General Anesthesia Considerations in a Patient with Possible Pseudocholinesterase Deficiency

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PSEUDOCHOLINESTERASE

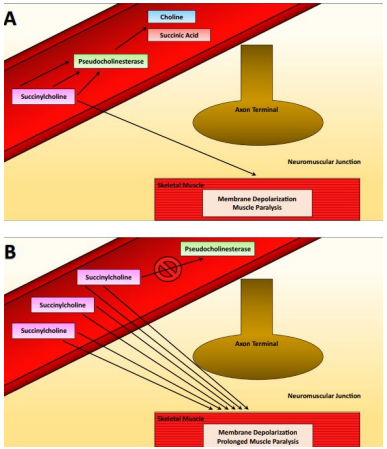
- Pseudocholinesterase (PChE) is a hydrolase plasma enzyme also known as plasma cholinesterase, serum cholinesterase, and butyrylcholinesterase
- Synthesized in the liver by hepatocytes and released into plasma
- Important for metabolization of drugs such as succinylcholine and ester local anesthetics
- Plays a role in maturation of central and peripheral nervous system through regulation of neuronal growth and cell proliferation

PSEUDOCHOLINESTERASE DEFICIENCY

- An inherited or acquired condition resulting in deficient PChE activity
- Alters the metabolism of choline ester drugs like succinylcholine, mivacurium, and ester local anesthetics
- Affects one in 3,200 to one in 5,000 people
- Diagnosed after prolonged paralysis and apnea following GA or through genetic testing
- Inherited: autosomal recessive inheritance pattern. Coding gene can have multiple polymorphisms with different levels of enzyme activity deficiency
- Acquired: common conditions can decrease the activity of PChE such as pregnancy, malignancy, malnutrition, and liver, renal, or cardiopulmonary disease

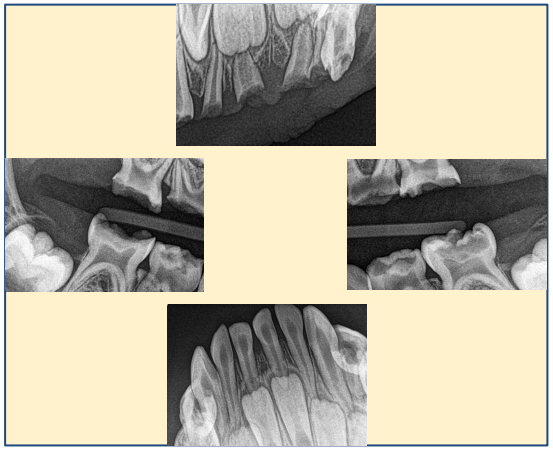
CLINICAL MANIFESTATIONS

- No clinically significant effects until enzyme activity decreases to 75%
- Seen as prolonged paralysis, apnea, hypoventilation, and uncoordinated respiratory movements
- The amount of enzyme activity reduction correlates to the duration of apnea and paralysis
- In a healthy patient, the succinylcholine induced paralysis lasts from 4-6 minutes
- In heterozygotes paralysis could last around 2 hours
- In homozygotes paralysis could be up to 18 hours
- Increased sensitivity and toxicity risk to pesticides, cocaine, ester local anesthetics
- No concern for amide anesthetics



CASE REPORT

- An otherwise healthy 3y10m F presents to Hurley ED for facial cellulitis
- Patient was given IV Unasyn and discharged with Augmentin
- Patient seen for new patient exam at MCHC dental clinic
- Due to behavior concerns and extent of treatment plan, sedation indicated
- Father has history of difficulty waking up from GA and was diagnosed with PChE deficiency
  Genetics referral placed with over six month waitlist
- Hurley anesthesia consulted and had no concerns with possible PChE deficiency - planned to avoid succinylcholine
- FMR completed under GA without complications
- Eleven extractions and three pulpotomy/SSC



ANESTHESIA CONSIDERATIONS

- Preoperative evaluation is the foundation for perioperative management plans in anesthesia
- If there is respiratory paralysis that unexpectedly persists following administration of succinylcholine, and a peripheral nerve stimulator produces no response, should suspect PChE deficiency
- Provide positive pressure ventilation until muscles regain adequate neuromuscular function through passive diffusion of succinylcholine
- Monitor the return of motor function through use of nerve stimulation
- Patient should remain sedated to reduce risk of awareness while waiting for motor function to return
- Avoid succinylcholine for future anesthesia
- Recommend genetic testing for family members

CONCLUSION

- It is important to get a thorough medical history of both patient and patient's family when undergoing general anesthesia to avoid any preventable complications.
- If there are any concerns regarding patient's ability to go under GA, anesthesia should be consulted.

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