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GIK infusion: Novel modality of treating metal phosphide toxicity

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Objective: Metal phosphides, especially Aluminum phosphide(ALP) and Zinc Phosphide are most common poisoning in sub-urban and rural parts of northern India. As there was no specific antidote for metal phosphide poisoning, the management remains supportive. This study tried to evaluate the safety therapeutic efficacy of the Glucose-insulin-Potassium infusion in acute aluminum phosphide poisoning.

Methods: In a single center, prospective interventional study, a total of 60 patients of acute ALP were included and assigned into intervention group and control group. The patients who died within 2 hours of admission were excluded. Two groups were categorized into mild, moderate and severe according to severity which was assessed by PGI 3 point score. The score was calculated from three parameters, pH, GCS and SBP (systolic blood pressure) with pH <7.2, SBP <90 mmHg and GCS ≤ 12 equals to score 1 for each parameter. The maximum score was 3 and minimum was 0.Intervention group was given GIK infusion along with standard treatment. The loading dose of regular insulin was at 0.1-0.2 U/kg followed by 0.2 to 0.5 U/kg/h. Glucose was given at the dose to maintain the serum glucose at around 150-200 mg/dL. Response to the protocol was defined as increase of SBP to higher than 90 mmHg or correction of acidosis. Additional potassium was given to maintain serum potassium at 3.5 to 4.5 mEq/L. GIK infusion continued for at least 12 to 24 hours. Hemodynamic, metabolic parameters at various time intervals, incidence of complications, requirement of intubation/mechanical ventilation, duration of the stay and outcome were compared in both groups after initiating GIK protocol.

Results: The 2 groups were similar in terms of demographic characteristics and on-arrival hemodynamic and metabolic parameters, time to presentation after ingestion, severity. The hemodynamic and metabolic parameters including SBP, DBP, MAP, GCS, SpO2, HCO_3- and pH showed significant improvement after GIK infusion at various time intervals (p <0.05). The median duration of the stay was 10.65 (8.25-30.50) in conventional group and 35 (19-61) in intervention (GIK) (p=0.001). The median survival was 11 (CI=5.8-16.1) hours in conventional group and 120 (CI=0-240) hours in GIK group. 22 (73.3%) patients in conventional group and 14 (46.7%) in intervention (GIK) group were died (p=0.03). 78.6% (n=11) in GIK group and 86.4% (n=19) in conventional group required intubation/mechanical ventilation. After GIK infusion the death rate was decreased by 50% in intervention group. The incidence of complications was similar in both groups.

Conclusion: The role of GIK infusion in patients of acute ALP poisoning seems promising. A 50% decrease in mortality and significant reduction in morbidity. It increases duration of the stay, median survival time and is safe. It could be recommended as definitive treatment protocol in ALP patients. PGI 3point score could be a better predictor of severity than others.