

MINISTRY OF HEALTH OF UKRAINE
POLTAVA STATE MEDICAL UNIVERSITY
DEPARTMENT OF THE GENERAL SURGERY WITH PATIENT'S CARE

It is confirmed on meeting of department of the
general surgery with patient's care

Head of Department

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**METHODICAL INSTRUCTIONS
FOR STUDENTS
DURING PREPARATION TO A PRACTICAL LESSON**

Subject matter	NURSE PRACTICE
<i>The module № 2</i>	BASIC DUTIES AND PROFESSIONAL SKILLS OF NURSE OF SURGICAL DEPARTMENT
<i>The substantial module 1</i>	HEMOSTASIS. BLOOD TRANSFUSION. RESUSCITATION ACTIONS AT SURGICAL PATIENTS
<i>Lesson theme № 2</i>	TRANSFUSIONS OF BLOOD AND BLOOD SUBSTITUTES
<i>Course</i>	<i>III</i>
<i>Faculty</i>	<i>Medical, foreign students</i>

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<i>The substantial module 1</i>	HEMOSTASIS. BLOOD TRANSFUSION. RESUSCITATION ACTIONS AT SURGICAL PATIENTS
<i>Lesson theme № 2</i>	TRANSFUSIONS OF BLOOD AND BLOOD SUBSTITUTES

I. A theme Urgency:

Some year the whole blood was universal transfusion medium, multilaterally reacted on an organism and to a hemotransfusion concerned as complex operation with a wide spectrum of indications. It has led to the significant complications which short became known as a result of the retrospective analysis, and also achievements of modern immunology.

The hemotransfusion (hemotransfusion) is an operation of uptake in a circulatory bed of sick (recipient) of an integral blood or its components, prepared from the donor (allogotransfusion) or at the recipient (autotransfusion), and also the blood which have streamed in a perigastrum at traumas or operations (reinfusion). Last years there was a tendency to reduction of volumes of a hemotransfusion and its components at the expense of augmentation of a lobe of antishock blood substitutes. It is caused by that tinned donor blood and its drugs sharply distinct from a blood circulating in an organism and these differences are enlarged in due course blood storages. It leads hemotransfusion reactions after decantation. Errors at definition of blood groups and Rh - the factor lead hemotransfusion complications (hemotransfusion shock) with a lethal outcome.

II. The employment purposes

1. To know hemotransfusion history.
2. The indication nobility to decantation.
3. To know kinds of hemotransfusions.
4. The nobility of a path of hemotransfusions.
5. The nobility of a procedure of hemotransfusions.
6. To know the mechanism of action of the transfused blood and its drugs.
7. To know blood preparations.
8. To know pathological action of the transfused blood.
9. The complication nobility at a hemotransfusion and its drugs and their treatment.
10. The reaction nobility at a hemotransfusion and its drugs and their treatment.
11. To know classification of blood substitutes.
12. The indication nobility to decantation of blood substitutes.
13. The nobility of reaction and their treatment at application of blood substitutes.

III. Maintenance of initial level of knowledge - of abilities

1. General Surgery. Textbook for students of higher medical educational establishments / [Lihonenko O.V., Chorna I.O. , Zubaha A.B., Khimich S.D et all.]; Edited by Prof. S.D. Khimich, Prof. M.D. Zheliba Kyiv AUS Medicine Publishing, 2019.- 608 p.
2. General Surgery. Textbook for students of higher medical educational establishments / [Lihonenko O.V., Chorna I.O. Khimich S.D et all.]; Edited by Prof. Ja.S.Bereznickij, M.P.Zacharash, M.P.Mishalov,. Vinnica: New book, 2019-344c
3. The general surgery / under the editorship of S.P.Zhuchenko, M.D.Zeliba, S.D.himicha. - Kiev, 1999.
4. The general surgery / under the editorship of M.P.Cherenko. - Kiev, 1999.
5. Methodical workings out for auditory and independent work of students.

The additional:

1. Gumenjuk N.I., Kirkilevsky S.I.: Infusional therapy. - M: - 2004 – P. 208.

Tests and problems for check of initial level of knowledge:

1. For an integral blood it is characteristic:

- The protein maintenance in Serum in usual concentration
- The raised maintenance of factors of coagulation
- Augmentation of number of leucocytes and thrombocytes
- The depressed maintenance of potassium
- The depressed maintenance of sodium

2. So-called universal donor blood considers:

- Any blood of bunch About (I)
- Blood O (I) Rh (-) with a titre of agglutinins 1:64
- Blood About (I) Rh (-) with a titre of agglutinins more 1:64
- Blood About (I) Rh (-)
- Blood About (I) Rh (+)

3. That is not complication of a massive hemotransfusion:

- Hypercalcemia
- Hemolysis
- Hyperpotassemia
- Acidosis
- Alkalosis

4. What duties of donors:

- To observe an interval between blood delivery
- To report about dermatoveneral diseases
- To agree on delivery of a full dose
- To demand satisfaction of privileges for donors
- To adhere to a healthy mode of life

5. For what it is necessary to adhere to a principle of preparation and blood application «one donor - one patient»

- Disease possibility in connection with infection contamination development in a vial decreases
- Possibility of conduction virus and infectious diseases from the donor decreases
- To reduce possibility of a sensibilization of an organism of the recipient foreign agents
- Possibility of development of reaction and complications decreases
- It is not necessary to make hallmark on individual compatibility

6. What quantity of antigens in erythrocytes of the person?

- 3
- 5
- 30
- 106
- 250

7. On what specifies detection in Serum of antibodies to an antigen of system a rhesus?

- To the patient blood a rhesus - positive was transfused
- The patient does not have the yielded antigen, a sick rhesus negative
- At the patient an organism hyperreactivity
- The woman had a rhesus - the conflict at pregnancy
- The patient can transfuse a rhesus - negative blood.

8. How many individual compatibility tests are necessary to execute at a hemotransfusion?

- One
- Three
- Two
- Five
- Six

9. What value has division on Rh-negative and a rhesus - positive?

The same person can be a rhesus - positive and a rhesus - negative

The rhesus - negative is the person if it does not have antigen D, but is With, E and others

Antigen D the most awake and often meets

The person is considered a rhesus - negative if it does not have antigens D, With, E

To transfuse a rhesus - to the negative recipient it is possible only a rhesus - negative blood of the donor (+)

10. A packed red cells shelf-life at to +4 With on preservative of Gljugitsir:

- 21 day
- 7 days
- 14 days
- 25 days
- 30 days

11. Shelf-lives of the refrigerated erythrocytes which are applicable for a transfusion:

- 5-10 days
- 1 year
- 1 month
- 3 years
- 5

12. What maximum shelf-life of the washed erythrocytes at

- 24 hour (+)
- 72 h
- 2 days
- 6 h
- 4 days

13. What causes of the circumscribed indications to application of a direct hemotransfusion?

Blood is not investigated on hepatitis viruses In and AIDS

Blood does not provide use of filters at decantation

Difficulties of pilot survey of donors

Absence of advantages in comparison with decantation fresh the prepared

"Warm" blood

Technical difficulties of application

14. On what, first of all, is necessary to pay attention at macroscopical evaluation test of stored blood?

Bacteriemic contamination, presence of clots, hemolysis

Chyle blood

Conformity of certification

Tightness of packaging

Conformity of conservation

15. What quantity of a blood, a packed red cells or plasma is introduced at bioassay performance?

- 10-15 ml 3 times
- 20-25 ml 3 times
- 2-5 ml 4 times

30-40 ml of 1 times

10-15 ml 2 times

16. What initial clinical symptoms of the complications bound to an incompatible blood transfusion on system AVO.

Falling of arterial pressure, appearance of red urine

Fever or burning sensation

Abdominal pains, muscles, a head

Pulse acceleration, breath, pallor

анурия

Hemorrhagic syndrome

17. What basic advantage at decantation of the washed erythrocytes?

апротокгенная transfusion medium as are deprived some leucocytes, protein and their antigens (+)

Does not invoke reaction in patients, сенсбилизованные to system HLA antigens

Do not render toxic action of citrate and products of a metabolism of cellular components

Have smaller risk of infestation by a virus hepatitis and a cytomegalovirus

18. A transfusion of what blood the safe?

Autoblood transfusion

Blood reinfusion

The defrozen washed erythrocytes

Packed red cells

Whole blood

19. The basic measures of preventive maintenance of a becoming infected a hepatitis In and retroviruses in transfusiology:

To transfuse a packed red cells and blood preparations when they are extremely necessary

To use blood of relatives

To use an autoblood

To use a reinfusion

Obligatory inspection of a donor blood

To apply one-time systems

20. What prescription blood, has poured out in a perigastrium, can be used for a reinfusion?

Till 12 o'clock.

Till 24 o'clock.

At 48 o'clock.

Till 72 o'clock.

Till 2 o'clock.

21. Choose salt for the prevention and treatment of a citrate intoxication.

NaCl

CaCl₂ Or calcium gluconate

KCl

MgCl₂

FeCl₂

22. An optimum mean of a hemotransfusion:

Intravenous

intraarterial

The intraaortal

In a spongiform bone

IV. The training Maintenance

Infusional therapy - a part of transfusiology which studies a question of decantation to the person of a blood and its drugs, and also krovo - and plasma substitutes with the medical purpose. This definition has historical roots as clinical transfusiology began the first experiences of a hemotransfusion. However for today the hemotransfusion urgency for widely known causes not only has considerably dropped, but in general is subject conceptual viewing. Therefore transfusiology definition on O.K.Gavrilovu, as partition of a medical science which corrects functions of an organism by whole the referred influence on morphological composition and physiological properties of a blood by introduction of organic and inorganic transfusion mediums. Infusional therapy corrects homeostasis disturbances on purpose:

1. Renewal OЦK and hypovolemia liquidations.
2. Restoration water - electrolytic balance and acid-alkaline balance.
3. Microblood circulation enriching.
4. Liquidation of disturbances of rheologic and coagulative them of properties.
5. Liquidation of distresses of a metabolism.
6. Maintenance of effective transport of oxygen.
7. Desintoxication.

To the beginning of XIX century the basic path of introduction of medicinal materials was peroral. At the time of Gippokrata and to Paratselsija medicinal materials were applied in

Kind of pills and mixtures. In 1628 the English doctor - the physiologist and anatomist William Garvej has opened system of a circulation of blood, has described the big and small circle of a circulation of blood. In system of a circulation of blood of Garveja there is no important part - capillars which were opened later by the Italian biologist and doctor Marcello Malpigi. In 1656 Christopher Ren - the architect and the doctor - in the world has conducted for the first time research on in / in introduction of solutions of opium, beer, wine, milk. As an infusional needle Ren used pen of an auk, and as a syringe bladder of fish served. Anatomist Richard Lover (1631-1691) in 1666 for the first time has successfully transfused blood from one dog another. Successful results of these experiments were stimulant of a hemotransfusion to the person. However to discovering by Lanshtejnerom of blood groups (it has evolved three bunches) hemotransfusions often concluded летально. The first attempt of a hemotransfusion of a sheep to the person has been executed in 1667 by doctor Jean - Batistom Deni.v the same year it was made to England by Richard Lover.

The first hemotransfusion from the person to the person has been made by the English surgeon and the accoucheur - gynecologist James Blondell (1790-1877). It has been executed to the patient with a carcinoma of the stomach. D.Blondellja's basic merit consists that it one of the first has defined the main display to decantation - a hemorrhage whereas at that time hemotransfusions it was carried out for a rejuvenation of an organism and for treatment of all serious illnesses.

Thanks to successes of Blondell the number of transfusions began to increase in the different countries of Europe. However the statistical data has shown that hemotransfusion consequences were not optimistical. In 1819 patients with a serious hemorrhage 57 hemotransfusions are made, from them 16 (almost third) have concluded летально.

Only after discovering of four basic groups of a blood (Jansky 1907) and a rhesus - the factor (Lanshtejner and Vinner 1940) and also as a result of rising of technics of preparation and preservation, the hemotransfusion became safe. The hemotransfusion and its drugs was widely adopted for the purpose of deintoxication, stimulation, is frequent not under indications. It has led to complications, pyrexial, allergic responses. Presently hemotransfusions is operation on transplantation of a foreign tissue., it should be carried out under absolute indications.

Now absolute indications to a hemotransfusion and its drugs evolve three. New transfusion tactics - a componental hematotherapy was extended. It provides the differentiated application, appointment under well-founded indications of those or other cellular or albuminous components of a blood. It not only the hematotherapy raises medical efficacy, reduces risk and danger of occurrence of reactions and complications, but also enlarges resources of transfusion mediums, after all from one dose of stored blood receive some its components. Along with it is necessary to emphasise that at massive hemorrhages with the expressed exhibitings of hypovolemic shock and an anaemic hypoxia, reduction of volume of a circulating blood

(OЦK) more than 20 %, reduction of level of haemoglobin below 80 g / l, a hematocrit less than 30 % consider application of an integral blood effective.

Other absolute indication to decantation of an integral blood are operations on open heart with use of the apparatus of an artificial circulation. The third display of massive metabolic hemotransfusions is hemolytic illness of newborns, acute hemolysis, a toxicosis and other illnesses of a blood.

Contraindications to a hemotransfusion:

1. Serious functional disturbances of a liver and nephroses, an acute heart failure and the diseases bound to stagnation in a small circle of a circulation of blood, absolute contraindications - a fluid lungs.
2. Thrombophlebitis, clottages, embolisms, infarcts.
3. Brain injuries, an epilepsy, rheumatic disease.
4. Allergic states and diseases (an acute eczema, a bronchial asthma).
5. An awake tuberculosis (process in an infiltration stage)

Depending on the purpose and conditions of a hemotransfusion it can be carried out such variants:

1. Decantation of donor stored blood.
2. A direct hemotransfusion from the donor to the recipient.
3. A reinfusion not infected and nonhemolized bloods from perigastriums.
4. An autohemotrasfusion prepared before a blood of the patient.

Last method has been recommended as a rule, instead of an exception by experts the CART in 1968 at planned operative measures with the big hemorrhage. At the patient for 1-2 weeks before operation carry out a fence of a blood of 500-1000 ml and substitute blood substitute infusion, and during operation and a hemorrhage transfuse its own blood. This method excludes reaction of tearing away and considerably reduces reactions and complications.

Technics of transfusion of components of a blood.

I. The Indirect hemotransfusion and its components.

The most widespread method of decantation of an integral blood and its components - a packed red cells, a platelet concentrate, fresh frozen plasma - is intravenous conducting by means of one-time system with the filter which the vial or the container with transfusion medium joins. Decantation of components of a blood with rate more than 10 ml in mines is considered jet, and with rate of 1-5 ml in mines - drop. The intravenous drop mean reaches the best mastering of transfusion medium without risk of an overload warmly - water systems.

Seldom, as reanimation action, is applied endarterial introduction of a blood with a pressure raising in a vial or the container to 200 ml. Hg Intraosteal blood uptake it is applied in cases when it is impossible to make decantation to the central vein at combustions and other grave conditions at children.

II. The Direct hemotransfusion.

Method of a hemotransfusion from the donor to the recipient without a stage of stabilisation or blood preservation name to straight lines. Such method it is possible to transfuse only a whole blood. An introduction path - only intravenous. Decantation is made without filters that considerably raises risk of hit in a circulatory bed of the recipient of fine thrombuses and can invoke thromboembolisms of fine twigs of a pulmonary artery. The yielded circumstances, and also disadvantages of decantation of an integral blood confine indications to direct decantation and survey it as forced medical action which is carried out in extreme situations at development of massive hemorrhage at absence in an arsenal of the doctor of blood preparations.

III. Change hemotransfusion.

Particulate or full excision from a circulatory bed of the recipient with simultaneous replacement in its adequate or exceeding volume of a donor blood. A main objective of this operation - excision together with blood of various toxins, toxins, decomposition products and hemolysis of antibodies (at venenatings, endogenous intoxications, hemolytic illness of newborns, Hemotransfusionic shock, serious toxicoses, acute renal insufficiency etc.). This operation reaches replaceable and disintoxication effect.

Presently the metabolic hemotransfusion with success changes performance Intensive medical plasmaferesis with a fence of two litres of plasma and its changing fresh frozen plasma, plasma substitutes.

IV. The Autohemotrasfusion.

The autohemotrasfusion is a decantation to the patient of its blood. It is carried out by two means: a transfusion of a blood prepared beforehand before operation with preservatives and a reinfusion of the blood collected from serous lumens, operational wounds at massive bleedings. For autotransfusions it is possible to execute in steps - a stage-by-stage method of recruitment significant (800 ml and more) volumes of a blood for carrying out of operative measures with the big hemorrhage. Advantages of a method of autohemotrasfusions before decantation of a donor blood the following: danger of the complications bound to incompatibility, conduction of infectious and virus diseases (a virus hepatitis, AIDS is excluded, etc.), with risk alloimmunisation, developments of a syndrome of massive transfusions, the best functional activity and erythrocytes is thus provided get accustomed in a vascular bed of the patient is better.

Use of a method of autohemotrasfusions is shown at patients with a rare blood group and impossibility of selection of the donor, at operative measures at patients with the provided big hemorrhage, at presence at them disturbances of a liver and nephroses which essentially raise risk of possible postoperational complications at decantation of a donor blood or erythrocytes. Thus, an autohemotrasfusion should be a rule, instead of an exception at planned operative measures.

Application of a method of autohemotrasfusions is contraindicative at acute inflammatory processes, a sepsis, painful impressions of a liver and nephroses, and also at a pancytopenia. Method use in pediatric practice is absolutely contraindicative.

V. A blood Reinfusion.

The blood reinfusion is a kind of autohemotrasfusions when to the patient transfuse its blood, has poured out in a wound or in serous lumens (abdominal, thoracal) and was in them more than 12 hours.

Indications:

- An extrauterine pregnancy
- Lien tearing up
- Wounds of members of a thorax
- Traumatic operations with the big hemorrhage.

Procedure. Blood which has poured out in a lumen, collects a suction machine in sterile vials or containers, and then flows over with an isoosmotic solution in the ratio 1:1 and heparin 1000 EД on 1 litre of a blood system for infusions with a microstrainer.

VI. Plazmaferéz.

Medical plazmaferézis is one of the basic transfusion operations who allows to render the effective medical help to the patients who are in a critical state. The method principle consists at a distance plasmas of the patient and simultaneous recruitment of the collected volume by decantation freshfrozen plasma or rheologic plasma substitutes, at indications - a packed red cells. Medical action is based on:

- 1) mechanical excision with plasma of toxic metabolites
- 2) recruitment of the vital components of a blood
- 3) microcirculation enriching

The procedure consists in branch of blood cells from plasma a method centrifugion or filtrations.

Indications: DIS - a syndrome, a sepsis, various intoxications, acute both chronic renal and hepatic insufficiency, etc.

The mechanism of action of the transfused blood and its components.

1. Replacement of losses ОЦК at acute and massive кровопотере.
2. Stimulation of the vital systems of an organism at the expense of plasma protein (arterial pressure rises, breath improves, etc.).
3. Haemostatic action.
4. Immunodefence stimulation at treatment of septic states.
5. Disintoxication action at the expense of blood globulins.

Blood preparations

1. A packed red cells.

Transfusion medium contains not less than 70 % of erythrocytes. The packed red cells is optimum at treatment of an anaemic syndrome. At identical volumes and in comparison with a whole blood the packed

red cells has larger quantity of erythrocytes, it is much less than citrate, decomposition products of cells, cellular and albuminous antigens and antibodies.

The basic indication for a packed red cells transfusion are anemias, significant depression of quantity of thrombocytes or reduction of oxygen container of a blood at the acute and chronic anaemia, an inadequate erythropoiesis, hemolysis of erythrocytes, oncologic and hematological diseases, cytostatic and radical therapy.

In most cases appearance of a dyspnea, palpitation, depression of arterial pressure, pallor of integuments, falling of haemoglobin below 80 g / l, Ht - 25 is the indication for a transfusion of erythrocytes.

Erythrocyte mass receive from stored blood by plasma branch. Depending on a method of preparation it can be:

- 1) native with a hematocrit 0,65-0,8;
- 2) a packed red cells impoverished by leucocytes and thrombocytes;
- 3) a packed red cells defrosted and washed.

The packed red cells is conserved at to +4° C on the average 21 day.

2. The washed erythrocytes.

Receive from an integral blood. After excision of plasma a packed red cells or the refrigerated erythrocytes wash in an isoosmotic solution of 0,9 % of sodium of Sodium chloridum or in special отмывных mediums. In the course of washing up squirrels of plasma, leucocytes, thrombocytes, микроагреганты cells and a stroma of victims leave at storage of cellular elements. The washed erythrocytes are areактогенне transfusion medium and is shown patients, at which in the anamnesis posttransfusion reactions and also the patient, сенсibiliзироваанные by antigens of protein. In connection with absence in the washed erythrocytes of stabilizers of a blood and products of a metabolism of cellular elements which lead to toxic action, their transfusion is shown in treatment of serious anemias at patients with hepatic and renal insufficiency and at «a syndrome of massive hemotransfusions».

Advantage of application of the washed erythrocytes is the smaller risk of a becoming infected a virus hepatitis and AIDS. The washed erythrocytes are conserved at to +4° C - 24 hours from the moment of their manufacturing.

3. Plasma

Plasma - a liquid part of a blood into which composition a considerable quantity biologically active materials, the squirrel, lipids, carbohydrates, ferments, vitamins, hormones enters, etc. Plasma (ПЦЗ) is effective свежемороженная, after all in it all biological functions are to the full conserved. Other kinds of plasma - native (liquid), лиофилизированная (dry) - substantially lose medical properties in the course of their manufacturing and their clinical use ineffectively and should be circumscribed.

ПЦЗ receive by плазмофореза or centrifuging of an integral blood within 2-6 hour. From the moment of its fence at the donor. Plasma at once refrigerate and store at to not above - 20oC till one year. At plasma defrosting probably floc formation of fibrine, are late at decantation on filters. It should be straw-yellow colour and transparent. Appearance significant turbidities, massive parcels testifies about некачественности plasmas and its decantations it is impossible.

Possibility of long-term storage ПЦЗ allows to accumulate it and to transfuse by a principle «one donor - one patient».

Indications to decantation ПЦЗ:

At massive hemorrhages for recruitment of volume of a circulating blood

Burn disease

DVS - A syndrome, etc. States

4. A platelet concentrate

Received from an integral tinned donor blood by fractionation. The indication to its decantation is the hemorrhagic diathesis which has arisen owing to a thrombocytopenia of penetrating degree that does not give in to other methods of haemostatic therapy. It is conserved at temperature +4... +22 °C. With within 1 days. Lifetime of the transfused thrombocytes of 7-9 days. At a transfusion group compatibility (ABO), compatibility on a Rh factor and a bioassay is considered.

5. Leukocytic mass

It is received by a fractionation method, it is conserved in vials or plastic pouches at temperature +4... +6 ° With within 1 days. At decantation it is necessary to consider group and a rhesus-accessory of the donor

and the recipient. Transfusions of leukocytic mass the patient from a leukopenia of various parentage, an agranulocytosis, a sepsis, with the time-lagged hemopoiesis invoked radial and chemotherapy.

6. Albumine

Receive by plasma fractionation. In 100 ml of solution 5, 10, 20 g of protein which on 97 % consists of albumine contain. 100, 250, 500 ml are issued in the form of 5, 10, 20 % of solution in vials in container 50. The drug is shown patients with various kinds of shock, a burn disease, a hypovolemia, гипо - and a disproteinemia, an overhydration of tissues, disturbances of function of a liver owing to various intoxications. Positive enough therapeutic effect yields albumine in a combination to a transfusion of a blood and a packed red cells at patients with a hemorrhage, shock, a posthemorrhagic anaemia.

7. A protein

Prepare from plasma or Serum blood. It consists from 75 - 80 % of albumine and 20 - 25 % stable * - and * - globulins. Is issued in vials on 250 - 500 ml in the pasteurised kind. It is applied at patients with a hemorrhage, shock, to indemnification of albuminous insufficiency. A daily dose 250 - 500 ml. In case of a massive hemorrhage the dose can be enlarged to 2000 ml.

8. Albuminates

The albuminous drug made of plasma of a human blood. Contains 8 - 10 % of plasma protein (75 - 80 % of albumins and 20 - 35 % of globulins). Let out in vials on 150 ml. Apply under the same indications, as albumine, intravenously or intraosseus in doses 150 - 450 ml the drop method. Store at ambient temperature.

9. Serum polyglobulin

Contains 8,5 - 10 % * - and γ - globulin fractions. It make of blood serum of donors. Let out in ampulas on 3 ml, store in a cooler at temperature +2... +8 wasps. A drug apply intramuscularly in a dose 3 - 9 ml single-passly and repeatedly to preventive maintenance and treatment of infectious diseases - measles, an infectious hepatitis, a dysentery and a poliomyelitis. It prescribe also the patient with hypoglobulinemia and depression of immune reactance of an organism.

Pathological action of a donor blood

Immune incompatibility.

Compatibility of a blood of the donor and the recipient is defined only on two erythrocyte antigenic systems, which in erythrocytes several times more. The antigenic system of leucocytes, thrombocytes and plasma is not considered At all. As the blood transfusion is transplantation of a liquid homogeneous tissue, at decantation it is possible to expect reaction of two phylums - immunizations and tearing away. It is positioned that in the first days of a critical state while cellular immunodefence is depressed, efficacy of a hemotransfusion above, than the next days when the organism awakely begins process of tearing away foreign tissues. The hemotransfusion always invokes immunodefence disturbance that should abandon in an organism of any traces. It is positioned that afteronco-syrgery at which blood was transfused, relapses of malignant growth arise more often, than after operations without a hemotransfusion. Thus, the doctor should represent accurately that the transfusion of an integral blood or its components is a transplantation foreign tissues with all its positive and negative consequences.

Contamination bloods.

This complication is enlarged every year and if earlier doctors were careful mainly of contamination of a blood by bacteria, a virus hepatitis In now it is a HIV - an infection contamination, a cytomegalovirus, a hepatitis With, etc. On the stuffs resulted by academician A.I.Vorobjovim, 80 % of children with a hemophilia in the USA and Japan are infected by a hepatitis. The cause consists that donors can be infected when the serodiagnosis yet does not display a carriage. This season can last till 2-3 months.

Metabolic disturbance in stored blood.

In a blood and its drugs, especially at long-term storage, level of plasma potassium, ammonium, the maintenance of free haemoglobin raises, acidity raises, there is Sodium citratum. These materials contain not only in a donor blood, but also in an autoblood.

Functional disturbances.

Stored blood and its drugs tolerate oxygen is worse. In 2 weeks of storage level biologically active materials raises, its rheological behaviour worsen. Besides, stored blood has properties of coagulation because of insufficiency of thrombocytes, factors VVII, VVIII and other factors of coagulation are broken.

Inhomogeneities of a blood.

In 1 ml of the blood preserved by Sodium citratum contains in the first days nearby 200, and at long-term storage 20000 агрегаты and fibrine strands. Thus, at decantation of a blood of 1 l gets to a vascular bed of the patient in 200000 микроагрегатов, and at long-term storage to 20 million First the capillary filter - lungs which are surprised first of all.

The listed important disadvantages of stored blood and its drugs have forced, except restriction of indications for decantation, to search for means of metabolic restoration of a blood with help of hemosorption method on different sorbents, its purifications from mycroагрегатов by means of a microstraining and to dilate indications to a reinfusion, autohemotrasfusions and a direct hemotransfusion.

The complications arising at an incompatible blood transfusion under group factors of system AVO (hemotransfusionsic shock).

The cause - default of rules and instructions on technics of a hemotransfusion, irregular definition of blood groups on ABO and carryings out of compatibility tests. A pathogeny - massive intravascular destruction (hemolysis) transfused incompatible agglutinoген the recipient with a yield in plasma of a stroma of the blasted erythrocytes and haemoglobin to which it is inherent tromboцlasts activity that leads to development disseminate an intravascular fibrillation, disturbance of the central hemodynamics, microcirculation and development of hemorrhagic shock.

Clinic - initial clinical signs of hemotransfusionsic shock occur at a hemotransfusion or right after it and the tachycardia, a hypotension, acute disturbances of function of nephroses and a liver - urine appearance darkly - cherry colour, an icterus are characterised by short-term excitation, pains in a thorax, a gaste, a loin. Gravity of a state of the patient is caused by volume transfused incompatible, character of disease and a state of the patient before decantation.

Treatment. Immediately to intercept a hemotransfusion, a packed red cells, invoking hemolysis. To connect new system with rheologic blood substitutes intravenously, to carry out medical actions for deducing from shock. Carrying out massive (nearby 2 - 2,5) плазмoфoрезу for the purpose of excision of free haemoglobin, products of fibrinogen with replacement of remote volumes by the conforming quantity свежeзамороженной plasmas is simultaneously shown. For reduction of coagulability of products of hemolysis in distal departments of a canaliculus of a nephron it is necessary to sustain a diuresis not less for 75 - 100 ml at an o'clock by means of 20 % of solution of Mannitolum (15-50) and Furosemidum (100 ml unitary, 1000 ml a day). Correction acid - an alkaline state of a blood of 4 % solution of bicarbonate of soda and stabilisation of arterial pressure by means of solutions reopolyglycinum, albumine, if necessary correction of a penetrating anaemia (Nv less than 60 g/l) - decantation of individually selected washed erythrocytes, desensitizing therapy - antihistamine drugs, corticosteroids, is warm - vascular drugs. The volume of transfusion therapy should be adequate a diuresis, control is datum level of the central venous pressure. In the first days of a posttransfusion acute intravascular hemolysis heparin appointment (intravenously to 20000 ЕД a day under blood clotting time control) is shown. When complex therapy is ineffective and acute renal insufficiency and an uremia educes it is necessary to make a hemodialysis in specialised branches.

The complications arising at a hemotransfusion, a packed red cells incompatible on Rh - the factor and to other systems of antigens of erythrocytes.

The cause: complication arises at the recipient, sensibilized under the attitude a rhesus - the factor. Immunization can arise:

- 1) at repeated introduction a rhesus - to the negative recipient a rhesus - a positive blood
- 2) at pregnancy a rhesus - the negative woman a rhesus - the positive child

The cause of development of these complications - the obstetric and transfusion anamnesis, default or an irregular assessment of hallmark on a rhesus - compatibility is not collected.

Pathogeny a massive intravascular hemolysis of the transfused erythrocytes immune antibody (anty Д, anty A, anty B, etc.), Which were formed at a presensitization of the recipient pre-award беременностями or decantation of an incompatible blood on a Rh factor. The clinic of this complication from previous (on system AVO) differs the serotinal beginning, the overdue or remote hemolysis and less expressed clinic, depends on an antiserum capacity and their kinds.

Principles the same treatments, as at treatment of hemotransfusions shock on group incompatibility.

Posttransfusion reactions and complications of not hemolytic phylum.

Aetiology: a sensibilization of the recipient antigens of leucocytes, thrombocytes at decantation of an integral blood, and also plasma protein at repeated hemotransfusions. Clinical exhibitings arise through 20 - 30 minutes after the terminal of a hemotransfusion and are characterised by reddening, rise in temperature, a headache, back pains, an itch, an urticaria, a Quincke's edema, a dyspnea.

Treatment: desensitizing therapy - adrenaline intravenously 0,5 - 1 ml, corticosteroids, calcium chloride, narcotic analgetics, it is if necessary warm - vascular drugs, disintoxication and antishock drugs.

Preventive maintenance: haemoanamnesis assembly, decantation of the washed erythrocytes, individual selection for a rule "one donor - one patient".

Posttransfusion reactions and the complications bound to preservation and storage of a blood and a packed red cells.

The cause of these complications is reaction of an organism to the stabilising solutions used at preservation of a blood and its components and products of a metabolism of blood cells which were formed at its storage and the temperature of transfusion medium flows over.

The hypocalcemia educes at decantation of the big doses of an integral blood or plasma, especially at a great speed of decantation with preservative use - Sodium citratum which in a vascular bed binds free calcium. It leads to an arterial hypotension, cramps of the inferior extremities, disturbance of a respiratory rhythm with apnoe. The patient before it feels of a pain behind a breast bone, in a mouth there is an off-flavour of metal, a myotonia of tongue and labiums, at hypocalcemia increase - there are tonic cramps, disturbance of breath with апноэ, disturbances of a rhythm of palpitation - a bradycardia up to an asystolia.

Preventive maintenance: introduction of a blood and plasma with rate no more than 40 - 60 ml a minute (at this time there is a mobilisation of calcium from endogenous depots), preventive introduction of 10 % of solution of gluconate of calcium - 10 ml on each 0,5 l of plasma

Syndrome of massive transfusions.

The yielded complication arises at introduction for the short season in a vascular bed of the recipient to 3 l of an integral blood from many donors more than 40 - 50 % from volume of a circulating blood. Arises ДВС with plural microclottages and hemorrhages in an internal, bleedings and a fibrillation.

For preventive maintenance of this complication it is necessary to transfuse freshfrozen plasmas at massive hemorrhages or tinned erythrocytes earlier collected from one donor. Transfusion therapy should be built by a principle "one donor - one patient". An effective method of preventive maintenance of a syndrome of massive hemotransfusions is application of an autoblood of the patient which is collected on the eve of a serious operative measure or a reinfusion of a blood of the patient, collected of perigastriums.

In treatment DVS of a syndrome by an important method the plasmapheresis (excision not less than 1 l of plasma and its changing свежемороженой) is.

Errors in the technician of decantation blood and its components.

1. **The air embolism** - arises at irregular filling of system for a hemotransfusion owing to what air traps get to a vein of the patient. Thus there is a difficulty of breath, a dyspnea, pains behind a breast bone, a cyanosis of the person, a tachycardia. The massive air embolism leads to clinical death and demands immediate reanimation actions. Preventive maintenance of this complication consists in correct installation of system for a hemotransfusion.

2. **The thromboembolism** - an embolism of twigs of a pulmonary artery, arises at hit in veins of various size of thrombuses. The cause - the irregular technics of a transfusion when convolutions get to a vein, microembolisms which are in stored blood. Formed микроагрегаты are late in pulmonary capillars and, as a rule, are exposed to a resorption. At considerable quantity hit микроагрегатов the clinical pattern of a thromboembolism of a pulmonary artery educes. There is a subitaneous pain in a thorax, the dyspnea strengthens, there is a tussis with a pneumorrhagia, pallor of integuments, a cyanosis, in certain cases educes a collapse - cold sweat, falling of arterial pressure, frequent pulse. On an electrocardiogram - signs правожелудочковой overloads, electrical axis shift to the right. Treatment of a thromboembolism demands introduction фибринолитиков - Streptokinasas (Streptodecasums, urokinases), heparin decantation, свежемороженой plasmas is shown. Preventive maintenance: The correct technics of preparation of a

blood and its decantation at which hit of parcels of a blood in a circulatory bed with use for a hemotransfusion of filters and a microstraining is excluded, especially at massive and continuous decantations. At a needle thrombosing the repeated puncture of a vein other needle is necessary.

Blood substitutes

Blood substitutes which are used in practice, on the action share on four bunches.

Crystalloid (saline) solutions. As blood substitutes are ineffective, influence arterial pressure minimumly and on short term. For recruitment of a hemorrhage for the purpose of stabilisation ОЦК by crystalloid solutions they are necessary for using in quantity, in 3-4 times exceeds a hemorrhage. Crystalloids are used for regulation of a water-salt and acid-base state. Raising a diuresis, they also take part in are deduced toxins.

Sodium chloridum isoosmotic solution (0,9 %), Ringera - Lock, solutions are as much as possible approached to composition of salt in solution of plasma (lactasol).

Blood substitutes geodynamic actions. The majority of them are low - (reopoliglucinum) and middlemolecular (Polyglucinum) dextrans which after intravenous or endarterial introduction raise arterial pressure upon a long term, raise a tonus of veins. Gelatinolum (8 % gelatine solution), polyvenol (2,5 % poly(vinyl alcohol)). Indications to their use is traumatic, burn and operational shocks, an acute hemorrhage, acute disturbance of a hemodynamics, a peritonitis, intestinal impassability.

The disintoxication. Use at various intoxications, a sepsis, serious combustions. These drugs promote a diuresis. The leading part drugs of low molecular weight poly(vinylpirrolidone) (play Haemodesum, a periston, Neocompensanum) and poly(vinyl alcohol) (Polydesum). Such drugs concern this bunch, as реополиглюкин, Rheoglumanum.

Drugs for a parenteral food. Protein hydrolyzates which are used for recruitment a hypoproteinemia at serious combustions, purulent diseases. In particular it is albumine, synthetic amino acids, Hydrolysinum, Aminopeptidum, аминозол. Wide use for a parenteral albuminous food was received by the balanced amino-acid admixtures in which composition free amino acids (polyamine, aminosol, Aminonum, Alvesin are included). Before introduction of protein hydrolyzates it is necessary to make a bioassey, considering possibility of occurrence of allergic responses.

Carbohydrates and fats are leading energy sources. 10 % Lipofundinum, интралипид, липозин; Saccharum - glucose, fructose, polyols (сорбитол).

Complications at decantation of blood substitutes.

The yielded complications can be caused a procedure of carrying out, a technical error, feature of action of infusional materials, features of a functional state of the patient.

At intravenous introductions more often changes arise from vascular wall that leads thrombosings, especially at long and frequent injections in one vein. For preventive maintenance of these complications it is necessary at long introductions катетеризувати the central vein, to change catheters, пунктировать other veins.

And phisic - chemical properties of infusional drugs can invoke composition allergic, pyrogenic reactions, etc. At decantation of a considerable quantity of solutions of glucose can arise hyperglycemic syndrome. The metabolic acidosis arises at significant decantations of carbohydrates, protein and fats. The azotemia - arises at introduction of a considerable quantity of albuminous drugs, amino acids.

V. The Rough basis of action.

Employment is made at first in an educational room where students get acquainted with a whole blood and its drugs. Make macro-estimation of bloods, read the blood passport, study possibility of its use. Students acquaint about blood substitutes.

Then students independently fill systems for a hemotransfusion, make a vein puncture, study paths of introduction of a blood and its drugs.

Further employment it is made at bed of the patient where decantation of blood preparations is shown to students, make a bioassey. The attention to possible reactions and complications is paid. Students measure body temperature of the patient, pulse rate, arterial pressure. The teacher

Acquaints them with the medical documentation - the hemotransfusion report.
Show patients whom flow over a blood substitute, the attention to possible complications is paid.

VI. System of educational problems for check of final level of knowledge.

Situational problems for check of final level of knowledge.

1. Patient K, 27 years, has arrived in surgical branch with knife wound of an abdominal lumen in 4 hours after a trauma. A state of the patient the serious. Pulse threadlike, 120 1 minute of joint-stock company 70/40 мм.рт.ст. The emergency laparotomy is made. In an abdominal lumen a lot of a liquid blood. The bleeding point - a small bowel mesentery, without damage of hollow members is positioned. The made hemostasis. How to arrive with blood in an abdominal lumen?

The answer: It is necessary to make a reinfusion of a blood from an abdominal lumen. For performance of a reinfusion blood should be the hollow members not infected with the maintenance and in it there should not be a hemolysis. Hemolysis is taped by hallmark of the Hempel (blood is centrifuged also plasma should not be coloured in pink colour). Blood which is in a lumen no more than 12 hours is subject to a reinfusion. The collected blood filter through 8 beds of a gauze. As the stabilizer standard haemopreservatives or heparin (10 mg on 50 ml of an isoosmotic solution of sodium of Sodium chloridum on 450 ml of a blood) serve. The collected blood before a hemotransfusion dissolve an isoosmotic solution of sodium of Sodium chloridum in the ratio 1:1 and add 1000 ЕД heparin on 1000 ml of a blood. Decantation make through system of infusion with the filter.

2. In proctologic branch the patient with a bleeding from hemorrhoidal knots and a serious anaemia has arrived. The patient is acyanotic, pulse 120 1 minute, a BP 100 / 60 мм.рт.ст., Nv of 60 g / l. For the purpose of restoration of deficiency of erythrocytes to the patient in the preoperative season it is transfused 300 ml однокоруппной and однокоруппной a packed red cells. How to issue the documentation on made hemotransfusions?

The answer: On a hemotransfusion case it is necessary to fill the report of a packed red cells transfusion, plasma. Indications to a hemotransfusion, then a method - in / in, in / and, drop, a trickle, then the data specified on a label of a vial (the blood passport) at first register: a blood group, number of a vial fence date, a surname and initials of the donor. After that results of blood typing of the donor and the recipient, and also results of carrying out of hallmarks on group and a rhesus - compatibility, a bioassey register. The data about a state of the patient becomes perceptible at decantation and after it. After decantation of blood preparations the temperature, pulse and a BP are hourly defined. In 24 hours it is necessary for patient to make blood and urine bulk analyses.

3. To the patient with knife wound in a gaste the laparotomy is executed. During last in an abdominal lumen to 1,5 l of a blood. At revision it is positioned damages of a mesentery of a small intestines and a small bowel. The bleeding is intercepted. Is the yielded state sick the absolute indication for a hemotransfusion? What blood preparations are better for applying? Whether it is possible autoreinfusion bloods from an abdominal lumen?

The answer: the Hemorrhage more than 1 l (20 % ОЦК) is the absolute indication to a hemotransfusion. It is better to transfuse однокоруппную and the same Rh a packed red cells or the washed erythrocytes. From an abdominal lumen it is impossible to transfuse blood, after all it is infected.

4. To the patient the packed red cells flows over однокоруппную and однокоруппную. In an hour after decantation pulse 76 in 1 mines, a BP 130/80 мм.рт.ст., body temperature of 36,8 wasps. 200 ml соломенно - yellow colour of urine have precipitated out. The dyspnea, at the patient is not present a hyperemia of the person, a back pain. What the doctor with an empty vial should make?

The answer: After decantation with the residual transfusion materials store a vial of the donor in a cooler within two days.

5. To the patient with hemorrhagic shock 4 - 5 degrees it is transfused 200 ml the same group and the same Rh packed red cells. A state of the patient at decantation did not change. What researches and laboratory methods of inspection the doctor should execute, transfused a packed red cells within days after decantation?

The answer: After a hemotransfusion the doctor makes overseeing by the patient:

- 1) observance of a confinement to bed and hunger within 2 hours after a hemotransfusion;
- 2) measurements of body temperature, arterial pressure each hour within 2 hours after a hemotransfusion;
- 3) medical control over the general state of the patient, to quantity and character of urine the first 6 hours after a hemotransfusion;
- 4) laboratory control of urine, a blood and in need of other indexes next day.

6. The patient, 42 years, has arrived in surgical branch after a road accident with the occluded stupid trauma of a gaste in 6 hours after a trauma. Laparocentesis is executed. In an abdominal lumen blood is found. At a laparotomy under intubation narcosis it is positioned traumatic damages of a lien with a hemorrhage to 1500 ml. The bleeding is intercepted. Whether a reinfusion of a blood and how it to execute?

The answer: the blood Reinfusion is possible, as from the moment of a trauma has passed less than 12 hours and there is no damage of a hollow member (blood it is not infected). The system is necessary For reinfusion performance, sterile ware with standard HAEMOPRESERVATIVE or heparin of 10 mg on 50 ml of an isoosmotic solution of sodium of Sodium chloridum on 450 ml of a blood. The collected blood before decantation dissolve an isoosmotic solution of sodium of Sodium chloridum in the ratio 1:1 and add 1000 ЕД heparin on 1000 ml of a blood. Decantation is carried out through system with the filter or special microstrainers.

7. The patient during bioassay carrying out (the first time by stryem it is transfused 15 ml of a packed red cells) had hyperemia of the person, a dyspnea, pulse rate, a back pain has increased. To continue a bioassay and what actions the doctor should execute.

The answer: In case of appearance of reaction to a packed red cells transfusion of carrying out of a bioassay stop. It is necessary to press immediately system (without leaving a needle a vein), to disconnect from a needle and to connect system with physical solution or glucose.

8. To the patient with stomach an intestinal bleeding And () Rh (+) blood groups from hemotransfusion station it is delivered a packed red cells And () Rh (+) 250 ml. How to make macroscopical a visual estimate of operability of a packed red cells?

The answer: Before a packed red cells transfusion the doctor should make a visual estimate to be convinced about operability of a packed red cells to decantation. First, the attention to tightness of packaging, a bottle or the container, coincidence of a blood group and a Rh factor of the donor and the recipient is paid. Secondly, the attention to number, blood sampling date, a preservative kind, a surname, a name and a patronymic of the donor who had been collected a packed red cells, the signature of the doctor is paid. Then it is necessary to pay attention to presence of clots of bacteriemic contamination of a packed red cells, hemolysis. To define operability of a packed red cells it is necessary at sufficient illumination in situ storages.

9. To the patient with repeated желудочно - an intestinal bleeding the packed red cells on 240 ml 3 times flowed over. At decantation there were hemotransfusions reactions Negemolitichesky phylum. At the patient again has arisen желудочно - an intestinal bleeding, the state has worsened. What is better for choosing transfusion medium for decantation?

The answer: In this case it is better to apply the washed erythrocytes. Them receive from a packed red cells by their washing up in an isoosmotic solution of sodium of Sodium chloridum. In the course of washing up the most part of plasma protein, thrombocytes, leucocytes, stromas of the blasted erythrocytes, metabolism products leaves. The washed erythrocytes least reactogenic hemotransfusions the medium containing erythrocytes. Use the washed erythrocytes when the patient had posttransfusion reactions Negemolitichesky phylum, and also the patient, sensebiled to antigens of protein of plasma. The washed erythrocytes within 24 h are conserved from the moment of their preparation. Component use right after preparations is optimum.

10. At a packed red cells transfusion затромбувалася a needle. Trying to reduce passableness of a needle, the nurse has blown a needle a syringe. Owing to what 2,0 ml have got to a vein. Air. At the patient has

subitaneously occurred a pain behind a breast bone, a dyspnea, tussis, a cyanosis, a collapse. On an electrocardiogram - signs of an overload of the right auricle with electrical axis shift to the right. What complication takes place *

The answer: As a result of disturbance of technics of a hemotransfusion the patient had an air embolism.

11. After a massive hemotransfusion of long terms of storage the patient had a short-term excitation which has variated apathy, drowsiness, convulsive twitchings of muscles, an atony, a bradycardia, falling of arterial pressure. On an electrocardiogram - appearance of high peaked tooth T with a narrow basis. What complication takes place?

The answer: the patient had a potassium intoxication.

12. At the patient with a stupid trauma of the gaste operated in 10 hours from the moment of reception of a trauma, during operation it is ascertained liver tearing up. In a gaste to 2,5 l of a blood with plural clots. In hospital in enough of the surveyed fresh blood of the necessary bunch. What tactics of indemnification of a hemorrhage should be chosen to the doctor in this case?

To refuse a hemotransfusion and to reduce BVC by means of crystalloids and colloid plasma substitutes

To transfuse a tinned packed red cells of the necessary bunch

To make a reinfusion of the stabilised and filtered blood collected in an abdominal lumen

To transfuse свежемороженой plasmas

To transfuse the washed erythrocytes

13. At the patient with желудочно - an intestinal bleeding after decantation of 200 ml About (I) Rh (+) a packed red cells through 1:00 body temperature to 38,5 wasps has raised, there were pains in muscles and joints, a fever. Pulse 82 уд / minute, a BP - 120/80 mm Hg the Catheter removes about 150 ml of straw-yellow urine, at laboratory research of changes in it it is not revealed. About what complication or reaction has educed at the patient? What treatment should be prescribed?

The answer: At the patient moderate severity level pyrogenic reaction. The patient should introduce antihistamine drugs, antipyretics, analgetics, Sodium chloridum of calcium of 10 % - 10мл century

14. At a packed red cells transfusion to the patient with a bleeding затромбувалась a needle. The nurse has disconnected system, and a needle has washed out heparin solution. The staff nurse has truly made?

The answer: At a needle thrombosing to wash out its solution of heparin it is impossible, as there can be a thromboembolism of a pulmonary artery.

15. At macroscopical evaluation test of stored blood the doctor has paid attention to tight packaging, conformity of certification, conservation, that blood not the chyle. On what first of all it is necessary to pay attention at a macroscopical assessment of a blood?

The answer: First of all it is necessary to pay attention to bacteriemic contamination, presence of clots, hemolysis.

V II. A procedure and organizational frame of employment

Allocation of points which the student can receive:

At theme mastering № 2 thematic modules № 2 for educational activity to the student are exposed an assessment on a 4-mark (traditional) scale which is then converted in points as follows:

Assessment	Points
"5" (perfectly)	5 points
"4" (well)	4 points
"3" (well)	3 points
"2" (unsatisfactorily)	0 points

The employment procedure sheet

№	The employment procedure sheet. The basic stages of employment, their function and the maintenance	Maste ring level	Quality monitoring and educations	Stuffs of methodical maintenance	Allocati on of time (minute)	
1. 2. 3.	Preparatory stage Organizational actions Statement of the educational purposes and motivation Control of initial level of knowledge, skills, abilities 1. A theme urgency. 2. Indications and contraindications to a hemotransfusion. 3. Paths and methods of a hemotransfusion and blood substitutes. The mechanism of action of the transfused blood.	II II II	Individual poll Tests in II g .	"A theme urgency" "The educational purposes"	1-3 5 15	Metho dical recom menda tions prepar ed Docen t of the chair of Gener al Surger y Chorn aja I.A.
4.	The basic stage 1. Macroscopic definitions of quality of a blood. Overseeing by the patient during decantation. The medical documentation 2. Blood preparations. Bunches of blood substitutes. 3. Possible errors and complications at a hemotransfusion. Preventive maintenance of complications.	III III III	Professional training in the decision of atypical clinical problems. Practical training.	Employment is made in educational rooms and at bed of the patient	55	_____
5. 6. 7.	The final stage Control and correction of level of professional skills Summarising Homework (the basic and additional literature on a theme)	III	Individual control of skills Tests of IIIgr	Tests IIIgr Problems IIIgr Short methodical indicatings to work on practical employment.	12	_____

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The distribution points are awarded to students:

At mastering topic number 2 to number 2 module for training activities for students rated a 4-point scale (traditional) scale, which is then converted into points as follows:

rating	Points
5 (excellent)	5
4 (good)	4
3 (satisfactory)	3
2 (poor)	0

Guidelines prepared

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