Placental Blood Draws: Conserving Neonatal Blood to Reduce Blood Transfusions in Preterm Infants

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Conflict of Interest Disclosure
• We have no actual or potential conflict of interest in relation to this program/presentation.

Background
• Very low birth weight (VLBW) premature neonates are routinely phlebotomized within the first hours of life.
  – Routine admission labs: CBC, BC, Type and Screen, Metabolic Screen
• Initial phlebotomies might equal up to 10% of their blood volume.
• ~90% of all VLBW infants will require 3-5 RBC Transfusions within the first 3-4 weeks of life.
• Transfusion often occurs in the first 72 hours of life, which has been associated with the development of Grade III and IV Intraventricular Hemorrhage (IVH).

VON
• VON- Vermont Oxford Neonatal Network
  – Neonatal Quality Collaborative
  – Database tracking morbidity and mortality of babies 22-29 6/7 weeks and/or 401-1500 grams
  – 682 NICU’s internationally
  – Tool for Quality Comparison
  – Sinai joined in 1992

Pre-Data/Baseline-VON
Goal Statement

• 75% of infants <1500 grams will have placental blood specimens obtained. This will be achieved by establishing clinical guidelines to obtain a placental blood specimen in place of phlebotomizing the infant. We hypothesize a decreased incidence of IVH in preterm infants due to a decreased need for blood transfusions in the first seven days of life.

Plan

• Evidence Based Findings:
  - Reviewed scholarly articles related to placental blood draws.

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  N= 8 (# of articles)

Intervention/Initiative

• Stakeholder Input:
  – December 2014: Provide education regarding the change in procedure and rationale for the change to all impacted services (Birthplace, NICU, Laboratory Service, and Blood Bank)
  – January 2015: Implement the new placental blood drawing process and procedural training of all involved staff

• Assess project using quality improvement standards and re-evaluate/re-design based on those assessments (Plan Do Study Act-PDSA- cycle evaluation)
  – Ensure project functionality
  – Assess project flow
  – Rectify errors

Evidenced Based Findings

• No difference in lab values between samples obtained from placenta versus infant (Christensen et al 2011)
  – CBC, Type and Screen, Blood Culture
• Findings:
  – May reduces the need for early blood transfusions in neonates < 30 weeks gestation
  – No additional cost
  – May reduce cost by using less donor blood
  – Less use of vasopressors in the first days of life due to improved hemodynamic stability
  – Reduction of IVH

  (Hensch et al 2015)
Intervention/Initiative: The Process

- Project Leader
- IT/Cerner Staff
- NICU Nursing
- Labor and Delivery Nursing
- Laboratory Staff
- Reported distinction of sample source
- Placental blood draw
- Attending deliveries to assist in the process

Challenges & Barriers

- Pre-term Placenta - 26 weeks
- Full-term Placenta - 40 weeks

Process Revisions

- Repeated nursing education sessions
- Revisited electronic reporting with Cerner & Laboratory
- Developed the Placental Blood Bag Kits and purchased a Placental Blood Draw cart for each OR
- Revised the guidelines
- September 2015: Expanded process to include all infants < 34 weeks.
- December 2015: Expanded to include all anticipated NICU admissions

Implementation Process

- Created of Guidelines: Choosing Blood Draw Options - Very low birth weight infants
- New Placental Blood Draws added to Cerner order set for low birth weight infants
- Revised guidelines
- September 2015: Expanded process to include all infants < 34 weeks
- December 2015: Expanded to include all anticipated NICU admissions
Outcomes - Success of Draws 2016

% of Successful Placental Blood Draws (ALL Weights)

Interventions

Outcomes - Success of Draws 2017

% of Successful Placental Blood Draws (ALL Weights)

Interventions

Outcomes - Success of Draws 2016

% of Successful Placental Blood Draws (<1500 grams)

Interventions

Outcomes - Success of Draws 2017

% of Successful Placental Blood Draws (<1500 grams)

Interventions

Outcomes - VON

VON: Any IVH Over Time

Year

Outcomes - VON

VON: Severe IVH Over Time

Year
Evaluation Summary - What Difference Have We Made?

- It is difficult to implement a process change between two departments and among disciplines. It took almost two years to overcome barriers and to refine the process of placental draws.
- L&D has perfected the placental draw process and uses this skill for other applications, such as genetics.
- Based on our latest data, we can conclude that we have finally been successful with the implementation of the new process. However, it is still too early to determine any impact on reduction in IVH. We continue to collect data.

Implications - 22% Reduction in RBC Transfusions Required for Infants <1500 Grams

- Less IVH?
- More circulating blood
- Hemodynamically more stable
- Cost savings
  - Nursing Care Hours
  - Lab Care Hours
  - Cost of RBC’s, supplies

Evaluation Summary

Lessons Learned:

- PDSA (Plan Do Study Act) is huge component of any PI project
- Constant revisions are vital to the success of performance improvement
- Collaboration is key

What would we have done differently?

- Hindsight is 20/20
  - Process Revisions
  - Recognition of low "n"
  - Increase initial population
Next Steps/Sustainability

• Process is in place
• Guideline/protocol
• Part of the NICU CQI committee; continuous monitoring occurring
• Based on results, changes are made as necessary
• Evaluate cost savings?
• Using Placental CBC data for Neonatal Sepsis Prediction Model

“Rocky”

Born At 27 weeks 3days
Weighed 1 lb 9oz
Length 12”

References


