

## **Proton Pump Inhibitors**

*Led as a 12-15 minute group discussion with active participation from the trainees.*

### **Objectives**

1. Understand adverse effects of proton pump inhibitors.
2. Know how to taper proton pump inhibitors.

### **What are the Long Term Side Effects of PPIs (at least one year)?**

- Some nutrients require gastric acidity for optimal absorption. With decreased acid secretion there is an increased gastric pH which could inhibit some absorption. The extent of the interaction is not known.
  - Calcium: use citrate salt because it is less affected by gastric acidity
  - Vitamin B 12: Not enough intrinsic factor to absorb b12 appropriately
  - Iron: give Vitamin C to increase acidity for iron absorption
- Increased fracture Risk (Due to decreased calcium absorption)
  - 25% increase in overall fractures
  - 47% increase in spinal fracture in postmenopausal women
  - No conclusive data about PPI and BMD
- Infections
  - Increased pH allows more bacterial growth → change in GI and respiratory flora
  - **\*\*Short term side effect\*\***
  - Pneumonia
  - Clostridium difficile infections
- Hypomagnesemia (mostly after 1 year of treatment)
  - FDA Drug Safety Communication in 2011
  - 25% of cases did not resolve until PPI was discontinued
  - Concerning with other medications that lower magnesium (thiazide and loop diuretics, digoxin)
  - Symptoms: muscle cramps, heart palpitations, dizziness, tremors, or seizures

### **How do you discontinue PPIs?**

- Rebound hypersecretion is observed in 60-90% of individuals who take PPIs for at least 2-3 months. The symptoms can last three months or longer.
  - Mechanism: PPIs can induce parietal cell proliferation, which leads to a state of hyperacidity after discontinuation
- Abrupt discontinuation has been shown to be effective at 1 year in 14-64%
- Dose reduction as an endpoint showed that 30-50% of patients were able to tolerate a lower dose

- Tapering seems to be the most successful due to the evidence of rebound acid hypersecretion and hypergastrinemia
  - May need to have antacid in the interim
- Best to take 30 minutes prior to meals to manage the gastric acid surge

## References

1. Reimer, C. (2013). "Safety of long-term PPI therapy." Best Pract Res Clin Gastroenterol **27**(3): 443-454.
2. Haastrup, P., et al. (2014). "Strategies for discontinuation of proton pump inhibitors: a systematic review." Fam Pract **31**(6): 625-630.