Management of Hospitalized Patients with Intrathecal Pumps:
A Clinical Practice Gap

Kimberly Gonzalez, RN, BSN
September 15, 2017
ASPMN® Annual Conference

Introduction

Kimberly A. Gonzalez, B.S.N.,
Critical Care Unit, Content Expert, Clin III
BSN, University of Texas at Arlington, May 2016
St. Jude Medical Center, Fullerton, CA.
Kimberly.Gonzalez@stjoe.org

Conflict of Interest Disclosure

• Author’s conflicts of interest:
  • Kimberly Gonzalez, RN, BSN, no conflict of interest
Case Study # 1

• Ms. A.C., a 32 yr. old Caucasian female with advanced Muscular Sclerosis came into the ER with respiratory failure from pneumonia and was subsequently intubated and sent to the ICU
• Two days later after being extubated and transferred to the Step Down Unit she exhibited profound rebound spasticity
• Her mother mentioned that she had a baclofen pump and it had been turned off on admission

My Journey

• A Clinical Practice Gap
• First Steps
• Research
• The Plan

Objective

• Explain the development of an intrathecal pump program for hospitalized patients at a community hospital that eliminates practice gaps and decreases significant safety risks involving patients with intrathecal pumps
What is an Intrathecal Pump?

- **Pump** – a metal canister containing the battery, the programmable component that stores information, and the drug reservoir. The pump is surgically implanted under the skin in the lower abdomen on either the right or the left side.
- **Catheter** – is connected to the pump, runs under the skin and enters the spinal canal in the lower back. The tip of the catheter is placed in the intrathecal space and advanced higher to a predetermined location depending on how much spasticity you have in your arms, your trunk, and your legs.
- **Programmer** – a handheld system used by your provider to read the pump information and reprogram the pump using radio telemetry.

### Synchronmed II Infusion Pump

- **Battery Life**: 4-7 years
- **Minimum Programmable Flow Rate**: 0.048 mL/day

### Target Populations

- **Include:**
  - Spinal Cord Injury
  - Multiple Sclerosis
  - Cerebral Palsy
  - Stroke
  - Traumatic Brain Injury
  - Chronic Pain
Patient Identification Process

- Ask all patients if they have an implanted device
  - If yes, determine what type of pump they have
  - If patient unable to answer
    - Ask a family member and/or perform physical assessment
- Perform a physical assessment of the patient's abdomen to determine if intrathecal pump is palpated

Pump Process

- When a Pump is Identified:
  - House Supervisor/Rapid Response RN contacted to interrogate the pump
  - Attending Physician informed and orders obtained
  - Medication added to the medication administration record (MAR)
  - Intrathecal Pump Assessment added to the nursing intervention list

Patient Assessment
Case Study #2

Mrs. P.S., a 65 yr. old Hispanic female, was found to have slurred speech when speaking to her daughter on the phone one evening.

Her daughter called 911 and she was brought to the E.R. and quickly developed respiratory arrest. She was intubated and sent to the ICU.

Her pump had been filled the day before and an error was found. The patient had been quadruple dosed due to a labelling error.

Baclofen Overdose

Symptoms:
- Drowsiness
- Lightheadedness
- Dizziness
- Somnolence
- Respiratory depression
- Seizures
- Hypothermia
- Rostral progression hypotonia
- Loss of consciousness progressing to coma (reversible)

There is no specific antidote for reversing overdose symptoms.

Baclofen Withdrawal

Symptoms:
- Altered Mental State
- Exaggerated rebound spasticity and muscle rigidity
- Multiple organ system failure
- Pruritus
- Death

Withdrawal may resemble:
- Autonomic dysreflexia
- Sepsis
- High Fever
- Malignant hyperthermia
- Neuroleptic malignant syndrome

There is no specific antidote for reversing withdrawal symptoms.
Medications in Intrathecal Pumps

- Skeletal Muscle Relaxants: lioresal (Baclofen®)
- Opioids: morphine (Duramorph®)
- Non Opioids: ziconotide (Prialt®)
- Other Opioids or combinations of medications are sometimes used off label

Cone Snail (Prialt)

Case Study #3

- Mr. J.C., a 35 year old male, who presented to the ER with respirations of 6/minute and altered level of consciousness
- He was intubated and sent to ICU where he also received continuous dialysis for acute renal failure
- Two days later it was discovered the patient had an intrathecal pump
Opioid Overdose

• Symptoms:
  • Pinpoint pupils
  • Respiratory depression
  • Unconsciousness/non-responsiveness
  • Bradycardia
  • Limb body
  • Pale face
  • Clammy skin
  • Cyanotic lips and fingernails
  • Nausea / Vomiting

Opioid Withdrawal

• Symptoms:
  • Muscle Aches
  • Restlessness
  • Anxiety
  • Lacrimation
  • Runny nose
  • Diaphoresis
  • Insomnia
  • Frequent yawning
  • Diarrhea
  • Abdominal Cramping
  • Nausea/Vomiting
  • Dilated pupils/Blurred Vision
  • Tachycardia
  • Hypertension
  • Seizures

Training: Staff

• Our entire nursing staff and physicians were trained to recognize and correctly assess patients with intrathecal pumps
• An SLM (Self Learning Module) was created for this purpose
• This module focused on:
  • Identification and assessment of patients with an intrathecal pump
  • Information on overdosing and underdosing of intrathecal pump medications
  • Locating appropriate resources to assist in the interrogation of the pump
Training: Key Personnel

• Key personnel included Rapid Response Nurses and House Supervisors.
• These specialty nurses attended a two hour training course which included:
  • Advanced assessment of intrathecal pump patients
  • In depth review of the new policy
  • Education on pump interrogation
  • Communication with the physician
  • Adding the medication to the MAR
  • How to assist the staff nurse to initiate the assessment and provide documentation

Patient Identifiers

Trouble Shooting

• Radiology and MRI are effective modalities in detecting if the pump has malfunctioned or if the catheter tip has become cracked, kinked or may have migrated.
• “Thorough workup is crucial to rule out implant system dysfunction if clinical evaluation is atypical.” (Awaad, Râk, Siddiqui, Roosen, McIntosh & Waines, 2012)
Radiology

- Location of the catheter can be seen via a PA/lateral chest x-ray which can identify:
  - the placement of the catheter tip
  - troubleshooting to see if the tip has migrated, or become cracked, kinked or damaged.
- The catheter is radiopaque to enable identification under fluoroscopy and x-ray.

MRI Precautions

- Pumps should resume normal operation upon termination of MRI exposure.
- It is necessary to confirm pump status before and after an MRI to detect the following:
  - Temporary Motor Stall and Stall Recovery
  - Time Required for Stall and Recovery Detection
  - Potential for Delay in Logging Motor Stall Events
  - Potential for Permanent Motor Stall

Refill Kit
Pump Alarms

- Elective Replacement Indicator (ERI): Non-critical alarm
  - Single-tone alarm
  - Low reservoir or replacement due
  - Will sound a minimum of every hour
- End of Service (EOS): Critical alarm
  - Indicates that the pump has stopped
  - Two-tone alarm
  - Will sound a minimum of every hour

Summary

- Intrathecal pump patients are a “low volume, high risk” population
- Our intrathecal pump project closed a critical clinical practice gap including the identification and tracking of intrathecal pump patients in the acute care setting
- Assessment and documentation were critical components since communication amongst team members is imperative for these patients
- Staff and physician training as well as additional training for key personnel were also key components in the success of this project to ensure high visibility and awareness of intrathecal pump patients

Questions?