

Hemotherapy

Hemotherapy is the replacement of a certain part of the blood. It is the transfer of biological material from the donor organism to the recipient organism.^[1]

Types of biological material

We distinguish **blood derivatives** and **transfusion products**.

Transfusion products

It is a biological material, which is served to the recipient directly (or sometimes after deleucotization and / or irradiation) after collection.^[1] Examples are erythrocyte concentrate (erythrocyte mass, "erymass"), platelet concentrate and fresh frozen plasma (*fresh frozen plasma*, FFP).

Blood derivatives

It is a material made from the donor's biological material by various biochemical-physical processes.^[1] For example are IV immunoglobulins ("ivigy") or individual coagulation factors (except recombinant ones).

Principles of expedient hemotherapy

The patient's benefit should outweigh the risk of possible complications of hemotherapy (urticaria, febrile reactions, hemolysis, TRALI, iron overload...). Concurrently, it is important to find out the **cause** of the deficiency.

For example in sideropenic anaemia, it is not appropriate to substitute erythrocytes. We substitute iron.^[1] Or in ITP, there is no sense in substituting platelets other than for vital indications, because they are immediately destroyed by antibodies.^[1]

Indication

Hemotherapeutic substitution is needed in cases of **anemia**, **thrombocytopenia** a **coagulopathy**.

Submission of fresh frozen plasma as a volume expander is not indicated.^[1]

Anemia

The classic recommendation states that erythrocytes should be substituted when **hemoglobin values are lower than 80 g / l**, unless the patient is suffering from ischemia or severe infection.^[1] An exception is sideropenic anemia, for which it is more appropriate to substitute iron. For elderly patients with ischemia (ICHS, ICHDK etc.) or patients with sepsis is advisable to substitute earlier. The limits are chosen individually according to the condition, often when hemoglobin values are lower than 100 g / l.^[1]

Clinical instruction states that for a healthy adult who does not bleed or undergo hemolysis, it increases by about 10 g / l after acceptance of a single erymass.^[1] Usually are served two transfusions for adult patients - for operational reasons. If a substitution is indicated, it should be performed sufficiently.^[1]

Hypertransfusion is useful in case of paroxysmal nocturnal hemoglobinuria and sick cell disease.^[1]

For substitution is most often used erythrocyte mass. Whole blood is used only in war medicine (or in developing countries).^[1]

Trombocytopenia

It is pointless to substitute platelets (even at zero values) in the case of immune thrombocytopenic purpura and thrombotic thrombocytopenic purpura. Substituted platelets are rapidly destroyed and the immune system is more sensitized.^[1] Substitution is necessary in case of vital indication for unstoppable bleeding. For other thrombocytopenias, the cut-off value is considered to be a **platelet count 10 . 10⁹/l**, after which it is expedient to substitute platelets.^[1] If a patient with thrombocytopenia also has a fever or coagulopathy, it is advisable to substitute the platelets earlier.^[1]



Fresh frozen plasma



Blood bag

The requested platelet values for invasive procedures are:

- at least $50 \times 10^9/l$ for venous cannula insertion or lumbar puncture,
- at least $80 \times 10^9/l$ before less complicated operations,,
- at least $100 \times 10^9/l$ before more complicated operations. ^[1]

(However, achieving these values is not always entirely realistic in hematology.)

Platelet concentrates can be served either mixed (mixed from several donors to achieve sufficient amount) or from platelet spheroids, which are from one donor and therefore less sensitizing.^[1]

Coagulopathy

The need for fresh frozen plasma is indicated:

- to substitute coagulation factors because of their deficiency (haemophilia, if individual factors are not available, etc.),
- for substitution in DIC,
- in case of Warfarin intoxication, if it is desirable to reduce INR rapidly and *prothrombin complex* is not available,
- for exchange plasmapheresis in TTP.^[1]

When the acceptance of fresh-frozen plasma is indicated, it is expedient to substitute it in a sufficient amount, even more than 10-20 ml / kg. Concurrently, each preparation must be served immediately after thawing, because coagulation factors have a short half-time.^[1]

Sources

Related Articles

- Blood transfusion
- Hemotherapy (pediatrics)
- Hemapheresis

Reference

1. KOUBA, Michal. *Stáž v ÚHKT* [lecture for subject Interna předstátnicová stáž, specialization Všeobecné lékařství, 1. lékařská fakulta Univerzita Karlova]. Praha. 27.5.2014.