



Pathology and Laboratory Medicine

**bloody
easy**

Nursing Transfusion Medicine Boot Camp: Lab → Bedside

Recognition, Management and Prevention of Transfusion Reactions and Errors

Donna Berta, RN BScN
Transfusion Safety Officer, LHSC / SJHC
Donna.Berta@lhsc.on.ca 519-685-8500 ext. 55303

Recognition, Management and Prevention of Transfusion Reactions and Errors

- Often complex
- Over lapping, 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

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

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

Risks of Transfusion



Risk of Event	Event
1 in 13	Red cell sensitization, increasing risk of hemolytic transfusion reaction and hemolytic disease of the fetus and newborn ⁷⁰
1 in 20	Febrile non-hemolytic transfusion reaction per pool of platelets ⁷¹
1 in 100	Transfusion-associated circulatory overload per transfusion episode ⁷²
1 in 100	Minor allergic reactions (urticaria)
1 in 300	Febrile non-hemolytic transfusion reaction per unit of RBC (1 'donor exposure')
1 in 7,000	Delayed hemolytic transfusion reaction
1 in 10,000	Transfusion-related acute lung injury (TRALI)
1 in 10,000	Symptomatic bacterial sepsis per pool of platelets
1 in 40,000	ABO-incompatible transfusion per RBC transfusion episode
1 in 40,000	Serious allergic reaction per unit of component
1 in 100,000	Post-transfusion purpura
1 in 200,000	Death from bacterial sepsis per pool of platelets
1 in 250,000	Symptomatic bacterial sepsis per unit of RBC
1 in 500,000	Death from bacterial sepsis per unit of RBC
<1 in 1,000,000	Transmission of West Nile Virus
1 in 4,000,000	Transmission of Chagas disease per unit of component
1 in 7,500,000	Transmission of hepatitis B virus per unit of component
1 in 7,600,000	Transmission of HTLV per unit of component
1 in 13,000,000	Transmission of hepatitis C virus per unit of component
1 in 21,000,000	Transmission of human immunodeficiency virus (HIV) per unit of component



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.

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



Risks of Transfusion

Information to engage in patient dialogue

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)

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

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:
 - the patient's underlying medical condition
 - 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:** $> 1^{\circ}\text{C}$ increase temperature from baseline
AND temperature $> 38^{\circ}\text{C}$
During/or within 4 hours post transfusion
- Urticaria (Hives), Itching or Rash
- Dyspnea or Decreased Oxygen Saturation (SpO_2)
- 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:** $< 39^{\circ}\text{C}$ with other symptoms: **Chills, Rigors**, Flushing, Nausea, Vomiting
or $> 39^{\circ}\text{C}$

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**

Fever: **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)

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)

Fever			
> 1°C increase temperature AND temperature > 38°C; during/or within 4 hours post transfusion			
Signs / Symptoms (distinguishing - bold font)	Suggested Treatment / Actions	Recommended Investigations	Classification / Possible Etiology
<p>< 39°C</p> <p>No other symptoms</p>	<ul style="list-style-type: none"> • Initial Steps 1 to 5 • Antipyretic • With MD order and if product still viable, cautiously resume transfusion with close patient assessment 	<ul style="list-style-type: none"> • No testing required 	<p>Febrile Non-hemolytic Transfusion Reaction (FNHTR)</p>
<p>< 39°C with other symptoms: Chills, Rigors, Flushing, Nausea, Vomiting</p> <p>or > 39°C</p>	<ul style="list-style-type: none"> • Initial Steps 1 to 5 • Do Not Restart Transfusion • Antipyretic • If no patient contraindications and with MD order, Meperidine (Demerol®) for significant rigors 	<ul style="list-style-type: none"> • No testing required 	<p>Febrile Non-hemolytic Transfusion Reaction (FNHTR)</p>
<p>No Fever</p> <p>Symptoms: Chills, Rigors, Flushing, Nausea, Vomiting</p>	<ul style="list-style-type: none"> • Initial Steps 1 to 5 • Do Not Restart Transfusion • If no patient contraindications and with MD order, Meperidine (Demerol®) for significant rigors 	<ul style="list-style-type: none"> • No testing required 	<p>“Atypical” or “Afebrile” Febrile Non-hemolytic Transfusion Reaction (FNHTR)</p>

Signs and Symptoms of a Transfusion Reaction

Fever (2)

Fever

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

Signs / Symptoms (distinguishing - bold font)	Suggested Treatment / Actions	Recommended Investigations	Classification / Possible Etiology
<p>Fever, Chills, Rigors, Flushing, Nausea, Vomiting, Dyspnea, Tachycardia, Hypotension, Shock, Multi-organ Failure, Disseminated Intravascular Coagulation (DIC)</p>	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • 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 	<p>Bacterial Contamination (BaCon) or Bacterial Sepsis</p>
<p>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)</p>	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • 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 	<p>Acute Hemolytic Transfusion Reaction</p>

Signs and Symptoms of a Transfusion Reaction

Fever (3)

Fever

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

Signs / Symptoms
(distinguishing - bold font)

Suggested Treatment / Actions

Recommended Investigations

**Classification /
Possible Etiology**

Refer to slide 35

TRALI (Transfusion
Related Acute Lung
Injury)



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 O₂ 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)

Urticaria (Hives), Itching or Rash during/or within 4 hours post transfusion			
Signs / Symptoms (distinguishing - bold font)	Suggested Treatment / Actions	Recommended Investigations	Classification / Possible Etiology
Less than 2/3 of body No other Symptoms	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • No testing required 	Minor Allergic Transfusion Reaction
2/3 of body or more No other Symptoms	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • No testing required 	Minor Allergic (Extensive) Transfusion Reaction

Signs and Symptoms of a Transfusion Reaction

Urticaria (Hives), Itching or Rash (2)

Urticaria (Hives), Itching or Rash during/or within 4 hours post transfusion			
Signs / Symptoms (distinguishing - bold font)	Suggested Treatment / Actions	Recommended Investigations	Classification / Possible Etiology
<p>Urticaria, Facial edema, Airway edema, Wheezing, Cough, Chest Pain, Dyspnea, Decreased O₂ saturation, Tachycardia, Hypotension, Anxiety, Gastrointestinal Symptoms</p>	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • TM – blood sample for Group and Screen, DAT • Serum IgA, Anti-IgA, Haptoglobin • If dyspnea Chest X-ray, Blood Gases 	<p>Anaphylactoid Reaction / Anaphylaxis</p>



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 $24 \times 10^9/L$

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 $36.9^{\circ}C$, BP 112/66, pulse 58, respiration 16

Currently:

Temperature $36.7^{\circ}C$, 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

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 SpO₂: Acute onset Dyspnea, decreased SpO₂, 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, Vasopressors 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 SpO₂: Mild Dyspnea, Slightly decreased SpO₂, 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)

Dyspnea or Decreased Oxygen Saturation (SpO₂)

less than 90 % during/within 6 hours post transfusion

Signs / Symptoms (distinguishing - bold font)	Suggested Treatment / Actions	Recommended Investigations	Classification / Possible Etiology
<p>Dyspnea, decreased SpO₂, orthopnea, cyanosis, increased venous pressure, tachycardia, hypertension, positive fluid balance</p> <p>Chest X-ray: pulmonary edema</p>	<ul style="list-style-type: none"> • 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 <p>Lasix PO: onset 30-60 minutes, maximal effect 1-2 hours, effect persists 6-8 hours</p> <p>Lasix IV: onset 5 minutes, maximal effect 20-60 minutes, effect persists about 2 hours</p>	<ul style="list-style-type: none"> • Chest X-ray 	<p>TACO (Transfusion Associated Circulatory Overload)</p> <p>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</p>

Signs and Symptoms of a Transfusion Reaction

Dyspnea or Decreased Oxygen Saturation (SpO₂) (2)

Dyspnea or Decreased Oxygen Saturation (SpO₂)

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

Signs / Symptoms (distinguishing - bold font)	Suggested Treatment / Actions	Recommended Investigations	Classification / Possible Etiology
<p>Acute onset Dyspnea, decreased SpO₂, fever, hypotension; Chest x-ray: bilateral interstitial/ alveolar infiltrates without elevated pulmonary pressures</p>	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • Chest X-ray • Blood Gases • CBS patient follow up testing – contact TM to order required samples 	<p>TRALI (Transfusion Related Acute Lung Injury)</p> <p>CBS Prevention Strategies:</p> <ul style="list-style-type: none"> • 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) (3)

Dyspnea or Decreased Oxygen Saturation (SpO₂)

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

Signs / Symptoms (distinguishing - bold font)	Suggested Treatment / Actions	Recommended Investigations	Classification / Possible Etiology
<p>Mild Dyspnea, Slightly decreased SpO₂, Slightly increased respiratory rate Chest x-ray: normal / unchanged No pulmonary edema No bilateral infiltrates</p>	<ul style="list-style-type: none"> • Initial Steps 1 to 5 • Do Not Restart Transfusion • Oxygen, Respiratory support as clinically indicated 	<ul style="list-style-type: none"> • Chest X-ray 	<p>TAD (Transfusion Associated Dyspnea)</p> <p>Mild symptoms that do not meet the criteria for TACO or TRALI</p>
	Refer to slide 28		Anaphylactoid Reaction / Anaphylaxis
	Refer to slide 20		Bacterial Contamination (BaCon) or Bacterial Sepsis
	Refer to slide 20		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 2nd unit of PRBC patient complains of SOB

Temperature 36.8 C, BP 168/88, pulse 102, respiration 28,

O₂ 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

Signs / Symptoms (distinguishing - bold font)	Suggested Treatment / Actions	Recommended Investigations	Classification / Possible Etiology
<p>Hypotension, may be associated with dyspnea, urticaria, nausea, vomiting</p>	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • No testing 	<p>Bradykinin Mediated Hypotension, more common with platelet transfusion</p> <p>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</p>

Signs and Symptoms of a Transfusion Reaction

Hypotension (2)

Hypotension

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

Signs / Symptoms (distinguishing - bold font)	Suggested Treatment / Actions	Recommended Investigations	Classification / Possible Etiology
	Refer to slide 35		TRALI (Transfusion Related Acute Lung Injury)
	Refer to slide 28		Anaphylactoid Reaction / Anaphylaxis
	Refer to slide 20		Bacterial Contamination (BaCon) or Bacterial Sepsis
	Refer to slide 20		Acute Hemolytic Transfusion Reaction



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

