Thank you to all of those who attended the 2017 annual fall conference in NY this past October. We had a successful networking and poster session as well as a stimulating full day of lectures. We look forward to seeing you all in Boston for this years annual conference.
During our fall conference, we set aside time in the afternoon to share our collective wisdom on a variety of topics. During this networking session, table groups were randomly assigned a discussion question. The topics included:

1. Innovative solutions to reducing infection rates in pediatric cardiac inpatient units.

2. Effective approaches to orienting and supporting newly graduated nurses in high acuity cardiac units.

3. Effective interventions to reduce moral distress among cardiac nurses in high acuity environments.

Here we summarize the results to share with our NPCNA community.

**Innovative solutions to reducing infection rates in pediatric cardiac inpatient units.**

At Tufts Floating Hospital for Children, a group of nurses collaborating with their wound care team and wound physicians, are working on a new intervention called Vash/Wash; they are looking at sutures used by surgeons and considering options for changing the type of sutures, and are in the process of creating an infection control bundle.

In the outpatient area at Cohen Children’s Hospital, they started handing out surveys to parents asking if the physician with whom they met had performed hand hygiene. This has resulted in an improvement in hand hygiene compliance.

At Boston Children’s Hospital, post op wound checks are performed in the clinic. They have also implemented hand washing surveys, a protocol for cleaning BP cuffs, and a policy of no toys in clinic. These interventions are monitored by the cardiology Infection Control nurse.

At Children’s National (DC), they also have an Infection Control nurse to track data and implement new strategies. They recently cultured the nursing station, parent chairs, keyboards to demonstrate where bacteria live. They have implemented infrared cleaning of patient rooms. They have developed infection control bundles that include elevated HOB and oral immune therapy. A “secret shopper” routinely monitors hand washing compliance. A quality board displays their outcomes.

At Morgan Stanley Children’s Hospital (NYP), the use of PPE is strictly enforced. CHG baths are performed preoperatively (x2) and daily on all patients with a CVL or PICC. CVL dressing changes are performed by 2 nurses per protocol. Prior to accessing line, a 15 second scrub of the hub is now required, unless a Curos (green) cap has been on it. Lines are removed as soon as possible once they are no longer needed. Although this is not a policy, it is a standard. A Foley care checklist was implemented to reduce catheter associated UTIs. All visitors are educated about 100% hand washing compliance and nurses (assigned daily) perform 4 hand washing audits throughout the day. C diff rates were down for the year as a result of this intervention.

**Effective approaches to orienting and supporting newly graduated nurses in high acuity cardiac units.**

In the PCICU at Morgan Stanley Children’s Hospital (MSCH), the length of orientation was adjusted to provide adequate exposure to a variety of clinical experiences. During the 24 weeks of clinical orientation, which includes didactic as well as bedside experiences, they have noted that orientees experience increased confidence in practice with very little turnover among new graduate nurses. In addition, “cardiac huddles,” 30-45 minute teaching sessions at the bedside or in a conference room, are held on the unit weekly. The sessions are held in the evening. All disciplines (cardiology, cardiac surgery, RN/NP, nutrition, pharmacy, etc) were recruited to present on various topics. While it can be challenging to get staff away from patient

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care to participate, they continue to make it work.

The PCICU nurses at MSCH have also implemented a mentorship program. All new orientees identify 3 nurses they trust and with whom they feel comfortable. They are paired with one of their choices. Guidelines have been established for mentee meetings, as well as discussion points. For those who have fully embraced the program, the relationships have been rewarding and lasting. They continue to evaluate the program and make improvements based on feedback from both mentees and mentors.

In the Neonatal Cardiac ICU at MSCH, first identified learning needs, restructured the curriculum based on learning needs and knowledge/skills expected of the new cardiac nurses, and developed/executed classes that blended didactic and hands-on skills. Sessions cover cardiac topics (defects, hemodynamics, post op, etc), ECMO/open chest, CRRT. Simulation sessions provide an opportunity for nurses to apply their new knowledge in open chest and emergency management scenarios.

At St Joseph’s Children’s Hospital, post op surgical patients return to the PICU. A Preceptor Program was developed for senior staff to prepare them to precept new nurses. Didactic and simulation experiences support the bedside learning. Nurses are introduced to post op care in a phased approach, and work closely with the APN on care priorities.

Children’s Hospital of Pittsburgh of UPMC recently re-designed their cardiac orientation, based on evaluations and outcomes from previous orientation groups. The current orientation consists of 14 weeks, with 2 weeks at the end with a clinical leader. Each orientee is assigned to 2 preceptors. Cardiac classes are provided to support bedside learning. Individualized schedules were designed for each orientee so that appropriate assignments could be made to meet their learning needs and skill level. This helped to assure that different types of assignments and learning experiences were covered. They are also in the process of developing a mentorship program to support new nurses.

**Effective interventions to reduce moral distress among cardiac nurses in high acuity environments.**

Morgan Stanley Children’s Hospital, Children’s National, and Nationwide Children’s offer an Employee Assistance Program (EAP) which provides psychotherapy and counseling. They agree that it is important to remind staff to use the program and advocate for RNs to use the program. Individualized results are seen with this intervention.

Children’s National uses facilitated case discussions and debriefings led by a chaplain with all disciplines invited. The hope is that the discussions ameliorate moral distress and builds resiliency amongst the staff.

Morgan Stanley Children’s Hospital conducts debriefs after events. Events include ECMO cannulations. There is an immediate “script” for the team and is attending MD led. Leadership encourages RNs to take breaks, pace themselves, get organized and allow staff to vent. Collaboration with medical team and pastoral care were important for this intervention and leadership is invested in the process. They need to see if the staff is satisfied with those as this time. Areas for improvement were identified.

Boston Children’s Hospital (BCH) has a NEST program, where 5-6 nurses were trained to identify moral distress. They rotate through the ICUs daily to check on nurses and “hot spots”. BCH sent out the “Healthy work environment survey” and conduct SASI rounds: Staff Appreciation and Support Initiative. Activities include Fun Committee and Sunshine club on the units, Panera Wednesday, Pizza from Leadership, Reiki provided to staff,
themed weekend and holiday parties and Espresso Joe. Leadership & Management support these initiatives which were driven by results of the survey. Staff commitment and involvement are key. The interventions increased comradery, help people with self-care, and make people want to come back to work therefore increasing retention.

Nemours/ AIDHC have Employee Assistance Program (EAP) visits monthly, Pastoral Care activities, mindfulness seminars, debriefs after events and continuously celebrate small wins. Success can be attributed to offering food, offering call-in opportunities, offering sessions on both days and nights and involving Palliative Care and other disciplines.

We thank all those who participated in the discussions for sharing their insights and strategies that positively impact patients and those who care for them.

2017 Poster Examples

Protein-Losing Enteropathy

Katherine Penny MSN, RN, WOCN, CPNP: Christine DeGray BSN, RN, CPN; Marlene Pelletier BSN, RN, CP; Michele Keough BSN, RN, CPN

**Background**

- **Protein Losing Enteropathy (PLE):** the abnormal loss of protein into the gastrointestinal (GI) tract.
  - Loss occurs through the enteric, vascular, and lymphatic systems.
  - Most affected protein is albumin, a water soluble molecule that functions as a transport medium for hormones, fatty acids, ions and bilirubin.
  - Losses can be up to 80% and liver unable to compensate for increased losses (normal losses 10%) by increasing production.

- Incidence and prevalence unknown but occurs in 4-13% of patients with single ventricle circulation (2,3).
- Vascular lesions from Fontan surgical procedure weeks to years previously (average 3.5 years).
- Chronic inflammation and undefined genetic predisposition likely play a role in determining who develops PLE after Fontan.

**Symptoms of PLE**

- Dermatitis
- Blotching
- Steatorrhea
- Fatigue
- Fever
- Weight Loss
- Malnutrition
- Abdominal Pain
- Periportal Edema
- Anorexia
- Hypoalimentation
- Coagulopathy
- Depression
- Loss of T Cells and Pleural and Pericardial Effusions
- Anemia
- Hepatic failure
- Disturbances in Immune System and Growth

**Causes**

- PLE can be caused by either an abnormality of the lymphatic system (loss of protein from lymph) or an increase in mucosal permeability secondary to injury to the mucosa (4).

**Mucosal Injury**

- Immune Disease (IBD) with leakage of protein-rich fluids through damaged mucosa (4).
- Rare cases seen with Malaria and Hanta Virus as part of a post-viral syndrome (5).

**Abnormalities of the Lymph System**

- Intestinal lymphangiectasia diffuse or local dilatation of enteric lymphatics located in the mucosa, submucosa or subcutaneous產業 occurs as congenital malformation or acquired defect (6).
- Secondary lymphangiectasia: dilatation of lymphatics from obstruction of the vessels (IBD, sarcoidosis, or lymphoma) or elevated lymph pressure due to elevated venous pressure from heart failure or other causes (7).

**Cardiovascular Disorders**

- Post Fontan procedure. Thought to be related to elevated Fontanentric vena cava pressures, decreased cardiac function, elevated pulmonary vascular resistance and poor cardiac output resulting in poor perfusion of the GI mucosa (8).

**Management of PLE**

- Goal: optimize nutritional status and treat underlying etiology (3,5).
- Heart transplant: only potential cure, needs to be healthy enough to survive transplant.
- Consult with GI clinician knowledgeable of Fontan operation/physiology (9).
- Minimize anemia or iron deficiency (2).
- Provide modified diet: high protein, low fat and medium chain triglycerides (MCTs).
  - MCTs bypass the intestinal lymphatic system and are absorbed directly into the bloodstream.
  - Give fat soluble vitamins in water-soluble forms (10).
- Identify and treat any reversible hemodynamic abnormalities.
  - Atrioventricular, anterolateral valve regurgitation, coarctation of the aorta.
- Medications to increase cardiac output (11).
  - Careful dosing to decrease symptoms of fluid overload and edema.
  - ACE inhibitors to reduce systemic vascular resistance (12).
  - Pulmonary vasodilators (nitric oxide) to reduce pulmonary arterial resistance short-term.
  - Sildenafil: decreases pulmonary vascular resistance and improve mesenteric arterial blood flow in chronic heart failure (13).
  - Bosentan: being investigated (14).
- Corticosteroids: oral administration delivers the medication directly to the mucosa where most needed (15).
- Low Molecular weight Heparin: decreases inflammation by inhibiting mast cell degeneration.
  - Heparin: lack of effect improves survival in a randomized trial (16).
  - Acts as barrier to large molecules (albumin) (17).
- Oxpertid: minic natural somatostatin.
  - Decreases thoracic duct lymph flow (18).
  - Used to treat chylous effusions and lymphangiectasia.
- Serum albumin transfusions: intermittent albumin transfusions may help increase serum albumin and offer symptomatic relief (19).

**Prognosis**

- Depends on the severity, underlying etiology and treatment options (4).
- Uncommon but life-threatening complication of the Fontan procedure with a 5 year survival rate of 46-50% (20).
- 2012 data show treatment advances have improved survival rate to 68% for 5 year and 72% for 10 years (21).
- Complications leading to mortality include severe edema, low cardiac output, hypocalcemia, thromboembolism, arrhythmia, infection, sepse.
- Resolves within 3-6 months post heart transplant in most patients (22).
Developing a Training Curriculum for the Nation’s First Dedicated Infant/Neonatal Cardiac Intensive Care Unit

Emilly DeMarco, MSN, RN, CCN

Background
- Morgan-Elgans Children’s Hospital (MEC) opened the nation’s first dedicated Infant/Neonatal Cardiac Intensive Care Unit (NICU) in September 2017.
- At the beginning of 2017, there was no standardized training program in place for nurses with Neonatal ICU experience to care for the specialized population of neonatal infants with cardiac anomalies.
- A review of the literature revealed 13 articles with varying degrees of relevance, and confirmed that there are no specific models/structures found to demonstrate a neonatal-specific cardiac training program for nurses.
- Question: Purpose: What are the current standards of practice for training neonatal cardiac ICU nurses?
- Hypothesis: Creating a specialized, competency-based training curriculum will address the identified knowledge gap for this specialized population and improve confidence in practice, ultimately leading to improved RN satisfaction and patient outcomes.

Methods
- This was a quality improvement project designed to identify best practices, design and implement a structured orientation program, and evaluate the effects of a structure orientation program on nursing perspectives and practices.
- A total of 13 RNs completed the training program at the time of data collection. These nurses were all external staff to the new Infant Cardiac ICU, with a mean 1 year experience in a level I NICU or PICU.
- Data was collected May 2017 through the opening of the unit in September 2017.
- Data was collected using both pre- and post-test assessments, as well as qualitative course evaluations based on the following criteria:
  1. Magnet Standard SE 4: RN participation in professional development programs that improve nursing knowledge, attitudes, and skills
  2. Milne’s Model of Evaluation, Level 2: Learning – evaluating the degree to which participants acquire the intended knowledge, skills, attitude, and commitment based on their participation in the training

Results
- Pre-test to post-test improvement in the learner’s pre- and post-test scores.
- Analysis of data showed an average of 28% improvement in the learner’s pre- and post-test scores.

Discussion
- Overall, there was a very positive response to the training program.
- Many experienced nurses currently caring for cardiac infants in the NICU requested the training as well. Going forward, all subsequent training will be open to all RNs within MEC.
- The quality evaluation did not account for any supplemental on-the-job training that occurred on managing ECMO, CRRT, and open heart procedures.
- The training program is being evaluated on a continuous basis and revised based on evaluation data.

References

Post-Transplant Lymphoproliferative Disorders (PTLD)

Katherine Penny MSN, RN, WCCN, CPNP; Marlene Pelletier BSN, RN, CPN; Christine DeGray BSN, RN, CPN; Michele Keough BSN, RN, CPN

Background
- "Post-transplant lymphoproliferative disorders (PTLD) are lymphoid or plasma-cell-like proliferations that occur in the setting of solid organ or allogeneic hematopoietic cell transplantation as a result of immunosuppression."
- "Heterogeneous group of lymphoproliferative diseases."
- "Among the most serious and potentially fatal complications of transplant.
- "Five year survival rates are 60-70%.

Types
- Early Lesion/Benign Polyclonal Lymphoproliferation: Presumed as an infectious, post-transplant acute illness, characterized by polyclonal B cell proliferation
- "No evidence of malignant transformation
- "Histology shows effacement of nodal architecture
- "Does not meet criteria for one of the B cell or T cell lymphoma in immunocompetent patients.
- Monomorphic PTLD (mPTLD): Monomorphic lymphoid proliferations that meet criteria for one of the B cell or T cell lymphoma in immunocompetent patients.
- "Clinical Hodgkin Lymphoma-like PTLD: Least common form
- "Lack of data for management
- "Typically treated with chemotheraphy or without radiation therapy.

Causes
- "Majority seems to be related to the presence of EBV
- "Aggressive immunosuppression
- "Risk factors include: time post-transplant, recipient age, ethnicity, pre-transplant malignancy

Clinical Manifestations of PTLD

<table>
<thead>
<tr>
<th>Variable</th>
<th>Definition</th>
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<tbody>
<tr>
<td>Fever</td>
<td>Cachexia</td>
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<tr>
<td>Fatigue</td>
<td>Weight loss</td>
</tr>
<tr>
<td>Rash</td>
<td>Nausea</td>
</tr>
<tr>
<td>Oral Ulcers</td>
<td>Abnormal liver enzymes</td>
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<tr>
<td>Diarrhea</td>
<td>Hemorrhagic necrosis</td>
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<tr>
<td>Cytopenia</td>
<td>Extravascular growth</td>
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</tbody>
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Diagnosis
- Fluorescence-activated cell sorting (FACS) Positive expression lymphomeningeal tumor (PET) shows malignant lymphoma, extranodal sites of disease (Figure 1)
- Histopathologically
- Lymphoid (immunoglobulin gene rearrangements)
- EBV infection
- Computed tomography
- Disruption of underlying tissue architecture

Incidence
- Varies after solid organ transplant.
- Highest incidence (5-20%) found after heart, lung, and small bowel transplants.
- Kidney transplant incidence lower at 1-2%.
- Less intensive immunosuppressive protocols could explain the difference

Prevention
- Routine monitoring in high risk patients
- Reduction of immunosuppression: early lesions may respond well
- Consider risk/benefit of graft rejection or graft-versus-host disease
- Antiviral agents prophylaxis (acyclovir and ganciclovir): limited productive viral replication
- Do not influence the latent cycle of EBV associated with PTLD

Treatment
- Varies based on subtype of PTLD
- Main goals: Eradication of PTLD and preservation of graft function
- Reduction of immunosuppression in early lesions
- Rituximab (CD20 monoclonal antibody) for PTLD or mPTLD with CD20+ cells
- Chemotherapy, with radiation, unless they do not have CD20, may be used alone
- Radiation therapy: therapy for localized PTLD or patients with central nervous system involvement
- Additive immunotherapy with EBV-specific cytotoxic T-cells: attempt to kill dividing B cells in EBV-associated PTLD, for persistent disease despite other therapies
- Re-transplantation: not much data exists to support this
Background
In post heart transplantation, a pediatric patient is required to come to the cardiac catheterization lab for a tissue biopsy on a routine schedule to rule out rejection of the newly transplanted organ. During this visit, there are some important laboratory tests that are needed for medical surveillance. Many of these tests are also participating in clinical trials which require additional blood specimens to be drawn at the time of biopsy, increasing the volume required at one time. Although there was a large volume of blood being drawn for each patient, some of the tests were cancelled due to an insufficient amount of blood collected.

Purpose
The purpose of this performance improvement project was to identify the maximum allowable blood draw volume for a pediatric patient based on their weight and to decrease the number of cancelled tests due to an insufficient volume of blood collected.

Methods
We identified the different tubes that were needed for each specific blood test and analyzed the volume of blood required for the laboratory to run each of the blood tests ordered. An inquiry was done to look into combining some of the tests that used the same color tubes to reduce the number of tubes and the volume required. The review of current literature shows that blood volume limits should be between 1% and 5% of total blood volume (TBV) on a single draw (or over 24 hours) (Howes, 2010). Many of the pediatric hospitals throughout the United States are utilizing 2.5% of TBV as their safe practice guidelines.

Interventions
• We met with the core lab manager to determine what the NYP laboratory guidelines were as to the maximum allowable blood draw volume for a pediatric patient based on their weight. The core lab manager provided us with a guideline to follow that mimics the same data used around the country of 2.5% of TBV as our target volume.
• After determining which labs could be combined and which required a separate tube, (tests that needed to be sent to a specific lab for analysis), a color coded chart was created. It provided the exact amount of blood required in each tube in order for all of the tests to be completed without any errors of insufficient volumes.
• The nursing staff in the catheterization lab, post-anesthesia care unit and the cardiac transplant team were educated on the guideline. The catheterization lab nurses were also instructed to contact the cardiac transplant team if the volume of blood for collection was greater than the maximum allowable amount.
• The charts were placed in each catheterization lab and in the post-anesthesia care unit. We are currently working with the cardiac transplant team to determine which labs can be spread out to different days with a goal to consolidate labs that are absolutely necessary to obtain during the routine biopsy.

Implementation
• We maximized the number of tests by consolidating blood tests into compatible specimen tubes; decreasing the total number of tubes required.
• We were able to eliminate 2 full specimen tubes by combining a total of 10 tests thus reducing the total volume of pediatric blood draw.
• The catheterization lab nurses follow the guideline for the maximum allowable blood volume based on the patient’s weight and place the exact volume in each tube.
• This performance improvement project increased clinical efficiency by preventing insufficient collection errors and proving to be cost-effective practice.
• Since the implementation of the color coded chart, we noted fewer instances of cancelled labs due to insufficient volume.

Results

Recommendations
The NYP laboratory policy on the maximum blood volumes remains unclear due to not including pediatric specific requirements. Our next step is to continue working with the laboratory team to finalize a policy that includes the maximum allowable blood draw volume for the pediatric patient.

References


SCHOLARSHIP WINNERS

EDUCATIONAL SCHOLARSHIPS:

Sarah McAlister, BSN, RN is a $1000 educational scholarship recipient. Here is her personal statement: I am very grateful for NPCNA’s support of my advanced practice education. Through my graduate education thus far I believe that my nursing practice has been expanded immensely. This has occurred not only in the ways I expected such as in the growth of my knowledge about clinical topics, but perhaps more importantly in my greater understanding of professional nursing roles and responsibility. I have come to realize that it is nurses’ responsibility to propel our profession forward through advocacy, professional advancement and research. With my graduate education I am hoping to be a part of the profession’s advancement through advocacy and nursing research. As a bedside nurse I believe that I have acted as an advocate for my patients and their families. I am hoping to expand this practice of advocacy to the nursing profession through continued engagement in professional organizations and through support of the nursing profession and our patients in the broader community. Nursing research is another crucial facet in propelling the nursing profession forward and I hope to utilize my graduate education to deepen my involvement in nursing research. It is a great interest of mine and I believe this is an important way that I can help to enact change in the...
nursing profession and for our patients. By becoming an advanced practice nurse, I hope to fulfill my goal of providing comprehensive and holistic nursing care to children with medically complex needs. I am grateful for professional organizations, such as NPCNA, that provide support for other nurses in their community. These organizations provide the structure to be able to enact change through financial assistance of graduate nursing education and nursing research, a knowledge sharing through yearly conferences and a structured community in which advocacy is possible. These have been invaluable additions to my own nursing practice and have strengthened the pediatric cardiac nursing community. Thank you very much for your aid towards my continuing education and for your continued support of the nursing profession, specifically of the pediatric cardiac nursing community.

**RESEARCH GRANTS:**

Alexandra Mikulis BSN, RN, CCRN, from Children's Hospital of Pittsburgh of UPMC, is the $1000 research scholarship recipient. This grant will be used for a patient education project that will assist with the transition from pediatric cardiac care into adulthood. Her group will create a video that will be available for patients on a USB drive allowing them to view the information at home. It will be used to reinforce the cardiologist’s education and allow teens to have information in a developmentally appropriate manner. The grant money will be used to help cover the cost of flash drives, camera, lighting and audio-visual aids.

Lynn Campbell, FNP-C, CCRN-P, MSN, RN from Atlantic Meical Group—Atlantic Health System in Morristown, NJ is the $500 research scholarship recipient. This grant will be used for a patient education project that will assist with the transition from pediatric cardiac care into adulthood. Her group will create a video that will be available for patients on a USB drive allowing them to view the information at home. It will be used to reinforce the cardiologist’s education and allow teens to have information in a developmentally appropriate manner. The grant money will be used to help cover the cost of flash drives, camera, lighting and audio-visual aids.

NPCNA offers an educational scholarship and research grant every year. Please visit our website NPCNA.org for more information. Applications are typically due in October/November and recipients are notified in December/January. You must be an NPCNA member for at least 2 years to qualify.
If you would like to contribute to the NPCNA Newsletter please contact Justine Fortkiewicz at jfortkie@childrensnational.org.

We are excited to return to Boston, MA for the 2018 Fall Conference hosted by Boston Children’s Hospital October 12th and 13th. Please stay tuned for more details.