Low Vagal Tone is Associated with Impending Necrotizing Enterocolitis in the Preterm Infant

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The Pennsylvania State University, College of Medicine, Division of Newborn Medicine

Background & Significance
Necrotizing enterocolitis (NEC) is a common and devastating neonatal disease affecting 6-10% of preterm infants. Despite technological advances in care, acute morbidity, mortality and long-term disability associated with NEC remain constant. Intestinal motility, secretion, and blood flow are important in gut integrity and are mediated by the vagus nerve. Heart Rate Variability (HRV) provides a measure of sympathetic and parasympathetic balance. The High Frequency (HF) power spectrum of HRV reflects parasympathetic system innervation (vagal tone). Thus, low vagal tone may be a biomarker for impending GI disease. The High Frequency (HF) power spectrum of HRV reflects parasympathetic system innervation (vagal tone). Thus, low vagal tone may be a biomarker for impending GI disease.

Hypothesis
Low vagal tone as measured by HRV in the first week of life will be associated with NEC in healthy preterm infants.

Methods
This was a prospective, observational study. Sample infants were 32.6 ±1.5wks GA (Mean ± SD), weighed 1878 ±409gms, had a low morbidity index (SNAP<9) at 48 hrs, were without congenital anomalies, and were off the ventilator by day 5 of life. On day 5-7 of life the infants’ postprandial measures of HRV were done in the afternoon when the infant was in a light sleep state. Analysis was done using Mindware HRV 2.51 software. Infant health outcomes were obtained prospectively with chart audit by coders blinded to HRV.

Results
• 4/30 subjects (13%) developed NEC which was confirmed by radiographic pneumatosis intestinalis and clinical findings.
• Of the 26 non-NEC subjects, 7 who were treated for sepsis within the first 10 days of life were excluded from the analysis.

Reduced HF Power in Impending Necrotizing Enterocolitis

• There was a statistically significant difference in HF power between No NEC (4.5 ± 10 msec²) vs NEC (2.8 ± 1.4 msec²) groups.
• The detection of low HF power was obtained from 12 hrs to 9 days prior to the onset of necrotizing enterocolitis, which was subsequently confirmed by clinical and radiographic evidence.

Conclusion
This pilot study found that markedly low HF power (i.e. low vagal tone) was associated with the onset of NEC in preterm infants. Hence, low vagal tone may be useful in identifying a subgroup of infants most susceptible to developing NEC.

Clinical Implications
The early recognition and treatment of NEC is critical to infant survival and the prevention of long-term disability in preterm infants. Low HF power may serve as a useful biomarker for NEC allowing prompt recognition, early treatment, and potentially improved neonatal outcomes for infants with NEC.

Selected References
A Descriptive Study of Neonatal Nurses Perceptions, Knowledge, and Practice on Support of Breastfeeding in the NICU
Lori Merkel, BSN, RNC; Heather Stephens, BSN, RN; Melissa Koonce, BSN, RN; Lindsay Zaleski, BSN, RN; Mary Lewis, MSN, RNC; Karen Campbell, RN, IBCLC; Barbara Shocker, MEd, RN, IBCLC; Kim K. Doheny, PhD, NNP-BC

**Background & Significance**
It is well documented that infants who receive breast milk also incur significant health benefits. Human milk contains growth factors and immunoglobulins that are proven to provide protection for the infant from various diseases, including respiratory and gastrointestinal infections. Breastfeeding in the Neonatal ICU can be hindered by many environmental challenges. Support of breastfeeding mothers can be influenced by unit policies and nursing practice as well as the nurse’s individual beliefs and/or perceptions. Providing the best care for our smallest patients means presenting consistent and evidence based breast milk/breastfeeding information to aid, support and encourage mothers. The purpose of this descriptive correlational study was to examine the knowledge, practice and perceptions of NICU nurses regarding breastfeeding.

**Methods**

- **N= 68 NICU nurse respondents**
- 45.9% RNs have had 5 years or less of Neonatal ICU experience
- 76.4% RNs have completed a Bachelors or Masters degree
- Participants completed a 34-item investigator generated survey which utilized a 4-point Likert scale to measure views on perceptions, knowledge and practice of breastfeeding

**Results**

- While only 32% of nurses reported completing formal breastfeeding training, the majority (59%) stated their views on breastfeeding were ‘highly’ influenced by knowledge/education.

- A statistically significant association was found between nurses’ perceptions and knowledge on breastfeeding (p=0.02).
- Those nurses who reported attending formal internal education on breastfeeding scored higher on practice domain questions in support of breastfeeding than those who did not report attending formal internal classes on breastfeeding (ANOVA, F=4.9; p=0.03).

- 54% of nurses felt there was inadequate support in the NICU for breastfeeding mothers and identified three opportunities for improvement. These included a lack of lactation resource people/support, inconsistent information given to mothers, and a lack of time.

**Conclusions**
This study implies that breastfeeding knowledge influenced nurses views on breastfeeding. Furthermore, nurses who attended formal education on breastfeeding reported higher support of breastfeeding in their practice. However, the majority of nurse respondents felt there were inadequate resources to support the practice of breastfeeding in the NICU.

**Clinical Implications**

- Promote staff participation in formal breastfeeding education within their practice setting and at outside conferences.
- Examine barriers to staff participation in these programs.
- Provide increased support for lactation services by utilizing lactation support nurses to work with breastfeeding mothers in addition to lactation consultants.
- Explore approaches to improve efficiency in care delivery so that additional time can be allocated for education and support of breastfeeding practices.

**Selected References**
An important area of concern for neonatal nurses is the delivery of developmentally sensitive care to infants in the Neonatal Intensive Care Unit (NICU). This means customizing care to the needs and sensitivities of each infant by accounting for gestational stage of development as well as individual responsiveness to handling and care provision. Sound protection for infants is an important aspect of developmental care. Excessive sound levels above 70dBA have been associated with detrimental physiological effects such as decreased heart rate and saturation levels. In addition, exposure to increased sound levels significantly decreases the duration of quiet/deep sleep. It is the current recommendation of the Consensus Committee on Recommended Standards for Newborn ICU Design that sound levels be kept at 45 dBA with transient sounds not to exceed 65 dBA in order to preserve a large portion of each hour for infant sleep. The purpose of this quality assurance project is to evaluate the current level of environmental sound exposure for infants and staff in the NICU at Penn State Children’s Hospital following an educational intervention on sound awareness, and to offer recommendations to staff for sound reduction.

**Methods**

This descriptive pre/post intervention design used the following measurement approach:

• A calibrated Extech Sound Level Meter® Model 407764 was used at frequency A Fast Mode to record decibel (dBA) levels of sound in 15 min increments 80-95cms from the edge of the infant’s crib space.
• Sound audits were obtained during expected peak activity times of 0200-0500, 0730-1030, 1530-1830 and at geographic locations in 15 min increments 80-95cms from the edge of the infant’s crib space.
• Sound level audits were taken during an average daily census at pre-intervention of 25/36 (69% bed occupancy) and post-intervention of 26/36 (72% bed occupancy).

By independent samples t test there was a significant difference between pre/post intervention sound audits in the 61-100dB range (p=0.031).

• While day and night shift audits showed a dramatic reduction in sound levels in the harmful range post-intervention, evening shift sound audits showed minimal change post-intervention.

The results showed that after a staff CE program on sound awareness and implementation of sound protective measures there was a significant reduction in sound levels within the harmful range. However, post-intervention more than 7.5% of measured ambient sound levels were in a range above those recommended for promoting infant sleep and well-being. Thus, ongoing strategies to reduce sound are needed.

**Clinical Implications**

- Promote staff participation in ongoing sound awareness education.
- Remove barriers to physician/nurse participation in these programs.
- Provide increased support and role modeling of quiet behaviors in NICU for new nurses/physicians, ancillary staff, and families.
- Encourage committee work to enforce standards of safety regarding sound levels in the NICU.
- Explore approaches to improve efficiency in care delivery and communication as an intervention to reduce sound levels.
- Consider NICU design modification strategies to reduce sound.

**Selected References**


Extremely Low Frequency-Magnetic Fields (ELF-MFs) Measured Within and Surrounding Standard Neonatal Intensive Care Incubators

Yuri Gordin, BS, Kim Kopenhaver Doheny, PhD, and Charles Palmer, MB, ChB
The Pennsylvania State University, College of Medicine, Division of Newborn Medicine

Background & Significance
ELF-MFs are emitted by alternating current-powered electrical equipment such as standard neonatal incubators with heating motors positioned directly under mattresses in several models. Li et al. found that during pregnancy, daily ELF-MF exposure in the range of 0.3 – 2.0 milliGauss (mG) raised the risk of developing childhood asthma in offspring by 74% compared to low ELF-MF (<0.3 mG) exposure. In a dose-response relationship, levels >2.0 mG in pregnancy produced a 3.5-fold increased risk of childhood asthma in offspring compared to low exposure group1. Quantifying ELF-MFs produced by standard incubators and essential electrical equipment is an important first step in identifying potential risks of exposure for preterm infants.

Methods
ELF-MFs of both standard and transport incubators were measured using EMDEX II Magnetic Field Meter and EMCALC 2007 software package (Enertech Consultants USA). ELF-MFs were recorded at mattress height in 3 inch increments across the surface of the mattress, as well as around the perimeter of the incubator at incremental horizontal distances ranging from 0 to 36 inches from the edge of the mattress, at vertical heights of 24, 36, and 42 inches from the floor. Similarly, ELF-MFs emissions were measured at mattress height around the perimeter of electrical equipment adjacent to the incubator, including a ventilator/humidifier, phototherapy lights, and syringe pumps.

Results

<table>
<thead>
<tr>
<th>ELF-MF Magnetic Flux Density (mG) in Incubator Models</th>
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<tbody>
<tr>
<td><strong>Figure A: Standard Incubator</strong></td>
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<tr>
<td>- Stronger fields were detected near the control panel.</td>
</tr>
<tr>
<td>- ELF-MFs detected outside standard incubator ranged from 0.4 to 281 mG, with highest values adjacent to the power supply located below the control panel.</td>
</tr>
<tr>
<td><strong>Figure B: Transport Incubator</strong></td>
</tr>
<tr>
<td>- Stronger fields were detected above power supply.</td>
</tr>
<tr>
<td>- ELF-MFs detected outside transport incubator ranged from 0.3 to 102.4 mG, with highest values adjacent to the power supply.</td>
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</tbody>
</table>

Surrounding equipment added 0.7 mG to baseline ELF-MF readings.

Conclusions
Magnetic flux density of ELF-MFs within and outside standard and transport incubators exceeds values correlated with negative health consequences2, and is highest near the power supply for the heating element of these incubators. Mechanical design of incubator models should incorporate strategies to reduce ELF-MF exposure.

Clinical Implications
In the standard incubator, if the infant’s head is oriented toward the control panel and/or power supply, the developing brain is exposed to 8-fold the ELF-MF magnetic flux density it would receive if oriented away from the control panel. In the transport incubator, if the infant’s head is oriented adjacent to power supply, the developing brain is exposed to over 40-fold greater emissions. Little is known about the clinical relevance of these fields on the developing newborn brain. NICU staff, pregnant or otherwise, could minimize exposure by not standing near the control panel and electrical components of either incubator type while tending to patients.

Selected References
Comfort Care: “The Thorough Provision of a Different Sort of Care”
Jadia Ditzler, BSN, RN; Melissa Lewis, BSN, RN; Jennifer Sies, BSN, RN
Penn State Hershey Cancer Institute – Inpatient Unit

The PICO Question
Population: Adult oncology patients with terminal diagnosis designated to be “comfort care” status
Intervention: Implementation of a nursing driven comfort care initiative
Comparison: Current practice
Outcome: Improve quality of life for patient and increase family and staff satisfaction with the dying process

Background
Penn State Hershey Medical Center Hospital Administrative Manual Policy PC-04HAM states: Comfort care is reserved for patients who are not expected to recover and whose life expectancy is short. It is not a discontinuation of care, but the thorough provision of a different sort of care. As with all patients, these patients require optimum pain control, privacy, respect for human dignity and assistance in putting their affairs in order. Any therapy that promotes these goals may be appropriate. The goal is to give as much ease and comfort as possible to the dying patient and his/her family.

- Care of “comfort care” status patients identified as an ambiguous area in current nursing practice.
- No clinical practice policies available and administrative policies very vague.

Methods

<table>
<thead>
<tr>
<th>Pre-survey</th>
<th>Utilized Survey Monkey to poll RN staff with six questions over two weeks.</th>
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<tbody>
<tr>
<td>Introduction to management and unit councils</td>
<td>Explanation of project and goals e-mailed to unit leadership.</td>
</tr>
<tr>
<td>Tool development</td>
<td>Drafted and finalized “comfort care” worksheet based on literature review to act as a communication tool for staff, a resource for palliative management, and a plan of care that may be individualized to meet patient desires and establish goals.</td>
</tr>
<tr>
<td>Review of pre-survey data</td>
<td>Analyzed survey results and identified themes.</td>
</tr>
<tr>
<td>Implementation of comfort care worksheet on unit</td>
<td>Copies of worksheet supplied to unit charge nurse with instructions.</td>
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Survey Results
Out of 51 registered nurses surveyed, 23 responded

1. How comfortable are you providing care to “comfort care” status patients (1-5 scale, 1 being not comfortable, 5 being very comfortable)?

2. If you answered 3 or below, what are the most difficult areas for you in providing care to these patients?
   - Pain management
   - Shifting focus from curative to palliative
   - Knowing what care to provide
   - Respiratory support

3. Which areas of patient care need to be addressed most (select all that apply)?

4. In your own words, what does it mean for a patient to be “comfort care” status?
   - “Pain free,” “Comfort,” “Quality of life until death”

5. What are your nursing goals for these patients?
   - “Pain control,” “To feel comfort, peace, and love,” “Emotional support to patient and family”

6. Do you feel that a shift-to-shift communication worksheet would be helpful in your care for “comfort care” patients?
   - 78% responded YES
   - 22% responded NO

Conclusions
- Staff perceived a need for tools to guide and direct comfort care interventions.
- Pain management is a major area of concern among nurses when caring for this population of clients.
- Strategies to improve nurse –physician communication need to be developed and implemented.
- The findings of this study can inform the development of an institutional “comfort care” order set.
- Follow-up to implementation of worksheet with post-survey and reevaluation of tool structure and content is needed.

References
- Salem Health West Valley Hospital, “Adult End of Life Care” Order Set, Form 429064.
- A special thank you to our colleague, Trisha Knight, BSN, RN.

“We have identified that a patient is in the dying process and have decided with the patient and family not to pursue aggressive curative measures, but rather to work towards making the client comfortable, helping to preserve their quality of life during their dying process.”

– American Nurses Association Code of Ethics (Italics added)

“The nurse in all professional relationships, practices with compassion and respect for the inherent dignity, worth, and uniqueness of every individual, unrestricted by considerations of social or economic status, personal attributes, or the nature of health problems... The nurse promotes, advocates for, and strives to protect the health, safety, and rights of the patient.”

– American Nurses Association Code of Ethics

“A special thank you to our colleague, Trisha Knight, BSN, RN.
Introduction

Hand hygiene is an evidence-based practice that lowers the risk of infection for both patients and caregivers. In cancer patients, who are often immunosuppressed, decreasing the risk of infection is vital. Complications from infections are a leading cause of mortality among these patients (Zitella, et. al., 2007). Good hand hygiene in very ill patients may be difficult to accomplish, but the ability and means to offer hand hygiene to patients is a source of RN and PCA satisfaction on the unit.

Methods

Pre-survey:
Identified need for source of hand hygiene for patients on the unit. Worked with management to have personal hand sanitizer stocked on floor.

Survey:
An anonymous survey was sent via e-mail to PSCI inpatient staff. Staff members could follow the link to submit responses. Responses were collected and analyzed by researchers.

Results

Conclusions

Infection deterrence is a primary goal on the inpatient unit, particularly when patients are immunosuppressed. While good hand hygiene is being practiced for the most part by staff, a need was identified to provide hand hygiene for patients, particularly those patients who are unable to ambulate. Results indicated that patients are not always being offered the opportunity to perform hand hygiene after toileting or before meals. Having personal hand sanitizer available to patients increases the likelihood of it being offered to patients at the appropriate time. Being able to offer a personal hand sanitizer to patients is one way caregivers can decrease infection risk for their patients and also increase both patient and staff satisfaction with the level of care on the unit.

References

School is Out: Creating Stroke Detectives through Summer Challenge
Gayle Watson, Judith Dillon & Kathy Morrison
Penn State Hershey Medical Center

Background
Childhood obesity and early-onset diabetes are on the rise. The American Heart Association Heart Disease and Stroke Statistics indicate that the unhealthy behaviors that are the risk factors for stroke begin with school-aged children. In 2009, our organization created a stroke awareness program for high schools and youth groups that demonstrated retention of knowledge in a pre-post test format. The content was developed to be relevant for that specific age group.

Purpose
Building on previous success and the need for earlier education, we developed a Stroke Detective Summer Challenge for elementary age children.

Method
- Information on the stroke center website
- Packets also placed at three local libraries
- Packets to 3rd graders at a local summer day camp
- Packet content:
  - stroke detective pledge
  - activity book
  - exercise & healthy eating log

To qualify as a stroke detective, participants were required to:
1) sign the pledge
2) share their stroke knowledge with 5 people by giving them a F.A.S.T. card and getting their signatures
3) return the signature page, completed exercise & healthy eating log, along with their T-shirt size

Results
A summer’s end celebration for the 22 new “stroke detectives” included stations for making a healthy snack and for some simple physical activity competitions. They each received a detective bag, healthy snack recipes, giveaways, and a Stroke Detective T-shirt. These young detectives, along with their parents and siblings were greeted by our hospital mascot and were given a tour of our helicopter. The students, supported by their parents, enthusiastically described their pride in becoming stroke detectives.

Conclusions
Our previous successful experience with making educational content relevant for specific age groups was repeated in this unique initiative. We demonstrated that stroke awareness education does NOT have to be complex or scary; in fact, by introducing simple facts at a young age, we may help eliminate the fear and ignorance that has made community awareness of stroke such a challenge in the past. They could become the first generation of adults to know that a stroke does not occur in the heart.

T-shirt Design
We are stroke detectives.
We're healthy every day.
We eat our fruits and veggies.
We run and jump and play!
We are stroke detectives.
Sharing what we learned is key.
We help our friends and family stay healthy and stroke-free!

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Stroke Support: Survivors Become Givers of Support
Gayle Watson, Kathy Morrison, and Judith Dillon
Penn State Hershey Medical Center

Background
Stroke recovery is a different experience for every survivor. The recovery process can continue for many years after the initial event. Reintegration into the community can be difficult, as stroke patients have both short and long-term needs. A stroke support group must be flexible enough to assist patients over the time spectrum of their recovery. Our stroke support group was established 21 years ago and has many of the original members still active as leaders. Because younger people are having strokes and have different recovery demands, we were concerned that our program had not evolved to meet the full spectrum of our patients’ needs.

Purpose
To evaluate our current program with the goal to update and expand its programming, and to facilitate the passion of the members to provide outreach to others.

Results
❖ New brochure created with snapshots of members to reinforce that stroke survivors can still be active
❖ Established 2 meeting times on the same day:
  ► afternoon meeting for those who want to be home before dark
  ► evening meeting for those who want to attend after work
❖ Group name changed to “Survivors and Thrivers”
❖ List of members willing to visit patients in the hospital, or to make phone calls to stroke patients and their caregivers
❖ Letter sent home with every stroke patient offering call or visit
❖ Steering committee created to facilitate meeting organization
❖ Meeting content selected by group members. Steering committee finds speakers, as needed. Quarterly sessions are devoted to open discussion for idea sharing and questions.
❖ Information provided via social media sites, email, and the stroke center web site in addition to traditional mailings
❖ Both groups walk together in the annual American Heart Association Heart and Stroke Walk.

Conclusions
Involving members of the stroke support group to participate in the structure and function of the program has increased member satisfaction, improved attendance at meetings, and allowed the program to reach a broader range of survivors. As a result, the support group has become empowered to meet the needs of more stroke survivors and their caregivers in our community – helping them to become “Thrivers” as well.
Abstract
Numerous studies have demonstrated that compliance with best practice standards produces higher quality of care which results in decreased mortality, disability, length of stay, and cost of care. In the current healthcare environment, competition for bedside nurses’ attention is intense. How do we keep quality initiatives front and center until they become ingrained in the staff practice patterns? It is not just stroke care that has opportunities for improvement; there are institutional initiatives, Center for Medicare & Medicaid Services (CMS) initiatives, Joint Commission initiatives, as well as various payer initiatives. All have good intentions, but the collective effect can be described as campaign fatigue. By thinking outside the box, we have improved compliance and continue to educate staff on best practice.

Objectives
- Discuss challenges to consistency with quality improvement measures
- Describe successful incentives

Project Summary
These successful strategies appealed not just to our desire to “do the right thing”, but also to our human desire for recognition & appreciation, positive feedback, and rewards.
- Compliance with dysphagia screening: we pulled a name each month from the list of patients who had been screened appropriately and provided them with a $5 gift card to Starbucks; in addition, an email went out to all the nurses congratulating this nurse for their efforts to protect their patients from aspiration pneumonia.
- Door-to-needle (DTN) time of less than 60 minutes: we provided $2 cafeteria dollars and thank you notes to the ED nurse and neurology resident who were involved with any case in which DTN goal was met. Copies of the notes went to their managers or resident directors for their files. Each note provides a brief case review, and a reminder of the value of early intervention to patient outcomes.
- Severity Scale Documentation: The enthusiasm for the DTN initiative has recently generated another layer of incentive from our medical directors. At the quarterly Stroke QI meetings, both the neurosurgery resident and neurology resident most consistent in documentation of severity scores, now receive a $25 cash card.
- Blood Pressure Management: After creating a blood pressure algorithm for nursing staff to follow, we started an incentive program which includes a small note of congratulations and attached chocolate gold coin. Each nurse who has implemented the algorithm and successfully controlled BP within one hour receives the note in their mailbox. The notes are also distributed to residents and mid-level practitioners who are involved in blood pressure management.

Results
- Our dysphagia screening compliance improved by 50%, with a 36% reduction in aspiration pneumonia.
- We have seen a 22% increase in the number of patients treated within 60 minutes. In addition, we have had enthusiastic suggestions from the neurology residents for process improvement in the paging system in order to ensure accurate arrival times.
- We have seen an increase in the number of cases with appropriate documentation of severity scores.
- We anticipate improvement in the timeliness of getting BP under control now that the process has been expedited.

Discussion
Despite the transparency and extensive reporting of our stroke program data, we remained challenged to meet some of the evidence-based quality standards that improve patient outcomes. Successful strategies related to simple human needs that too often go unfilled in the chaos of a typical day. Recognition of a job well-done and appreciation for efforts made go a long way, especially when shared with one’s peers. In addition, feedback of any kind related to various initiatives is often lacking, leaving healthcare professionals to wonder if what they do makes any difference.

Conclusions
Our methods of thinking outside the box could be translated as “turning the tables” on our nursing and physician colleagues. Rather than using a punitive approach to non-compliance, we used a simple technique proven in parenting for generations: catch them doing the right thing and celebrate it.

References
Berry, J. 2009. There are three basic steps to motivating nurses. Nursing Standard, 24(6): 33.
Abstract
Decreasing hospital readmissions is now a major goal of the federal government, insurance agencies, and other regulatory agencies. Our stroke program follow-up involves appointments at 30-days, 90-days and one year; however many readmissions occur before the first appointment. To address this concern, high risk stroke and TIA patients discharged home now receive a phone call three to seven days following discharge. High risk is defined by: emergent admission in past six months, inability to “teach back” care information, five or more new medications, newly prescribed Warfarin, no caregiver at home, poorly controlled diabetes, or poorly controlled hypertension. We intended to demonstrate that early follow-up with high risk patients will reduce our current 30-day readmission rate of 6.7%, and improve patient satisfaction – a win for all.

Methods
The inpatient care coordinator identifies at-risk patients during their acute care hospitalization, and notifies the stroke clinic nurse by email, including the reason that they qualify for the call. The stroke clinic nurse makes the call within 3-5 days post discharge. They take any necessary action, and document the process on a powerform in the electronic medical record.

Results
This initiative was instituted in July 2011. During the second half of 2011, eleven patients were identified by the inpatient care coordinator, and called by the stroke clinic nurse. Qualifying criteria were as follows:
• Eight were for new warfarin therapy
• 1 was for non-compliant history
• 1 was for new diabetes diagnosis
• 1 was for an unscheduled admission during the previous 6 months

None of these eleven patients had a readmission during the 30-day or 90-day period post discharge.

Discussion
This initiative was instituted in addition to our current process of clinic visit / phone call follow-up at 30-days, 90-days and 1-year for ischemic stroke and TIA patients which was started in 2009. The readmission rates for 2011 – including elective readmissions – are significantly less than for 2010.

<table>
<thead>
<tr>
<th>Readmissions</th>
<th>30 day</th>
<th>90 day</th>
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<tbody>
<tr>
<td>TIA</td>
<td>2010</td>
<td>2011</td>
</tr>
<tr>
<td></td>
<td>10.9%</td>
<td>2.7%</td>
</tr>
<tr>
<td></td>
<td>16%</td>
<td>10.8%</td>
</tr>
<tr>
<td>Ischemic</td>
<td>2010</td>
<td>2011</td>
</tr>
<tr>
<td></td>
<td>6.7%</td>
<td>6.3%</td>
</tr>
<tr>
<td></td>
<td>13.1%</td>
<td>5.5%</td>
</tr>
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</table>

However, this data represents only 80% of the discharged patients, as 20% had no follow-up information as a result of being unable to reach them. We anticipated the volume of early phone calls to be @ 2-3/month based on historical data from our database; eleven cases in 6 months is consistent with that. The improvement in readmission cannot be definitively attributed to the early phone call initiative, but more likely is a result of the structured program that is in place. The engagement of the inpatient care coordinator is new with the early phone call initiative, and has resulted in additional observations/communications to the clinic nurse about specific patient concerns for follow-up.

Conclusions
In the past, hospital readmission has been related to decreased patient satisfaction and increased cost of healthcare. Under the new Patient Protection and Affordable Care Act, hospitals will now be penalized for high readmission rates, making it all the more important to find strategies to limit readmission. Nationally, rates have been reported between 6.5% and 24.3%. Our outcomes suggest that a structured follow-up program that includes early phone calls for high-risk patients can impact the readmission rate.

References

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Care coordination work flow and use of electronic medical record (EMR): A look at the impact of process redesign on patient safety and staff satisfaction

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Penn State Hershey – Milton S. Hershey Medical Center

The use of the electronic medical record (EMR) in medical case management positions has the potential to improve patient safety and the quality of health care. This study will establish the benefits and drawbacks of leveraging health information technology systems to redesign the process and work flow of both RN case managers and social workers employed at an academic medical center.

Methods
In order to evaluate the efficacy of transitioning from an unstructured, paper-based data collection method to a unified system within the EMR, a comprehensive review will be done of specific hospital driven quality measures and data from a questionnaire given pre- and post-implementation.

Objectives
• Redesign the work flow of care coordinators and social workers
• Use the electronic health record as a major factor in influencing changes
• Develop a universal process which can be easily accessed by all disciplines and will be used to generate more positive patient experiences and outcomes

Phase 1 (1-2 months)
* Collection of pre-implementation data
* Defined roles and responsibilities established
* Begin to create electronic documents that are independent of work flows

Phase 2 (3 months)
* Implementation of changes in staffing structure/roles/responsibilities
* Creation of the resource center
* Workout sessions to determine proposed process flows

Phase 3 (6 months)
* IT preparation of new electronic documents
* Continued support to staff in newly defined roles
* Begin education on new work flows and forms

Phase 4 (6 months)
* Test and finalize new forms in production
* Complete staff education

Phase 5 (6 months)
* Monitor changes and determine lessons learned
* Collect post-implementation data

Outcomes
• Increased staff satisfaction as measured by NDNQI and in-house survey given pre and post implementation
• Formation and opening of a Case Management Resource Center to aid staff in discharge planning and obtaining resources with the anticipation of improved customer relations both internally and externally
• Decreased Length Of Stay (LOS) and prevention of readmission for patients
• Reduction in the amount of time spent writing and reading narrative notes to obtain discharge information
• Ability to run reports on discrete data elements
• Identical data elements being utilized and pre-populated across electronic forms and clinical disciplines to increase transparency of information and interdepartmental communication
• Development of a policy/procedure for the collection and documentation of data within the care coordination department

Current State
• Identification of straw man diagram for role delineation and work flow
• Staffing model redesign complete and ready for implementation
• Educational needs identified per role
• IT project proposal accepted and assigned
• Care coordination staff designed new assessment tool using case management standards of practice
• Discrete data element audit completed and in process of identifying appropriate fields for cross-discipline use
Development and Implementation of an Automated, Integrated, Continuous Acute Pain Patient Information Management System (Acute Pain PIMS)

Sanjib Adhikary M.D., Susan Riemondy, RN, Patrick McQuillan M.D.
The Department of Anesthesiology Penn State Milton S. Hershey Medical Center

Introduction

Traditionally, acute pain management consults, procedures, and follow-up have been documented in the medical record as a single point of entry, either by electronic or hand written methods. Pain scores and analgesic requirements during an in-patient admission are subsequently documented independently in different locations in the patient’s medical record. Shortcomings with these methods include:

- Data is discontinuous and entered by different teams (APMS, nursing, surgical) at different times.
- Gaps in evaluation and management of pain.
- Variability in assessment.
- Incomplete documentation.
- Inconsistent communication between nursing, APMS, and Surgical teams.

We have developed an Acute Pain PIMS that is integrated with the Electronic Medical record (EMR) in our institution. PIMS automatically imports patient information, in a continuous fashion, to the acute pain database. Patient information includes: name, surgical procedure and service, APMS treatment and pain scores, as well as the time and dose of pain medication administered. The system is searchable and was designed to be robust, so that in the future, other parameters can be added.

Methods

A team consisting of specialists in Information Technology (IT), billing, acute pain nurses and physicians designed the PIMS in approximately 8 months. Joint Commission (JC) and Centers for Medicare & Medicaid Services (CMS) guidelines and compliance requirements were also built into PIMS. PIMS use has 4 components:

Component A: Acute Pain procedure and medication documentation is completed by the APMS team (resident/attending) performing the acute pain procedure.

Component B: Creation and uploading the document to PIMS is completed by the APMS attending after verifying and electronically signing the APMS procedure document.

Component C: Data entry is completed by the point of care team on the inpatient wards. This is usually the nurse responsible for the patient’s care.

Component D: A report can be generated by anyone with access to the EMR. One is also automatically generated every 12hr, including all patients having had acute pain procedures in the previous 48 hrs.

Discussion

The implementation of an Acute Pain PIMS has led to improvement in our APMS in a number of ways including:

- We are now able to evaluate the efficacy of all Acute Pain procedures in one report before interacting with the patient. This information is also readily available to all care teams.
- Analgesic requirements and pain scores are now monitored continuously for 48hrs after acute pain procedure.
- The Acute Pain PIMS links the acute pain procedure details with the patient’s pain management. This information has led to better evaluation of the effectiveness of procedure and detection and elimination of gaps in pain management.
- This system fosters communication between care teams.
- The implementation of Acute Pain PIMS, with the inclusion of required fields for documentation, ensures accuracy and compliance with regulatory requirements.
- Utilization of a consistent, validated evaluation tool for peri-operative pain management.

Conclusions

To our knowledge, this is the first report of an integrated, continuous, electronic APMS data system. We believe implementation of an Acute Pain PIMS leads to a better and more comprehensive peri-operative pain management program.

References

2. Neal JM, Wedel DJ. Ultrasound guidance and peripheral nerve injury: is our vision as sharp as we think it is? Reg Anesth Pain Med 2010; 35:335-7.
Save a Line - Save a Life!
Promoting Best Practice for Central Venous Catheter Care
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Introduction
The Central Line Associated Blood Stream Infection (CLABSI) rate among inpatient oncology clients was frequently higher than our target goal. Audits revealed less than 100% compliance with practice outlined in our evidence-based Central Venous Catheter (CVC) policies. Our policies were reviewed to confirm compliance with recommendations in the literature. To evaluate if change in practice is needed, consistent adherence to the EBP policies by all staff nurses must occur. An opportunity was recognized to promote nurse accountability for best practice in CVC care in this vulnerable population.

Significance
• An estimated 248,000 bloodstream infections occur in U.S. hospitals annually.
• Most bloodstream infections are believed to be associated with a CVC.
• CVC infections can increase length of stay, hospital cost, and patient mortality.
• Guidelines are available from the Center for Disease Control, the Infusion Nurses Society, and the National Comprehensive Cancer Network. However, the literature lacks consensus about best practice.
• Query of similar large teaching medical centers reveals a lack of consensus about best practice.
• Reducing CLABSI is a nurse sensitive outcome and a key quality initiative in hospitals.

Will consistent adherence to the policy for central venous catheter care reduce the CLABSI rate on the hematolgy/oncology inpatient units?

P - The CLABSI rate for the hematology/oncology inpatients with central venous catheters is higher than our target goal. (Population; Problem)

I - Identify, train, and utilize Resource Nurses to re-educate all staff nurses on consistent adherence to the CVC policies through review of policies, pre-test, e-learning, post-test, and return demonstration of CVC care procedures. (Intervention)

C - The variations in practice that were identified through competency reviews and nursing staff survey. (Comparison)

O - The average CLABSI rate will be ≤ 1.9 for the FY3Q10-11.
• Consistent adherence to the policies for care and maintenance of central venous catheters will increase as a result of the education program as measured by Real Time Analysis chart reviews. (Outcomes)

Method
• Identify Project Leaders from among the PSHCI staff nurses.
• Identify RNs to function as Central Line Care Resource Nurses.
• Provide education (PSHCI Project Leaders, Nurse Educator, Clinical Nurse Specialist) to Resource Nurses regarding meticulous central venous catheter care to ensure consistent performance.
• All staff complete pre-test, review our EBP policies, complete e-learning on policy for obtaining blood culture, complete a post-test.
• Resource nurses evaluate return demonstration of each RN for CVC dressing change and blood culture drawing technique.
• Project Leaders monitor compliance with CVC policy through peer observation, stress documentation of patient education and CVC care, and assist with Real Time Analysis of positive blood cultures.

Discussion/Outcomes
• Emphasis on our EBP policies for care of CVCs stimulates dialogue among staff about best practice regarding this care. Ongoing discussion identifies areas for practice improvement.
• Project Leaders perform Real Time Analysis of identified bloodstream infections.
• Project Leaders now participate in our Central Line Utilization Education quality initiative team (CLUE) and make recommendations about tubing changes, blood culture collection methods, and separation of transplant patient from hematology/oncology patient CLABSI results.
• Staff Nurses are more aware of the importance of EBP policy adherence to help lower the CLABSI rate, improve our ability to monitor our contribution to CLABSI, and evaluate practice change recommendations.
• Collaborative discussions are occurring between nurses and physicians on ways to reduce CLABSI , i.e. the evidence for insertion of tunneled rather than non-tunneled catheters and earlier removal of central venous catheters.
• Real Time Analysis reports demonstrate improvement in documentation of central line care, maintenance, and assessment.

Conclusions
Our CLABSI rate continues to fluctuate. Further investigation of techniques to reduce potential for infection are needed. Transfer of knowledge into practice requires vigilant monitoring until it becomes routine care.

Results

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<tbody>
<tr>
<td>Absolute # Bloodstream Infections</td>
<td>6</td>
<td>0</td>
<td>3</td>
<td>3</td>
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<td>1</td>
<td>2</td>
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<td>CLABSI Rate</td>
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References