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ACUTE ARSENIC POISONING IN EMERGENCY MEDICINE: CONTEMPORARY APPROACHES TO DIAGNOSIS AND MANAGEMENT

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Background: Acute arsenic poisoning is a potentially life-threatening toxicological emergency characterized by rapid clinical deterioration and multisystem involvement. Although acute exposure is relatively uncommon, delayed recognition and treatment may result in severe complications and increased mortality. Early diagnosis and timely therapeutic intervention are essential for improving clinical outcomes.

Objective: This narrative review aims to summarize the principal mechanisms of arsenic toxicity, its clinical manifestations, diagnostic challenges, and contemporary approaches to emergency management and treatment.

Clinical and Pathophysiological Considerations: Arsenic exerts its toxic effects primarily through the inhibition of essential cellular enzymes, disruption of mitochondrial function, impairment of adenosine triphosphate (ATP) production, and induction of oxidative stress. Acute poisoning commonly presents severe gastrointestinal manifestations, including abdominal pain, nausea, vomiting, and profuse watery diarrhea, potentially leading to profound dehydration, electrolyte disturbances, and circulatory shock. Severe systemic toxicity may be associated with cardiovascular instability, QT interval prolongation, life-threatening arrhythmias, encephalopathy, acute kidney injury, and multiorgan dysfunction.

Diagnosis and Management: Diagnosis requires a high index of clinical suspicion, careful assessment of exposure history, and appropriate toxicological investigations. Urinary arsenic measurement, preferably with arsenic speciation when indicated, is particularly important for confirming exposure. Emergency management prioritizes airway protection, hemodynamic stabilization, intravenous fluid resuscitation, correction of electrolyte abnormalities, and continuous cardiac monitoring. Chelation therapy with agents such as dimercaprol or succimer (dimercaptosuccinic acid, DMSA) may be considered clinically significant poisoning following consultation with a medical toxicologist. The selection and timing of chelation should be

individualized according to the severity of toxicity, clinical presentation, and availability of appropriate treatment.

Conclusion: Acute arsenic poisoning remains a significant diagnostic and therapeutic challenge in emergency medicine. Early recognition of characteristic clinical manifestations, prompt supportive care, appropriate toxicological assessment, and timely consideration of chelation therapy are essential components of effective management. A multidisciplinary approach involving emergency physicians, clinical toxicologists, and critical care specialists may improve patient outcomes and reduce the risk of severe complications and mortality.

Keywords: Acute arsenic poisoning; Emergency medicine; Clinical toxicology; Multiorgan dysfunction; Chelation therapy.