

Haemovigilance Workshop, 26. Oktober 2015

Mini-Journal Club

Vox Sanguinis (2015) 109, 353-358



Lorenz Amsler, Markus Jutzi, Clinical Reviewer Haemovigilance

Swissmedic • Schweizerisches Heilmittelinstitut • Hallerstrasse 7 • CH-3000 Bern 9 • www.swissmedic.ch

Original Paper

Measuring the influence of blood component infusion rate on recipient vital signs

E.A. Gehrie¹, J.E. Hedrickson^{1,2} & C.A. Tormey^{1,3}

1) Department of Laboratory Medicine, Yale University, New Haven, CT, USA

2) Department of Paediatrics, Yale University, New Haven, CT, USA

3) Pathology & Laboratory Medicine Service, VA Connecticut Healthcare System, West Haven, CT, USA

Introduction

- Few published recommendations regarding appropriate transfusion rate

Retrospective study on:

- Rates of blood product infusion in a large cohort of recipients
- Explore possible connection between infusion rate and peri-transfusion vital signs

Materials and Methods

- **Retrospective record analyses of 3'496 consecutive transfusions over 1 year period**
 - Product volume
(If unavailable, assumed as average of 10 randomly selected products)
 - Duration of infusion
 - Temperature
 - Heart rate
 - Blood pressure

Results (Volumes, infusion rates)

- **Mean volume of 10 randomly selected**
 - RBC: 345.7 ml (SD 44.1, Median 341.3; 278.5 – 432.7)
 - Plasma: 228.7 ml (SD 22.4, Median 222.2; 197.2 – 260.7)
 - PLT: 241.3 ml (SD 23.1, Median 251.2; 208 – 260.3)

- **Median component infusion rate**
 - RBC: 2.3 ml (25-75%ile 2 - 3 ml; SD 23.7 ml)
 - Plasma: 10.4 ml (25-75%ile 6.8 – 14.6 ml; SD 12.1 ml)
 - PLT: 7.2 ml (25-75%ile 5 – 9.6 ml; SD 5.9 ml)

Results (infusion rates, hospital units, TR's)

- **RBC (2'359; 2.3 ml/Min)**
 - Infusion rate varied between hospital unit (OR 18.8 ml/Min (n=146) vs 2.3 outside OR; $p < 0.0001$)
 - 13 TR's reported ? (7 ward, 3 outpatient, 2 ICU), Median rate 2.3 ml
- **Plasma (659; 10.4 ml/Min)**
 - No statistically significant difference OR vs. outside OR
 - 2 TR's reported ? (5 ml/Min and 9.7 ml/Min)
- **Platelets (478; 7.2 ml/Min)**
 - Infusion rate varied between hospital unit (OR 16.1 ml/Min (n=20) vs 6.9 outside OR; $p < 0.0001$)
 - 2 TR's reported ? (5.3 ml/Min and 8 ml/Min)

Results (vital signs)

- **RBC (2'359; 2.3 ml/Min)**
 - 92 Transfusions at a rate > 20 ml/Min (fastest 4%)
(0°F vs 0°F, 0 vs 1 bpm, systolic 0 vs +4, diastolic 0 vs +2 mm Hg)
 - 1 of the 13 TR's reported in this group (hypotensive TR)
- **Plasma (659; 10.4 ml/Min)**
 - 51 Transfusions at a rate > 20 ml/Min (fastest 7.7%)
(0°F vs 0°F, 0 vs 0 bpm, systolic +1 vs +1, diastolic +1 vs 0 mm Hg)
 - No TR's reported for "rapid" infusions
- **Platelets (478; 7.2 ml/Min)**
 - 16 Transfusions at a rate > 20 ml/Min (fastest 3.3%)
(0°F vs 0°F, 0 vs 0 bpm, systolic 0 vs 0, diastolic 0 vs -1 mm Hg)
 - No TR's reported "rapid" infusions

Discussion (Authors)

- No clear correlation between blood component infusion rate and significant alterations in peri-transfusion vital signs (infusions rates ≥ 20 ml/Min vs infusions rates <20 ml/Min)
- Reports on transfusion reactions did not correlate with meaningful deviations from standard transfusion practice
- ... our data could provide useful guideline for routine inpatient transfusion

Discussion (Authors)

- Of course, other factors such as urgency of transfusion, age, weight, ability to compensate for increased intravascular volume, respiratory status, renal function cardiac function ... must be taken into account
- ... we feel that it is reasonable to recommend RBC infusion rates of 2-3 ml/Min for routine transfusions while plasma and platelets may be infused at rates of 7-10 ml/Min
- Our data also suggest that faster infusion rates (>20 ml/Min) do not correlate with substantial changes in the measured vital signs and likely can be applied with close patient monitoring if there is a more urgent need for rapid infusion

Discussion (workshop participants)

Variables not considered for analysis:

- Initial intravascular volume status (hypo-, eu-, hyper- Volaemia?)
- Risk factors for reduced volume tolerance such as
 - Age >60 years
 - Cardiac function impairment
 - Renal function impairment
 - Chronic anaemia
 - Pre-existing respiratory difficulties