Saint Luke's REGIONAL LABORATORIES

Clinical Laboratory News

June 2015

Fungitell Assay (1-3)-β-D-Glucan

Fungitell, which measures (1–3)-β-D-glucan in serum, has received FDA approval for use as an adjunct in the diagnosis of invasive fungal infections. Fungal cell walls are primarily composed of polysaccharides such as glucan, chitin, and mannan. Glucan is the major constituent of the cell walls of most pathogenic and saprophytic fungi, with the notable exception of the Zygomycetes such as *Mucor* and *Rhizopus*. Likewise, *Cryptococcus* produces only low levels of β-D-glucan and *Blastomyces dermatitidis* produces very little in the yeast/tissue phase.

A meta-analysis of β-D-glucan cites pooled sensitivity and specificity of Fungitell for the diagnosis of an invasive fungal infection as 71% and 82%, respectively (CID 2011:52, 15 March). Fungitell may be useful for detection of β-D-glucan production from fungal pathogens including *Candida, Aspergillus, Fusarium*, and *Histoplasma*. Serum from normal subjects contains low levels of detectable β-D-glucan (<40 pg/mL) likely due to the presence of commensal *Candida* species in the gastrointestinal tract. Serum (1-3) β-D-glucan levels of 60-79 pg/mL are considered indeterminate, while results >80 pg/mL are indicative of a possible invasive fungal infection.

Fungitell results are best interpreted with consideration of its limitations. False-positive results have been attributed to concomitant bacterial infections (especially Streptococcus), exposure to hemodialysis cellulose membranes, and infusion of intravenous immunoglobulin or albumin. Furthermore, surgery patients exposed to glucan-containing sponges or gauze may have elevated levels for 3-4 days post-operatively. False negative reactions are associated with lipemic specimens, hemolyzed specimens and infections with fungi that lack significant levels of (1–3)-β-D-glucan such as Zygomycetes (*Mucor, Rhizopus*, and *Absidia*), *Cryptococcus* species, and *Blastomyces dermatitidis*.

Fungitell testing is performed by a reference laboratory. Specimen requirement is 3 to 5 mL of blood collected into a serum separator gel tube. The original sample, not a pour-off tube, should be submitted to decrease the likelihood of false-positive results due to environmental contamination.

West Nile Virus Update

West Nile Virus (WNV) is an arbovirus, first reported in North America in the summer of 1999. According to CDC, 70-80% of human WNV infections are subclinical. However, WNV infection should be considered in any patient with a febrile or acute neurologic illness and recent mosquito exposure, blood transfusion, or organ transplant especially during summer months. WNV is not transmissible from person to person. Recently the Kansas Department of Health and Environment reported the first WNV case for 2015 in an adult from Lincoln County. Cases have also been reported in Texas, New Mexico, & Oklahoma.

The diagnostic test of choice for WNV and other arboviral infections is serologic analysis of serum or CSF for IgM and IgG antibodies. IgM antibody to WNV can be detected as early as 4 days after onset of illness and may persist for several weeks. Since IgM antibody does not cross the blood-brain barrier, its presence in CSF strongly suggests central nervous system infection. IgG antibody to WNV may be detectable one week after illness onset. Patients who have been vaccinated against, or infected with, related flaviviruses (yellow fever, dengue) may also have positive WNV antibody tests. Although PCR testing is available for WNV, it has been found to be relatively insensitive for diagnosis. Specimen requirement is one red top tube of blood or 1.0 mL CSF.

MERS-CoV Update

Updated information and guidelines for MERS-CoV (Middle East Respiratory Syndrome Coronavirus) were issued by CDC on June 12, 2015, due to an ongoing outbreak investigation in the Republic of

Korea. Importantly, no MERS-CoV cases have been reported in the United States since two cases occurred in May 2014. Both of these infections were acquired in Saudi Arabia. Currently CDC recommends that any patient presenting with fever and severe lower respiratory illness should be questioned about recent (within 14 days) travel history. Suspect cases with travel to either the Arabian peninsula or a healthcare facility in Republic of Korea should be reported immediately to local or state health departments who will coordinate testing with CDC, if deemed necessary. Guidance on the evaluation of patients for MERS-CoV infection, infection control, and home care and isolation measures is available on the CDC MERS website at http://www.cdc.gov/coronavirus/mers. Of note, the respiratory virus PCR panel available through Saint Luke's Microbiology does not detect the MERS-CoV virus.

Lab Test Directory Available in EPIC

A link to the Laboratory Test Directory is now available under the Clin Ref tab in EPIC Hyperspace.

Fecal Calprotectin for IBD

Calprotectin is a zinc and calcium binding protein that is released from neutrophils and monocytes into body fluids and stool. Fecal calprotectin is an indicator of the presence of neutrophils in stool. The concentration of calprotectin is directly proportional to the intensity of neutrophilic infiltration in the gastrointestinal mucosa. Fecal calprotectin is increased in patients with inflammatory bowel disease such as ulcerative colitis (UC) and Crohn's disease (CD). Calprotectin levels are generally higher in patients with inflammatory bowel disease than irritable bowel syndrome (Lehmann FS, et al, The role and utility of faecal markers in inflammatory bowel disease. Ther Adv Gastroenterol. 2015;8:23-36). Patients with irritable bowel syndrome and inflammatory bowel disease share many of the same clinical symptoms. Colonoscopy is usually required to rule out inflammatory bowel disease. More than half of adults and 70% of children with symptoms suggestive of inflammatory bowel disease have negative findings on endoscopy and are diagnosed with irritable bowel syndrome. Prior testing with fecal calprotectin would result in a 50% reduction in the number of adults and 70% reduction in the number of children requiring colonoscopy. Unfortunately, there is considerable overlap in fecal calprotectin levels between irritable bowel syndrome and inflammatory bowel disease. Currently, it remains unclear if patients with calprotectin levels between 50 and 150 ug/g should be referred for colonoscopy or not.

Test performance varies depending on the prevalence of inflammatory bowel disease in the study population. Sensitivity and specificity for differentiating inflammatory bowel disease from noninflammatory etiologies is 93 and 96% in adults and 92 and 76% in children. In settings with a low prevalence of IBD calprotectin might be most useful to help rule out inflammatory bowel disease while in high prevalence settings it might be most useful for ruling in inflammatory bowel disease.

Calprotectin levels cannot distinguish between UC and CD. Patients with inflammatory bowel disease alternate between active and inactive stages of disease. Calprotectin levels fluctuate during these stages. Serial calprotectin levels can be used to monitor response to infliximab or adalimumab therapy, but no cutoff has been established for clinical remission. Calprotectin remains elevated in some patients in clinical remission, suggesting the presence of subclinical mucosal inflammation. Elevation of calprotectin after discontinuation of therapy is a risk factor for relapse.

Reference range is <50 ug calprotectin per gram of stool. Results greater than 100 are suggestive of inflammatory bowel disease. Indeterminate levels between 50 and 100 should be repeated in 4 to 6 weeks. Considerable intra-individual day to day variability of fecal calprotectin may exist.

Increased calprotectin is not specific for inflammatory bowel disease. Fecal calprotectin may be increased in bacterial or viral gastroenteritis, food intolerance, nonsteroidal enteropathy, colorectal cancer and after pelvic irradiation.GI bleeding of as much as 100 mL per day increases fecal calprotectin concentration by 15 µg/g.

Specimen requirement is 5 g of random stool in a screw-capped, plastic container. Calprotectin is homogenously distributed within a stool specimen. Calprotectin is stable in feces for up to 7 days at room temperature. No preservative is necessary.