A Small Baby Bundle to Reduce Brain Injury

Kathleen Marble MSN, RNC-NIC, Jessica Pelletier BSN, RNC-NIC, and Sarah Collins BSN, RNC-NIC

Sparrow Health System; Lansing, MI; United States
Primary author: Sarah Collins BSN, RNC-NIC; Sarah.collins@sparrow.org  517-364-2245

Background: IVH is associated with an increased rate of co-morbidities and future hospitalizations resulting in decreased quality of life and high cost for our patients and health care systems. In 2013, Sparrow RNICU rates for any IVH in very low birth weight infants, was higher than the 3rd quartile of the VON and severe IVH close to 3rd quartile. Reducing IVH will decrease costs associated with frequent head ultrasounds, shunt placements in some cases and may decrease length of stay. This project is in alignment with the Sparrow vision to create a standardized approach to care for very low birth weight babies that focuses on providing the best care and outcomes for every baby, every time.

Aims: To decrease the incidence of any IVH and severe IVH for very low birth weight infants, under 1600g and 30 weeks gestation, to the lower quartile of the Vermont Oxford Network through the implementation of an IVH prevention bundle by October 1, 2015.

Setting: 35 bed, level III Regional Neonatal Intensive Care unit in a 600+ bed Magnet® hospital. Sparrow delivers 4300 infants each year and is a community referral center accepting 100 infant transports each year.

Mechanisms:
- Lack of standardized approach to antenatal steroid and magnesium for neuroprotection management.
- Use of standard, immediate cord clamping.
- Lack of evidence-based fluid management in the first days of life.
- Lack of standardized way to change IV fluid tubing when treating with vasopressors.
- Managing nursing and respiratory care of micro premature infants in the same manner as more mature infants.
- Inconsistent interpretation of radiographs.
- Less than optimal family-centered care practices.

Drivers of Change: Reference attached driver diagram

Method:

Implementation of an IVH prevention bundle using PBP toolkit / Driver diagram focusing on the following:

- Development of project charter.
- Prenatal care: standardization of antenatal steroids and magnesium for neurological protection.
- Medical care: delayed cord clamping, standardized use of supplemental fluid boluses / management, etc.
- Nursing and Respiratory care: development and implementation of a small baby protocol including minimal stress, head positioning, elevating the head of the bed, and decreasing endotracheal suctioning during day1-2 of life for infants with RDS.
- Radiology: consistent reading of HUS by radiologist. In addition Neonatologist to review HUS and finalize IVH in collaboration with Pediatric radiologist.
- Family and Social work: collaborate with social work to provide available resources and support parents.
- Parent support members to help develop information about IVH to be shared with infant’s parent.
Measures:

<table>
<thead>
<tr>
<th>Performance Measures</th>
<th>Baseline</th>
<th>Goal or Target VON 2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of babies admitted with birth weight of less than or equal to 1600 gms or gestation of 30 wks.</td>
<td>79 (&lt;1501 / 32 wks)</td>
<td></td>
</tr>
<tr>
<td>Percentage of VLBW infants that have grade 1 and 2 IVH</td>
<td>20.8%</td>
<td>1Q = 4.5%</td>
</tr>
<tr>
<td>Percentage of VLBW infants that have grade 3 and 4 IVH</td>
<td>9%</td>
<td>1Q = 3.3%</td>
</tr>
<tr>
<td>Percentage of VLBW infants that have PVL</td>
<td>4.1%</td>
<td>1Q = 0%</td>
</tr>
<tr>
<td>Percentage of VLBW infants that receive delayed cord clamping at birth</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percentage of VLBW infants that are receiving any antenatal steroids</td>
<td>83%</td>
<td>3Q = 90.1%</td>
</tr>
<tr>
<td>Percentage of VLBW infants that are receiving =&gt; 2 doses or 1 coarse of antenatal steroids</td>
<td>72%</td>
<td></td>
</tr>
<tr>
<td>Percentage of VLBW infants that are receiving Magnesium</td>
<td>50%</td>
<td>3Q = 58%</td>
</tr>
<tr>
<td>Percentage of VLBW infants that are maintained with head position midline for 7 days</td>
<td>No baseline data</td>
<td>100% compliance</td>
</tr>
<tr>
<td>Percent VON eligible (? Any baby) babies received fluid bolus during day one</td>
<td>No baseline data</td>
<td>Awaiting data analysis</td>
</tr>
<tr>
<td>Available monthly data from EPIC for IVH, PVL, Prenatal Steroids, prenatal Mg use, Head position, S2S time etc</td>
<td>No baseline data</td>
<td>Awaiting data analysis</td>
</tr>
</tbody>
</table>

Data/Results:

- 77 babies were admitted with birth weight of less than or equal to 1600 gms or gestation of 30 wks from July 1, 2014 to September 1, 2015.
  - 86% of these infants received at least one dose of antenatal steroids.
  - 71% of these infants received neuro-protective Magnesium.
  - 100% of infants were kept with their head midline.
Discussion: In collaboration with the minimizing brain injury homeroom, the toolkit was referenced to develop guidelines for a small baby protocol. Challenges included consistent implementation of the IVH bundle and small baby protocol guidelines by all medical, nursing, respiratory, obstetric, and ancillary service teams. Multiple PDCA cycles were used for small tests of change and to keep staff well informed to decrease resistance to process and practice changes. QI analyst and EPIC team support was instrumental for data abstraction. There has been difficulty with compliance specifically related to performing delayed cord clamping. The team is researching the option of providing cord milking for infants that are unable to receive delayed cord clamping due to a non-vigorous state and need for immediate resuscitation. The number of new staff members at night has made compliance with the bundle a challenge. Training will be provided to each new staff member prior to starting infant care to ensure that all staff is knowledgeable about the small baby protocol.

Team Acknowledgement: Small Baby Champion Team members – Tina Hummell BSN, RNC-NIC, Sarah Collins BSN, RNC-NIC, Michelle Devore BSN, Kimberly Spencer RN, Elizabeth Schieding BSN, RNC-NIC, Krista Wegenke RT, Sarah Eagleston PharmD, Jessica Pelletier BSN, RNC-NIC, Robin Scott, Kathleen Marble MSN, RNC-NIC, Padmani Karna MD, Said Omar MD, Mary Lou Wesley MSN, Mark Kadrofske MD, Alyse Strahm NNP-BC, Jennifer Thompson-Wood MSN, CNS, Hollie Huhn RN, Jodi Renfro RN, Elizabeth Jadczak RN

Key Words: brain injury, intraventricular hemorrhage, premature, small baby bundle, small baby protocol
Minimizing Brain Injury Driver Diagram

Outcomes

To minimize brain injury and optimize development in term and preterm infants.

To decrease the incidence of any IVH and severe IVH for very low birth weight infants, under 1600g and 30 weeks gestation, to the lower quartile of the Vermont Oxford Network through the implementation of an IVH prevention bundle by October 1, 2015.

Primary Drivers

- Prenatal care
- Medical care
- Radiology
- Nursing and Respiratory care
- Family and Social work

Secondary Drivers

- Improve standardization of antenatal steroids and magnesium for neurological protection.
- OB department to identify percentage of infants under 30 weeks and 1600g where another received antenatal steroids and neuroprotective magnesium.
- Collaborate to provide consistent reading of HUS by pediatric radiologist and has been reviewed by Neonatologist.
- Create a standardized medical care bundle.
- Consider delayed cord clamping.
- Consider use of volume and noninvasive ventilation, and fluid management.
- Create and consistently implement a standardized small baby protocol bundle.
- All staff to complete education about the small baby protocol at skills fair.
- Head positioning midline, minimal stress with use of hands on assessment.
- Elevating the head of the bed 45 degrees.
- Decreasing endotracheal suctioning.
- Education for all staff of slow technique when drawing off of lines and changing fluids with vasopressors.
- Collaborate with social work and former parents to provide parent education and support.
- Engage a former parent to be an active member of the team.
- Provide parent support with PALS members.
- Create a family focused education regarding IVH.