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Moxifloxacin: A Unique Cause of Severe Hypoglycemia

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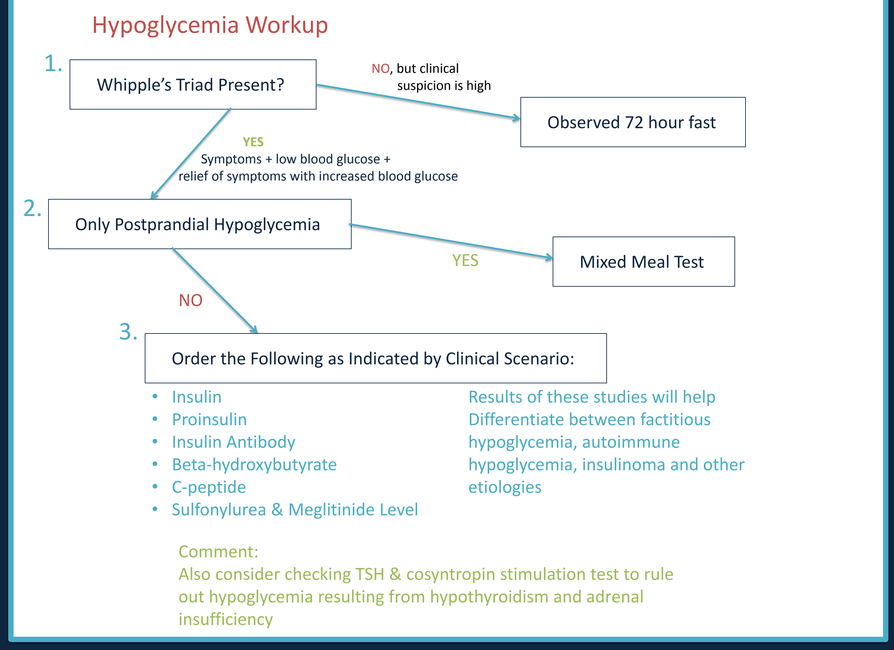
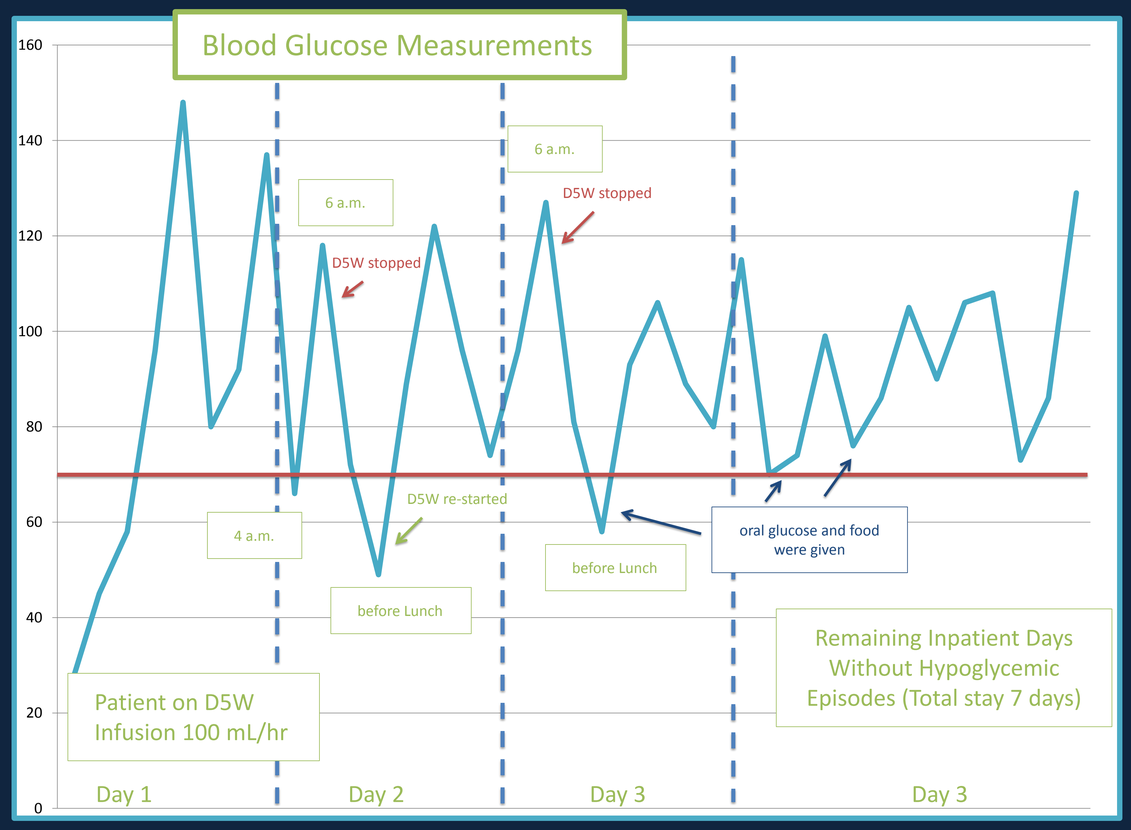
Introduction:

As a class, quinolone antibiotics have been rarely associated with hypoglycemia in non-diabetic patients and rare reversible episodes of hypoglycemia documented in the literature typically occur within the duration of action of the medication. In this case, however, we believe the effect of the medication persisted much longer.

Case Description:

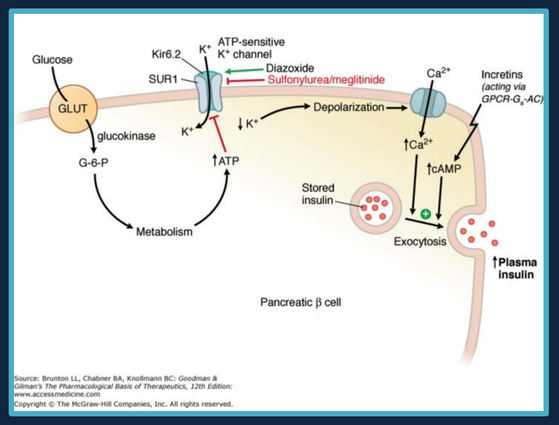
A thin 61-year-old man with a past medical history significant for schizoaffective disorder, bipolar disorder and recent episode of community acquired pneumonia (CAP) presented with shaking and confusion after having fallen while under observation as an inpatient psychiatric patient. A random blood glucose measurement taken at the time of the fall was found to be 26 mg/dL. The hypoglycemia and symptoms were rapidly reversed with oral glucose tablets, however, the patient continued to suffer from recurrent hypoglycemia requiring intervention with intravenous dextrose and oral glucose until hospital day 4 when his blood glucose stabilized within the normal range. The patient's A1c, insulin, insulin Ab, proinsulin, c-peptide, TSH, sulfonylurea level and cosyntropin stimulation tests were all within normal limits. The patient was recently treated for CAP with moxifloxacin 400 mg PO daily for 7 days and received his last dose of the medication 4 days prior to presentation. He had no other recent changes in medications.





Proposed Mechanism of Fluoroquinolone-Induced Hypoglycemia:

Like sulfonylureas, the medications disrupt the function of the ATP-sensitive K^+ channel, resulting in increased insulin release by pancreatic beta cells.



Medications:

Acetaminophen 500 mg PO PRN
Clonazepam 0.5 mg PO daily
Clozapine 400 mg PO daily
Docusate/Senna 50/8.6 mg PRN
Finasteride 5 mg PO daily
Gabapentin 1200 mg PO TID
Lithium 600 mg PO BID
Omeprazole 20 mg PO daily
Tamsulosin 0.8 mg PO daily
Trazodone 200 mg PO daily

Discussion:

Upon presentation, the origin of the patient's hypoglycemia was unclear. He had no significant medical comorbidities, his psychiatric illness had been stable on the same treatment regimen for many years, and he was in an inpatient ward with a very low likelihood of having been given insulin or any other hypoglycemic agent. Omeprazole was the only other medication the patient was receiving associated with hypoglycemia and was discontinued on admission to the medical ward. This was thought not to be the cause of his acute hypoglycemia as he had been taking omeprazole for many years. Fluoroquinolones as a class have been shown to cause hypoglycemia by inappropriate activation of pancreatic beta cells resulting in increased insulin release.[1] Considering the patient's recent course of moxifloxacin this was thought to be the most likely culprit. Pharmacy and endocrinology services were consulted and both agreed that this was the most likely explanation for the patient's presenting symptoms.

Among diabetic patients, especially those taking sulfonylureas, dysglycemia is a well-established side effect of fluoroquinolone antibiotics with moxifloxacin being most likely to cause hypoglycemia in these patients.[2-5] Rarely fluoroquinolones have been shown to cause persistent hypoglycemia in non-diabetic patients.[1,6&7] A handful of case reports have been published showing an association between levofloxacin and hypoglycemia.[1,6&8] A phase IV study of 1701 patients treated with levofloxacin for CAP found only 2 suffered an adverse hypoglycemic event.[8] moxifloxacin is much less commonly cited as a cause of hypoglycemia among non-diabetic patients.[7-8] Additionally, a perplexing aspect of this case was the duration of time from discontinuation of the offending medication to appearance of severe, symptomatic hypoglycemia. The patient reported decreased oral intake the morning preceding presentation, which may have worsened any persistent underlying hypoglycemia and resulted in altered mental status and fall. Advanced age and reduced renal function are thought to be risk factors for the development of hypoglycemia among non-diabetic patients treated with fluoroquinolones. This case adds to the base of literature regarding severe hypoglycemia resulting from moxifloxacin administration and brings awareness to the rare, but potentially fatal side effect of this commonly used class of medications.

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Blood Glucose Measurements