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Amanda M. Bagdasarian BSN, RN

*Lehigh Valley Health Network, amanda\_m.bagdasarian@lvhn.org*

Lindsay B. Field BSN, RN

*Lehigh Valley Health Network, lindsay\_b.field@lvhn.org*

Stephanie L. Weakland BSN, RN

*Lehigh Valley Health Network, stephanie\_l.weakland@lvhn.org*

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# Midline Head Positioning to Reduce the Risk of Intraventricular Hemorrhage in Very Low Birth Weight Neonates

Amanda Bagdasarian, BSN, RN; Lindsay Field, BSN, RN; Stephanie Weakland, BSN, RN

Lehigh Valley Health Network, Allentown, Pennsylvania

## Background/Introduction

### PICO Question

**For very low birth weight infants born weighing less than 1,500 grams, does the use of midline head positioning for the first 72 hours of life reduce the risk of intraventricular hemorrhage compared with current practice?**

### Etiology and Evidence

- The most common type of injury in the premature brain is Intraventricular Hemorrhage
- IVH results from bleeding into the germinal matrix which is an immature structure that is highly vascularized. Increased fluctuations in cerebral blood flow can easily rupture the fragile blood vessels causing bleeding into the lateral ventricles.
- The incidence of IVH increases with decreasing gestational age. The incidence is 30-40% in infants who weigh less than 1,500 grams.
- 50% of cases of IVH occur by 24 hours of age; 80% by 48 hours of age; and 90% by 72 hours of age
- Ten percent of infants with small IVH have some neurodevelopmental disabilities. Infants with moderate IVH have major neurodevelopmental disability in 40% of cases and a mortality rate of 10%.
- Those with severe IVH have major neurodevelopmental disability in 80% of cases with severe mortality rates as high as 60%.
- Head positioning influences the venous congestion and hydrostatic pressure changes in the germinal matrix that can lead to intraventricular hemorrhage.
- By maintaining a neutral head position, it is possible to avoid the venous obstruction thus preventing IVH caused by head position

## Methods

In the Neonatal ICU at LVHN, there is currently no set clinical standard for head positioning of a very-low birth-weight infant upon admission and during the first 72 hours of life. Head positioning varies between infants based on nursing judgment and respiratory support needs.

In order to change this practice, several forms of education were implemented. These included a presentation to the NICU's Developmental Care Committee and the Neonatologists, online education assigned to nursing staff through TLC, in-service education on the unit showing proper infant positioning with different forms of respiratory support, and hands on practice positioning a model both supine and laterally.

Evaluation of a successful change in practice will be evaluated using data from the Vermont Oxford Network to compare the incidence of intraventricular hemorrhage in neonates born weighing less than 1,500 grams at LVHN prior to change in practice in 2014 to a year after practice was changed in 2015.

Additionally, following the change of practice, nursing compliance will be observed in practice and assessed with a post-education survey, which will determine the need for future re-education of staff.

## Staff Education



Figure 1a



Figure 1b

- Above: This image shows a model of an infant maintained supine and midline.
- Right: This image shows an example of how to position an infant midline and side lying while on a traditional ventilator.
- In both photos, blanket rolls, frogs or other nesting devices are used as developmental support to provide the infant with boundaries and to also maintain midline positioning.

## Evidence

### 2014 Data

	Lehigh Valley Health Network			Vermont Oxford Network	
	Cases	N	%	N	%
Imaging	107	113	94.7%	58,631	90.8%
Any IVH	25	107	23.4%	53,227	28.8%
Grade 0	82	107	76.6%	53,227	86.2%
Grade 1	12	107	11.2%	53,227	14.0%
Grade 2	4	107	3.7%	53,227	7.2%
Grade 3	6	107	5.6%	53,227	4.9%
Grade 4	3	107	2.8%	53,227	6.5%

### 2015 Data

	Lehigh Valley Health Network			Vermont Oxford Network	
	Cases	N	%	N	%
Imaging	44	46	95.7%	58,631	90.8%
Any IVH	13	44	29.5%	53,227	28.8%
Grade 0	31	44	70.5%	53,227	86.2%
Grade 1	7	44	15.9%	53,227	14.0%
Grade 2	4	44	9.1%	53,227	7.2%
Grade 3	0	44	0.0%	53,227	4.9%
Grade 4	2	44	4.5%	53,227	6.5%

## RESULTS

Currently, not all data from LVHN and other hospitals/ health networks belonging to the Vermont Oxford Network have been uploaded. In 2016, when entries from 2015 are complete, the data will be evaluated to determine if midline head positioning has had an effect on LVHN's statistics for intraventricular hemorrhage in very low-birth-weight infants. Results from a full calendar year will provide a more comprehensive picture of the outcomes. As of now, the evidence indicates an improvement in 2015 with zero Grade 3 bleeds and only two Grade 4 hemorrhages documented. While this is still a higher percentage of patients, the complete data collected from the yearly census has not yet been documented due to several pending discharges from the NICU.

Furthermore, it has been noted in the Neonatal ICU and verbalized by staff, that very-low-birth weight infants should be kept midline. Additionally, several doctors and nurse practitioners have written orders to keep infants in a midline position until 72 hours of life.

## Conclusion

- Vermont Oxford Network data indicates that compliance with midline head positioning and the reduction of Grade 3 & 4 intraventricular hemorrhages is improving, thus continued education is recommended

- PLAN for DISSEMINATION
- Continued education through the use of multiple modalities for RNs, RRTs, PT, and MDs
- Continue to encourage compliance and interventions
- Institute a bedside card reminding staff to maintain midline positioning until a specified date

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