Safeguarding Valuable Resources through Partnership, Technology, and Education

Session # C707, 8:00AM – 9:00AM
Friday, October 10, 2014

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<table>
<thead>
<tr>
<th>Category</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beds</td>
<td>551</td>
</tr>
<tr>
<td>Total Admissions</td>
<td>27,721</td>
</tr>
<tr>
<td>Total Outpatient Visits</td>
<td>911,097</td>
</tr>
<tr>
<td>ED Visits</td>
<td>67,128</td>
</tr>
<tr>
<td>Births</td>
<td>1,700</td>
</tr>
</tbody>
</table>
**Penn State Hershey Medical Center: Our People**

<table>
<thead>
<tr>
<th>Total RNs:</th>
<th>2,256</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Physicians/APN:</td>
<td>900</td>
</tr>
<tr>
<td>Residents and Fellows:</td>
<td>565</td>
</tr>
<tr>
<td>Total Staff:</td>
<td>9,000+</td>
</tr>
</tbody>
</table>
Learning Objectives

- Share best practice in blood product administration that improve patient outcomes, reduce labor costs, and safeguard valuable resources.
- Discuss the implications of real-time clinical decision improvement in blood product administration that has impact globally, nationally, and locally.
Blood Product Statistics

Supply
- Every two seconds someone in the U.S. needs blood.
- More than 41,000 blood donations are needed every day.
- Over 30 million blood components are transfused each year in the U.S.

Demand
- Blood donations collected in the U.S. in a year: 15.7 million
- Blood donors in the U.S. in a year: 9.2 million
- An estimated 38% of U.S. population is eligible to donate, less than 10% actually do each year.
Blood Product Components

<table>
<thead>
<tr>
<th>Whole Blood</th>
<th>Red Blood Cells</th>
<th>Platelets</th>
<th>Plasma</th>
<th>Cryoprecipitated AHF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Color</td>
<td>Red</td>
<td>Colorless</td>
<td>Yellowish</td>
<td>White</td>
</tr>
</tbody>
</table>

**BLOOD COMPONENT SHELF LIFE**

- 21-35 Days*
- Up to 42 Days*
- 5 Days
- 1 Year
- 1 Year

**STORAGE CONDITIONS**

- Refrigerated
- Refrigerated
- Room temperature with constant agitation to prevent clumping
- Frozen
- Frozen

**KEY USES OF THIS BLOOD TYPE**

- Trauma
- Surgery
- Trauma
- Surgery
- Anemia
- Any blood loss
- Blood disorders, such as sickle cell
- Cancer treatments
- Organ transplants
- Surgery
- Burn patients
- Shock
- Bleeding disorders
- Hemophilia
- Von Willebrand disease (most common hereditary coagulation abnormality)
- Rich source of Fibrinogen

* Shelf life of whole blood and red cells varies based on the type anticoagulant used.
Your chances are greater for being:
- Murdered;
- Involved in a fatal auto accident;
- Involved in a fatal unexpected drug reaction in the hospital;

Than suffering an infection with a blood product transfusion.

Blood Product Risk

- Human Error
  - Risk 1:180

- Fever
  - Risk 1:100 transfusions

- Bacterial Infections
  - Risk 1:500,000 red cells
  - Risk 1:12,000 platelets
Blood Product Risk

- **Hemolytic Transfusion Reactions**
  - Risk 1:25,000 transfusions

- **TRALI (Transfusion Associated Acute Lung Injury)**
  - Risk is about 8:100,000 transfusions
Nursing Role

- Nurses are at the center of patient care and therefore are essential drivers of quality improvement.
- Nurses are most likely to intercept errors and prevent harm to patients.
- Nurses value teamwork and collaboration as essential to the care of the patient.
- Nurses are focused on evidence based practice for clinical decision making.
Quality Improvement Committee

- Review and evaluate appropriateness of blood and blood product utilization, encouraging cost-effective use of resources.
- Perform regular audits of transfusion practice.
- Review and evaluate ordering practices for blood and blood products.
- Evaluate all confirmed transfusion complications and reactions.
Collaboration and Teamwork: Blood Usage Committee

- Review the adequacy of transfusion services to meet the needs of patients.
- Approve policies and procedures relating to distribution, handling, use and administration of blood products.
- Maintain written reports of monitoring activities performed and actions taken.
Founded to leverage the EMR to improve care and advance discovery.

- Make patient care data more accessible for secondary use.
- Execute projects that enhance care quality and increase efficiency.
- Share what we learn with others.
Shared Governance Structure: Interprofessional Collaboration

- Nursing Professional Practice Council
  - Ensures safe, high quality delivery of nursing care.
  - Identifies and resolves practice issues
  - Provides evidence-based standards, policies & procedures
  - Oversees nursing clinical quality and safety
  - Promotes clinical regulatory and accreditation compliance

- Nursing Education and Professional Development Council
  - Ensures competent staff and a continuous learning environment to increase the level of staff expertise and knowledge through review and evaluation.
  - Promotes continuing education
  - Oversees competency evaluations
Current Practice: Packed Red Blood Cells (PRBCs)

- 18% were given when the most recent Hgb was \( \geq 10\text{g/dL} \)
- 20% were given when the most recent Hgb was \( >9\text{g/dL} \) and \( <10\text{g/dL} \)
- 31% were given when the most recent Hgb was \( >8\text{g/dL} \) and \( <9\text{g/dL} \)
- 23% were given when the most recent Hgb \( >7\text{g/dL} \) and \( <8\text{g/dL} \)
- 9% were given when the most recent Hgb was less than \( <7\text{g/dL} \)
Current Practice: Packed Red Blood Cells (PRBCs)

- 40% given when the most recent Plt count was $\geq 100\text{K/ul}$
- 16% given when the most recent Plt count was $\geq 50\text{K/ul}$ and $< 100\text{K/ul}$
- 20% given when the most recent Plt count was $\geq 20\text{K/ul}$ and $< 50\text{K/ul}$
- 12% given when the most recent Plt count was $\geq 20\text{K/ul}$ and $< 10\text{K/ul}$
- 12% given when the most recent Plt count was $< 10\text{K/ul}$
Current Practice Opportunity

PRBCs
- 68% of red cells were ordered when most recent Hgb ≥8 g/dL
- 18% of red cells were ordered when most recent Hgb ≥10 g/dL

Plts
- 40% of platelets were ordered when most recent Plt ≥ 100 K/ul
- 27% of platelets were ordered when most recent Plt ≥ 150 K/ul
Evidence Based Guidelines: American Association of Blood Banks (AABB)

- **Recommendation 1**
  Adhere to a restrictive transfusion strategy (7 to 8 g/dL) in hospitalized, stable patients (Grade: strong recommendation; high-quality evidence).

- **Recommendation 2**
  Adhere to a restrictive strategy in hospitalized patients with preexisting cardiovascular disease and consider transfusion with symptoms or hgb level of ≤8 g/dL (Grade: weak recommendation; moderate-quality evidence).
Evidence Based Guidelines: American Association of Blood Banks (AABB)

**Recommendation 3**

Cannot recommend for or against a liberal or restrictive transfusion threshold for hospitalized, hemodynamically stable patients with **acute coronary syndrome** (Grade: uncertain recommendation; very low-quality evidence).

**Recommendation 4**

Suggests that transfusion decisions be influenced by symptoms as well as hgb concentration (Grade: weak recommendation; low-quality evidence).
Quality Improvement: Education

- Encourage bottom-up approach rather than top-down edict.
- Promote physician buy in via involvement and collaboration.
- Use a multidisciplinary approach.
- Develop guidelines and educational “road show” and training module.
Transfusion Therapy Modules

**Evidence-Based Transfusion Therapy**
Online Class | PSH Online
July 2013

**Massive Transfusion Protocol & Large Blood Volume Protocol**
Online Class | PSH Online
eLearning to review to protocols: Massive Transfusion Protocol & Large Blood Volume Protocol Objectives: To differentiate between the Massive Transfusion Protocol (MTP) and Large Blood Volume Protocol (LBVP). To list the steps to activate & deactivate the protocols.

**BloodTrack Transfusion Management System**
Online Class | PSH Online
A review of the BloodTrack® Transfusion Management System for emergency blood transfusions. Objectives: Locate the BloodTrack® Transfusion Management System in the ED. Demonstrate proper steps to take blood products out of the machine. Demonstrate proper steps to put blood products in to the machine. Discuss alerts that may be seen an...

**Blood Product Therapy**
Curriculum | PSH Online
Summary of HMC guidelines

Surgical Patients
- Post-op following surgical blood loss or when symptoms are present, consider transfusing to restore Hgb = 10 g/dL or Hct = 30%

Non-surgical Patients
- Transfuse when Hgb falls below 8 g/dL or Hct falls below 25% except for:
  - Patients with extensive blood loss
  - Symptomatic cardiac patients (use Hgb < 10 or Hct < 30%)
  - Exchange transfusion patients (e.g. Sickle cell patients)
  - Patients with autologous transfusions (use Hgb < 10 or Hct < 30%)
Case 1

Assuming that all pertinent clinical information is listed below...

A 55 year old male, hemodynamically stable, with line placement tomorrow.

Hgb = 8.7 g/dL

Transfuse pRBC?

- Yes
- No
**Electronic Order Entry: PRBC Transfusion**

<table>
<thead>
<tr>
<th>Component</th>
</tr>
</thead>
<tbody>
<tr>
<td>One unit of pRBCs is expected to increase Hgb by approximately 1 g/dL or Hct by 3%</td>
</tr>
<tr>
<td>Evidence does not support transfusion in patients:</td>
</tr>
<tr>
<td>... with Hgb greater than 8.0 g/dL; or</td>
</tr>
<tr>
<td>... with Hgb greater than 10.0 g/dL in patients with acute coronary syndrome.</td>
</tr>
</tbody>
</table>

Ordering Red Cells for transfusion is a 3 STEP PROCESS

**STEP 1:** Does your patient have a CURRENT Type and Screen?
- [ ] NO -> Order the Type and Screen.
- [ ] Blood Type/Antibody Screen (Type and Screen (for possible tx))
- [ ] Blood Type and Screen, Neonatal (Type and Screen, Neonatal)

**STEP 2:** Have you already sent the request to the blood bank to crossmatch the units?
- [ ] NO -> Order the Crossmatch Red Cells.

**STEP 3:** Identify when the units are to be transfused.
- [ ] Transfuse Red Cells.

**NOTE:** All components are leukoreduced. Any special requests will require a Pathology Consult.
Electronic Order Entry: PRBC Transfusion

**CLINICAL PICTURE**

- ABO/Rh: 0 POSITIVE
- Antibody Scr: NEGATIVE
- Expires at 0600AM on: 12/28/2012
- Hgb: 9.9, 9.3

**DECISION**

- Product: Red Cells
- *Specify units or mls:*
- *Start date/time: 12/11/2012 17:26
- *Indication:
  - Hgb < 10.0 g/dL (Coronary Syndrome)
  - Hgb < 8.0 g/dL (hemodynamically stable)
  - Acute, ACTIVE bleeding
  - Heme/Onc patient with standing order
  - Other - describe in Special Instructions
Transfusion Practices Trending in Right Direction

Patient population

- Inpatients, at least 18 years old
- Excluding all massive transfusions

Hgb targets used as markers for compliance

- ≤ 8 g/dL for non-surgical patients
- ≤ 10 g/dL for surgical patients in the first 24 hours post-op

<table>
<thead>
<tr>
<th>Timing relative to EMR intervention</th>
<th>RBC Transfusions per Admission</th>
<th>% Transfusions falling within Hgb targets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year immediately prior to intervention</td>
<td>0.59</td>
<td>55 %</td>
</tr>
<tr>
<td>Year immediately following intervention</td>
<td>0.53</td>
<td>64 %</td>
</tr>
</tbody>
</table>
For the first year following the EMR intervention, was the stated Indication for transfusion consistent with the available lab values?

- Units transfused = 18,997
- Units with transfusion indication = 10,607

<table>
<thead>
<tr>
<th>Indication for RBC Transfusion</th>
<th>Agreed</th>
<th>Disagreed</th>
<th>No Hgb within 24 hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hgb &lt; 8.0 g/dL (hemodynamically stable) n=4,791</td>
<td>90%</td>
<td>9%</td>
<td>1% (n=78)</td>
</tr>
<tr>
<td>Hgb &lt; 10.0 g/dL (Coronary Syndrome and post CT surgery) n=1,414</td>
<td>80%</td>
<td>19%</td>
<td>&lt; 1% (n=8)</td>
</tr>
</tbody>
</table>
Impact: Locally

- 9% decrease in PRBC transfusion
- $350,000 decrease in product acquisition costs
- $260,000 decrease in transfusion administration labor costs
Impact: Nationally

National Blood Supply

76 COMMUNITY BLOOD CENTERS ACROSS NORTH AMERICA

NUMBER OF CENTERS BY SUPPLY LEVEL

- **5** community blood centers have a 1-day supply or less. Please donate now!
- **19**
- **30**

NATIONAL SUPPLY LEVEL PERCENTAGES

- **0-1 DAY**
- **1-2 DAYS**
- **3+ DAYS**
- **N/A**

Centers with a blood supply of 3 or more days have enough blood to meet normal operating demands. Those with only a 2-day supply are running low and need blood donations. Centers with a day or less of blood are critically low on blood and need donations as soon as possible. "N/A" indicates centers that haven't yet reported a blood supply level.

Foundation for American Blood Centers as of August 18, 2014
Impact: Globally

Whole blood donations per 1000 population, 2008*

*Data since 2006 from 17 countries are used

The boundaries and names shown and the designations used on this map do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted lines on maps represent approximate border lines for which there may not yet be full agreement.

Data Source: World Health Organization
Map Production: Blood Transfusion Safety (BTS)
World Health Organization
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