Nursing Transfusion Medicine
Boot Camp: Lab → Bedside

Recognition, Management and Prevention of Transfusion Reactions and Errors

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Recognition, Management and Prevention of Transfusion Reactions and Errors

- Often complex
- Overlapping, diverging symptoms
- Early symptoms can evolve into more severe reactions
- Standardized definitions of transfusion reactions have varied over time
Recognition, Management and Prevention of Transfusion Reactions and Errors

Abbreviations

TR – Transfusion Reaction
Patient ID - Patient identification
MD - Attending Physician, Health Care Provider (Nurse Practitioner)
TM - Transfusion Medicine (Blood Transfusion Laboratory)
DAT – Direct Antiglobulin Test
DIC - Disseminated Intravascular Coagulation
CBS - Canadian Blood Services
SOB – Short of Breath
Plts – Platelets
POD – Post-Operative Day
Objectives

After this session participants will be able to:

- Explain the risks of transfusion and incidence of transfusion reactions
- Define presenting signs and symptoms of transfusion reactions
- Understand the suggested treatment / actions and recommended investigations for transfusion reactions
- Delineate the key nursing actions in the recognition, management and prevention of transfusion reactions and errors
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### Risks of Transfusion

<table>
<thead>
<tr>
<th>Risk of Event</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 in 13</td>
<td>Red cell sensitization, increasing risk of hemolytic transfusion reaction and hemolytic disease of the fetus and newborn&lt;sup&gt;73&lt;/sup&gt;</td>
</tr>
<tr>
<td>1 in 20</td>
<td>Febrile non-hemolytic transfusion reaction per pool of platelets&lt;sup&gt;71&lt;/sup&gt;</td>
</tr>
<tr>
<td>1 in 100</td>
<td>Transfusion-associated circulatory overload per transfusion episode&lt;sup&gt;72&lt;/sup&gt;</td>
</tr>
<tr>
<td>1 in 100</td>
<td>Minor allergic reactions (urticaria)</td>
</tr>
<tr>
<td>1 in 300</td>
<td>Febrile non-hemolytic transfusion reaction per unit of RBC (1 &quot;donor exposure&quot;)</td>
</tr>
<tr>
<td>1 in 7,000</td>
<td>Delayed hemolytic transfusion reaction</td>
</tr>
<tr>
<td>1 in 10,000</td>
<td>Transfusion-related acute lung injury (TRALI)</td>
</tr>
<tr>
<td>1 in 10,000</td>
<td>Symptomatic bacterial sepsis per pool of platelets</td>
</tr>
<tr>
<td>1 in 40,000</td>
<td>ABO-incompatible transfusion per RBC transfusion episode</td>
</tr>
<tr>
<td>1 in 40,000</td>
<td>Serious allergic reaction per unit of component</td>
</tr>
<tr>
<td>1 in 100,000</td>
<td>Post-transfusion purpura</td>
</tr>
<tr>
<td>1 in 200,000</td>
<td>Death from bacterial sepsis per pool of platelets</td>
</tr>
<tr>
<td>1 in 250,000</td>
<td>Symptomatic bacterial sepsis per unit of RBC</td>
</tr>
<tr>
<td>1 in 500,000</td>
<td>Death from bacterial sepsis per unit of RBC</td>
</tr>
<tr>
<td>&lt;1 in 1,000,000</td>
<td>Transmission of West Nile Virus</td>
</tr>
<tr>
<td>1 in 4,000,000</td>
<td>Transmission of Chagas disease per unit of component</td>
</tr>
<tr>
<td>1 in 7,500,000</td>
<td>Transmission of hepatitis B virus per unit of component</td>
</tr>
<tr>
<td>1 in 7,600,000</td>
<td>Transmission of HTLV per unit of component</td>
</tr>
<tr>
<td>1 in 13,000,000</td>
<td>Transmission of hepatitis C virus per unit of component</td>
</tr>
<tr>
<td>1 in 21,000,000</td>
<td>Transmission of human immunodeficiency virus (HIV) per unit of component</td>
</tr>
</tbody>
</table>

*All of these risk frequencies are likely to have quite wide confidence intervals.*

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Callum JL et al.  
Bloody easy 4: blood transfusions, blood alternatives and transfusion reactions: a guide to transfusion medicine  
Ontario Regional Blood Coordinating Network; 2016.
Common Minor Reactions / Risks
• The majority of transfusion reactions are minor and not life threatening
• Itching and hives or fever occur in about 1 of every 100 to 300 transfusions

More Serious Reactions / Risks
• Fluid overload (TACO - Transfusion Associated Circulatory Overload) common, more serious transfusion reaction (occurs in about 1 of every 100 transfusions)
• Lung injury (TRALI - Transfusion Related Acute Lung Injury), receiving the wrong blood type and bacterial infection are uncommon more serious reactions (occur in about 1 of every 10,000 to 250,000 transfusions)
• These reactions can be medically treated
• Patient identification steps are meticulous to prevent receiving the wrong blood

Media Publicized Reactions / Risks
• Life altering infectious transfusion risks such as Hepatitis and Human Immunodeficiency Virus (HIV) are often described by the media
• In Canada, these risks are extremely rare (occur in about 1 of every 7.5 to 21 million transfusions)
Objectives

After this session participants will be able to:

• Explain the risks of transfusion and incidence of transfusion reactions
• Define presenting signs and symptoms of transfusion reactions
• Understand the suggested treatment / actions and recommended investigations for transfusion reactions
• Delineate the key nursing actions in the recognition, management and prevention of transfusion reactions and errors
Transfusion Reactions

Initial Steps 1 to 5 for all Possible Transfusion Reactions

1. Stop the transfusion
2. Maintain IV access
3. Check vital signs (temperature, pulse, respiratory rate, BP, and oxygen saturation)
4. Bedside check:
   - patient ID on armband and product label
   - product visual inspection for contamination, discoloration, hemolysis, clotting
5. MD to assess
Transfusion Reactions

• As a Transfusionist, be familiar with the signs and symptoms of a possible transfusion reaction

• Educate patients (as appropriate for their clinical status) to report any symptoms typical of a transfusion reaction – fever, flushed/chills, rash, itching, SOB, hemoglobinuria, feeling different than usual

• Focus on the predominant symptom, direct patient care toward the signs and symptoms rather than the classification / possible etiology
Transfusion Reactions

• Evaluate each possible TR in the context of:
  o the patient’s underlying medical condition
  o clinical status of the patient prior to the transfusion

• Consider blood product transfused, any risks specific to that product

• Report all possible transfusion reactions to TM

• Etiology of reported, TM investigated TR may be “unrelated to transfusion”
Transfusion Reactions: Signs and Symptoms
(distinguishing signs and symptoms - **bold** font)

- **Fever**
- **Urticaria (Hives), Itching or Rash**
- **Dyspnea or Decreased Oxygen Saturation (SpO₂)**
- **Hypotension**
Signs and Symptoms of a Transfusion Reaction

• **Fever:** > 1°C increase temperature from baseline AND temperature > 38°C During/or within 4 hours post transfusion

• Urticaria (Hives), Itching or Rash

• Dyspnea or Decreased Oxygen Saturation (SpO₂)

• Hypotension
Fever: < 39°C
No other Symptoms

Suggested Treatment and Actions
• Initial Steps 1 to 5
• Antipyretic
• With MD order and if product still viable, cautiously resume transfusion with close patient assessment

Recommended Investigations
• No testing required

Classification / Possible Etiology
• Febrile Non-hemolytic Transfusion Reaction (FNHTR)
Fever: < 39°C with other symptoms: Chills, Rigors, Flushing, Nausea, Vomiting or > 39°C

Suggested Treatment and Actions
• Initial Steps 1 to 5
• Do Not Restart Transfusion
• Antipyretic
• If no patient contraindications and with MD order, Meperidine (Demerol®) for significant rigors

Recommended Investigations
• No testing required

Classification / Possible Etiology
• Febrile Non-hemolytic Transfusion Reaction (FNHTR)
Fever: No Fever
Symptoms: Chills, Rigors, Flushing, Nausea, Vomiting

Suggested Treatment and Actions
• Initial Steps 1 to 5
• Do Not Restart Transfusion
• If no patient contraindications and with MD order, Meperidine (Demerol®) for significant rigors

Recommended Investigations
• No testing required

Classification / Possible Etiology
• “Atypical” or “Afebrile” Febrile Non-Hemolytic Transfusion Reaction (FNHTR)
Fever: Fever, Chills, Rigors, Flushing, Nausea, Vomiting, Dyspnea, Tachycardia, Hypotension, Shock, Multi-organ Failure, Disseminated Intravascular Coagulation (DIC)

Suggested Treatment and Actions
- Initial Steps 1 to 5
- Do Not Restart Transfusion
- Return product to TM
- Broad spectrum antibiotics, do not wait for culture results
- Supportive patient care as required – Oxygen, Respiratory Support, IV fluid, Vasopressors

Recommended Investigations
- Patient blood culture (from a different peripheral IV site)
- TM - Product culture, gram stain
- TM – Blood sample for Group and Screen, DAT
- Urinalysis – first post-reaction urine sample

Classification / Possible Etiology
- Bacterial Contamination (BaCon) or Bacterial Sepsis

Suggested Treatment and Actions
- Initial Steps 1 to 5
- Do Not Restart Transfusion
- Return product to TM
- Maintain good urine output
- Supportive patient care as required – Oxygen, Respiratory Support, IV fluid, Vasopressors
- Manage DIC and hemorrhage as clinically indicated

Recommended Investigations
- TM – blood sample for Group and Screen, DAT
- Urinalysis – first post-reaction urine sample
- Hemolytic work-up: CBC, electrolytes, creatinine, bilirubin, LDH, INR, PTT, fibrinogen, haptoglobin, plasma Hb

Classification / Possible Etiology
- Acute Hemolytic Transfusion Reaction
# Signs and Symptoms of a Transfusion Reaction

## Fever (1)

<table>
<thead>
<tr>
<th>Signs / Symptoms (distinguishing - <strong>bold</strong> font)</th>
<th>Suggested Treatment / Actions</th>
<th>Recommended Investigations</th>
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</tr>
</thead>
<tbody>
<tr>
<td>&lt; 39°C No other symptoms</td>
<td>• Initial Steps 1 to 5</td>
<td>• No testing required</td>
<td>Febrile Non-hemolytic Transfusion Reaction (FNHTR)</td>
</tr>
</tbody>
</table>
| < 39°C with other symptoms: Chills, Rigors, Flushing, Nausea, Vomiting or > 39°C | • Initial Steps 1 to 5  
• Do Not Restart Transfusion  
• Antipyretic  
• If no patient contraindications and with MD order, Meperidine (Demerol®) for significant rigors | • No testing required | Febrile Non-hemolytic Transfusion Reaction (FNHTR) |
| No Fever Symptoms: Chills, Rigors, Flushing, Nausea, Vomiting | • Initial Steps 1 to 5  
• Do Not Restart Transfusion  
• If no patient contraindications and with MD order, Meperidine (Demerol®) for significant rigors | • No testing required | “Atypical” or “Afebrile” Febrile Non-hemolytic Transfusion Reaction (FNHTR) |
# Signs and Symptoms of a Transfusion Reaction

## Fever (2)

> 1°C increase temperature AND temperature > 38°C; during/or within 4 hours post transfusion

<table>
<thead>
<tr>
<th>Signs / Symptoms (distinguishing - <strong>bold</strong> font)</th>
<th>Suggested Treatment / Actions</th>
<th>Recommended Investigations</th>
<th>Classification / Possible Etiology</th>
</tr>
</thead>
</table>
| **Fever**, Chills, Rigors, Flushing, Nausea, Vomiting, **Dyspnea**, Tachycardia, **Hypotension**, Shock, Multi-organ Failure, Disseminated Intravascular Coagulation (DIC) | • Initial Steps 1 to 5
• Do Not Restart Transfusion
• Return product to TM
• Antipyretic
• **Broad spectrum antibiotics, do not wait for culture results**
• Supportive patient care as required – Oxygen, Respiratory Support, IV fluid, Vasopressors | • Patient blood culture (from a different peripheral IV site)
• TM - Product culture, gram Stain
• TM – blood sample for Group and Screen, DAT
• Urinalysis – first post-reaction urine sample | Bacterial Contamination (BaCon) or Bacterial Sepsis |
| **Fever**, Chills, Rigors, Flushing, Nausea, Vomiting, Pain: Back/Flank/IV site, Hematuria, Dark Urine, Oliguria, **Dyspnea**, Tachycardia, **Hypotension**, Shock, Multi-organ Failure, Disseminated Intravascular Coagulation (DIC) | • Initial Steps 1 to 5
• Do Not Restart Transfusion
• Return product to TM
• Maintain good urine output
• Supportive patient care as required – Oxygen, Respiratory Support, IV fluid, Vasopressors
• Manage DIC and hemorrhage as clinically indicated | • TM – blood sample for Group and Screen, DAT
• Urinalysis – first post-reaction urine sample
• Hemolytic work-up: CBC, electrolytes, creatinine, bilirubin, LDH, INR, PTT, fibrinogen, haptoglobin, plasma Hb | Acute Hemolytic Transfusion Reaction |
## Signs and Symptoms of a Transfusion Reaction

### Fever (3)

> 1°C increase temperature AND temperature > 38°C; during/or within 4 hours post transfusion

<table>
<thead>
<tr>
<th>Signs / Symptoms (distinguishing - bold font)</th>
<th>Suggested Treatment / Actions</th>
<th>Recommended Investigations</th>
<th>Classification / Possible Etiology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Refer to slide 35</td>
<td></td>
<td></td>
<td>TRALI (Transfusion Related Acute Lung Injury)</td>
</tr>
</tbody>
</table>
Patient Case # 1

58 year old male transferred from Community Hospital
History: presented there SOB, melena off and on x 2 weeks, initial Hb 32 g/L, transfused 3 units PRBC in Community Hospital

Admission Hb is 68 g/L; Order: 1 unit PRBC over 2 hours

30 minutes after transfusion completed, patient found to have severe rigors and mild confusion

Pre-transfusion:
  Temperature 36.6°C, BP 118/60, pulse 94, respiration 18
Currently:
  Temperature 39.3°C, BP 84/50, pulse 126, respiration 24
Signs and Symptoms of a Transfusion Reaction

- Fever

- **Urticaria (Hives), Itching or Rash:** During/or within 4 hours post transfusion

- Dyspnea or Decreased Oxygen Saturation (SpO₂)

- Hypotension
Urticaria (Hives), Itching or Rash: Less than 2/3 of body
No other Symptoms

Suggested Treatment and Actions

• Initial Steps 1 to 5
• Antihistamine
• With MD order and if product still viable, cautiously resume transfusion with close patient assessment
• If recurrent reactions, review with TM MD – possible trial of pre-medication with antihistamine

Recommended Investigations

• No testing required

Classification / Possible Etiology

• Minor Allergic Transfusion Reaction
Urticaria (Hives), Itching or Rash: 2/3 of body or more
No other Symptoms

Suggested Treatment and Actions
- Initial Steps 1 to 5
- Do Not Restart Transfusion
- Antihistamine
- May require steroid
- If recurrent reactions, review with TM MD – possible trial of pre-medication with antihistamine/steroid; possible washed/plasma depleted blood products

Recommended Investigations
- No testing required

Classification / Possible Etiology
- Minor Allergic (Extensive) Transfusion Reaction
Urticaria (Hives), Itching or Rash:  Urticaria, Facial edema, Airway edema, Wheezing, Cough, Chest Pain, Dyspnea, Decreased $O_2$ saturation, Tachycardia, Hypotension, Anxiety, Gastrointestinal Symptoms

Suggested Treatment and Actions

- Initial Steps 1 to 5
- Do Not Restart Transfusion
- Return product to TM
- Epinephrine / Steroid / Antihistamine
- Oxygen, Respiratory support, Vasopressors as clinically indicated
- Pending investigation, washed/plasma depleted blood products

Recommended Investigations

- TM – blood sample for Group and Screen, DAT
- Serum IgA, Anti-IgA, Haptoglobin
- If dyspnea Chest X-ray, Blood Gases

Classification / Possible Etiology

- Anaphylactoid Reaction / Anaphylaxis
## Signs and Symptoms of a Transfusion Reaction

### Urticaria (Hives), Itching or Rash (1)

<table>
<thead>
<tr>
<th>Signs / Symptoms</th>
<th>Suggested Treatment / Actions</th>
<th>Recommended Investigations</th>
<th>Classification / Possible Etiology</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Less than 2/3 of body</strong>  &lt;br&gt;No other Symptoms</td>
<td>• Initial Steps 1 to 5  &lt;br&gt;• Antihistamine  &lt;br&gt;• With MD order and if product still viable, cautiously resume transfusion with close patient assessment  &lt;br&gt;• If recurrent reactions, review with TM MD – possible trial of pre-medication with antihistamine</td>
<td>• No testing required</td>
<td>Minor Allergic Transfusion Reaction</td>
</tr>
<tr>
<td><strong>2/3 of body or more</strong> &lt;br&gt;No other Symptoms</td>
<td>• Initial Steps 1 to 5  &lt;br&gt;• Do Not Restart Transfusion  &lt;br&gt;• Antihistamine  &lt;br&gt;• May require steroid  &lt;br&gt;• If recurrent reactions, review with TM MD – possible trial of pre-medication with antihistamine/steroid; possible washed/plasma depleted blood products</td>
<td>• No testing required</td>
<td>Minor Allergic (Extensive) Transfusion Reaction</td>
</tr>
</tbody>
</table>
## Signs and Symptoms of a Transfusion Reaction

### Urticaria (Hives), Itching or Rash (2)

<table>
<thead>
<tr>
<th>Signs / Symptoms (distinguishing - <strong>bold</strong> font)</th>
<th>Suggested Treatment / Actions</th>
<th>Recommended Investigations</th>
<th>Classification / Possible Etiology</th>
</tr>
</thead>
</table>
| **Urticaria, Facial edema, Airway edema, Wheezing, Cough, Chest Pain, Dyspnea, Decreased O₂ saturation, Tachycardia, Hypotension, Anxiety, Gastrointestinal Symptoms** | **Initial Steps 1 to 5**  
**Do Not Restart Transfusion**  
**Return product to TM**  
**Epinephrine / Steroid / Antihistamine**  
**Oxygen, Respiratory support, Vasopressors as clinically indicated**  
**Pending investigation, washed/plasma depleted blood products** | **TM – blood sample for Group and Screen, DAT**  
**Serum IgA, Anti-IgA, Haptoglobin**  
**If dyspnea Chest X-ray, Blood Gases** | **Anaphylactoid Reaction / Anaphylaxis** |
Patient Case # 2

73 year old female admitted after fall at home, mild persistent headache, CT scan - subdural hematoma
History: undergoing treatment for leukemia

Admission platelet count is 24x10^9/L
Order: 1 adult dose platelets

15 minutes after transfusion started, patient complained of itching, rash noted on her back and antecubital area of arms

Pre-transfusion:
Temperature 36.9°C, BP 112/66, pulse 58, respiration 16

Currently:
Temperature 36.7°C, BP 120/70, pulse 56, respiration 16
Transfusion Reactions: Signs and Symptoms

- Fever
- Urticaria (Hives), Itching or Rash
- **Dyspnea or Decreased Oxygen Saturation (SpO₂):** SpO₂ less than 90 %, during/within 6 hours post transfusion
- Hypotension
**Dyspnea or Decreased SpO₂:** Dyspnea, decreased SpO₂, orthopnea, cyanosis, increased venous pressure, tachycardia, **hypertension, positive fluid balance**

**Chest X-ray:** pulmonary edema

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**Suggested Treatment and Actions**

- Initial Steps 1 to 5
- Oxygen, High Fowler’s Position
- Diuretics
- With MD order and if product still viable, cautiously resume transfusion at slow rate with close patient assessment
- Future transfusions: Slow transfusion rate, Consider Pre-emptive diuretics
  - Lasix PO: onset 30-60 minutes, maximal effect 1-2 hours, effect persists 6-8 hours
  - Lasix IV: onset 5 minutes, maximal effect 20-60 minutes, effect persists about 2 hours

**Recommended Investigations**

- Chest X-ray

**Classification / Possible Etiology**

- **TACO (Transfusion Associated Circulatory Overload)**

Pre-transfusion assess patients for TACO Risk Factors:

age > 70 years, history of heart failure or myocardial infarction, left ventricular dysfunction, renal dysfunction, positive fluid balance
Dyspnea or Decreased $\text{SpO}_2$: Acute onset Dyspnea, decreased $\text{SpO}_2$, fever, hypotension

Chest x-ray: bilateral interstitial/alveolar infiltrates without elevated pulmonary pressures

**Suggested Treatment and Actions**

- Initial Steps 1 to 5
- Do Not Restart Transfusion
- Return product to TM
- Oxygen, Respiratory support, Vaspressors as clinically indicated
- Diuretics and steroids are not believed to be of benefit

**Recommended Investigations**

- Chest X-ray
- Blood Gases
- CBS patient follow up testing – contact TM to order required samples

**Classification / Possible Etiology**

- **TRALI (Transfusion Related Acute Lung Injury)**
Dyspnea or Decreased $\text{SpO}_2$: Mild Dyspnea, Slightly decreased $\text{SpO}_2$, Slightly increased respiratory rate

Chest x-ray: normal / unchanged, No pulmonary edema, No bilateral infiltrates

**Suggested Treatment and Actions**
- Initial Steps 1 to 5
- Do Not Restart Transfusion
- Oxygen, Respiratory support as clinically indicated

**Recommended Investigations**
- Chest X-ray

**Classification / Possible Etiology**
- **TAD (Transfusion Associated Dyspnea)**
  Mild symptoms that do not meet the criteria for TACO or TRALI
# Signs and Symptoms of a Transfusion Reaction

## Dyspnea or Decreased Oxygen Saturation (SpO₂) (1)

<table>
<thead>
<tr>
<th>Signs / Symptoms (distinguishing - <strong>bold</strong> font)</th>
<th>Suggested Treatment / Actions</th>
<th>Recommended Investigations</th>
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</tr>
</thead>
</table>
| **Dyspnea, decreased SpO₂, orthopnea, cyanosis, increased venous pressure, tachycardia, hypertension, positive fluid balance**  
* Chest X-ray: pulmonary edema | • **Initial Steps 1 to 5**  
• Oxygen, High Fowler’s Position  
• Diuretics  
• If symptoms resolve and with MD order and if product still viable, cautiously resume transfusion at slow rate with close patient assessment  
• Future transfusions: Slow transfusion rate, Consider Pre-emptive diuretics  
Lasix PO: onset 30-60 minutes, maximal effect 1-2 hours, effect persists 6-8 hours  
Lasix IV: onset 5 minutes, maximal effect 20-60 minutes, effect persists about 2 hours | • Chest X-ray | TACO (Transfusion Associated Circulatory Overload)  
Pre-transfusion assess patients for TACO Risk Factors: age > 70 years, history of heart failure or myocardial infarction, left ventricular dysfunction, renal dysfunction, positive fluid balance |
# Signs and Symptoms of a Transfusion Reaction

## Dyspnea or Decreased Oxygen Saturation (SpO₂) (2)

<table>
<thead>
<tr>
<th>Signs / Symptoms (distinguishing - bold font)</th>
<th>Suggested Treatment / Actions</th>
<th>Recommended Investigations</th>
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</tr>
</thead>
</table>
| **Acute onset Dyspnea, decreased SpO₂, fever, hypotension;** Chest x-ray: bilateral interstitial/ alveolar infiltrates without elevated pulmonary pressures | • Initial Steps 1 to 5  
• Do Not Restart Transfusion  
• Return product to TM  
• Oxygen, Respiratory support, Vasopressors as clinically indicated  
• Diuretics and steroids are not believed to be of benefit | • Chest X-ray  
• Blood Gases  
• CBS patient follow up testing – contact TM to order required samples | TRALI (Transfusion Related Acute Lung Injury)  

**CBS Prevention Strategies:**  
• Plasma for transfusion from male donors  
• Buffy coat platelet pools in male plasma  
• Plateletpheresis from male donors or never pregnant females |
## Signs and Symptoms of a Transfusion Reaction

### Dyspnea or Decreased Oxygen Saturation (SpO₂)

Less than 90% during/or within 6 hours post transfusion

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</tr>
</thead>
</table>
| **Mild Dyspnea,** Slightly decreased SpO₂, Slightly increased respiratory rate **Chest x-ray:** normal / unchanged No pulmonary edema No bilateral infiltrates | • Initial Steps 1 to 5  
• Do Not Restart Transfusion  
• Oxygen, Respiratory support as clinically indicated | • Chest X-ray | TAD (Transfusion Associated Dyspnea)  
Mild symptoms that do not meet the criteria for TACO or TRALI |

Refer to slide 28

Refer to slide 20

Refer to slide 20

Anaphylactoid Reaction / Anaphylaxis

Bacterial Contamination (BaCon) or Bacterial Sepsis

Acute Hemolytic Transfusion Reaction
Patient Case # 3

79 year old female – POD #2 revision hip surgery (femoral and acetabular – 4 hour operation)
Medical History: Myocardial infarction 2 years ago, hypertension, atrial fibrillation, Type II diabetes mellitus

AM Rounds: serosanguinous oozing from incision, extensive bruising– to below knee on operative leg
fluid bolus given x 2 overnight for hypotension
now BP 96/56, pulse 88, AM labs Hb 66 g/L
Orders: Transfuse 2 units PRBC, each unit over 1 hour

55 minutes into 2\textsuperscript{nd} unit of PRBC patient complains of SOB
Temperature 36.8 C, BP 168/88, pulse 102, respiration 28,
O\textsubscript{2} saturation 88 %
Transfusion Reactions: Signs and Symptoms

- Fever
- Urticaria (Hives), Itching or Rash
- Dyspnea or Decreased Oxygen Saturation (SpO₂)

- **Hypotension:** > 30 mmHg decrease in systolic or diastolic BP (in adult patients)
Hypotension: Hypotension, may be associated with dyspnea, urticaria, nausea, vomiting

Suggested Treatment and Actions
• Initial Steps 1 to 5
• Do Not Restart the Transfusion
• Supportive care, including IV fluids
• If ACE inhibitors implicated if possible, consider an alternative anti-hypertensive prior to additional transfusion

Recommended Investigations
• No testing

Classification / Possible Etiology
• Bradykinin Mediated Hypotension, more common with platelet transfusion

Of reported cases > 50% on ACE inhibitors; Angiotensin-converting enzyme is main enzyme responsible for bradykinin degradation; some patients have genetic polymorphism leading to decreased bradykinin degradation
# Signs and Symptoms of a Transfusion Reaction

## Hypotension (1)

### Hypotension

> 30 mmHg decrease in systolic or diastolic BP (in adult patients); during /within 4 hours of transfusion

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</thead>
</table>
| **Hypotension**, may be associated with **dyspnea**, **urticaria**, nausea, vomiting | • Initial Steps 1 to 5  
• Do Not Restart the Transfusion  
• Supportive care, including IV fluids  
• If ACE inhibitors implicated if possible, consider an alternative anti-hypertensive prior to additional transfusion | • No testing | **Bradykinin Mediated Hypotension**, more common with platelet transfusion  
Of reported cases > 50% on ACE inhibitors; Angiotensin-converting enzyme is main enzyme responsible for bradykinin degradation; some patients have genetic polymorphism leading to decreased bradykinin degradation |
# Signs and Symptoms of a Transfusion Reaction

## Hypotension (2)

> 30 mmHg decrease in systolic or diastolic BP (in adult patients); during /within 4 hours of transfusion

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<td>Refer to slide 35</td>
<td></td>
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<td>TRALI (Transfusion Related Acute Lung Injury)</td>
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<tr>
<td>Refer to slide 28</td>
<td></td>
<td></td>
<td>Anaphylactoid Reaction / Anaphylaxis</td>
</tr>
<tr>
<td>Refer to slide 20</td>
<td></td>
<td></td>
<td>Bacterial Contamination (BaCon) or Bacterial Sepsis</td>
</tr>
<tr>
<td>Refer to slide 20</td>
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<td>Acute Hemolytic Transfusion Reaction</td>
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</tbody>
</table>
Patient Case # 4

50 year old female, Stage I revision knee replacement
POD # 1 Hb  58 g/L
Multiple Comorbidities (Mitral Valve Replacement, Hypertension, Transient Ischemic Attack)
Group and Screen: A positive, anti-FyA, anti-K, anti-e, anti-M
Order: Transfuse 1 unit PRBC over 2 hours
No Compatible PRBC available, Physician signed for “least incompatible” PRBC

Three hours after transfusion, patient tells her nurse “my urine was red just now and I feel very nauseated”

Pre-transfusion:
   Temperature 36.9°C, BP 112/66, pulse 58, respiration 16, O₂ saturation 96 %

Currently:
   Temperature 38.7°C, BP 90/50, pulse 88, respiration 24, O₂ saturation 88 %
Recognition, Management and Prevention of Transfusion Reactions and Errors

Objectives

After this session participants will be able to:

• Explain the risks of transfusion and incidence of transfusion reactions
• Define presenting signs and symptoms of transfusion reactions
• Understand the suggested treatment / actions and recommended investigations for transfusion reactions
• Delineate the key nursing actions in the recognition, management and prevention of transfusion reactions and errors
**Key Nursing Actions in the Recognition, Management and Prevention of Transfusion Reactions and Errors**

**Advocate for Patient Safety**

- **Unequivocal Patient Identification**
  Armband worn by patient
  Sample collection (label at bedside)
  Administration of blood (Checks by 2 providers at bedside)

- **Recognize the signs and symptoms of possible TR**

- **Assess patient for TACO risk factors**

- **Be aware of patient’s underlying medical condition and patient’s clinical status prior to transfusion (baseline)**

- **Monitor patient closely during and post transfusion**
Thank you !!!

London Transfusion Medicine Physicians
Dr. Ian Chin-Yee
Dr. Cyrus Hsia
Dr. Ziad Solh

London Transfusion Safety Officers
Kathleen Eckert
Laura Aseltine

Transfusion Safety Officer/Nurse Colleagues
Questions