A-49: Stndy of dibucaine inhibition of acetylcholinesterease activity

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Cholinesterase deficiency leads to prolonged apnea after use of succinylcholine. Deficiency of acetylcholinesterase could be acquired due to parenchymal liver disease, estrogen treatment, chronic renal disorders or exposure to organophosphates. Deficiency also could be genetically inherited and it could be detected by dibucaine inhibition. In this study, we have determined the dibucaine inhibition of acetylcholinesterase activity of 256 school children of the age group 15-16 years from Kurunegala, Kegalle, and Ratnapura districts, to determine the prevalence of genetic variants of acetylcholinesterase activity.

No statistically significant correlation was found between erythrocyte cholinesterase activity or plasma cholinesterase activity and sex, height, weight or haemoglobin content in districts of Kegalle, Kurunegala and Ratnapura. Erythrocyte and plasma cholinesterase activity was determined spectrophotometrically (λmax 405nm) using propinylthiocholine as the substrate and 5,5'-dithiobis-2-nitrobenzoic acid as colour developing reagent. Distribution of plasma cholinesterase activity in Kurunegala district varied from 2200 –5200 U/L while in Kegalle district enzyme activity varied from 2400-4600 U/L. In Ratnapura District plasma cholinesterase activity varied from 2800-5200 U/L with 1 male and 2 females having plasma cholinesterase activity higher than 5200 U/L.

Studies on dibucaine inhibition showed that in Kurunegala district 23.6% were heterozygotes while in Kegalle 11% were heterozygotes and 2.2% were heterozygotes in Ratnapura. The high percentage of heterozygotes in Kurunegala indicates the presence of a higher number of atypical homozygotes than expected.

Of the 7 patients with accute pesticides poisioning studied in Kurunegala, 3 had plasma cholinesterase activity below 300 U/L and dibucaine numbers below 30 indicating atypical homozygote status, and a greater susceptibility to organophosphate toxicity than heterozygotes or normal homozygotes.