Pseudochoinesterase Deficiency

Quick Facts **by Core Concepts Anesthesia Review, LLC**

What You Must Know

1. The deficiency will prolong the action of succinylcholine.
2. The deficiency can also cause an increase in the toxicity of ester local anesthetics.
3. The dibucaine number reflects the activity (not quantity) of pseudocholinesterase.
4. Deficiency inheritance pattern suggests a single gene locus.
5. A normal dibucaine number is 76-86% (homozygous normal).
6. Homozygous abnormal patients will have a dibucaine number of 18-26% and will experience very prolonged paralysis following succinylcholine administration.
7. Evaluation of a patient with a prolonged response to succinylcholine should include a dibucaine number, fluoride number and absolute activity of pseudocholinesterase.

Pseudocholinesterase, also known as butyryl-cholinesterase, is the plasma enzyme responsible for the degradation of succinylcholine and ester-based local anesthetics. Pseudocholinesterase deficiency can occur as an inherited disorder or an acquired disorder. Acquired causes include:

1. Pregnancy (third trimester)
2. Liver disease
3. Cancer, malnutrition and debilitating diseases
4. Collagen-vascular diseases
5. Uremia
6. Exposure to anticholinesterase agents such as neostigmine or organophosphorus agents
7. Exposure to cyclophosphamide
8. Cardiopulmonary bypass

In addition to the dibucaine number, a fluoride number is also commonly used to assess the activity of the enzyme. A low percentage of inhibition of the enzyme by either dibucaine or fluoride reflects a low level of activity of the enzyme.

Approximately 96% of the population has normal levels and activity of pseudocholinesterase. 2.5% of the population is heterozygous for normal enzyme activity, with dibucaine numbers between 50-70%. Heterozygous patients experience moderate prolongation of succinylcholine activity. Finally, the remainder of the population has dibucaine and/or fluoride numbers of 18-26% and will experience significantly prolonged neuromuscular blockade after receiving succinylcholine.

Additional Reading:

Barash, PG, Cullen, BF, Stoelting, RK, Calahan, MK and Stock, MC. *Clinical Anesthesia*. Philadelphia: Lippincott Williams & Wilkins; 2009:613-614