Rare Case of CYP2D6 and CYP2C19 Poor Metabolizer: A Pain Management Dilemma

Amna Shaikh  
*Henry Ford Health System, AShaikh1@hfhs.org*

Murali Patri  
*Henry Ford Health System*

Follow this and additional works at: [https://scholarlycommons.henryford.com/merf2019caserpt](https://scholarlycommons.henryford.com/merf2019caserpt)

Recommended Citation  
Shaikh, Amna and Patri, Murali, "Rare Case of CYP2D6 and CYP2C19 Poor Metabolizer: A Pain Management Dilemma" (2019).  
*Case Reports*. 7.  
[https://scholarlycommons.henryford.com/merf2019caserpt/7](https://scholarlycommons.henryford.com/merf2019caserpt/7)
A Rare Case of CYP2D6 and CYP2C19 Poor Metabolizer: A Pain Management Dilemma.
Amna Shaikh MD, Murali Patri MD

Department of Anesthesiology, Pain and Perioperative medicine, Henry Ford Health System, Detroit, Michigan

Introduction

- Cytochrome P450 enzymes are essential for the metabolism of many medications.
- Genetic variability in these enzymes may influence a patient’s response to commonly prescribed drug classes. CYP2D6 and CYP2C19 enzymes are part of the CYP450 enzyme.
- CYP2D6: responsible for the metabolism of most of the commonly prescribed opiate medications
- CYP2C19: affects the metabolism of diazepam and carisoprodol, as well as clopidogrel, proton pump inhibitors, and several antidepressants
- Poor metabolizers of these enzymes are extremely rare and when deficiency present can cause severe and fatal side effects and overdose of drugs.
- We herein report an unusual case of a poor metabolizer of medications metabolized by CYP2D6 and CYP2C19 enzymes due to genetic deficiency diagnosed on genetic testing.

Clinical Vignette

- 56 year old female patient – PMHx of Ehlers-Danlos Syndrome (EDS) and known deficiency of CYP2D6 and CYP2C19.
- Patient presented for an elective Occipital to T3 fusion.
- The patient had a known deficiency of CYP2D6 and CYP2C19 diagnosed through genetic testing, the presenting deficiencies caused several instances of anaphylaxis, life threatening allergic reactions, serotonin syndrome and side effects including delirium to medications including morphine, hydromorphone, tramadol, codeine, diazepam, metoclopramide, ondansetron, amitriptyline, just to name a few.
- On pre-operative visit patient did mention her concerns regarding post-operative pain management because of extensive allergy list to several pain medications. Since patient also had history of difficult airway and failed intubation in past due to cervical surgeries, focus was done on airway and the presence of genetic deficiency somehow got ignored.
- A pre-operative planning for post-operative pain control was not formulated and pain team was not involved prior to surgery.
- She underwent spinal surgery leading to a pain management dilemma starting in the recovery room.

Post-operative Course

- Patient started complaining of intractable pain and due to lack of options in her case for pain control, Anesthesiology staff was called, who considering her known genetic deficiencies started her on intravenous (IV) ketamine infusion. Due to the complexity of her postoperative pain management and the risk of deleterious side effects, patient was admitted to the neurology intensive care unit (ICU).
- On POD (post op day) 1: Pain team was consulted who continued her on IV ketamine infusion. Her home medications for chronic pain and muscle spasms which included pregabalin and clonazepam were restarted.
- On POD 2: Methocarbamol was started which was then increased from 750 mg TID to 1 gm q12hr on POD 2. IV ketamine infusion was decreased to 0.5mg/kg/hr on POD 2.
- On POD 3: Ketamine infusion was decreased to 0.25mg/kg/hr and IV acetaminophen 1G q 8 hrs. scheduled was started.
- On POD 4: Memantine 5 mg bid was started and ketamine infusion was later discontinued. IV acetaminophen was continued.
- On POD 5: Patient reported improvement in pain as ketamine was transitioned to memantine.
- On POD 6: Transferred to General Practice Unit (GPU) and was discharged home on POD 7. The whole process required a six day close management in ICU with pain service onboard to manage her intractable pain causing an unpleasant experience for the patient.

Conclusion

- This case represents an unusual presentation where a patient with Ehlers-Danlos syndrome (EDS) has rare serious drug intolerance due to genetic deficiency of CYP2D6 and CYP2C19 enzymes.
- When such patients are undergoing surgery, involving pain service early in the care can lead to a well formulated plan for postoperative pain management.
- As seen in this case IV Ketamine is an excellent alternative medication for acute pain control when opioids can not be used due to the above mentioned genetic deficiencies as Ketamine’s major pathway is CYP3A4 and CYP2B6 enzymes.

Images

Table 1: Opioid Dosage and CYP Enzyme Deficiencies

Table 2: CYP2D6 is responsible for metabolism of most Opioids

References