Association Between Initial Platelet Count and Antivenom Dose Following Rattlesnake Envenomation

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Background: Venom-induced thrombocytopenia may occur following rattlesnake envenomation (RSE). Association between initial platelet count and dose of antivenom administered has not been studied.

Research Question: Does severity of thrombocytopenia prior to antivenom affect outcomes in RSE?

Methods: Prospective review of RSE patients entered into the ACMT North American Snakebite Registry (NASBR) between 2013 and 2016, with cases excluded if platelets were never reported or Fab antivenom was not used. Patients were grouped by degree of thrombocytopenia before antivenom: severe (platelets 0–50 K/mm^3), moderate (platelets 51–120 K/mm^3), or normal (platelets ≥121 K/mm^3). Data extracted included demographics; initial, nadir, discharge, and follow-up platelets; initial and total antivenom dose. Descriptive statistics including median (IQR) and univariate analysis were used with linear regression to deter- mine independent predictors of total vials administered.

Results: Three hundred fifteen patients were included, 296 with pre- antivenom platelet count available. Most were from AZ, CA, and UT. Median age was 38 years (19.8, 57); 75% men; 51% upper extremity bites. Median initial platelets = 222 K/mm^3 (171, 273); median time to antivenom = 2.5 h (2,4); median initial antivenom dose = 6 vials (4,6); and median total antivenom dose = 10 vials (6,16). 'Severe' n = 13 patients; 'moderate' n = 25 patients; and 'normal' n = 258 patients. Platelet group predicted total vials of antivenom administered (p = 0.027), with lower platelets associated with higher total vials. Other independent predictors of total vials were initial vials ($p < 0.001$) and time to antivenom (p = 0.001). Time to antivenom was inversely related to total vials, with later presentation associated with lower dose. One hundred forty-nine patients had follow-up platelets available; 24/37 patients (65%) with initial, nadir, or discharge platelets ≤ 120 K/mm^3 developed recurrent thrombocytopenia, while 27/112 patients (24%) with nadir platelets > 120 K/mm^3 developed new, delayed-onset thrombocytopenia.

Discussion: Venom-induced thrombocytopenia is sometimes used as a marker of severity in RSE, which can affect antivenom dose administered. In this study, thrombocytopenia was associated with higher total antivenom dose. Despite use of higher doses with lower pre-antivenom platelet counts, recurrent thrombocytopenia was common in follow-up. Conclusion: In this NASBR RSE cohort, pre-antivenom thrombocytopenia was associated with higher total dose of antivenom.