

Characterization of Utilization and Effectiveness of Toxicology Screening in Patients with Suspected Overdose in the Emergency Department

Abstract

Toxicology laboratory tests are widely used to evaluate patients with poisonings, toxic ingestions and overdose (PTOD) in Emergency Departments (ED) and other settings, but effectiveness data of the use of these tests is limited. One test, commonly used at our institution is the gas chromatography and mass spectrometry (GCMS) tests that screens for prescription (Rx) and over the counter (OTC) drugs. This test is highly sensitive and specific to identify and quantify chemical compounds in blood and body fluids (i.e. plasma, urine). Potential drawbacks of this test are increased cost and a longer turnaround time relative to other tests thus limiting utility in the ED. The “comprehensive” GCMS tests can also potentially not detect relevant chemical compounds in this setting. To the best of our knowledge, there is very limited data available to support the routine use of GCMS testing, and there is no published data on the direct costs associated with the use this test.

Our study will retrospectively characterize the patient populations and settings where these tests are utilized at Mayo Clinic. We will examine utilization specifically in the ED relative to other services at Mayo Clinic. We will identify relevant patient characteristics, clinical and other laboratory diagnostic testing used in the ED setting to evaluate patients with suspected PTOD. We will also identify treatment interventions, costs and short-term outcomes including ED discharge, rate of intensive care unit (ICU) admissions, associated morbidity, mortality, and early ICU and hospital discharge. We will also determine the rate that at which GCMS information triggers specific medical decisions, and clinical and therapeutic interventions. We will analyze these data using univariate and multivariate regression analyses to determine predictors (including negative and/or expected GCMS tests results) associated with a composite positive outcome defined as ED discharge home; ICU length of stay ≤ 24 h; ED discharge with medical clearance for psychiatric evaluation; or ED disposition to the general ward. We will also identify in a similar fashion, predictors of a composite negative outcome defined as ICU length of stay ≥ 24 hours, serious toxicologic complications (organ system failure, aspiration pneumonia, hemodynamic instability, seizure, cardiac arrhythmias, and cardiac arrest) or death. Finally, we will assess the overall direct costs associated with the GCMS in the ED setting and the overall cost of care for the institution.