

Antifreeze Poisoning Detection at the Point-of-Care

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Summary of the Clinical Unmet Need

Ethylene glycol is the principal active ingredient in commercially available anti-freeze. While this is an effective chemical to prevent freezing of liquids, it also has extremely poisonous effects to human beings. Ethylene glycol is converted by the body into several toxic acid by-products that can lead to metabolic acidosis, acute renal failure, and even death.

The major problem with ethylene glycol poisoning is making the diagnosis. Previous work has evaluated both urine and blood testing. Blood testing can be achieved; however, this is typically a send out test and takes hours (if not days) for results to return, and is therefore not very useful. Urine testing has not been proven to be sensitive enough to be confident in the diagnosis. The major reason why it is imperative to make the diagnosis quickly of ethylene glycol poisoning is because an antidote exists. However, this antidote is only efficacious if given early after ingestion when the parent compound of ethylene glycol is still present. The antidote inhibits the first step of ethylene glycol metabolism and hence limits the acid by-products from being generated. Ethylene glycol itself is not overtly toxic; rather, it is the generation of the acid by-products. Giving the antidote to all patients suspected to have antifreeze poisoning is not practical, due to cost and safety, and does not provide immediate indications of the accuracy of the diagnosis.

We aim to develop a much faster method of detecting antifreeze poisoning, and give physicians the information they need in order to identify the necessary course of action. Our goal is not only to identify ethylene glycol poisoning early, but if proven efficacious, this method will also be utilized to exclude this poisoning in the undifferentiated patient