Transfusion Reactions

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Objectives

- Describe common transfusion reactions
- Explain routine investigations of transfusion reactions
- Identify anticipated lab findings associated with transfusion reaction

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Conflict of Interest

- No conflicts of interest to declare

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Transfusion Reactions

- Acute- During transfusion or within 24 hours
- Delayed- After transfusion, more than 24 hours
- Immune
- Nonimmune
- Up to 3% of transfusions
  - Depends on type

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Transfusion-associated Circulatory Overload (TACO)

- Acute, non-immunologic
- Definitive TACO
- Probable, possible

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TACO

- Pathophysiology
  - Circulatory overload
  - May occur with any blood product
- Risk
  - Age >85 years, Prior HF, etc.
  - Volume and rate

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TACO

- Epidemiology
  - Estimated overall incidence 1%
- Clinical
  - Signs of fluid overload

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TACO

- Lab testing
  - BNP, NT-pro-BNP
  - CBC
  - Pleural fluid analysis
  - D-dimer
- Treated supportively

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TACO

- Prevention
  - Decrease volume over time
  - Pre transfusion diuresis

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Transfusion-related Lung Injury (TRALI)

- Acute, Immune
- Type I
- Type II

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TRALI

- Pathophysiology
  - Neutrophil sequestration and priming
  - Neutrophil activation
- Risk
  - Uniform age, M:F
  - Underlying inflammation
  - Larger plasma volume

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TRALI

- Epidemiology
  - Very rare
- Clinical
  - Hypoxic respiratory failure

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TRALI

- Lab Testing
  - BNP
  - CBC
  - Pleural fluid
  - VBG/ABG
  - Observation of supernatant
  - DAT
- Treated supportively

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TRALI

- Prevention
  - Donor screening
  - Solvent/detergent treated plasma
  - HLA testing

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Allergic

- Acute, Immune
- New local itching, hives
- Usually minor

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Allergic

- Pathophysiology
  - Type I hypersensitivity
- Risk
  - History of atopy

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Allergic

- Epidemiology
  - Very common
- Clinical
  - Hives, itching, angioedema

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Allergic

- Lab testing
  - Broadly negative
- May resume current transfusion
- Treated with antihistamines

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Allergic

- Prevention
  - Decrease transfused plasma

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Anaphylactic

- Acute, Immune
- Severe allergic reaction

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Anaphylactic

- Pathophysiology
  - Type I hypersensitivity
- Risk
  - Ig-A deficiency
  - History of atopy

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Anaphylactic

- Epidemiology
  - Rare
- Clinical
  - Allergy with vital instability

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Anaphylactic

- Lab testing
  - Broadly negative
- Treated with epinephrine, usually

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Anaphylactic

- Prevention
  - Avoid plasma
  - Solvent/detergent plasma
  - Screen plasma

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Acute Hemolytic Transfusion Reaction (AHTR)

- Acute, immunologic/non-immunologic
- Definite, probable

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AHTR

- Pathophysiology
  - Usually ABO incompatibility
  - May be mechanical, chemical
- Risk
  - Clerical

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AHTR

- Epidemiology
  - Exceedingly Rare
- Clinical
  - Back/flank pain
  - Fevers/chills
  - Hypotension
  - DIC, hematuria
  - Oliguria/anuria, AKI

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AHTR

- Lab Testing
  - CMP, LDH, Haptoglobin
  - CBC w/microscopic exam
  - Fibrinogen, D-dimer, aPTT, PT
  - UA
  - DAT, repeat ABO and crossmatch, antibody panel, elution
- Treated supportively

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AHTR

- Prevention
  - Record keeping, speicmen handling

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Febrile Nonhemolytic Transfusion Reaction (FNHTR)

- Acute, immunologic
- Mild reaction
- Fever or chills/rigors

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FNHTR

- Pathophysiology
  - Reaction of donor leukocytes with recipient antibody
  - Cytokine release from donor leukocytes
  - HLA on leukocytes
  - CD 40 Ligand
- Risk
  - Age
  - Type of blood product
  - Leukoreduction

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FNHTR

- Epidemiology
  - Exceedingly common
- Clinical
  - Isolated fever, chills

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FNHTR

- Lab testing
  - Broadly negative
- Treated supportively

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FNHTR

- Prevention
  - Early leukoreduction
  - Pathogen reduction technology (PRT) not shown to work

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Transfusion-transmitted Infection (TTI)

- Acute or delayed, non-immunologic
- Unexpected pathogen after transfusion

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TTI

- Pathophysiology
  - Pathogen present in component
- Risk
  - Highest with platelets
  - Recipient health

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TTI

- Epidemiology
  - Uncommon
  - Platelets>other components
- Clinical
  - Signs of infection

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TTI

- Lab testing
  - Component and recipient testing
- Treatment specific to pathogen, supportive

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TTI

- Prevention
  - Collection protocol
  - Pre-release testing
  - Donor screening, testing

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Delayed Hemolytic Transfusion Reaction (DHTR)

- Delayed, immunologic
- Evidence of hemolysis, >24 h after transfusion

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DHTR

- Pathophysiology
  - Alloantibody formation
- Risk
  - Previous foreign antigen exposure

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DHTR

- Epidemiology
  - Uncommon
- Clinical
  - Signs and symptoms similar to AHTR

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DHTR

- Lab testing
  - Similar findings to AHTR
- Treated supportively

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DHTR

- Prevention
  - Per protocol

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Transfusion-associated Graft vs. Host Disease (TAGVHD)

- Delayed, immunologic
- Clinical syndrome with biopsy

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TAGVHD

- Pathophysiology
  - Donor lymphocytes attack recipient tissues
- Risk
  - Immunosuppression

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TAGVHD

- Epidemiology
  - Extremely rare
- Clinical
  - Syndromic presentation

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TAGVHD

- Lab testing
  - CBC
  - BMP
  - Hepatic panel
  - Coagulation testing
- Treated with hematopoietic stem cell transplant

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TAGVHD

- Prevention
  - Irradiation

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