
بسم الله الرحمن الرحيم

ADVERSE REACTIONS TO BLOOD TRANSFUSION

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ISOAGGLUTININ

- در سرم هر فرد آنتی بادی های ضد گروه خونی مخالف از نظر ABO وجود دارد که به آن ایزو آگلوتینین اطلاق می شود
- IgM

آلو آنتی بادی

- آنتی بادی بر علیه آنتی ژنهای گروههای خونی فرد دیگر بعد از مواجهه ایجاد میشود
- IgM or IgG

ACUTE HEMOLYTIC TRANSFUSION REACTIONS

- وقتی اتفاق می افتد که در سرم گیرنده آنتی بادی بر علیه گلبولهای قرمز دهنده با تیتر بالا وجود دارد
- شایع ترین علت, ایزوآگلوتینین ABO است ولی آلوآنتی بادی ها بر علیه گروههای خونی فرعی می تواند باعث این حالت شود

- تزریق خون اشتباه به بیمار

CLINICAL PRESENTATION

- The most common presentation is fever with or without chills or rigor
- In mild reactions this may be accompanied with abdominal, flank and back pain
- Severe cases may present with dyspnea hypotension, tachypnea, hemoglobinemia, hemoglobinuria, and discomfort at the infusion site

CLINICAL PRESENTATION

- The morbidity and mortality rates of AHTR directly related to the occurrence of renal failure or DIC.
- Sever reaction with the infusion of as little as 5-20 ml of ABO-incompatible blood.
- Fatal reaction with as little as 30 ml .
- The most severe HTR –those that result in DIC-are associated with the infusion of greater than 200 ml of ABO –incompatible blood.

- The immune complexes that result in RBC lysis can cause renal dysfunction and failure.
- Diuresis should be induced with intravenous fluids and furosemide or mannitol.

- Tissue factor released from the lysed erythrocytes may initiate DIC.

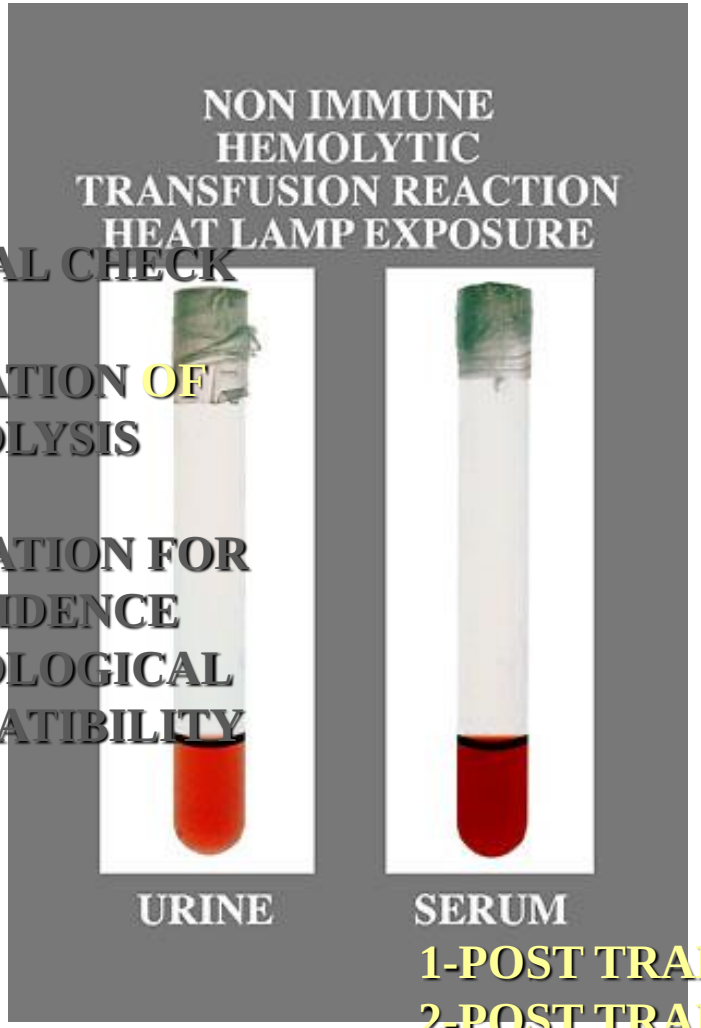
- (PT), activated partial thromboplastin time (aPTT), fibrinogen, and platelet count should be monitored in patients with hemolytic reactions.

BLOOD BANK INITIAL EVALUATION

1-CLERICAL CHECK

2-EVALUATION OF HEMOLYSIS

3- EVALUATION FOR ANY EVIDENCE OF SEROLOGICAL INCOMPATIBILITY



1-POST TRANSFUSION PLASMA
2-POST TRANSFUSION URINE

- A correctly labeled posttransfusion blood sample and any untransfused blood should be sent to the blood bank for analysis
- LDH, BILIRUBIN, HAPTOGLOBIN,DAT, PT PTT,

- repeating the cross-matching of the blood component; and checking all clerical records for errors.

DELAYED HEMOLYTIC AND SEROLOGIC TRANSFUSION REACTIONS

- These reactions occur in patients previously sensitized to RBC alloantigens who have a negative alloantibody screen due to low antibody levels.

- The alloantibody is detectable 1–2 weeks following the transfusion,

THE DELAYED HEMOLYTIC TRANSFUSION REACTION

- Ab against:
- MNS, Rh, Kell, Kidd,or duffy
- Knowledge of prior red cell alloimmunization is essential to preventing the DHTR.
- Clinical presentation:
  Asymptomatic or very mild

Fever
Anemia
History of blood transfusion

- an unexplained failure to maintain the patients post transfusion hemoglobin level/low-grade fever / mild jaundice

FEBRILE NONHEMOLYTIC TRANSFUSION REACTION

- The most frequent reaction associated with the transfusion of cellular blood components is a febrile nonhemolytic transfusion reaction (FNHTR).

- These reactions are characterized by chills and rigors and a 1°C or more rise in temperature
- Occurs during or up to 4 (6) hours after transfusion
- More common in children

ETIOLOGY

- Cytokines (IL-1,,IL-6,,TNF α)

- Antibodies directed against donor leukocyte and class 1 HLA antigens may mediate these reactions; thus, multiply transfused patients and multiparous women are felt to be at increased risk

- FNHTR is diagnosed when other causes of fever in the transfused patient are ruled out.

- leukocyte-reduced blood products
- leukoreduction before storage
- acetaminophen

ALLERGIC REACTIONS(ATR)

- Urticarial reactions are related to plasma proteins found in transfused components
- Different forms: mild, anaphylactoid, and anaphylaxis(IgE mediated).

ATR

- ATRs usually begin during or within an hour of starting a transfusion but may not become evident until several hours later.
- Common findings include hives, rash, pruritus, and flushing.
- More severe reactions occur sooner and may include chest tightness, dyspnea, cyanosis, hoarseness, stridor, or wheezing.
- In addition, gastrointestinal symptoms such as abdominal pain, nausea, vomiting, and diarrhea may also occur.

ATR

- Unlike other acute transfusion reactions, fever is usually absent.

MANAGEMENT

- Antihistamin
- Transfusion should never be resumed in patients with severe ATR especially in atopic patients.
- IV fluid + epinephrine

- Cellular components can be washed to remove residual plasma for the extremely sensitized patient.

ANAPHYLACTIC REACTION

- Patients who are IgA-deficient, <1% of the population, may be sensitized to this Ig class and are at risk for anaphylactic reactions associated with plasma transfusion

- Individuals with severe IgA deficiency should therefore receive only IgA-deficient plasma and washed cellular blood components

GRAFT-VERSUS-HOST DISEASE

- Transfusion-related GVHD is mediated by donor T lymphocytes that recognize host HLA antigens as foreign and mount an immune response,
- GVHD is manifested clinically by the development of fever, a characteristic cutaneous eruption, diarrhea, and liver function abnormalities.

- GVHD can also occur when blood components that contain viable T lymphocytes are transfused to immunodeficient recipients or

- to immunocompetent recipients who share HLA antigens with the donor (e.g., a family donor).

PATIENTS AT RISK FOR TA-GVHD

- fetuses receiving intrauterine transfusions,
- selected immunocompetent (e.g., lymphoma patients) or
- immunocompromised recipients,
- recipients of donor units known to be from a blood relative,
- and recipients who have undergone marrow transplantation

POSTTRANSFUSION PURPURA

- 7-10 days after platelet transfusion
- Female predominance
- Platelet-specific antibodies are found in the recipient's serum, and the most frequently recognized antigen is HPA-1a found on the platelet glycoprotein IIIa receptor.
- The delayed thrombocytopenia is due to the production of antibodies that react to both donor and recipient platelets.

POSTTRANSFUSION PURPURA

- Additional platelet transfusions can worsen the thrombocytopenia and should be avoided

- Treatment with intravenous immunoglobulin may neutralize the effector antibodies, or plasmapheresis

TRANSFUSION-RELATED ACUTE LUNG INJURY

- TRALI type 1(no cocompitant risk factor for ARDS)
- uncommon reaction
- acute respiratory distress, either during or within 6 h of transfusion

- signs of noncardiogenic pulmonary edema, including bilateral interstitial infiltrates on chest x-ray and normal cardiac size

TRALI

- The typical presentation is the sudden development of dyspnea, severe hypoxemia (O_2 saturation <90% in room air), hypotension, and fever without rales

- results from the transfusion of donor plasma that contains high-titer anti-HLA antibodies that bind recipient leukocytes.

TRALI

- The leukocytes aggregate in the pulmonary vasculature and release mediators that increase capillary permeability
- The implicated donors are frequently multiparous women, and transfusion of their plasma component should be avoided.

TREATMENT

- is supportive, and patients usually recover without sequelae
- Non invasive methods: CPAP or BIPAP

- Intubation in 70 – 80% of cases

TRANSFUSION ASSOCIATED CIRCULATORY OVERLOAD TACO

- بیمار نمیتواند حجم فراورده خونی را تحمل کند
- سرعت تزریق مهمتر از مقدار تزریق است
- بیماری زمینه ای قلبی, کلیوی و ریوی در ایجاد آن مهم هستند

CLINICAL FINDING

- وجود رال ریوی
- بزرگ بودن قلب در عکس سینه
- فشار خون افزایش یافته

- پاسخ به لازیکس

BACTERIAL CONTAMINATION

- Most bacteria do not grow well at cold temperatures;
- . However, some gram-negative bacteria can grow at 1° to 6°C. *Yersinia*, *Pseudomonas*, *Serratia*, *Acinetobacter* and *Escherichia* species have all been implicated in infections related to PRBC transfusion.

- Platelet concentrates, which are stored at room temperature, are more likely to contain skin contaminants such as gram-positive organisms

- It is estimated that 1 in 1000–2000 platelet components is contaminated with bacteria.

- fever and chills, which can progress to septic shock and DIC. These reactions may occur abruptly, within minutes of initiating the transfusion, or after several hours

- Rapid diagnosis usually can be made via Gram stain of the residual donor blood.

اقدامات لازم در واکنش به انتقال خون

- قطع تزریق
- برقراری راه وریدی مطمئن
- اثبات صحت فرآورده برای بیمار
- ارزیابی کاردیواسکولار, ریه , کهیر و آنژیوادم

ALLOIMMUNIZATION

- antigens on cellular blood elements and plasma proteins.
- Alloantibodies to RBC antigens are detected during pretransfusion testing, and their presence may delay finding antigen-negative cross-match-compatible products for transfusion

- Alloimmunization to antigens on leukocytes and platelets can result in refractoriness to platelet transfusions

INFECTIOUS COMPLICATIONS

- Viral Infections
- Hepatitis C Virus
- Hepatitis B Virus
- HIV-1
- CMV
- Parvovirus B19
- Human T Lymphotropic Virus (HTLV)Type I

NONIMMUNOLOGIC REACTIONS

- Fluid Overload
- Hypothermia
- Electrolyte Toxicity (K,,Ca)
- Iron Overload
- Immunomodulation(Transfusion of allogeneic blood is immunosuppressive.)
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