Medication Errors Arising from Inexperienced Hands: Baclofen-Induced Seizures in End-Stage Renal Disease

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Learning Objectives
1) Educate trainees about dangerous medications for end-stage renal disease (ESRD) and chronic kidney disease (CKD) patients.
2) Explore sources of medication prescribing errors in residency training programs.
3) Recognize mania and seizure as a complication of baclofen intoxication.

HPI:
61 yo AAM presents to ED with new onset of generalized tonic-clonic seizure

Social Hx:
• 61 yo AAM presents to ED with new onset of generalized tonic-clonic seizure

HEENT: Bite laceration on lateral tongue

General: thin, elderly male

T 98.3°F, HR 75, BP 148/87, RR 16

Physical Exam:
• New Rx for Baclofen 20mg Q8hrs for spasticity
• Drowsy, oriented to person and place.
• MRI Brain: chronic left basal ganglia encephalomalacia consistent with old stroke.
• EEG: Mixed delta and theta slowing throughout both hemispheres

Differential Diagnosis and Hospital Course

Infection → No fevers, chills, lab or clinical evidence of CNS infection
Electrolyte disturbance → No electrolyte abnormalities
Toxin-induced → Serum toxicology screen negative
Medication-induced → Recent addition of Baclofen

Postictal/Somnolent; Manic

Day 1
IV Levetiracetam
2 sessions urgent hemodialysis

Day 2
Supportive Care
Complete Resolution of encephalopathy and mania

Day 3
Discharge home without anti-epileptics

Dx: Baclofen-induced seizure and mania

Background

• Adverse Drug Events (ADEs) are a frequent cause of patient morbidity and mortality
• ADEs occur annually in 3.8 million inpatient and 3.3 million ambulatory encounters
• 43% of ambulatory ADEs are from inappropriate drug prescribing
• Medication errors have been shown to decrease with increased prescriber experience
• Chronic kidney disease patients are at especially high risk of ADEs

• Baclofen is a centrally-acting GABA_A receptor agonist used for treatment of muscle spasticity and hiccups
• 15% metabolized by liver; 80% excreted by kidneys
• Serum drug levels rapidly increase in renal insufficient patients
• Neurotoxic affects occur in as little as 2-4 hours in CKD/ESRD
• Seizures and mania are both documented side effects of baclofen toxicity

Baclofen Toxicity in ESRD

• 21 case reports (41 patients) were identified (as of 2011) of baclofen neurotoxicity in CKD patients.
• Most common symptom is encephalopathy. But, there are multiple reports of seizures and mania.
• Treatment is supportive care and urgent hemodialysis.
• Hemodialysis rapidly clears serum baclofen, reducing hospital stay from 9 to 2 days, on average.

Dementia Antidepressants Muscle Relaxers Pain Medications
Galantamine Venlafaxine Baclofen Gabapentin
Memantine Citalopram Methocarbamol Gabapentin
Mirtazapine Tramadol
Pramiramine Baclofen Memantine Oxycodone
Desvenlafaxine Metaxalone Oxycontin
Galantamine Citalopram Gabapentin

Anticoagulants CCI < 30 ml/min
Fondaparinux Dicumarin Anticoagulants
Salicylates Glubricide CONTRA- INDICATED if CCI <50 ml/min
Enoxaparin Rosuvastatin Laxatives Metformin
Dabigatran Sotalol NSAIDs Watch for insulin accumulation in AKI
Rivaroxaban Gemfibrozil Herbas
Apixaban Eptifibatide Fenofibrate

Table 2. List of common medications requiring dose adjustment or avoidance in renal disease patients.

Conclusion

• We propose early resident education through simple pocket-cards to reduce ADEs in CKD. Other high-risk patients and common errors should be included.
• Though seizure has been reported in acute baclofen-intoxication in ESRD, this is the first reported case of mania in this specific population.
• Trainees should be aware of the risk, diagnosis, and treatment of baclofen-intoxication in ESRD patients.

Table 1. Common central nervous system acting medications requiring specialized renal dosing or avoidance. A simple table with medications to avoid and alternatives may reduce prescribing errors among trainees.

References