



Lab Update

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LabUpdate is a periodic publication of the Clinical Laboratories of UC Health. By way of this publication, lab users are provided: 1) updated operational information relevant to the practice of laboratory medicine within UC Health facilities, and 2) didactic material generally applicable to laboratory medicine.

LAB UPDATE

University Hospital Clinical Laboratory

If you are interested in the on site availability of a particular test, please contact the Laboratory Client Services Department at 584-0696 or via email to Jenny Ford at jennifer.ford@uchealth.com.

TOXICOLOGY

Volatile Analysis

A volatile is a group of compounds that can evaporate at normal temperature and pressure. They tend to have low boiling points and many times are regulated by governments. They can be found in anesthetics, refrigerants, solvents, petroleum distillates, adhesives and even essential oils; but the most common volatiles are the ones most familiar to us daily, namely: ethanol (ethyl alcohol); methanol (methyl alcohol); acetone; and isopropanol (2-propanol). These are the four substances we will be analyzing quantitatively by Gas Chromatography/Flame Ionization Detection (GC/FID). They are sometimes referred to as “toxic alcohols”. Even though acetone is not an alcohol, it is included in this group because it has similar physical characteristics for analysis.

Volatiles can be voluntary or accidental especially in children. They can be consumed or inhaled. Methanol can be found in windshield washer fluid, isopropanol in rubbing alcohol and

acetone in fingernail polish remover. Ethanol is the volatile found in alcoholic beverages and its effects are well documented.

Interestingly, the average human digestive system can produce as much as 3 grams of ethanol per day through fermentation and other metabolic pathways. We handle the metabolism of alcohols through renal excretion and metabolism by alcohol dehydrogenase (ADH) and aldehyde dehydrogenase (ALDH). Ethanol is eventually metabolized to carbon dioxide and water, but methanol is mainly cleared by expiration and metabolized to formic acid and formaldehyde. These toxic substances can cause loss of sight and metabolic acidosis. The ingestion of isopropanol can cause hemorrhagic gastritis. Unlike methanol, isopropanol is metabolized to acetone, a ketone, which is not further metabolized to an acid. Acetone can cause a ketoacidosis and is cleared by excretion.

There are many other volatiles that can be analyzed by GC/FID. They include such compounds as acetaldehyde, an unstable but toxic metabolite of ethanol that can accumulate in chronic alcoholics as well as 1,1-difluoroethane (Freon 152a) a substance found in canned air dusters and abused as an inhalant. We will be adding many of these to a list of identifiable substances in the near future.

Testing is available 24x7 in the Toxicology department of the University Hospital Core Laboratory. Analysis time per sample is approximately 10 minutes and the sample volume is 50 μ L. Serum is the specimen of choice and the test code is VOLSCRN. The Volatile Screen includes testing for Methanol, Acetone, and Isopropanol. Individual orders will be accepted for Methanol (METH) and Acetone (ACETONE). Ethanol test requests will be performed in Chemistry on the Ortho Vitros analyzer as currently performed.

MICROBIOLOGY

Group A *Streptococcus* Testing

Group A *Streptococcus* (*Streptococcus pyogenes*) is the etiologic agent of a number of infections in humans, including pharyngitis. These infections are of particular concern because serious complications, such as glomerulonephritis and rheumatic fever, may result if the original infection is left untreated. Group A beta hemolytic Streptococci are universally susceptible to penicillin G, making treatment simple and straightforward, as well as making antimicrobial susceptibility testing unnecessary, unless the patient is allergic to penicillin.

Beginning July 9, UC Health Microbiology Laboratory will offer a complete spectrum of tests for Group A Streptococcus. In clinical situations in which rapid screening is required, the laboratory can provide immunodetection of *S. pyogenes* antigen using the Acceava Rapid Strep A Test Kit. Negative screens will be reflexed to Microbiology for the Gen-Probe Group A *Streptococcus* (GAS) Direct Test. GAS Direct is a DNA probe assay that uses nucleic acid hybridization for the qualitative detection of Group A streptococcal RNA, as an aid in the diagnosis of Group A streptococcal pharyngitis from throat swabs. If the rapid screen is not required, the more sensitive GAS Direct test can be ordered using the test code SADP.

Testing pharyngeal swabs for Group A *Streptococcus* using Gen-Probe GAS Direct was compared with rapid antigen testing and/ or culture in two separate prospective clinical studies (1,2). In both studies, the culture results were used as the gold standard for comparison. The GAS Direct assay was more sensitive (94% vs. 76%) than the rapid test, and yielded a higher positive predictive value for a negative result (98% vs. 92%) than the rapid assay. When compared with culture in a low prevalence population, the GAS Direct had slightly lower sensitivity (86% vs. 97%), whereas, in a higher prevalence population, the sensitivity was not significantly different (92% vs. 99%). Specificity was equivalent in both studies. A significant advantage the GAS Direct displayed over the culture was in time to results. Therefore, both studies concluded that GAS Direct is a user-friendly assay that is reliable for batch screening (2) and has the potential to replace culture (1). The following swab transports are acceptable for use in the GAS Direct Assay: Becton Dickenson Culturette swab (red top), Remel BACTI-SWAB, Liquid Amies or Stuart medium swabs with Dacron tip, Double Dacron Dry Swab, or ESwabs.

If a Throat Culture is required, because other organisms, such as *Arcanobacterium hemolyticum*, are suspected, or in cases of treatment failure, contact UC Health Microbiology at 584-3913.

Cultures for these unusual pathogens are available upon consultation with the laboratory. In addition, if the GAS Direct assay is positive and the patient is allergic to penicillin, contact the laboratory within 72 hours to request culture and alternative antibiotic testing.

If you have any questions about the lab's implementation of the GAS Direct test, please contact Dr. Rhodes at 584-3923 or Vicki Stegner at 584-6014.

Emergency Room Satellite Lab Grand Opening July 17th, 2012



Opening on July 17th, the new ED Satellite Lab will offer emergent need testing on site in the Emergency Room 24/7 with an expanded menu over the current Point of Care offerings. This project has been the result of collaboration between the Emergency Department and Laboratory Administration with the goal of increasing access to laboratory testing for ED patient while improving turn around times and decreasing costs to the hospital.

Staffed by Laboratory Personnel, the ED Lab will offer POC testing as well as lab analyzer based testing. The testing menu will include Blood Gases with electrolytes, POC Troponin and BNP, Hemoglobin, Urinalysis, Urine Drug Screen and Chemistry analytes.

Additional Lab testing will be forwarded to the Core Lab via the newly installed pneumatic tube system.