A Simple Tool Predicts Mortality in Aluminum Phosphide Self-poisoning

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Abstract

Incorporating the toxidrome-specific prognostic systems into the daily emergency department practice might become a standard of care in low- and middle-income countries. The PGI score is appealing because it is quick and easy, it accurately identifies high-risk patients at in-hospital mortality, and it shows promise in predicting those at low risk. Although further validation of the PGI score is required in more extensive studies, it can help direct appropriate resources to those most likely to benefit and stratify patients for testing novel clinical interventions.

Keywords: Aluminum phosphide, Mortality, Prognostic tool, Scoring system, Toxicological emergencies.

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Self-harm with hazardous substances is a significant cause of mortality in low- and middle-income countries (LMICs).[1,2] Pesticide ingestion (e.g., organophosphate, aluminum phosphide) is the most common form of self-poisoning and contributes a large number of emergency department (ED) admissions.[2,3] Because the earlier prediction of toxidrome severity is required to improve outcomes by leading to prompt diagnostic and therapeutic interventions, proactive critical care unit transfers, and better allocation of the limi resources, ED physicians continue to seek a way of identifying high-risk poisoned patients. This goal would be best achieved by developing the risk prediction scores containing the parameters that are readily available on admission and have good predictive ability.

In general, the most scoring tools used for toxicological emergencies have been devised for assessment for multiorgan dysfunction in critical medical or surgical conditions, such as Acute Physiologic Assessment and Chronic Health Evaluation II (APACHE II) score, the Sequential Organ Failure Assessment score (SOFA), or the Simplified Acute Physiology Score (SAPS).[4–7] ED physicians do not routinely use them to guide clinical decision-making in poisoned patients, mostly because of the perceived difficulty and time needed to perform calculations and the requirement of the many laboratory factors. Many individual clinical and laboratory parameters have been identified that predict the severity and case fatality rate of various toxidromes; however, widely accepted prognostic models are lacking. In an attempt to address the gap, Pannu and colleagues evaluated multiple predictors of mortality in acute aluminum phosphide self-poisoning, resulting in a simple risk score now published in this issue of the Indian Journal of Critical Care Medicine.[8]

Aluminum phosphide is mainly used as fumigants for stored grains. Self-ingestion results in a severe toxidrome typically comprising vomiting, metabolic acidosis, hypotension, cardiac dysrhythmia, and pulmonary edema. The treatment is mostly supportive without a specific antidote, and mortality ranges from 30 to 80%.[5–9] Currently, mortality prediction mainly relies on various previously reported variables, including severe vomiting, hypotension, altered sensorium, low pH or bicarbonate levels, alteration in blood glucose levels, leukocytosis leucopenia, abnormal electrocardiogram or echocardiography, high scores

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on APACHE II, SOFA, or SAPS, etc.[5–7,9,10] The index study revisited multiple demographic, clinical, and laboratory parameters in prospectively enrolled 105 patients of aluminum phosphide self-ingestion with 51% mortality. Three characteristics, i.e., blood pH <7.25, Glasgow coma scale (GCS) score <13, and systolic blood pressure (SBP) <87 mm Hg, had strong associations with in-hospital mortality using multivariate regression analysis and area under the receiving–operating characteristic curve. With similar importance and 1 point awarded to each variable, the authors devised a simple prognostic scoring system, ranging from 3 (worst) to 0 (best). A total score of 3 had a 98.2% specificity and a positive-predictive value of 96.4%, whereas a score ≤1 had a 100% sensitivity and 100% negative-predictive value. Point scores are easily calculated at the bedside combining two clinical parameters and one readily available laboratory variable. The authors call this the PGI score, representing low pH (P), low GCS score (G), and impaired or low SBP (I).

The PGI score is appealing because it is quick and easy, it accurately identifies high-risk patients at in-hospital mortality, and it shows promise in predicting those at low risk. Although further validation of the PGI score is required in more extensive studies, it can help direct appropriate resources to those most likely to benefit and stratify patients for testing novel clinical interventions.[11]

Incorporating the toxidrome-specific prognostic systems into the daily ED practice might become a standard of care in LMIC, not unlike sepsis or pancreatitis. Like the PGI score, a simple risk index appears to be an essential step forward in rapid risk stratification and triage for patients with toxicological emergencies.

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