Assessing Preoperative Patients

ORBcoN Spring Symposium April 2015
Faculty: Gail Murray

Relationships with commercial interests:
- Former Member of the Advisory Board 2012 with Takeda Canada for Feraheme
Potential for conflict(s) of interest:

Gail Murray has received funding from Takeda Canada to attend a conference in California supporting this program whose former product(s) are being discussed in this program.
I no longer am on the Advisory Board, since 2012
Only 1 slide states the dose of IV iron products and both IV iron products available to us are listed, Venofer and feraheme.
Two case studies are listed one uses Feraheme and one uses Venofer
Goals

❖ Determine acceptable strategies used to predict patient transfusion needs prior to surgical procedures
❖ Learn about Anemia screening
❖ Accurately inform patients of the benefits of pre-operative Patient Blood Management
❖ Strategies used to treat anemia in the pre-op patient
❖ Talk about the risks, benefits and possible alternatives to Blood/Blood products
❖ ONTraC – Patient Blood Management Program
Peterborough Regional Health Centre

Gail Murray Reg. N with ONTraC
Patient Blood Management
PRHC

- 494 bed Regional Hospital
- Built 11 years ago
- 90 minutes north east of Toronto
- Region’s largest employer – more than 2,000 staff
- Referral population of 600,000
- 350 physicians

ONTraC

- Patient Blood Management
- 2002
- Krever’s Commission Report 1997
- Dr. John Freedman
- 27 coordinators at 25 hospitals in Ontario
- St. Michael’s Hospital
- Funded by the Ministry of Health and Long Term Care
PBM — proactive application of 4 guiding principles

- Optimizing Coagulation
- Interdisciplinary Blood Conservation Modalities
- Patient-Centered Decision Making
- Managing Anemia

Improved Patient Outcomes
42 year old female

Pre-op clinic  Dec 9, 2014

Below Knee Amputation – Jan 7, 2015

Hx -Smoking and COPD
- Hypertension
- Anxiety Problems
- GI Reflux
- Chronic Anemia x 4 years
- Thrombus and Embolization both feet Dec. 2014, unsuccessful in one foot with resulting chronic pain from spasm of distal digital vessels

Previous transfusion Dec. 2014 for HGB 75

Hematology consult with no diagnosis arrived at

Pre-op Clinic Hgb – 76
MCV – 71
Ferritin - 5
1 Month till surgery ?? How would you handle this patient

A. Transfuse 2 units RBC’s pre--Operatively
B. Erythropoietin supported by iron replacement therapy
C. Intravenous iron only
D. Cancel surgery till HGb. optimized
Let's just see if our numbers change after my presentation.
**Definition**

- WHO – clinical anemia
  - Men < 130 g/dl
  - Non-Preg Women < 120g/dl
  - Pregnant Women < 110g/dl
- Prevalence – as high as 40% - 60 % in pre-op
- Anemia increases cost of health care delivery - 50%

**Causes**

- Reduced Production
- Increased destruction
- Combination
- Anemia is the single most important factor for predicting Transfusion
Overused Treatments

- The National Summit on Overuse on July 8, 2013 identified 5 overused treatments that can harm patient safety and quality.
  - Antibiotic use for the common cold
  - **Blood transfusions**
  - Ear tubes for children
  - Early scheduled births
  - Heart vessel stents

- One of the top 5 fastest growing procedures in hospitalized patients

- The goal of the summit were to reduce risks to patients, improve care and discourage waste of patient and hospital resources.

**ASH Choosing Wisely® Campaign** recommends avoiding liberal RBC transfusion
**AABB Choosing Wisely**: Don’t transfuse more units of blood than absolutely necessary
Five Things Physicians and Patients Should Question

1. Don’t transfuse blood if other non-transfusion therapies or observation would be just as effective.

Blood transfusion should not be given if other safer non-transfusion alternatives are available. For example, patients with iron deficiency without hemodynamic instability should be given iron therapy.

2. Don’t transfuse more than one Red cell unit at a time when transfusion is required in stable, non-bleeding patients.

Indications for red blood transfusion depend on clinical assessment and the cause of the anemia. In a stable, non-bleeding patient, often a single unit of blood is adequate to relieve patient symptoms or to raise the hemoglobin to an acceptable level. Transfusions are associated with increased morbidity and mortality in high-risk hospitalized inpatients. Transfusion decisions should be influenced by symptoms and hemoglobin concentration. Single unit red cell transfusions should be the standard for non-bleeding, hospitalized patients. Additional units should only be prescribed after re-assessment of the patient and their hemoglobin value.
1. HGB <135 g/l
2. Weight <77 kgs.
3. Female Sex
4. Age >65 years
5. Non-elective surgery
6. Serum Creat. >120
7. Previous cardiac Surgery
8. Non-isolated surgery

TRUST SCALE

Transfusion Risk Understanding Scoring Tool

1 - low risk
2 - intermediate risk
3 - high risk
4 - 8 - very high risk
Hgb. is the single most important factor to predicting Transfusion

- TRUST scale
- Pre-op HG of 100g/dl

**TRUST Scale**

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has a **SEVEN**-fold higher likelihood of transfusion the HGB 130g/dL.
Improving Patient Outcomes – evidence is unequivocal that patient outcomes are better when transfusions can be avoided. Paradigm shift from Blood Transfusion as a Benefit to Blood Transfusion as a Risk.

- Lower infection rates
- Lower mortality
- Lower morbidity
- Shorter length of stay
- Decreased ventilated and ICU time
- Conserving a limited resource
- Lowering costs
- Patient Preference - Tailor made plan of treatment
BC measures to avoid transfusion

- Oral iron – heme iron preparations, proferrin 11mgs. 1 – 3 per day
- Intravenous Iron – Venofer 300 mgs iv x 3 doses weekly or
- Feraheme 510 mgs. X 2 doses iv 2 – 8 days apart
- Increase Dietary intake of Iron rich foods
- Erythropoietin
- Vitamin C, D, Folic Acid and B12
- Delay surgery till HGB optimized
- Autologous donation
- Cell Saver
- Tranexamic Acid – antifibrinolytic - 20mg/kg in a 50 ml mini bag IV.
- Meticulous Surgical Technique
- Topical hemostatics,
- Controlled hypotension
- Regional anaesthetic – 30 % reduction in intraoperative blood loss
- Hemodilution
- Cooperation and collaboration between our colleagues
Effectiveness of BC Measures to Reduce Blood Loss

- Cell Salvage: 41%
- Epo and /Or Iron: 27%
- ANH: 28%
- Antifibrinolytics: 23%
- Controlled Hypertension: 24%
- Regional Anaesthetic: 30%
### Effect of having a long lead time to optimize preoperative treatment of anemia (2013)

<table>
<thead>
<tr>
<th>Lead Time</th>
<th>1 Knee</th>
<th>1 Hip</th>
<th>CABG</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 7 days</td>
<td>5.3 %</td>
<td>11.5 %</td>
<td>22.8%</td>
</tr>
<tr>
<td>7-14 days</td>
<td>4.1 %</td>
<td>10.2 %</td>
<td>21.9%</td>
</tr>
<tr>
<td>15-21 days</td>
<td>2.5 %</td>
<td>9.6 %</td>
<td>24.7%</td>
</tr>
<tr>
<td>&gt; 21 days</td>
<td>2.4 %</td>
<td>4.8 %</td>
<td>19.7%</td>
</tr>
</tbody>
</table>

**P (ANOVA)**
- <0.0001
- <0.001

### Lead Time prior to surgery:
- CABG pts had short lead times: only 27% had lead time > 14 days
- 1 Knee pts: 53% had lead time > 14 days; 1 Hip: 51%
### Transfusion Risks

<table>
<thead>
<tr>
<th>Risk of Event</th>
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</tr>
</thead>
<tbody>
<tr>
<td>1 in 100</td>
<td>Minor Allergic Reaction (Hives)</td>
<td>1 in 500,000</td>
<td>Death from bacterial sepsis, per unit of red blood cells</td>
</tr>
<tr>
<td>1 in 300</td>
<td>Fever (Non Hemolytic Transfusion Reaction)</td>
<td>Less than 1 in 1,000,000</td>
<td>Transmission of West Nile Virus</td>
</tr>
<tr>
<td>1 in 100 - 700</td>
<td>Transfusion Associated Circulatory Overload (TACO)</td>
<td>1 in 1,700,000</td>
<td>Hepatitis B (HBV) transmission per unit of component.</td>
</tr>
<tr>
<td>1 in 10,000</td>
<td>Bacterial sepsis, per pool of platelets</td>
<td>1 in 4,300,000</td>
<td>Human T-cell lymphotropic virus (HTLV) transmission, per unit of component</td>
</tr>
<tr>
<td>1 in 12,000</td>
<td>Transfusion Related Acute Lung Injury (TRALI) Bacterial Sepsis (Platelets)</td>
<td>1 in 6,700,000</td>
<td>Hepatitis C Virus (HCV) transmission, per unit of component,</td>
</tr>
<tr>
<td>1 in 40,000 – 60,000</td>
<td>ABO Incompatibility, Anaphylaxis, Death from Bacterial Sepsis (Platelets)</td>
<td>1 in 8,000,000</td>
<td>Human Immunodeficiency Virus (HIV) transmission, per unit of component,</td>
</tr>
<tr>
<td>1 in 250,000</td>
<td>Bacterial sepsis (red blood cells)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Repeat case study

- 42 year old female
- Pre-op Clinic December 9, 2014
- Below Knee Amputation Jan. 7, 2015
- Hx – smoking
- Hypertension
- Anxiety Problems
- GI Reflux
- Chronic Anemia – 4 years
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  MCV -71
1 month till Surgery ?? How would you handle this patient

A. Transfuse 2 units RBC’s pre-operatively
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C. Intravenous iron and monitor Hgb.
D. Cancel surgery till HGB. optimized
C. Intravenous Iron and Monitor Hgb.
What we did??

- Venofer 300 mgs. X 3 doses 5 – 7 days apart
- No Eprex because of her contraindications
- Hgb. came up nicely with each iron infusion from 76 to 99 and 105g/L
- Surgery done January 7, 2015, Hgb. 115g/g/L
- Post op Hgb. 101g/L
- Discharged to Rehab Jan. 14, 2015 with instructions to follow up with Family Dr. when discharged
Change in Autologous Donations

- 2002 – 10 – 15%
- 2014 < 1%

Why the change

- Allogeneic transfusions were also required
- Infection rate > age of blood
- Not Cost Effective
- Risk of Clerical error >
- Feasibility for patient – logistics – CBS-
- Time frame and restrictions to donate
Iatrogenic Anemia

Hospital Acquired Anemia (HAA)

Anemia that develops during hospitalization in patients who have a normal admission Hgb. level

- Hemodilution
- Blood Loss
- Blood Sampling
- Impaired Erythropoiesis
- Hemolysis
- Malnutrition

FYI

- Very common, wards, ICU, surgical, medical
- Implications on outcomes
- Mean Decrease in Hgb. by 7.9g/l. during Hosp. stay
- 40% of ICU pts. become anemic while in hospital
  90 % by 3rd day in ICU.
- Very significant for Patient outcomes
### Non pharmacological
- Reduce blood draws and use 2 ml. Pedi tubes or microtainers
- Reduce unnecessary procedures
- Optimize nutrition
- Stop any active bleeds
- Easier to prevent or reduce rather than treat

### Pharmacological
- IV or po. iron
- B12 supplementation
- Folate
- Vit. C
- EPO
- Multivitamin
Clicker questions

Good luck
A. Patient Blood Management can improve patient outcomes by helping to avoid transfusion.

B. Hospitals with an established Patient Blood Management Program may have a 50 – 70 % reduction in blood use in orthopedic and heart surgery.

C. Blood transfusion is inherently hazardous and costly and should only be prescribed when there is evidence that patient benefit would outweigh the potential risk.

D. All the above.
D. All of the Above
A. Anemia is associated with increased morbidity, increased LOS and increase in infections. It should never be seen as an independent and innocent bystander.

B. Anemia remains under-recognized, poorly, inappropriately and haphazardly treated, with resultant transfusion overuse.

C. Paradoxically, both anemia and transfusions are independently associated with organ injury and increased morbidity.

D. In situations where dangerously low Hgb. levels need to be quickly raised, RBC transfusion remain the mainstay, life saving management.

E. All of the above.
E. All the above.

Blood Transfusion should be viewed as an Organ Transplant. Just as a timely Organ transplant can be life saving so can appropriate transfusion.

The issue is the balance between the risk of Transfusion and the risk of Anemia.
47 year old female wife and mother of 2 children, wt. 43.4 kgms.  
Kindergarten teacher, working full time  
Menorrhagia x 3 years, IDA diagnosed  
Intolerance to oral iron – referred to OBGYN – for treatment  
Hgb. 60g/L, Booked for TAH, sent to Emerg for transfusion.  
Transfused 4 units on evenings – sent home at 0400 hrs. with no instructions (2145 – 0405 hrs.)  
I was asked the next day to see pt./ I just happened to be in the lounge  
Pt. told me on the phone – can’t get her shoes on to go to school  
-Red rash on her neck
A. Transfusion of 4 units, average rise in Hgb. of 10g/L per unit
B. Transfused on Evening shift when Emerg was a bit quieter.
C. Patient was sent home at 0400 hrs. she wanted to get to work.
D. Chronic anemia was managed with oral iron which had not been tolerated.
E. Contacted ONTraC for consult.
E. – ONTraC – can offer Patient Blood Management Suggestions, arrange and coordinate treatment plan that works for all parties

Talked to Pt. April 29th

Feraheme 510 mgs. X 2 doses, 1 week apart, May 1 and 9th

Vitamin B₁₂ – May 1st.

Hgb. 126g/dl – May 9th, No Eprex

Surgery May 12 – Hgb - 127g/dl

Disch. 2 days post op – Hgb 108g/dl

Cost of Feraheme Tx. - $378.74 (Meds and supplies)

Cost of Blood transfusion - $1400/unit

Risks to Patient -?