Transfusion in Frail Elderly

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Outline of talk

• Frailty
  - definition of frailty
  - impact of frailty

• Anaemia in the elderly
  - epidemiology and causes

• Case study

• Transfusing an elderly person
  - assessment and management guidelines
  - avoidance of complications
The Ageing Population
Frailty
Frailty defined

“A physiological syndrome characterized by decreased reserve and resistance to stressors, resulting from cumulative decline across multiple physiologic systems, and causing vulnerability to adverse outcomes”.

(Fried et al, 2003)
Frailty and accumulation of deficits

[Diagram showing the relationship between reserve, threshold, and age with different systems of decline indicated]
The frailty cycle

Fig 2. The frailty cycle $\text{VO}_2 = \text{volume of oxygen utilisation.}$ Reproduced with permission from The McGraw-Hill Companies.²
Impact of frailty
Kaplan-Meier curves, adjusted for age and sex, for study participants (n) over the medium term (5-6 years), according to their scores on the CSHA Clinical Frailty Scale

Rockwood, K. et al. CMAJ 2005;173:489-495

Box 1: The CSHA Clinical Frailty Scale

1 Very fit — robust, active, energetic, well motivated and fit; these people commonly exercise regularly and are in the most fit group for their age
2 Well — without active disease, but less fit than people in category 1
3 Well, with treated comorbid disease — disease symptoms are well controlled compared with those in category 4
4 Apparently vulnerable — although not frankly dependent, these people commonly complain of being “slowed up” or have disease symptoms
5 Mildly frail — with limited dependence on others for instrumental activities of daily living
6 Moderately frail — help is needed with both instrumental and non-instrumental activities of daily living
7 Severely frail — completely dependent on others for the activities of daily living, or terminally ill

Note: CSHA = Canadian Study of Health and Aging.
Impact of frailty on the individual

Fit 79 y.o. who swims and plays bridge

Strong/repeated precipitant needed

79 y.o. with poor mobility and dementia

Minimal precipitant needed
Anaemia in the elderly
Definition of anaemia (WHO)

- Males <130 g/L
- Females <120 g/L
Anaemia and the elderly

• No “lower normal range”

• Anaemia abnormal

• Hb < 130 g/L in males and < 120 g/L in females: associated with an increased relative risk of mortality (1.6 and 2.3 respectively)
Demographics of transfusion

Median age – 73 years
Men 53%
Women 47%
Clinical reason for red cell use

- 7128, 78%
- 1773, 20%
- 189, 2%

- Anaemia
- Blood Loss
- Prophylaxis prior to procedure
- Gastro-intestinal bleeding, liver failure
- Haematology
- Bone marrow failure
- Nephrology
- Other bleeding
- Oncology
- Anaemia under investigation

![Bar chart showing various reasons for red cell use with corresponding numerical data and percentages.](chart.png)
Table 2. Distribution of types of anemia in persons 65 years and older, United States: NHANES III, phase 2, 1991 to 1994

<table>
<thead>
<tr>
<th>Anemia</th>
<th>No. in the United States</th>
<th>Type, %</th>
<th>All anemia, %</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>With nutrient deficiency</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Iron only</td>
<td>467 000</td>
<td>48.3</td>
<td>16.6</td>
</tr>
<tr>
<td>Folate only</td>
<td>181 000</td>
<td>18.8</td>
<td>6.4</td>
</tr>
<tr>
<td>B₁₂ only</td>
<td>166 000</td>
<td>17.2</td>
<td>5.9</td>
</tr>
<tr>
<td>Folate and B₁₂</td>
<td>56 000</td>
<td>5.8</td>
<td>2.0</td>
</tr>
<tr>
<td>Iron with folate or B₁₂ or both</td>
<td>95 000</td>
<td>9.9</td>
<td>3.4</td>
</tr>
<tr>
<td>Total</td>
<td>965 000</td>
<td>100.0</td>
<td>34.3</td>
</tr>
<tr>
<td><strong>Without nutrient deficiencies</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Renal insufficiency only</td>
<td>230 000</td>
<td>12.4</td>
<td>8.2</td>
</tr>
<tr>
<td>ACI, no renal insufficiency</td>
<td>554 000</td>
<td>30.0</td>
<td>19.7</td>
</tr>
<tr>
<td>Renal insufficiency and ACI</td>
<td>120 000</td>
<td>6.5</td>
<td>4.3</td>
</tr>
<tr>
<td><strong>UA</strong></td>
<td>945 000</td>
<td>51.1</td>
<td>33.6</td>
</tr>
<tr>
<td>Total</td>
<td>1 849 000</td>
<td>100.0</td>
<td>65.7</td>
</tr>
<tr>
<td>Total, all anemia</td>
<td>2 814 000</td>
<td>NA</td>
<td>100.0</td>
</tr>
</tbody>
</table>

NA indicates not applicable.
Look hardest for readily treatable causes of anemia:

- Nutritional deficiency (iron, B-12, folate)
- Endocrinopathy (esp thyroid)
- Chronic inflammatory conditions (identify and treat)
- Low-EPO state (more common than you think)
- GI blood loss
Case study

• 86 year-old man (probable dementia)
• Seen with elderly wife
• Referred to gastroenterology from renal (eGFR 19)
• Hb 90 → 79 over 4 months (MCV 78)
• Referrer requesting transfusion and OGD/colonoscopy
When to give a transfusion

The decision to transfuse is based on the whole clinical picture

- What are the blood results?
- Is the patient bleeding?
- Is the patient symptomatic?
- Will a transfusion solve the problem?
- What are the risks of transfusion?
- Are there alternative treatments?

4mL/kg will typically give a Hb increment of 10g/L = 1 unit RBC gives a Hb increment of 10g/L in a 70-80 kg patient.

‘The decision to transfuse must be based on a thorough clinical assessment of the patient and their individual needs. The rationale for the decision to transfuse and the specific components to be transfused should be documented in the patients’ clinical records.’

BCSH guidelines 2012
When it goes wrong
Cumulative numbers of cases reviewed 1996-2010 \( n = 8117 \)

- IBCT 2837 (35%)
- HSE 942 (11.6%)
- Anti-D 962 (11.9%)
- ATR 1744 (21.5%)
- I&U 531 (6.5%)
- Unclassified 7 (0.1%)
- Autologous 57 (0.7%)
- TTI 69 (0.9%)
- TA-GvHD 13 (0.2%)
- PTP 50 (0.6%)
- TAD 40 (0.5%)
- TACO 92 (1.1%)
- TRALI 272 (3.4%)
- HTR 501 (6.2%)

*IBCT, incorrect blood component transfused; I&U, inappropriate, unnecessary and under/delayed transfusions; HSE, handling and storage errors; ATR, acute transfusion reactions; HTR, haemolytic transfusion reactions; TRALI, transfusion-related acute lung injury; TACO, transfusion-associated circulatory overload; TAD, transfusion-associated dyspnoea; PTP, post-transfusion purpura; IA-GvHD, transfusion-associated graft versus host disease; TTI, transfusion-transmitted infection.*
Transfusion-related deaths 2005 - 2010

<table>
<thead>
<tr>
<th>Year</th>
<th>TRALI</th>
<th>TACO</th>
<th>HTR (non-ABO)</th>
<th>HTR (ABO)</th>
<th>Bacterial Infection</th>
<th>Anaphylaxis</th>
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<tbody>
<tr>
<td>2005</td>
<td>29</td>
<td>1</td>
<td>16</td>
<td>6</td>
<td>8</td>
<td>0</td>
</tr>
<tr>
<td>2006</td>
<td>35</td>
<td>8</td>
<td>9</td>
<td>3</td>
<td>7</td>
<td>1</td>
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<tr>
<td>2007</td>
<td>34</td>
<td>5</td>
<td>2</td>
<td>3</td>
<td>6</td>
<td>2</td>
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<tr>
<td>2008</td>
<td>16</td>
<td>3</td>
<td>7</td>
<td>10</td>
<td>7</td>
<td>3</td>
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<tr>
<td>2009</td>
<td>13</td>
<td>12</td>
<td>8</td>
<td>4</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>2010</td>
<td>18</td>
<td>8</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>4</td>
</tr>
</tbody>
</table>
Patient blood management

- Patient information and valid consent
- Consider and discuss alternatives
- Minimise anaemia
- Give the right amount of blood
- Consider special requirements
- Review the outcome
Blood Cell Transfusion?

Remember....

“Size Matters”

Transfusion Associated Circulatory Overload (TACO) is an important cause of transfusion-related morbidity and mortality

Before Transfusion...
- Ensure the patient’s weight is recorded
- Document the target Haemoglobin (Hb) level
- Calculate the required number of units

Note: The average size of an adult red cell unit is 280mL

As a general guide, transfusing a volume of 4mL/kg will typically give a Haemoglobin increment of 10 g/L

The assumption that one unit of red blood cells gives a Haemoglobin increment of 10 g/L should only be applied as an approximation for a 70-80 kg patient

Don’t use two...until you review

- Clinically re-assess the patient after each red blood cell unit transfused
- Re-check the patient’s Hb after transfusing the first unit


Transfusion likely beneficial

- Hb < 70 g/L (general medical and surgical)
- Hb < 80 g/L (ACS)
- Hb > 100 g/L usually inappropriate

- Single unit transfusion

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Innovation respect care achievement pride
Operationalising frailty

- Better MDT working
- Chronic disease management guidelines appropriate to (frail) elderly
- Need for ‘tailored’ management for high risk people
- Customise “best practice”
- Need for case management to link effort and care – “whole systems approach”
Renal Association and Gold Standards Framework

Patients with multiple co-morbidities may not benefit from dialysis

- Can we predict those who are likely to do poorly?

- Renal Association and The Gold Standards Framework
  - “if patient should have at least 1 core and 1 disease-specific indicator then that a patient may benefit from a palliative care approach”

- Core indicators are likely to be
  - Recent, significant functional decline (loss of ADLs)
  - Dependency in 3 or more ADLs
  - Multiple co-morbidities
  - Weight loss
  - Serum albumin less than 25
  - Karnofsky score less than or equal to 50%
Case study

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