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Diagnostic utility of serum Phospholipase A2 in systemic envenomation in snake bite - An exploratory study

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Objective: There are no diagnostic tests in clinical use in India to identify the biting species or to predict the severity of envenomation. To assess the utility of Serum Phospholipase A2 in the diagnosis of clinical envenomation syndromes in India.

Methods: Patients admitted into accident and emergency with snake bite at Christian Medical College were categorized into clinical envenomation and no envenomation and based on severity of envenomation syndrome (need for product support, dialysis or mechanical ventilation). Additional non-envenomated snake bite cases were enrolled from Government Vellore Medical College. Normal health controls were selected from hospital staff members. For snake bite cases blood samples were collected daily from admission for a maximum of 5 days. PLA2 activity was assayed on the chromogenic substrate 4-Nitro-3-ocatanoyloxy benzoic acid (NOBA) and absorbance recorded in ELISA reader.

Results: PLA2 levels were measured in 30 normal controls, 100 patients with snake envenomation and 64 snake bite patients with no envenomation. The median PLA2 activity was 62.10 µmol/min/ml (41.9-91.1) in normal healthy controls. There was no significant difference between the median PLA2 activity at admission for patients with systemic envenomation [74.02 µmol/min/ml (40.2-180.6)] and without systemic envenomation [80.93 µmol/min/ml (40.9-151.6; p=0.886)]. The admission median PLA2 values were significantly higher for Viperine envenomation 79.61 (IQR 63.6-120.1) µmol/min/ml when compared to Elapidae (Krait/Cobra) envenomation 61.78 (IQR 53.22-70.39) µmol/min/ml (p=0.001). Median PLA2 levels in viper bite syndromes requiring blood transfusion was significantly higher compared to in patients who did not require transfusion [106.89 (69.7-144.8) µmol/min/ml vs 72.80 (IQR 59.4-90.8) µmol/min/ml (p=0.009)]. Median PLA2 activity in patients with AKI who required haemodialysis was significantly higher compared to patients who did not require dialysis [106.89 (IQR 74.33-146.92) µmol/min/ml vs. 70.36 (IQR 59.2-92.0) µmol/min/ml (p=0.047)]. PLA2 > 79.33 µmol/min/ml could distinguish Viperidae envenomation from Elapidae (sensitivity 50 % and specificity 87.3%). In Viperine syndrome, PLA2 activity > 88.02 µmol/min/ml predicted requirement of product support (sensitivity 63% and specificity 84%) and PLA2 activity > 89.84 µmol/min/ml predicted requirement of haemodialysis (sensitivity of 63.6% and a

specificity of 83.8%). There was significant declining trend in the mean PLA2 values from the time of admission to fourth day (p =0.008) in patients with clinical envenomation.

Conclusion: PLA2 activity is not a useful test to diagnose snake bite patients with systemic envenomation although it may have a role in distinguishing between Viper and Elapidae bites and assessing severity of Viperine envenomation.