Standardizing Blood Drawing Technique in the NICU

In this feature, Neonatal Intensive Care interviews clinicians and healthcare providers about the actual application of specific products and therapies. This interview is with Stacia Nickell RN, Shift Coordinator at Riley Children's Hospital, which implemented the use of the Hummi Micro Draw in its 60-bed NICU.

Standardizing Blood Drawing Technique in the NICU: A follow up 2 years after implementation of the Hummi Micro Draw Blood Transfer System at Riley Children's Hospital, Indianapolis, IN, a Level IV NICU.

This follow up interview looks at the recognized benefits of using this unique closed system for Central Line blood draws over the last 2 years? What potentially unexpected benefits does standardization of technique and improved line management bring to the Blood Draw procedure in the Neonate in terms of improved clinical outcomes and reduced economic costs?

Background

In August of 2018 Riley Children's Hospital implemented the use of the Hummi Micro Draw in its 60 bed NICU. The system was implemented for blood draws on Umbilical Arterial Catheters, Umbilical Venous Catheters and PICC Central Line Catheters (>2.5Fr). The Hummi System was implemented over the next year into 4 other NICUs in the IU Health System in an effort to standardize line setup and technique for blood draws throughout the network.

This interview was conducted after approximately 2 years of product utilization with Riley Childrens Hospital with input from key staff members: Stacia Nickell RN, Shift Coordinator, Laura Blaizer, RN Clinical Nurse Specialist and Rebecca Rose, MD, Neonatologist.

Neonatal Intensive Care: What were your original goals in implementing the Hummi Micro Draw system in your NICU?
Stacia Nickell: As mentioned in our first interview, Riley Children's receives the sickest newborns in the state of Indiana. Access to draw blood can be a big issue with these infants. Prior to using the Hummi Micro Draw we had trialed several different closed blood draw systems and were running into problems with line clearance and flushing when running TPN, Glucose, Lipids etc. with our then current system when drawing ABGs and Labs. Lab values were often inaccurate because the in line device was difficult to clear when used with Central Venous lines, often requiring 3mL or more of clearance. We observed higher than desirable infection rates possibly due in part to blood residual in the devices after drawing which was not clearing without up to 3mL of flush. Blood exposure during use was also a problem with some of the systems we trialed. We were looking to reduce our infection rates, improve line setup, standardize and simplify the blood drawing procedure and easily access the line in place to draw blood without excessive clearance and flushing required. The risk for IVH development due to large fluid shifts during blood drawing was also an issue.

NIC: What were some of the key clinical benefits you recognized during the first year of using the Hummi Micro Draw device?

SN: With the Hummi Micro Draw system we were able to standardize our line setup, as well as standardizing our clearance and flush volumes for both Arterial and Venous placed lines. We standardized our waste holding from 3mL down to 1mL of blood and we do not have inaccurate labs. We do run TPN, Glucose through the Central Venous lines and with the Hummi Micro Draw it is very easy to flush any catheter after the blood draw with only 0.6mL of flush. Actually we do not need to draw any blood up into the line itself when using the Hummi system, as the waste and sample are taken directly from inside the catheter hub with this sampling method.

The great thing about the Hummi System is that it can be used successfully when any fluid is being administered through any type of line, Central or Venous. The clearance draw volumes are small and the small amount of flush (0.6mL) completely clears the catheter after the blood draw. More importantly we observed a significant reduction in infection rates compared to the previous 2 years.

Our work flow has improved as we change our fluids with an aseptic technique and the Hummi Micro Draw System fits easily into this process. The packaging is user friendly and it works nicely with our new line setup with minimal components compared to other systems. The Hummi System has made our process for blood draw more streamlined, and is very easy to use and easy to teach how to use.

NIC: In addition to improvements in work flow, reduced CLABSI rates, standardization of blood draw technique across the Health System and IVH Risk Reduction, what economic benefits have you recognized that might be attributable to the implementation of the Hummi Micro Draw after 2 years of ongoing use
SN: We continually review our infections, clinical results, outcomes, issues etc. as a group of practitioners system wide. One area where we saw a marked improvement in the last 2 years was in the reduction of the incidence of re-draws of blood sampling due to contaminated or inaccurate blood test results.

If you would like to participate in this feature, as a company or healthcare provider, please contact Steve Goldstein at s.gold4@verizon.net.

Patient safety has been improved and the economic cost of re-drawing blood samples has been significantly reduced.

For example: Riley Children's does on average 30 blood draws per day. Prior to implementing the Hummi Micro Draw we were seeing on average 10 re-draws of blood samples per day. In 2019-2020 we are seeing re-draws on average of 2 per day. This is a reduction in re draws of 80%. The average cost of a re-draw is $200. Previously this re-draw rate resulted in increased lab costs of $730,000 annually. The current re draw rate of only 2 per day has resulted in an average annual savings on blood re- draws of $584,000 annually.

The Hummi Micro Draw system has given us a more consistent standardized method with which to draw labs. This consistency and ease of use has contributed greatly to this cost savings.

NIC: What other notable benefits have you observed that affect both patient safety and help to reduce costs?
SN: We have implemented a number of changes in an ongoing effort to reduce CLABSI rates. Consistency of practice overall is very important. Using the Hummi Micro Draw system with simple concise direction on how to draw and standardized guidelines for the amounts we clear and flush has helped to reduce our CLBASI rate in that everyone is consistent in the use of this blood drawing device. Each CLASBSI costs the Hospital approximately 35-40,000 dollars to treat, so reducing even one can greatly save money and length of stay, as well as reduced morbidity and mortality.

Over the 4 year period from 2015 – 2018 we experienced on average 14 CLABSIs per year. This cost to treat was on average $525,000 per year. In 2019 – 2020 we are averaging 2 CLABSIs annually, which was 0.38 per 1000 line days in 2019. This represents an 85% reduction in CLABSI and an annual cost savings of $450,000 annually in CLABSI costs. We attribute much of these savings to the nursing staff being very consistent with line care, line maintenance and standardized blood drawing techniques in which the Hummi Micro Draw has been a large part. This represents a reduction in CLABSI cost from $525,000 annually to $75,000 annually.

NIC: Outside of the Cost Savings you are seeing with the implementation of these specific clinical and patient safety improvements over the last 2 years, how has Riley Children's Hospital been measured for these significant clinical improvements?
SN: Due to our many quality improvement projects we have been able to appreciate an increase in our ranking in the US News and World report on NICUs in the United States. One area that really affects a NICU's ranking nationally is a decrease in the CLASBI rates. In our case, we feel in large part this can be attributed to consistency in the way we have improved our line care and blood drawing practices. This consistency in drawing practices relates specifically to the adoption of the Hummi Micro Draw system. We ranked 45th Nationally in 2017-18 and we were very pleased to enjoy an increase our National NICU ranking to 14th in the 2019-20 report.