

ABSTRACT**DIVERSITY OF HUMAN SERUM CHOLINESTERASE IN TRINIDAD****YURI NIGEL CLEMENT**

Succinylcholine, a persistent, depolarizing neuromuscular blocking agent has caused prolonged apnoea in Trinidad. Serum cholinesterase metabolises succinylcholine returning muscle contractility within ten minutes. Co-dominant alleles control polymorphic serum cholinesterase inheritance, causing drug-induced muscular paralysis, by altered enzyme.

Trinidad has a gene pool for variant cholinesterase alleles from the ethnic population mix and frequent interracial marriage. Frequency distributions of 'typical' and variant cholinesterase were studied in population and psychiatric patient samples.

Cholinesterase activity was determined by the dibucaine number (DN) test. Population stratification based on percentage inhibition of enzyme by dibucaine into 'typical', 'atypical' and 'intermediate' groups demonstrated esterase inhibition between 71-90%, < 20% and 40-70% respectively. Non denaturing gel electrophoresis with fast Red TR staining assayed cholinesterase (Modified Ellman). Two-dimensional denaturing gel electrophoresis and Western Blotting identified the 'silent' variant.

Mean DN and cholinesterase was 88.88 ± 2.63 and 10.59 ± 2.96 U/mL respectively (n=1274). Africans, Asian Indians and 'mixed' origin males had significantly higher ($p < 0.01$) cholinesterase levels and enzyme activity was significantly higher ($p < 0.01$) in Asian Indian females and lowest in Africans. Highest and lowest

frequencies of the 'intermediate' DN(n=19) were in the minority (44.1%) and African (0.53%) groups respectively. No 'atypical' variant was detected.

Psychiatric patients (168), did not express 'intermediate' or 'atypical' DN's. Cholinesterase was higher ($p < 0.05$) in Africans compared to 'mixed' ethnicity subjects and was not influenced by gender, diagnosis or treatment.

Five isoenzymes ($C_1 - C_5$) on non-denaturing gel electrophoresis, showed 80% activity in C_4 . Randomly selected population and patient sera showed identical isozyme banding patterns.

An Asian Indian female with succinylcholine-induced apnoea had inestimable DN. Esterase was 0.17U/mL and 0.9U/mL in her sister. Western Blotting of cholinesterase after 2 - Dimensional gel electrophoresis indicates the Type II variant segregates in the family.