

Direct ordering of Methanol and Ethylene Glycol Levels.

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Effective **January 26, 2007**, the lab progressive testing algorithm for toxic alcohols (volatiles) was discontinued. Requests in Sunrise Clinical Manager (SCM) for an individual toxic alcohol (methanol, isopropanol or ethylene glycol) will be performed as requested. The Osmolal Gap(O-GAP) test will still be available as a test option in SCM, however the laboratory will not automatically order and perform the O-GAP test in response to orders for toxic alcohols.

Methanol and ethylene glycol are substances that are not toxic by themselves but they produce metabolites that cause significant morbidity and mortality. Ingestion of one of these agents is a toxicological emergency requiring rapid diagnosis and emergent treatment. In the absence of clear history, the most useful method to identify poisoned patients would be a thorough physical examination, and an evaluation of acid-base status.

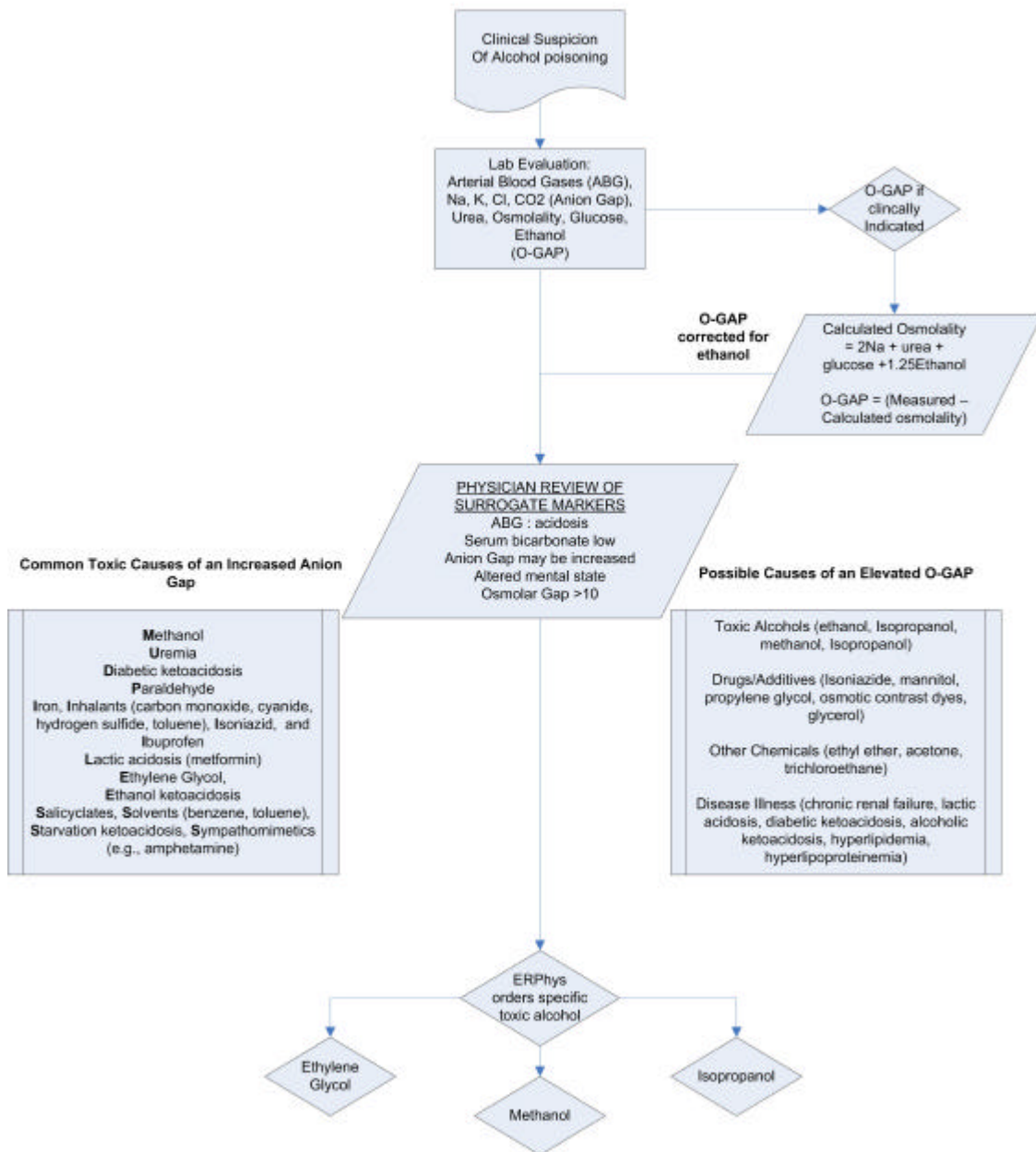
Serum osmolality (osmoles per litre of solution) represents a measure of the number of particles dissolved in solution. The O-GAP is obtained by subtraction of the calculated from the osmolality (osmoles per kilogram of solvent) measured in the patient's blood. The significantly increased O-GAP is widely accepted to be due to the levels of osmotically active compounds (i.e., ethanol, methanol, ethylene glycol) in contribution to overall serum osmolality.

The O-GAP may be increased early but normalizes as the parent compound is metabolized, and that the anion gap is usually normal initially and then increases as the toxic metabolites are formed. In methanol or ethylene glycol poisoning the metabolic acidosis and increased anion gap are secondary to formic acid (for methanol) or glycolic acid and glyoxylic acid (for ethylene glycol), their respective metabolites which increase late in the course of presentation. A significantly increased gap should raise suspicion of toxic alcohol exposure but its absence does not reliably rule out its presence. Direct laboratory tests for methanol and ethylene glycol are needed because toxicities can occur without clinical signs of inebriation. Surrogate markers such as the O-GAP suffer from a number of false-positives and false-negative findings (see algorithm below). Increases can occur in patients with multiple organ failure and unmeasured osmolal entities can falsely suggest a toxic alcohol exposure. Patients with an established metabolic acidosis from toxic alcohol ingestion can present with a normal or low O-GAP if the blood is sampled after the parent compounds have been converted to their acid metabolites. A markedly negative O-GAP in a patient without an anion gap metabolic acidosis may essentially rule out recent toxic alcohol ingestion.

Specific treatment of methanol and ethylene glycol poisoning involves the use of ethanol IV or fomepizole therapy for patients who present early after their exposure without evidence of metabolic acidosis or end organ damage (visual disturbances for methanol, cardiopulmonary failure, renal failure, or cranial neuropathies for ethylene glycol

poisoning). Hemodialysis is often recommended when the patient presents with anion gap metabolic acidosis, evidence of end organ damage as discussed above, or a concentration of either alcohol over 16 mmol/L (50 mg/dL).

Toxic Alcohol Poisoning Algorithm



For known abusers of toxic alcohols, to monitor therapy of a patient undergoing treatment for toxic alcohol poisoning, physicians may directly request methanol, ethylene glycol or isopropanol levels.