Comparing and Contrasting Traditional Practice to Evidence-Based Practice for the Experienced Advanced Practice Nurse

Donna Hallas PhD, PNP-BC, CPNP
Mary M. Brennan MS, ACNP-BC
Mary Koslap-Petraco MS, PNP-BC, CPNP
Donna Hallas PhD, PNP-BC, CPNP

- Clinical Associate Professor
- Coordinator Pediatric Nurse Practitioner Program
- New York University
- College of Nursing at the College of Nursing
Mary M. Brennan, MS, ACNP-C

- Clinical Assistant Professor
- Coordinator, Acute Care Nurse Practitioner Program
- New York University
- College of Nursing at the College of Dentistry
- DNP candidate,
- Case Western Reserve University

NYU College of Nursing
M. Koslap-Petraco MS, PNP-BC, CPNP

• Coordinator of Child Health
• Department of Health Suffolk County, NY
• DNP candidate: Stony Brook University,
  – School of Nursing
Abstract

- Evidence-based practice guidelines have clearly changed the underpinning of educating advance practice nurses for clinical practice. There are now cadres of advance practice nurses (APNs) who have been educated and are practicing within this framework. However, APNs educated prior to this movement remain reluctant to embrace and implement evidence-based practice guidelines in their clinical practices. The purpose of this presentation is to inform advances practice nurses about ways to enhance their practices through the use of evidence-based practice in such settings as adult acute care, pediatric primary care, and public health care.
Objectives

• Describe strategies that can be used by current practicing APNs to efficiently integrate evidence-based diagnostic reasoning and clinical making decisions skills in acute, primary, and pediatric health care settings.
Valuing Clinical Practice Guidelines

• Knowledge vs Understanding Clinical Evidence
• Traditional Practice vs Evidence-based Practice
Issues for APNs in Pediatrics

- Lack of published evidence to guide management in children
- Few clinical trials include children
- Of the primary therapeutic interventions used in pediatrics, it has been estimated that 75% of the inpatient interventions (most involve diagnosis of asthma or bacterial infections) and 40% of the outpatient interventions are based on high level evidence

Thus, it is important to use the practice guidelines that have high level of evidence for the pediatric population
According to Sackett, clinicians make decisions about therapy by one of three methods:

- Induction: based on their own anecdotal experience or an understanding of disease mechanisms (this therapy seem to work or ought to work)
- Deduction: Using information from properly conducted studies
- Seduction: relying on the word of others, for example, colleagues or drug representatives

Sackett, Haynes, & Tugwell, 1985
The Most Frequently Questions Raised in Clinical Practice

Therapy (treatment) and prevention questions arise frequently in clinical practice. The usual questions are:

– How should I treat my patient?
– Which therapy (RX) is best for my patient?
– Does the harms/risk outweigh the benefits of the RX?
– Will the therapy (RX) be acceptable to the patient and family?
– Is it cost effective?
Case Scenario: Pediatrics
Primary Hypertension

• Several of your pediatric/adolescent patients have a strong family history of hypertension, and heart disease. Additionally, you have a large population of children with a diagnosis of obesity. You have read a recent report that 5% of the pediatric/adolescent population has primary hypertension. You have very few children with this diagnosis in your practice and wonder if you are missing the diagnosis. You want to learn more about the diagnosis, evaluation, and treatment of children/adolescents with primary hypertension.
The PICO Therapy Question

- In children and adolescents with primary hypertension, what is the effect of life style changes as compared to administration of antihypertensive medications on blood pressure?
Search Strategies

- TRIP Database searches these simultaneously
- Quality of evidence
- Systematic Reviews
- Critically-Appraised Topics [Evidence Syntheses]
- Critically-Appraised Individual Articles [Article Synopses]
- Randomized Controlled Trials (RCTs)
- Cohort Studies
- Case-Controlled Studies
  Case Series / Reports
- Background Information / Expert Opinion

FILTERED INFORMATION
UNFILTERED INFORMATION
Stressed!!!
Search Results

• Keyword search: Hypertension children
• National Guideline Clearinghouse
  – www.guideline.gov
• 221 related articles
• Set limits on the search

Drug therapy of high-risk lipid abnormalities in children and adolescents. A scientific statement from the American Heart Association Atherosclerosis, Hypertension, and Obesity in Youth Committee, Council of Cardiovascular Disease in the Young, with the Council on Cardiovascular Nursing. American Heart Association - Professional Association. 2007 Apr 10. 20 pages. NGC:005623

Search Results (continued)

Guideline Title & Source

- Guideline Title:
  The fourth report on the diagnosis, evaluation, and treatment of high blood pressure in children and adolescents.

- BIBLIOGRAPHIC SOURCE(S)
Summary of Guideline Content

- RECOMMENDATIONS
- EVIDENCE SUPPORTING THE RECOMMENDATIONS
- IDENTIFYING INFORMATION AND AVAILABILITY
Primary Hypertension Pediatric Clinical Practice Guideline

- Definitions of Hypertension in children
- Measurement of blood pressure
- BP tables with percentiles
- Primary and secondary hypertension
- Evaluation
- Therapeutic Life style changes
- Medication management
- Treatment Goals
Application to Pediatric Clinical Practice

• Appraisal of the Guideline
• Implementation of the Guideline
• Evaluation of the office based outcomes
• Evaluation of the hospital based outcomes
Public Health
You are asked by several community leaders to suggest ways to reduce the number of senior citizens who acquire the flu each year. You perform a search and learn that there are approximately 36,000 influenza-associated deaths during each influenza season in the US. Additionally, the data revealed that more than 90% of the deaths occur in individuals over 65 years old. During the 2007-2008 influenza season, 85 deaths in children between the ages of birth to 18 years were also attributed to the flu. Furthermore, 226,000 hospitalizations related to the flu were reported during each influenza season.

- What interventions should you recommend?

- *MMWR* 2008;57 (RR-7) and CDC unpublished data
Public Health Prevention Question

• For individuals over 65 years old & high risk pediatric populations, does the administration of the influenza vaccine to all children from 6 months to 18 years old, reduce the future risk of morbidity and mortality in high risk pediatric and adult populations as compared to the previous public health strategies to immunize all children between the ages of 6 months and 5 years old?
Searching for the Best Available Evidence

- **Seasonal influenza in adults and children - diagnosis, treatment, chemoprophylaxis, and institutional outbreak management: clinical practice guidelines by the Infectious Diseases Society of America.** Infectious Diseases Society of America - Medical Specialty Society. 2009 Mar. 30 pages. NGC:007080
Searching for the Best Available Evidence (continued)


Searching for Best Available Evidence: Webliography

- www.cdc.gov: Center for Disease Control: National Center for Infectious and Respiratory Diseases
- http://www.who.int/en/: World Health Organization
Average Influenza-Associated Illness Rates by Age Group*

Sources: Monto J Infect Dis
Glezen N Engl J Med
Inactivated Influenza Vaccine Recommendations, 2007-2008

- Conditions that increase the risk of influenza infection or complications:
  - Age
    - 65 years and older
    - 50 through 64 years
    - 59 months and younger
  - Pulmonary (emphysema, asthma)
  - Cardiovascular
  - Metabolic (diabetes)
  - Renal dysfunction
  - Hemoglobinopathy
  - Immunosuppression, including HIV infection

*MMWR* 2008;57 (RR-7)
Influenza Vaccination Recommendations from Practice Guidelines

• Beginning with the 2008–2009 influenza season, all children 6 months through 18 years of age should be vaccinated against influenza annually

• Begin in 2008 if feasible, but no later than the 2009–2010 influenza season

*MWRR 2008;57 (RR-7)*
Effects of Immunization of Children on Adult Populations

- This study used a mathematical model to substantiate herd immunity when school aged children are immunized against influenza
- This herd immunity protected the senior citizen population

Clinical Decision Making

- Who should be immunized in your pediatric and adult populations
Adult Acute Care
Case Scenario: Adult with Diabetic Ketoacidosis

• Mrs. S. is a 45 year-old female with Type II DM and a recent urinary tract infection. Her husband notices that she is slow to arouse this AM and calls 911. EMTs obtain an initial blood sugar reading of 645 dl/.

• As the nurse practitioner in the ER, you consider the initial management of DKA. Your colleagues tell you that insulin therapy must be delayed until serum lytes are checked.
Diabetic Ketoacidosis

• Background Questions
  – Pathophysiology
  – Pharmacology
  – Acid-base balance

• Foreground Questions
  – Management
Questions

• **Therapy**: In patients with diabetic ketoacidosis, should potassium replacement precede insulin supplementation?

• **Diagnosis**: In patients with hyperglycemia, does beta hydroxybutyrate accurately diagnose diabetic ketoacidosis?

• **Prognosis**: In patients with diabetic ketoacidosis, what are the risk factors that predict length of stay?
PICO
Directs the Search

• P: (Patient or Population)
  – Diabetic Ketoacidosis; Hyperglycemia

• I: (Intervention)
  – Potassium; Potassium replacement, Potassium replacement and insulin

• C: (Control or Comparison)
  – Insulin alone

• O: (Outcome)
  – To resolve hyperglycemia; to reduce arrhythmias.
Position Statement

Hyperglycemic Crises in Diabetes

Management of Adult Patients with DKA

Complete initial evaluation. Start IV fluids: 1.0 L of 0.9% NaCl per hour initially (10-20 ml·kg⁻¹·h⁻¹).

**IV Fluids**
- Determine hydration status
  - Hypovolemic shock
  - Mild hypovolemic
  - Cardiogenic shock
- Administer 0.9% NaCl (1.0 L/h) and/or plasma expander

- Hypotension
- Hemodynamic monitoring

**Evaluate corrected serum Na⁺**
- Serum Na⁺ high
- Serum Na⁺ normal
- Serum Na⁺ low
- 0.45% NaCl (4.14 ml·kg⁻¹·h⁻¹) depending on hydration state
- 0.6%/NaCl (4.14 ml·kg⁻¹·h⁻¹) depending on hydration state

**Check electrolytes, BUN, creatinine and glucose every 2-4 h until stable. After resolution of DKA, if the patient is NPO, continue IV insulin and supplement with SC regular insulin as needed. When the patient can eat, initiate a multidose insulin regimen and adjust as needed. Continue IV insulin infusion for 1-2 h after SC insulin is begun to ensure adequate plasma insulin levels.**

- Double insulin infusion hourly until glucose falls by 50-70 mg/dL
- Give hourly IV insulin boluses (10 units) until glucose falls by 50-70 mg/dL
- If serum glucose does not fall by 50-70 mg/dL in first hour
- If initial serum K⁺ is <3.3 mEq/L, hold insulin and give 40 mEq KCl per h (2/3 KCl and 1/3 KPO₄) until K⁺ ≥ 3.3 mEq/L
- If initial serum K⁺ ≥ 5.0 mEq/L, do not give K⁺ but check K⁺ every 2 h.
- If initial serum K⁺ ≥ 3.3 but <5.0 mEq/L, give 20-30 mEq K⁺ in each liter of IV fluid (20 as KCl and 1/3 as KPO₄) to keep serum K⁺ at 4-5 mEq/L.

- Potassium
- Assess Need for Bicarbonate

- Initial DKA bolus in 400 ml H₂O Infuse at 200 mL/h.
- Repeat HCO₃⁻ administration every 2 h until pH > 7.0.
- Monitor serum K⁺.

### Table 3—Summary of major recommendations

<table>
<thead>
<tr>
<th>Recommendations</th>
<th>Grading</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initiate insulin therapy according to recommendations in position statement.</td>
<td>A</td>
</tr>
<tr>
<td>Unless the episode of DKA is mild, regular insulin by continuous intravenous infusion is preferred.</td>
<td>B</td>
</tr>
<tr>
<td>Assess need for bicarbonate therapy and, if necessary, follow treatment recommendations in position statement; bicarbonate may be beneficial in patients with a pH &lt; 6.9; not necessary if pH is &gt; 7.0</td>
<td>C</td>
</tr>
<tr>
<td>Studies have failed to show any beneficial effect of phosphate replacement on the clinical outcome in DKA. However, to avoid cardiac and skeletal muscle weakness and respiratory depression due to hypophosphatemia, careful phosphate replacement may sometimes be indicated in patients with cardiac dysfunction, anemia, or respiratory depression and in those with serum phosphate concentration &lt; 1.0 mg/dl.</td>
<td>A</td>
</tr>
<tr>
<td>Studies of cerebral edema in DKA are limited in number. Therefore, to avoid the occurrence of cerebral edema, follow the recommendations in the position statement regarding a gradual correction of glucose and osmolality as well as the judicious use of isotonic or hypotonic saline, depending on serum sodium and the hemodynamic status of the patient.</td>
<td>C</td>
</tr>
<tr>
<td>Initiate fluid replacement therapy based on recommendations in position statement.</td>
<td>A</td>
</tr>
</tbody>
</table>

Scientific evidence was ranked based on the American Diabetes Association’s grading system. The highest ranking (A) is assigned when there is supportive evidence from well-conducted, generalizable, randomized controlled trials that are adequately powered, including evidence from a meta-analysis that incorporated quality ratings in the analysis. An intermediate ranking (B) is given to supportive evidence from well-conducted cohort studies, registries, or case-control studies. A lower rank (C) is assigned to evidence from uncontrolled or poorly controlled studies or when there is conflicting evidence with the weight of evidence supporting the recommendation. Expert consensus (E) is indicated, as appropriate. For a more detailed description of this grading system, refer to Diabetes Care 24 (Suppl. 1): S1–S2, 2001.
The nurses ask if beta-hydroxybutyrate confirms the diagnosis?

- In patients with DKA, does beta hydroxybutyrate accurately predict the diagnosis of DKA?
- P: Adult patients with DKA
  - Hyperglycemic crisis
- I: Beta-hydroxybutyrate
  - Ketoacids, acidosis
- C: Gold standard
- O: Accurate diagnosis, sensitivity, specificity, likelihood ratio
The nurse asks…. Can beta-hydroxybutyrate be used to confirm diagnosis of DKA?

- PUBMED search
- Search revealed 93 articles
- Most retrospective reviews
Can serum beta-hydroxybutyrate be used to diagnose diabetic ketoacidosis?

Sheikh-Ali M, Karon BS, Basu A, Kudva YC, Muller LA, Xu J, Schwenk WF, Miles JM.

Division of Endocrinology, Diabetes, Nutrition, and Metabolism, Mayo Clinic, Rochester, Minnesota.
Mr. S. asks how long Mrs S. will be in the ICU?

Prognosis

- In patients with diabetic ketoacidosis, what are the risk factors that predict length of stay?
  - P: Adults with DKA
  - I: Risk factors
  - C: None
  - O: Length of Stay

Search revealed…

- Prospective cohort, 18 month observation
- Sample: 584 patients; 56% men; 82% African American; single institution
- Results:
  - DKA patients – those with noncompliance as the etiology of DKA had shorter length of stay than those patients with underlying illness as the trigger of DKA
  - No deaths in patients with DKA
  - DKA patients are less ill than other patients admitted to the ICU
  - Lower Apache II scores, lower mortality, and shorter length of ICU stay than other patients admitted to the ICU.
References

Implementing Practice Guidelines

- Creating the active practice-learning/patient centered health care environment
- APNs and patients are active participants
Additional References

Questions and Answers