentrations. Thromboelastography may be of help. 2) Fresh frozen plasma and platelets are required to increase the platelet count to > 50 x 10^9/l and the INR <1.5. 3) CVP and urinary output monitoring. 4) Preoperative control of hypertension.

**GESTATIONAL DIABETES MELLITUS**

Gestational diabetes is defined as carbohydrate intolerance resulting in hyperglycemia with onset (or initial detection) in the course of pregnancy with different severity of its manifestations. Pregestational and gestational diabetes occurs in 2-5% of the pregnant women. Gestational diabetes accounts for approximately 90% of the cases, while pregestational one accounts for the remaining 10%. Hypertension (pregnancy-induced hypertension - PIH), infections, polyhydramnios and spontaneous miscarriage are more frequently encountered during pregnancy in patients with some form of diabetes. Fetal congenital anomalies (most frequently those affecting cardiovascular and central nervous system), fetal macrosomia (increased neonatal body weight), respiratory distress syndrome, metabolic acidosis and delayed psychomotor development are also more common. Normoglycemia is achieved by dietary regime in 80-85% of the pregnant women with gestational diabetes.

The most common presentation of diabetes is glycosuria. In the course of pregnancy, particularly during the first and at the beginning of the second trimester, renal blood flow and glomerular filtration are increased by 25-50% and approximately 50%, respectively. The former leads to significant increase in renal glucose inflow, while glucose reabsorption in the proximal tubuli is insufficient (glucose overloading of the proximal tubuli) which results in glycosuria. Upper admissible limit of glucose excretion via the urine is 140 mg per day, while in case of gestational diabetes glycosuria values may be ten times as high (more than 1.5 g per day). The concentration of glycosylated hemoglobin HbA1c, as the best indicator of the long-term metabolic control should be determined (one examination per trimester) and fundus oculi examination should be performed.

Double biochemical screening test is mandatory between the gestational weeks 10 and 14, while triple screening test must be performed between the gestational weeks 16 and 18. Regular detailed ultrasound examination are also suggested for the purpose of detection of fe-
tal anomalies, as well as fetal echocardiographic examination since the gestational week 20. Color Doppler assessment of the fetomaternal circulation is performed once a week starting from the gestational week 34. Perioperative preparation also includes mandatory assessment of fetal lung maturity using ratio of lecithin/sphingomyelin (L/S) and phosphatidyl glycerol tests if the pregnancy must be terminated before the gestational week 39.

If the pregnant woman has previous history of diabetes mellitus, safety of the applied antidiabetic agents must be evaluated. Oral hypoglycemics pass across the placental barrier and there is a theoretical risk of congenital malformations. Discontinuation of the following hypoglycemics is recommended during pregnancy: acarbose, repaglinide, nateglinide, pioglitazone and rosiglitazone, as well as their replacement with insulin. Sulfonylurea preparations may cause neonatal hypoglycemia. As for the oral hypoglycemics, metformin is considered to be the safest. Insulin is compatible with pregnancy and recommended as drug of the choice. In case of pregnant diabetic patient with poorly controlled diabetes mellitus, termination of pregnancy is recommended in presence of HbA1c >10%.15,16

OTHER CO-EXISTING DISEASES DURING PREGNANCY

Preoperative examination of the urinary tract is essential since urinary tract is particularly susceptible to infections in the course of pregnancy. The reasons of this higher susceptibility to infections include: changed secretion of the steroid sex hormones, pressure exerted by the pregnant uterus on the urinary bladder leading to hypotonia and congestion, as well as predisposition to ureterovesical reflux and urinary stasis. Asymptomatic bacteriuria is seen in approximately 5% of the pregnant women, while the incidence of the acute pyelonephritis is 1-2% of all pregnancies. Treatment of asymptomatic bacteriuria prevents 25% of the acute urinary tract infections. The total of 2% of the pregnant women with negative urine culture will present with a picture of the acute inflammatory disease of the urinary tract. The most common causes of infections are Escherichia coli and Enterococcus. The therapy is based on ten-day antibiotic treatment (ampicillin, sulfooamides, nitrofurantoin, cephalosporins). Analgesics, laxatives and antipyretics should be applied as indicated, as well as fluid replacement and increase of urine alkalinity.17

Hyperthyroidism occurs in 2 of 1,000 pregnant women, being relatively frequent disease in pregnancy. The patients with hyperthyroidism may develop thyrotoxic crises, which are most frequently caused by infection, delivery, trauma and stress. The disease is more difficult to recognize during pregnancy due to enhanced metabolism during pregnancy. The attention must be paid to cardiac function and K, Mg and phosphate levels. Preoperative preparation of such patients is required and normal serum levels of the hormones should be achieved. Administration of potassium iodide may reduce concentration of the circulating hormones, however its administration over the period longer than two weeks is not recommended during pregnancy. The thyroid gland is extremely susceptible to iodine and fetal goiter may rapidly develop. Beta-blockers used in therapy will block peripheral effects of the hormones, however they will not prevent hormone release. Thyroid hormones will be present in circulation and they will lead to predominance of the catabolic processes. Hyperthyroidism is most commonly treated with thioamides. The initial dose of propylthiouracil usually ranges between 100-150 mg, in 6-8 h intervals, up to maximum daily dose of 600 mg, with maintenance dose being 50-300mg/day, divided in three doses. Thioamides are considered to be nonteratogenic. They pass across the placenta and the dose sufficient to induce euthyroid state in mother may cause fetal hypothyroidism. Fetal monitoring is mandatory (US examination: fetal goiter, retardation of the fetal growth, fetal bradycardia).18,19

Hypothyroidism is seen in one of 2000 pregnant women. Hypothyroidism is associated with reduced metabolism, cardiovascular, respiratory and other disorders. The attention should be primarily paid to bradycardia, hypotension, hypoglycemia and electrolyte disorders. The patients are exceptionally susceptible to anesthetic agents, narcotics and analgesics, and thus dose reduction is required. Treatment of hypothyroidism is of the utmost importance for outcome of pregnancy. Women with untreated hypothyroidism have higher incidences of preeclampsia, placental abruption, stillborn infants and newborns with low birth mass. Levothyroxine in dose of 0.1-0.15mg/24h, which is increased in 4-week intervals until normalization of the thyroid hormones is used in treatment. T3, T4 and TSH follow-up is required between weeks 6 and 8, 16 and 20 and 28 and 32.19,20

CONCLUSION

In the course of pregnancy all female tissues and organs undergo changes. The changes are aimed at provision of the optimal fetal growth and development and simultaneous preservation of the maternal health. Detailed knowledge on the physiology of pregnancy enables differentiation between the normal and initial pathophysiological events, which is a prerequisite for appropriate preoperative preparation of the pregnant women.

SUMMARY

PREOPERATIVNA PRIPREMA TRUDNICA

Sve elektivne operacije u toku trudnoće se izbegavaju i trudnice se podvrgavaju samo hitnim hirurškim intervencijama. Trudnoća je povezana sa različitim fiziološkim promenama u organizmu, pa to treba uzeti u obzir prilikom preoperativne pripreme trudnica. Povišen volumen telesnih tečnosti vodi dilucionaloj anemiji, ali postoje i drugi hematološki poremećaji. Od komorbiditeta česta je pojava ekstremne gojaznosti, dok je najčešće i najrizičnija hipertenzijska koja može dovesti do vitalno ugrožavajuću komplikacije ekklampsi. Od drugih koezistirajućih oboljenja, najčešće se javljaju infekcije urinarnog trakta i gastacijskih dijabetes, a mogu se javiti i hipertireoza i druga
oboljenja. U zavisnosti od vrste i težine akutnog hirurškog oboljenja, ekstenzivnosti planirane operacije kao i vrste anestezije koja će biti primenjena, nekada je potrebno razmotriti i mogućnost prekida trudnoće u zavisnosti od gestacione starosti ploda. Kod svih hirurških intervencija koje se planiraju kod trudnica, neophodna je konsultacija sa ginekologom-akušerom.

Ključne reči: preoperativna priprema, trudnoća, eklampsija, gestacioni dijabetes

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