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The Usefulness of Leukocytosis in Identifying Infections in the Overdose Patient

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Introduction:Elevated white blood cell (WBC) counts are frequently used by clinicians as an indicator of infections, despite WBC elevations potentially stemming from acute stress responses. Patients admitted for acute toxidromes are often treated for co-infections due to arbitrary WBC count elevations.

Hypothesis: We hypothesize WBC counts are less useful to differentiate infected from non-infected overdose patients when toxicities involve substances that trigger an acute stress response.

Methods: This is a retrospective review of consecutive acute overdose patients admitted to a medical toxicology service between April 2013 and August 2014. Exclusions included non-drug ingestions (e.g. methemoglobinemia, caustic ingestions), post-cardiac arrest patients, outpatients, withdrawal conditions, and patients lacking laboratory studies. Patients were grouped into 12 possible drug overdose categories (ethanol, stimulant, insulin, acetaminophen, opioid, antihistamine, NSAID, antihypertensive, benzodiazepine, antidepressant, antipsychotic, toxic alcohol). Primary outcome was mean WBC count on initial presentation based upon the presence or absence of infection. All statistical comparisons were made using a two tailed student's t-test.

Results: Of 1102 charts reviewed, 533 met inclusion/exclusion criteria. Mean age was 38 years (range 13-90). Patients were 274 female (51.4%). The most common overdose was ethanol (95/533; 17.8%), opioids (60/533; 11.3%) and antidepressants (59/533; 11.1%). Sixty-one (11.4%) patients were diagnosed with infection during their hospital stay. Aspiration pneumonia (48/61; 78.7%) and UTI (7/61; 11.5%) were most frequent infection type. For all patients, mean WBC count was higher in infection group (13.83 (±6.78 SD) vs 9.91 k/mm^3 (±5.95 SD); $p<0.001$).

In subgroup analysis, the WBC count was statistically higher when infection was present in only 3 subgroups: ethanol, opioid, and benzodiazepine (all $p<0.05$).

Discussion: Generally, overdose patients presenting with an infection have higher WBC counts. However, in subgroup analysis, only the ethanol, opioid and benzodiazepine groups have higher WBC counts with infections present. We believe this may be related to the lack of an acute stress response in these toxidromes unlike other toxic ingestions (i.e., stimulants).

Conclusion: Overdose patients with infections tend to have higher WBC counts. However, future studies should examine how different toxic substances alter the immunologic system, which could have implications for infectious risk.