Saint Luke's REGIONAL LABORATORIES

Clinical Laboratory News

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Patient RBC Genotyping

Blood group antigen testing is necessary to confirm alloantibodies and to provide antigen compatible blood for potential antibodies that a patient can develop. RBC antigens have been historically tested through serological (haemagglutination) techniques. However, this simple technique has several limitations. For example, it is not reliable in recently transfused patients, as both donor and patient's RBCs coexist, and some typing reagents are in short supply and even not available. RBC Genotyping, the use of molecular testing to predict blood types, can overcome these limitations.

Cost and lengthier turnaround time limits the routine use of genotyping. RBC genotyping is currently indicated for following:

- Patients with weak D, partial D, and variable or discrepant RhD typing results
  - Helps Obstetrics to determine candidate for RhIG
  - Determine if females of child bearing potential need Rh positive or Rh negative blood

- Fetal antigen testing to determine if fetus is at risk because of mom's existing alloantibodies
  - Paternal sample to determine risk (zygosity) of Hemolytic disease of the fetus & newborn (HDFN)
  - Neonatal alloimmune thrombocytopenia (NAIT) & investigation of platelet incompatibility

- Chronically transfused patients
  - Sickle cell disease- 87% of African-Americans have at least one altered Rh allele
  - Thalassemia
  - Congenital hemolytic anemia

- Potential chronic transfusion
  - Myelodysplastic syndrome
  - Chronic myelomonocytic leukemia
  - Stem cell transplants
  - Organ transplants

- Immunohematology workups
  - Warm autoantibodies
  - Hemolysis with no new antibodies identified (can be Dombrock incompatibility)
  - Autoimmune hemolytic anemia
  - Clinically significant cold autoantibodies
  - Suspected autoantibody yet patient types antigen positive (Rh & Jk variants)
  - Recently transfused patients with multiple antibodies
  - Presence of antibodies to high frequency antigens
  - Suspected antibody for antigens for which there is no typing antisera
  - Multiple myeloma patients on Daratumumab or other monoclonal antibody therapy

Transfusion services at Saint Luke's Health System utilize Community Blood Center's National Center for Blood Group Genomics for patient RBC Genotyping.

Helicobacter pylori Serology Discontinued

Helicobacter pylori (H. pylori) is a spiral-shaped Gram negative bacteria that is estimated to infect approximately half of the world's population. In developing countries, prevalence is more than 80% in adults. In the U.S., prevalence increases with age and is 50% by age 60. Transmission of *H. pylori* is generally thought to occur person-to-person or through contaminated water sources. The infection is associated with peptic ulcer disease and gastric cancers, with a possible role in dyspepsia as well.

The American College of Gastroenterology published a clinical guideline in 2017 regarding

treatment of *H. pylori* infection (Am J Gastroenterol 2017; 112:212-238). This guideline also provides indications for testing.

The diagnosis of *H. pylori* infection can be achieved from biopsies obtained by upper endoscopy. Urease testing can be performed directly on biopsy specimens at the time of endoscopy with a sensitivity and specificity of 90% and 95%, respectively. Histologic examination of biopsy specimens for the presence of *H. pylori* is also an option, and has a sensitivity/specificity of 95% and 98%, respectively.

Non-invasive choices for diagnostic testing include the urea breath test (UBT), stool antigen, and serology. UBT is based on detection of urease metabolites produced by the organism. Samples are collected pre- and post-administration of a non-radioactive carbon-isotope labeled oral solution (Pranactin-Citric). Sensitivity and specificity are 95% and 98% respectively. Likewise, stool antigen testing is both highly sensitive and specific (94% and 97%). False-negative results can occur with either test following use of proton-pump inhibitors, antimicrobials, or bismuth within two weeks of testing. Both UBT and stool antigen can be used for post-treatment eradication testing when clinically indicated.

Serologic testing, primarily for IgG antibody to *H. pylori*, has been in use for some years. However, serologic sensitivity and specificity is relatively low at 85% and 79%, respectively and predictive values are dependent upon local prevalence. Serology does not distinguish between active and past infection and cannot be used to confirm organism eradication following treatment. Because of these disadvantages to serology, and due to development of improved tests including UBT and stool antigen, serologic testing is no longer offered by many major reference laboratories. Likewise, Saint Luke's Regional Laboratories will no longer perform *H. pylori* serology effective July 1, 2018. Both UBT and stool antigen are available as non-invasive test options.

Interpretation of Cardiac Troponin Assay

Two main subtypes of myocardial infarction (MI) have been described;

1. Type 1 which is a consequence of primary coronary event such as plaque rupture, erosion, fissuring, or dissection, and

2. Type 2 which is secondary to the imbalance between oxygen demand and supply (resulting from, for example, endothelial dysfunction, coronary spasm, anemia, hypertension, or hypotension).

Substantial coronary stenosis is easily identified with coronary angiography in type 1 MI. However, in type 2 MI, an identifiable lesion may not be present. Differentiating type 1 and type 2 MI, therefore can be challenging and relies on clinical judgement and additional evaluation.

Because of the high sensitivity and specificity, troponin levels are considered the biochemical gold standard of myocardial necrosis. American College of Cardiology and American Heart Association guidelines state that troponin is the preferred biomarker for diagnosis of MI. Typically, the diagnosis of MI is established based on presence of an increasing and/or decreasing pattern of troponin levels, with at least one value above the 99th percentile of a healthy reference population. Symptoms of ischemia, EKG changes suggestive of myocardial ischemia, imaging evidence of new loss of viable myocardium or wall-motion abnormality are also required for the diagnosis. Type 2 MI is usually associated with lower troponin levels.

At Saint Luke's laboratories, troponin assay is performed 24/7. The specimen requirement is 2 mL (minimum 0.5 mL) plasma or serum (serum gel tube or green heparin tube). The interpretation of the assay is based on three ranges;

- 0.0 to 0.03 ng/mL: Healthy
- 0.04 to 0.12 ng/mL: Increased cardiac risk
- >0.12 ng/mL: Myocardial Infarction

The determination of the 99th percentile cut off (0.03 ng/mL) is done using specimens obtained from local populations participating in health fairs sponsored by Saint Luke's Hospital. The high-sensitivity troponin (hs-troponin) assay is currently not available at Saint Luke's laboratories. The analytical sensitivity of hs-troponin assay is comparatively higher, although differentiating type 1 MI from type 2 MI is still difficult and challenging.

C. E. Essmyer, M.D. ◆ S. Nanua, M.D., Ph.D. ◆ G. Mathur, M.D., M.B.A.