What You Need to Know About Blood Transfusion

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Objectives

• Why your doctor might order transfusion therapy
• Where does the blood come from
• The beginning of your transfusion
  – Consent
• The middle of your transfusion
  – Blood testing
• The end of your transfusion
  – Infusion
PLASMA - 55% of Total Blood Volume

CELLULAR COMPONENTS - 40% of Total Blood Volume

"Buffy" Coat

White Blood Cells (leukocytes), part of the immune system (7,000 - 9,000 per cubic millimeter of blood)

Platelets

Blood clotting (250,000 per cubic millimeter of blood)

Red Blood Cells (RBCs)

Carry oxygen and carbon dioxide (about 5,000,000 per cubic millimeter of blood)
Red Blood Cell Transfusion

• Red blood cells carry oxygen from the lungs to other parts of the body
• They contain hemoglobin
  – This is what is measured and followed
• Anemia= When hemoglobin is low
• If you have anemia you may feel:
  – Fatigued
  – Short of breath
  – Chest pain
Red Blood Cell Transfusion-2

• Reasons you might have anemia
  – Congenital conditions
    • Ex Sickle cell disease, thalassemia
  – Blood loss
    • Ex Accidents, surgery
  – Bone marrow diseases
  – Chemotherapy

• Red blood cell transfusion is used to help relieve symptoms of anemia
Platelet Transfusion

• Platelets are tiny cells that help blood coagulate at sites of injury
• Thrombocytopenia = when platelet count is low
• If you have thrombocytopenia you might experience:
  – Bruising
  – Easy bleeding
Platelet Transfusion- 2

• Reasons you might have thrombocytopenia
  – Congenital conditions (rare)
  – Immune destruction
    • Ex ITP
  – Bone marrow diseases
  – Chemotherapy

• Platelet transfusions are given to prevent bleeding or to help stop bleeding in patients with thrombocytopenia

• Platelet transfusion may not be the therapy of choice in the case of immune destruction
Plasma Transfusion

• Plasma is the liquid portion of the blood that contains blood proteins

• Role for plasma transfusion less clear and should be determined on a case by case basis
Other Blood Products
Where Does the Blood Come From?

Canadian Blood Services
it's in you to give
Blood Donor Selection

• Donor screening procedures exclude people who are at risk of diseases transmissible by blood.
  – Criteria used by CBS to determine donor eligibility are based on scientific knowledge of risk factors
  – The screening process is lengthy and may seem intrusive, but is considered absolutely necessary to safeguard the blood supply

• Criteria for selection also protect donors
  – Example: Persons with serious heart disease are not eligible to donate
Donation Testing and Processing

- Donors can donate either whole blood or only platelets
- Whole blood is separated into red cells, platelets and plasma portions
- All donor units are tested for blood groups as well as for infectious diseases
The Beginning

• Your transfusion starts with a discussion with your health care provider
  – Benefits: Why you may need transfusion therapy
  – Risks: Some statement about the risks related to your transfusion
  – Alternatives: Options other than transfusion to treat your condition. These may not always exist

• Consent signing
A Note About Risk

• Some adverse outcomes of transfusion are uncomfortable or irritating but not serious
  – Mild allergic reactions
  – Mild fever

• Some adverse outcomes of transfusion are immediately life threatening
  – Serious allergic reactions and others

• Some adverse outcomes of transfusion may not be detected until weeks, months or years later
  – Antibody development
  – Iron overload
<table>
<thead>
<tr>
<th>Risk of Event</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 in 100</td>
<td>Hives (itchy skin rash)</td>
</tr>
<tr>
<td>1 in 300</td>
<td>Fever</td>
</tr>
<tr>
<td>1 in 700</td>
<td>Heart failure</td>
</tr>
<tr>
<td>1 in 5,000</td>
<td>Lung injury</td>
</tr>
<tr>
<td>1 in 7,000</td>
<td>Delayed hemolysis. Hemolysis is when your red blood cells are destroyed.</td>
</tr>
<tr>
<td>1 in 10,000</td>
<td>Symptomatic bacterial sepsis, per pool of platelets that you receive. Sepsis is when you get an infection in your bloodstream or tissue.</td>
</tr>
<tr>
<td>1 in 40,000</td>
<td>Death from bacterial sepsis, per pool of platelets that you receive.</td>
</tr>
<tr>
<td>1 in 40,000</td>
<td>Wrong ABO (blood) group, per unit of red blood cells that you receive.</td>
</tr>
<tr>
<td>1 in 40,000</td>
<td>Anaphylaxis, which is an extreme sensitivity to a drug or substance that can result in death.</td>
</tr>
<tr>
<td>1 in 82,000</td>
<td>Hepatitis B (HBV) transmission per unit of component. Hepatitis is an inflammation of the liver. Hepatitis B is caused by a virus and spread through contact with infected blood, blood products, and body fluids.</td>
</tr>
<tr>
<td>1 in 100,000</td>
<td>Symptomatic bacterial sepsis, per unit of red blood cells that you receive.</td>
</tr>
<tr>
<td>1 in 500,000</td>
<td>Death from bacterial sepsis, per unit of red blood cells that you receive.</td>
</tr>
<tr>
<td>&lt; 1 in 1,000,000</td>
<td>Transmission of West Nile Virus</td>
</tr>
<tr>
<td>1 in 3,000,000</td>
<td>Human T-cell lymphotropic virus (HTLV) transmission, per unit of component. HTLV is a virus that can be transmitted by exposure to blood or sexual contact, and can cause a form of cancer of the blood.</td>
</tr>
<tr>
<td>1 in 3,100,000</td>
<td>Hepatitis C (HCV) transmission, per unit of component. Hepatitis is an inflammation of the liver. Hepatitis C is caused by a virus and spread through injection drug use, tattooing, and body piercing.</td>
</tr>
<tr>
<td>1 in 4,700,000</td>
<td>Human Immunodeficiency Virus (HIV) transmission, per unit of component. HIV is the virus that causes AIDS. HIV attacks the immune system.</td>
</tr>
</tbody>
</table>

**Frequency of Non-Transfusion Associated Risks for Comparison with Risks of Complications of Blood Transfusion**

<table>
<thead>
<tr>
<th>Hazard</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 in $10^{29}$</td>
<td>Dying from lung cancer after smoking 1 pack a day for 30 years</td>
</tr>
<tr>
<td>1 in $60^{30}$</td>
<td>Stroke within 30 days of cardiac surgery</td>
</tr>
<tr>
<td>1 in $100^{31}$</td>
<td>Death associated with hip replacement surgery</td>
</tr>
<tr>
<td>1 in $10,000^{32}$</td>
<td>Annual risk of death in a motor vehicle crash</td>
</tr>
<tr>
<td>1 in $60,000^{32}$</td>
<td>Annual risk of being murdered in Canada</td>
</tr>
<tr>
<td>1 in $200,000^{33}$</td>
<td>Death from anesthesia in fit patients</td>
</tr>
<tr>
<td>1 in $300,000^{34}$</td>
<td>Death from oral contraceptives age &lt; 20 yrs</td>
</tr>
<tr>
<td>1 in $1,000,000^{32}$</td>
<td>Annual risk of death from accidental electrocution in Canada</td>
</tr>
<tr>
<td>1 in $5,000,000^{32}$</td>
<td>Annual risk of death from being struck by lightning in Canada</td>
</tr>
</tbody>
</table>
The Beginning of the Middle
• What the lab does
  – Test your blood:
    • Determine your ABO and Rh(D) blood group
    • Check if you have antibodies against red cells from previous pregnancy or transfusion
  – Find the right blood for you:
    • Find a blood product that is the right blood group for you
    • Find a blood product that has additional features you might need
      – Example Irradiated blood
End of the Middle

• The blood product selected by the lab for you is picked up and brought to the area in which you are having transfusion therapy.
Beginning of the Last Step
What to Expect Next

• Vitals signs will be checked after 15 minutes and at regular intervals thereafter
• Transfusion usually well tolerated but…. 
Tell your nurse or doctor if...

- Allergic symptoms
  - Hives
  - Itching
  - Mouth/airway symptoms
  - Nausea
- Fever
- Pain
- Shortness of breath
- Anything that feels wrong
What might happen

• At the moment
  – Mild symptoms
    • Medication and restarting of transfusion
  – Others
    • Discontinuation of transfusion
    • Other treatments

• Later
  – Special pre-treatments of patients or products
  – Might take longer to prepare blood product
  – Might take longer to give the transfusion
Thanks!