Nursing Care of the Telemetry Patient: Neuro, GI, Renal, Ortho

First Topic:
The Renal Patient & Telemetry

Renal Complications & Telemetry
How does telemetry relate to the renal system?
- Consider the major functions of the kidneys
  - Filtration & excretion of metabolic wastes
  - Urine formation
  - Acid-base balance & electrolyte regulation
  - Fluid & blood pressure regulation

Renal Complications & Telemetry
- Consider the multiple & complex etiologies of acute kidney injury
  - Prerenal, intrarenal, postrenal
  - Severe hypotension/ischemia/shock
  - Severe hypertension
  - Dehydration (more common in the older adult)
  - Nephrotoxicity

Renal: Electrolyte Imbalances
- The primary organ responsible for excretion are kidneys.
- Decreased kidney function leads to electrolyte imbalances

- Common electrolyte imbalances
  - K+
  - Na
  - Ca
  - Phosphate
  - Magnesium

Renal: Potassium Imbalance
- Normal potassium level: 3.5 - 5.0 mEq/L
- Hyperkalemia: > 5.0 mEq/L
  - Fatal dysrhythmias reported when serum level reaches 7 - 8 mEq/L

1. ECG changes
   a. Tall, peaked T waves
   b. P wave changes (flat/disappearance of P waves, prolonged PR interval)
   c. Wide QRS complexes
   d. Brady and/or irregular rhythm
   e. Vfib or cardiac standstill

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Renal: Potassium Imbalance Solutions

- Cardiac muscle is intolerant of acute increases in potassium
  - Treatment is essential – know your options
  2. Treatment options → protect the heart, hide the K, remove the K
    a. Calcium chloride/glucosamine
      - Reverses membrane excitability
    a. Bi-carb if metabolic acidosis present
    a. Insulin + glucose in form of D50
      - Forces potassium from ECF to ICF
    a. Kayexalate
      - Binds potassium in exchange for sodium, excreted in feces

Renal: Sodium Imbalance

- Normal sodium level: 135 - 145 mEq/L
  - Hypernatremia: > 145 mEq/L
  - Hyponatremia: < 135 mEq/L

- Sodium may be elevated, normal, or low in kidney failure
  - Dilutional hypernatremia may occur w/ fluid retention
  - Both hypernatremia & hyponatremia do not result in ECG changes
  - Research on ECG changes with hypernatremia is scarce

Renal: Calcium Imbalance

- Normal calcium level: 8.5 - 10.2 mg/dL
  - Hypocalcemia seen in later stages of CKD as kidneys lose the ability to convert vitamin D to its active form
  - Telemetry changes:
    - QTc prolongation
    - T wave typically unchanged
    - Dysrhythmias uncommon

Next Up... The Neuro Patient & Telemetry

Neuro Complications & Telemetry

- How does telemetry relate to the neuro system?
  - Psychiatric medications
  - Post-stroke monitoring
  - Post-surgical monitoring
  - Elevated intracranial pressure (ICP)

Neuro: Tele & Psychiatric Medications

- Tricyclic antidepressants (TCAs)
  - Used for treating depression
  - TCAs vs SSRIs
  - Cardiotoxicity risk
  - Various ECG changes
  - Stimulants
    - Used for treating various diagnoses
    - Assessments before use
    - Tachycardia/irregular heart rate
Neuro: Tele & Psychiatric Medications Continued...

- Antipsychotics
  - Typical and atypical
  - Main use for psychosis management
  - Multiple side effects
  - Risk assessment
  - Prolonged QTc

Neuro: Tele & Post-Stroke Monitoring

- Risk factors for a stroke
  - Modifiable
    - Non-modifiable
    - Cardiac arrhythmias: atrial fibrillation, ventricular tachycardia and ventricular fibrillation
  - Post-stroke
    - Ischemic vs Hemorrhagic
    - Determine treatment
    - ICU
    - Telemetry 24-hours post

Neuro: Tele & Post-Operative Monitoring

- Post-surgery
  - Cardiac, neurologic, and vascular
  - Telemetry utilized 24-hours post
  - Examples

Neuro: Increased ICP

- What is increased ICP?
- Signs and symptoms
- Causes
- ECG changes based on the cause
- Treatment → medical emergency → critical care status

GI Complications & Telemetry

- GI bleed
  - Hypovolemic shock
    - Early signs: tachycardia, weak pulse, hypotension
    - Tilt not always required but beneficial to monitor for a m-2hwx
  - Abdominal trauma - blunt or penetrating
    - Profuse bleeding 
      - Hypovolemic shock/d/ solid organ damage
    - Lacerated liver, ruptured spleen, great vessel tears, etc.
    - ECG incorporated into work-up (FAST exam, labs, etc.) & used as part of the pt.’s ongoing assessment

Now… The Gastrointestinal (GI) Patient on Telemetry
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GI Complications & Telemetry Continued...
- Acid/base imbalances due to dehydration, prolonged vomiting/diarrhea, gastric suction
  - Metabolic alkalosis (base bicarb excess) due to loss of acid from vomiting or suction
  - Zofran may cause QT prolongation
- Metabolic acidosis (loss of bicarb) due to severe diarrhea

& Finally… The Orthopedic Patient on Telemetry

Ortho Complications & Telemetry

Ortho: Fat Embolism Syndrome (FES)
- What is FES?
  - Systemic fat globules are distributed into tissues & organs
  - Causes
  - When do symptoms occur?
- ECG
  - Potential changes with FES
  - Tachycardia, ST changes, & strain pattern

Ortho: FES Continued...
- Imaging
  - X-ray
  - CT
  - MRI
  - TEE
- Treatment options:
  - Hydration, intravascular volume restoration, possibly steroids, albumin, oxygen, early stabilization.

One more case study
Patient profile:
A 29-year-old male presents to the ED at 0200 via ambulance with a closed right femur fracture after an MVC. He is vitally stable upon admission, his pain is not well-controlled.
VS: BP 129/68, HR 88, Temp 98.4, RR 20, 02 93% on RA.
The patient and orthopedic team decide to admit the patient for surgery.

The patient remains alert and oriented but becomes lethargic the next day prior to surgery, by this point expectorant of blood. A bedrested vital
VS on admission: BP 133/70, Temp 100.4, HR 113 regular, RR 33 rapid, 02 87% on RA.

Discussion questions:
- What risk factors does this patient have which may indicate fat embolism syndrome?
- What concerning symptoms does the patient exhibit?
- Would you place this patient on telemetry?
Any questions?

Thank you for your attentiveness and time spent here with us today.

References


References continued...


Hyperkalemia digital image retrieved from https://en.wikipedia.org/wiki/Hyperkalemia

