Appropriate use of Platelet Transfusions in Belfast Health and Social Care Trust

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\textsuperscript{2}Northern Ireland Blood Transfusion Service (NIBTS)
Background on BHSCT

- 7 hospital sites including the regional centres for cancer, trauma and cardiac surgery.
- With a staff of 20,000 it is one of the largest Trusts in the United Kingdom.
- NIBTS issued 8300 platelets in 2012/13 and 5600 went to the Belfast Trust.
- 86% of platelet component donations are apheresis units.
Reason for selecting this topic for audit

- There was a red colour coded activation of NIBTS platelet shortage in June 2013 requiring importation of component.

- Appropriate use in BHSCT was selected for audit as it receives over 70% of platelets issued.
Audit Methods

- For 11 days in June 2013 information was recorded on consecutive platelet components issued by NIBTS to the BHSCT.
- This was a concurrent audit of 194 components of platelets and there were no defined exceptions.
- The data search was comprehensive and the following primary sources were interrogated:
  - NIBTS records
  - BHSCT laboratory information management system
  - Northern Ireland electronic care records
  - Patient notes and follow up discussion with clinical staff as appropriate
Audit Criteria (standards)


- Policy for the appropriate use of platelets. Published December 2011, BHSCT Intranet
Use by Clinical Specialty Area 2013

Northern Ireland Blood Transfusion Service

- Haematology/Oncology = 51%
- Surgical Ward
- Medical Theatre
- Cardiac Surgery
- ICU
- Oncology
- Children/NICU
Number of adult therapeutic doses (ATDs) issued for each clinical indication (%)

- Post-operative bleeding: 4
- Intraoperative bleeding: 10
- Non-surgical bleeding: 16
- Pre-procedure/surgery: 25
- Prophylaxis of bleeding: 45

Number of ATDs
Appropriate use 2013

Not compliant with audit criteria scored as appropriate following independent consultant review: chronic stable patient, no active bleeding, platelet count = 12x10^9/l, transfusion in patient’s home.

Appropriate 92%

Inappropriate 8%
## Examples of appropriate use

<table>
<thead>
<tr>
<th>Clinical indication</th>
<th>Platelet count (x10⁹/l)</th>
<th>ATDs prescribed</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paediatric haematology patient, routine lumbar puncture</td>
<td>&lt; 50 x 10⁹/l</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Oesophageal carcinoma</td>
<td>11</td>
<td>1</td>
<td>Post chemotherapy bone marrow suppression, active bleeding epistaxis</td>
</tr>
<tr>
<td>ICU patient, gastrointestinal haemorrhage</td>
<td>1</td>
<td>1</td>
<td>Active bleeding</td>
</tr>
</tbody>
</table>
### Examples of inappropriate use

<table>
<thead>
<tr>
<th>Clinical indication</th>
<th>Platelet count (x10⁹/l)</th>
<th>ATDs prescribed</th>
<th>Comment</th>
</tr>
</thead>
</table>
| Necrotising fasciitis listed for fasciotomy | 11 (unexpected result)  
75 (repeat result) | 3               | Repeat result available and not acted upon. |
| Primary total hip replacement          | 75                       | 1               | No excessive surgical bleeding. No anti-platelet medication. |
| Routine bone marrow examinations       | 23  
69                        | 1 (x3)           | Three patients impacted.                     |
Multiple Dosing 2013

- 28 double doses, 1 triple dose and one order for 4 ATDs

<table>
<thead>
<tr>
<th>Clinical Specialty</th>
<th>Multiple Doses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regional ICU</td>
<td>13 double doses and 1 triple dose</td>
</tr>
<tr>
<td>Cardiac Surgical ICU</td>
<td>6 double doses</td>
</tr>
<tr>
<td>Haematology Ward</td>
<td>2 double doses</td>
</tr>
<tr>
<td>Theatres</td>
<td>3 double doses and 1 quadruple dose</td>
</tr>
<tr>
<td>Medical Wards</td>
<td>4 double doses</td>
</tr>
<tr>
<td>Surgical Wards</td>
<td>1 double dose</td>
</tr>
</tbody>
</table>
Platelet increment post transfusion ($x10^9/l$)

<table>
<thead>
<tr>
<th>Time interval post transfusion (hours)</th>
<th>1 ATD administered</th>
<th>2 ATDs administered</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-6</td>
<td>36.2</td>
<td>30.8</td>
</tr>
<tr>
<td>7-12</td>
<td>15.5</td>
<td></td>
</tr>
<tr>
<td>13-18</td>
<td>29.0</td>
<td></td>
</tr>
<tr>
<td>19-24</td>
<td>21</td>
<td></td>
</tr>
<tr>
<td>25-48</td>
<td>7.6</td>
<td></td>
</tr>
</tbody>
</table>
Conclusions from initial audit

- Appropriate use = 92%
- Inappropriate use = 8%
- There is evidence of multi unit prescribing which anecdotally may be related to supply chain issues.
- In the clinical specialties Regional ICU and Cardiac Surgical ICU multi-unit prescribing is routine.
- Time expired platelets accounted for 5% of issues and this may relate to over ordering; an additional 4% were returned to blood bank unused and reallocated.
Recommendations from 2013 Audit

- Platelets should be prescribed according to agreed clinical guidelines
- Requesting of platelets in Cardiac Surgical ICU should be supported by near patient test results
- One ATD should be requested in Regional ICU/Cardiac Surgical ICU routinely.
- Clinical response and post transfusion platelet count should be assessed before re-ordering.
Detailed action plan for improvement

1. Present findings to key stakeholders in Regional ICU and Cardiac Surgical ICU.
2. Establish a stock holding unit in hospital blood bank to improve inventory management and supply logistics to clinical areas.
3. Supplemented clinical practice guidance for Regional ICU and Cardiac Surgical ICU following discussion and agreement.
4. Schedule re-audit
Re-audit June 2014

- 11 consecutive days in June 2014 (1 year later)
- 193 platelet units issued vs. 194 in June 2013
Comparison: Platelet transfusion in four main clinical areas

- **Haematology inpatient**: 68 in 2013, 77 in 2014
- **Haematology outpatient**: 21 in 2013, 24 in 2014
- **Regional ICU**: 35 in 2013, 7 in 2014
- **Cardiac Surgical ICU**: 20 in 2013, 29 in 2014
Comparison: Appropriate use

<table>
<thead>
<tr>
<th></th>
<th>Appropriate (%)</th>
<th>Inappropriate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>June 2013</td>
<td>92</td>
<td>8</td>
</tr>
<tr>
<td>June 2014</td>
<td>92</td>
<td>8</td>
</tr>
</tbody>
</table>
Comparison: Multi-unit dosing (2 ATDs)

Number of transfusion episodes

- Overall: 28 in 2013, 8 in 2014
- Regional ICU: 10 in 2013, 0 in 2014
- Cardiac Surgical ICU: 6 in 2013, 6 in 2014
- Haematology inpatient: 2 in 2013, 0 in 2014
- Medical: 3 in 2013, 1 in 2014
- Surgical theatres: 3 in 2013, 0 in 2014
Improvement outcomes following re-audit

<table>
<thead>
<tr>
<th></th>
<th>2013</th>
<th>2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multi-unit dosing (total)</td>
<td>28</td>
<td>8</td>
</tr>
<tr>
<td>Multi-unit dosing (Regional ICU)</td>
<td>10</td>
<td>0*</td>
</tr>
</tbody>
</table>

*one episode of triple ATD administration
Conclusions following re-audit

- Reduced level of multi-unit prescribing in specific clinical areas.
- Platelet transfusion episodes comparable.
- Appropriate use outcome comparable.
- Platelet increment post transfusion comparable.
- Time expired platelets accounted for 1.5% of issues; an additional 2% were transferred between blood banks within the Trust.
Detailed action plan for improvement

- Audit and feedback to key stakeholders.
- Targeted interventions in specific clinical areas.
- Identify areas for improvement in decision making and prescribing which can be mentored.
- Improve platelet supply so that clinicians and hospital blood bank personnel have increased confidence in inventory management.
- Schedule sequential periodic audit of this topic and collaborate with clinical teams.
References


• BHSCT Policy for the appropriate use of platelets. Published December 2011 via Trust intranet