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V. N. Karazin Kharkiv National University

OBSTETRIC BLEEDING IN THE POSTPARTUM PERIOD

Guidelines to practical training in obstetrics
for higher education students of the 5th year Medical Faculty

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The methodical recommendations contain a list of theoretical questions on the given topic for independent preparation of students for practical training, a list of recommended and additional literature, as well as an example of test tasks.

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LIST OF CONDITIONAL ABBREVIATIONS

AP – blood pressure

BR – respiratory rate

DIC – Disseminated intravascular coagulation

HR – heart rate

PPH – postpartum haemorrhage

VCB – volume of circulating blood

INTRODUCTION

Annually, worldwide postpartum haemorrhage (PPH) occurs in 14 million women. 125,000 patients die each year from PPH.

Postpartum bleeding is a recognized obstetric problem, which is accompanied by maternal morbidity and mortality. The sudden appearance of PPH and the rate of blood loss are the leading factors that often make bleeding uncontrollable. According to the literature, most PPHs occur within the first four hours after delivery, and the most common cause of early PPH is uterine atony. For vaginal birth bleeding is considered to be blood loss > 500 ml, and for caesarean section > 1000 ml.

An analysis of maternal deaths from PBC in developed countries shows that all aid errors can be formulated in a single phrase: «Made not enough and too late». In this case, the delay in detecting excessive blood loss was encountered in most cases of maternal death due to PPH.

Thus, one of the main prerequisites for maternal morbidity and mortality is the delay in recognizing excessive blood loss, determining its severity, and making clinical decisions about the onset of care and its extent.

SECTION 1



Obstetric bleeding in the postpartum period

By classic definition, early (primary) postpartum bleeding is blood loss in the first 24 hours after childbirth. Bleeding that occurs after 24 hours and up to 6 weeks, is late (secondary). Late postpartum haemorrhage often occurs 7 to 12 days after delivery.

1.1. Early postpartum bleeding

Classification of early postpartum bleeding:

- hypotension and atony (in 90 % of cases) of the uterus;
- retention of parts of the placenta or membranes;
- trauma to the birth canal;
- uterine ruptures;
- coagulopathic bleeding.

Hypotonic and atonic bleeding

Uterine bleeding in the first hours of the postpartum period (early postpartum haemorrhage) is most commonly associated with impaired uterine contractility (hypo- and atonic). The frequency of hypotonic bleeding is 3–4 % of the total number of births, and in the structure of all bleeding in the postpartum period – 90 %.

The term «atony» defines the state of the uterus, in which the myometrium completely loses its property to contract. Uterine hypotension is characterized by a decrease in tone and insufficient ability of the uterus to contract.

Causes of hypotension and atony of the uterus:

- anatomical and functional failure of the myometrium (late preeclampsia, endocrinopathy, somatic diseases, malformations, tumors of the uterus, scar on the uterus, large fetus, polyhydramnios, polyplids);
- over-excitation with further depletion of myometrial function (prolonged delivery, operative termination of delivery, use of drugs that reduce myometrial tone (spasmolytics, tocolytics), hypoxia during labor, etc.);
- impaired contractile function of the myometrium due to disturbance of biochemical processes, correlation of neurohumoral factors (estrogens, acetylcholine, oxytocin, cholinesterase, progesterone, prostaglandins);
- violation of the process of attachment, separation and allocation of the placenta and placenta;
- Idiopathic (not established), iatrogenic.

Clinical picture of hypotonic and atonic bleeding

There may be 2 clinical bleeding options.

The first option: immediately after birth, the uterus loses its ability to contract; it is atonic, does not respond to mechanical, temperature and drug stimuli, bleeding from the first minutes has the character of profuse, quickly brings the woman into shock.

The second option: the uterus relaxes periodically; under the action of stimulants, muscle tone and contractility are temporarily restored; then the uterus becomes loose again; bleeding wavy; gain periods alternate with almost complete stoppage; blood is lost in portions of 100–200 ml. Maternity compensates for such blood loss if obstetric care is provided in a timely and sufficient manner. If obstetric care is delayed or performed haphazardly, the body's compensatory capacity is depleted. The uterus ceases to respond to pathogens, haemostasis disorders join, the bleeding becomes massive, haemorrhagic shock develops. The second variant of hypotonic bleeding is much more common.

Treatment

Assisting with hypotonic bleeding is a set of activities that are carried out quickly, clearly, without wasting time in reusing inefficient remedies and manipulations.

Methods for determining the amount of blood loss

1. Libov method

The amount of blood loss is determined after weighing the blood-soaked napkins

Blood loss volume = $V / 2 \times 15\%$ (less than 1000 ml blood loss) or

Blood loss volume = $V / 2 \times 30\%$ (with blood loss of more than 1000 ml),

where B is the weight of the napkins, 15 % and 30 % are the magnitude of the error on the amniotic fluid, the solutions.

2. Nelson's formula

The percentage ratio of total blood loss is calculated as follows:

Ratio of total blood loss = $0.036 \times \text{initial blood volume} / \text{body weight} \times \text{hematocrit}$,

where the initial volume of blood (ml / kg) = $24 / 0,86 \times \text{initial hematocrit} \times 100$

3. Determination of blood loss by blood density and hematocrit:

Blood density, kg / ml	Haematocrit	Volume blood loss, ml
1057–1054	44–40	Up to 500
1053–1050	38–32	1000
1049 – 1044	30–22	1500
Less than 1044	Less than 22	More than 1500

4. The Shock Index of Algover

Shock Index = HR / BPS,

where the heart rate is the heart rate; BPS – systolic blood pressure.

Normally, the Algover index = 0.5.

By the values of the index we can draw conclusions about the amount of blood loss:

Algover Index	Blood Volume (% of VCB)
1	20 %
1.5	30 %
2	40 %

Note: Algover index is not informative in patients with hypertension.

5. Moogat hematocrit method

$BL = VCB(n) \times (GT(n) - GT(f) / GT(n)$,

where BL – blood loss;

VCB (n) is normal VCB;

HT (n) – normal hematocrit (in women – 42);

HT (f) is the actual hematocrit, determined after stopping bleeding and stabilizing hemodynamics.

6. For an approximate determination of the volume of blood loss in pregnant women is possible using a modified Mooge formula:

$BL = (0.42 - GT(f)) / M \times 75 \times 0.42$,

where BL – blood loss (ml);

M – body weight of the pregnant woman (kg);

HT (f) – the actual hematocrit of the patient (l / l).

It is advisable to provide assistance under the following scheme:

1. Assessment of the general condition of the woman in labor and the amount of blood loss (see below).

2. Urgent examination (hemoglobin level, hematocrit, coagulogram, group and rhesus factor, biochemical blood test).

3. Catheterization of peripheral (or central) veins depending on the condition of the woman.

4. Emptying of the bladder.

5. Introduction of uterotonic agents: in / in dropwise oxytocin 10–20 IU per 400 ml of saline.

6. Manual examination of the uterus under intravenous anesthesia (evaluation of the integrity of the uterus, especially the left wall, removal of blood clots, placental remnants and membranes).

7. Inspection of childbirth paths and closing of gaps.

8. Temporary bimanual external or internal uterine compression is recommended to reduce blood loss.

9. External uterine massage (20–30 s in 1 min).
10. If bleeding continues, misoprostol 800 mcg rectally.
11. Recovery of VCB and blood loss (see section «Hemorrhagic shock»).
12. With a blood loss of 1.5 % of body weight and prolonged bleeding, surgical intervention in the volume of extirpation of the uterus without appendages should be applied, and, if necessary, bandaging of the internal iliac arteries.
13. With continuation of bleeding after extirpation of the uterus – tight tamponade of the abdominal cavity and vagina (do not sew the abdominal cavity to stop bleeding).

A step-by-step approach to the treatment of postpartum bleeding

Step 1

Primary assessment and therapy

Resuscitation	Assessment of the cause	Laboratory tests
• vein catheterization • oxygen mask	examination of the uterus (tone)	Blood group and Rhesus factor
• monitoring of blood pressure, Ps, BR, diuresis • urinary catheter • blood oxygen saturation	• Maternity examination ways (trauma) • Viewing history (thrombin) • blood tests blood clots and blood group	• coagulogram • general blood test

Step 2

Purposeful therapy

«Tone»	«Tissue»	«Trauma»	«Thrombin»
• external massage • shortening preparations	• manual Examination of the uterine cavity • curettage	• diagnosis of traumatic damage and Recovery	• VCB recovery • anticoagulation • recovery coagulation factors blood

Step 3

Massive postpartum bleeding or uncontrolled bleeding

Assistance:	Local Activities:	
Department of intensive care and resuscitation	• manual compression • preparation for surgical treatment	• blood pressure and blood clotting • renewal of VCB

Step 4
Surgical treatment

Uterine extirpation

Step 5
Bleeding after uterine extirpation

Traumatic injury restoration	Abdominal cavity tamponade	ligation of the internal iliac arteries
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1.2. Late postpartum bleeding

Late (secondary) postpartum hemorrhage is referred to as bleeding that occurs after 24 hours and up to 6 weeks after delivery.

The main causes of late postpartum bleeding:

- delay of parts of litter in the uterus;
- removal of necrotized tissues after childbirth;
- divergence of sutures on the uterus after caesarean section.

In the first days and even weeks after childbirth, bleeding may be caused by a delay in parts of the placenta or membranes in the uterus, which has not been timely diagnosed. Litter particles that are trapped in the uterus interfere with the normal involution of the uterus, promote the development of metroendometritis and other forms of postpartum infectious pathology.

Diagnosis

At the beginning of bleeding, the diagnosis is made on the basis of the data obtained during vaginal examination. Determine the cervical canal passable for 1–2 fingers, the large soft uterus, the sizes of which do not correspond to the day of the postpartum period. Sometimes a dense tubular tissue palpates behind the inner eye.

Obstetric tactics for late postpartum bleeding:

- a) assessment of the amount of blood loss and the overall state of childbirth;
- b) catheterization of peripheral (or central) veins;
- c) instrumental revision of the uterine cavity under / in anesthesia (the tissue that is removed must be sent for histological examination);
- d) the introduction of uterotonic agents – IV drip oxytocin 10–20 UNIT per 400 ml of saline;
- e) in case of continuation of bleeding – misoprostol 800 mcg rectally;
- f) infusion and antibacterial therapy;

g) with blood loss above 1.5 % of body weight – laparotomy and extirpation of the uterus, and if necessary – ligation of the internal iliac arteries.

Postpartum hemorrhage prevention

a) during pregnancy:

- assessment of risk factors for bleeding;

Factors that contribute to the occurrence of bleeding in the postpartum period

Pregnancy	Factors arising during Pregnancy	Emerging Factors during childbirth
Firstborn	Full presentation placenta	Excitation
Pathology of separation or placental release	Polyhydramnios	Immediate birth
Anamnesis of uterine surgery, including caesarean section	Multiple pregnancies	Urgent caesarean section
Anamnesis of long or difficult childbirth	Prenatal death of the fetus	Birth by obstetric forceps
Diseases history - Cardiovascular diseases, diabetes, blood clotting disorders.	severe preeclampsia, eclampsia	Chorionamionitis
Anaemia	Hepatitis	Disseminated intravascular coagulative syndrome (DIC)
Uterine fibroids	Related conditions Anaemia	General or epidural anesthesia

- diagnosis and treatment of anemia;
- hospitalization in a maternity hospital with readiness to assist pregnant women at risk of bleeding who had: prenatal bleeding, bleeding at previous births, have polyhydramnios, multiple pregnancies and a large fetus;

b) during childbirth:

- Pain relief of childbirth;
- avoidance of prolonged childbirth;
- active management of the third period of labor;

- use of uterotonics in the third period of labor;
 - routine examination and evaluation of the integrity of the placenta and membranes;
 - prevention of injuries during childbirth;
- c) after childbirth:
- examination and survey of maternal pathways;
 - close supervision for 2 hours after childbirth;
 - in pregnant women at risk of IV administration of 20 units of oxytocin within 2 hours after childbirth.

TEST QUESTIONS

1. Maternity C., 28 years old, the first urgent birth. The first period of labor lasted 4 hours, the powerful period lasted 30 minutes. Born a boy weighing 3800 g, height 52 cm, in the state of Apgar 9–10 points. Third period of labor without features, uterus shortened, dense. From the birth canal, there are bloody discharge that appeared in the first period of labor. What does this clinical picture most likely indicate?

- A. Cervical rupture. *
- B. Premature detachment of the placenta.
- C. Placental presentation.
- D. The ruptured uterus.
- E. Hypotonic bleeding.

2. 1 hour after delivery, a large fetus had a large fetal blood discharge from the vagina with blood clots. Skin and visible mucous membranes. Pulse – 100 beats / min, rhythmic, blood pressure – 90/60 mm Hg. The bottom of the uterus is in the middle of the distance between the navel and the xiphoid process. The uterus is soft. With external massages, blood was collected from the uterus with clots. The blood loss was 700 ml. What is the diagnosis ?

- A. The early postpartum period. Hypotonic bleeding. *
- B. Late postpartum period. Hypotonic bleeding.
- C. Uterine hypotension. DIC syndrome.
- D. Deep vaginal ruptures, bleeding.
- E. Incomplete uterine rupture, bleeding.

3. Hypotonic bleeding in the early postpartum period began in the mother of O., 16 years old. Blood loss – 1.6 % of body weight, heart rate 115 – beats / min, blood pressure – 80/40 mm Hg, CVP – 35 mm Hg. What is the diagnosis?

- A. Hypotonic bleeding in the early postpartum period I degree hemorrhagic shock.
- B. Hypotonic bleeding in the early postpartum period. II degree hemorrhagic shock. *
- C. Hypotonic bleeding in the early postpartum period. III degree hemorrhagic shock.
- D. Hypotonic bleeding in the early postpartum period. IV degree hemorrhagic shock.

4. Maternity O., 25 years, pregnancy 39 weeks, the main presentation. The contractions are intense, the duration of the first birth period is 2 hours. During one of the maternity contractions, she loses consciousness, pulse rate up to 140 beats / min, blood pressure – 70/40 mm Hg. After 3 minutes, consciousness recovered, but there was a marked inhibition. II period – 10 minutes, III period – 5 minutes, placenta without defects. In the early postpartum, hypotonic bleeding began. Blood released from the vaginal tract does not clot. What is the most likely cause of bleeding?

A. Hypotonic bleeding in the early postpartum period.

Embolism with amniotic fluid. *

B. Hypotonic bleeding in the early postpartum period.

Trauma of the birth canal.

C. Hypotonic bleeding in the early postpartum period.

Premature detachment of a normally located placenta.

D. Hypotonic bleeding in the early postpartum period.

The uterine rupture.

5. Maternity A., 28 years, pregnancy 39 weeks, the main presentation. The contractions are intense, the duration of the first birth period is 2 hours. During one of the maternity contractions, she loses consciousness, pulse rate up to 140 beats / min, blood pressure – 70/40 mm Hg. After 3 minutes, consciousness recovered, but there was a marked inhibition. II period – 10 minutes, III period – 5 minutes, placenta without defects. In the early postpartum period, hypotonic and coagulopathic bleeding began. Suspected embolism with amniotic fluid. Which of the first aid measures is wrong?

A. Artificial lung ventilation.

B. Immediate infusion of canned blood. *

C. Deployment of the operating room.

D. Bladder catheterization.

LIST OF RECOMMENDED LITERATURE

Required

1. E. Albert Reece & John Hobbins Clinical Obstetrics of Fetus and Mother. – Third Edition. – Blackwell publishing, 2007. – 328 p.
2. Evans A. T., Niswander K. R. Manual of Obstetrics. Philadelphia, 2000. – 654 p.
3. Jennifer R., Niebyl, Henry L. Galan, Mark B. Landon, Joe Leigh Simpson, Eric R. M. Jauniaux Obstetrics: Normal and Problem Pregnancies. – Elsevier Health Sciences, 2012. – 1292 p.
4. Manual on Obstetrics / Arthur T. Evans. – Seventh Edition. – Lippincott Williams & Wilkins. – 2007. – 425 p.
5. Stuart Campbell, Christoph Lees Obstetrics by Ten Teachers. Malta, 2003. – 516 p.

Additional literature

1. Martin L., Pernoll Benson & Pernoll's handbook of Obstetrics & Gynecology – Tenth Edition, 2010. – 910 p.
2. Obstetrics – edited by Professor I.B. Ventskivska, Kyiv "Medicine", 2008. – 396 p.
3. Obstetrics & Gynecology PreTest Self-Assessment & Review, Twelfth Edition by Karen M. Schneider, Stephen K. Patrick, 2009. – 289 p.
4. Obstetrics & Gynecology PreTest Self-Assessment and Review Eleventh Edition by Karen M. Schneider, Stephen K. Patrick.-McGraw-Hill Medical Publishing Division, 2006. – 347 p.
5. Obstetrics Illustrated by Kevin P. Hanretty – 2009. – 437 p.
6. Obstetrics Illustrated by Kevin P. Hanretty. – Sixth Edition. – Churchill Livingstone, 2003. – 478 p.
7. Williams Obstetrics / M. C. Graw Hill/ 2005

Information resources

1. www.uzhnu.edu.ua - Information Package (ESTC).
2. <http://www.moz.gov.ua> - Ministry of Health of Ukraine.
3. <http://medstandart.net/byspec/9> - Standards of medical care in Ukraine.

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