Saint Luke's Regional Laboratories
Clinical Laboratory Letter
March 2012

Blood Culture Data 2011

Saint Luke's Regional Laboratories processed 25,631 blood cultures in 2011. There were 2226 positive cultures which is slightly decreased compared to previous years. The majority of positive blood cultures yielded Gram positive bacteria (68%), followed by Gram negative bacteria (24%), anaerobic bacteria (5%) and yeast (3%). A breakdown of the most common isolates is as follows:

Organism	# Isolates (%)
Coagulase-negative staph	588 (26%)
S. aureus, methicillin-sensitive	231 (10%)
S. aureus, methicillin-resistant	167 (8%)
E. coli	229 (10%)
Viridans streptococci	111
Enterococcus sp, non-VRE	86
Enterococcus, VRE	15
Klebsiella species	87
Beta-hemolytic streptococci	76
Streptococcus pneumoniae	64
Pseudomonas aeruginosa	29
Candida species	59

Uncommon or unusual isolates for the year included Listeria, Desulfovibrio, Bilophila, Wolinella, Actinobaculum, Rhodococcus, Roseomonas, Variovorax and Ochrobactrum. Additionally, 7 extended-spectrum beta lacatamase (ESBL)-producing E. coli, and 5 ESBL-producing Klebsiella species were identified, which is slightly increased from last year.

Of note, the number of coagulase-negative staphylococcal isolates has decreased significantly from previous years, both in number & percentage of isolates. This likely reflects improved blood culture contamination rates at Saint Luke's Hospital and Saint Luke's East, which together account for 2/3 of all blood cultures drawn.

SLHS Hospital	Contamination rate 2010	Contamination rate 2011
SLH	2.45%	1.67%
SLEH	1.95%	1.78%
SLNH	2.20%	2.44%
SLS	1.73%	1.97%

Improvement of blood culture contamination rates is a worthy goal due to their significant impact on patient care and health care costs. The most recently published data revealed both increased length of stay and increased charges of $8720 per contamination event (J Clin Microbiol 47(4):1021-1024). These false-positive cultures result in unnecessary antibiotics, additional cultures and diagnostic tests, and increased workload for technical staff.

Which Test for Enteric Pathogens?

Most acute infectious diarrhea is self-limited, caused by bacteria or viruses, and has a duration of illness less than 7 days. When illness is severe or becomes prolonged, laboratory evaluation may be indicated.

Common bacterial causes of severe acute diarrhea include *Campylobacter*, *Salmonella*, *Shigella*, and enterotoxigenic or shiga toxin-producing *E. coli*. Less common bacterial pathogens include *Yersinia enterocolitica*, *Aeromonas*, *Plesiomonas*, and *Vibrio* species. Routine stool culture performed by Saint Luke's Regional Laboratories Microbiology includes enzyme immunoassay (EIA) testing for *Campylobacter* and shiga toxin-producing *E. coli* (includes EC0157:H7), as well as culture for *Salmonella* and *Shigella*. If another bacterial pathogen, such as *Yersinia* is suspected, the laboratory should be notified so that appropriate

selective media can be included in the culture set up.

Parasites are an uncommon cause of acute diarrhea, and many studies have shown that routine comprehensive fecal ova and parasite testing is not cost-effective. Most enteric parasite infections in the United States are caused by *Giardia* or *Cryptosporidium*. Enzyme immunoassay (EIA) is the most sensitive and specific test methodology for these pathogens. Routine O & P testing performed by SLRL Microbiology now includes EIA for *Giardia* and *Cryptosporidium*. Comprehensive O&P testing will include *Giardia* & *Cryptosporidium* EIA, as well as a microscopic exam. Comprehensive O&P testing should be reserved for patients that have a history of travel outside the United States, are immunocompromised, or have a protracted diarrheal illness with no other etiology identified.

Testing for stool pathogens is performed daily and samples are retained for one week.

More Evidence Supporting Blood Conservation

Saint Luke's Hospital started a Blood Conservation Program in January of 2000 to improve patient outcomes by optimizing hemostasis and minimizing blood loss. Recently, two more major studies have confirmed the value of blood conservation. In 2010, the TRACS trial evaluated a restrictive versus liberal blood transfusion approach to patients undergoing CABG surgery or cardiac valve replacement or repair, alone or in combination (JAMA 2010;304:1559-67). The objective was to determine if a restrictive perioperative red blood cell transfusion strategy targeting a hematocrit of 24% was as safe as a liberal strategy targeting a hematocrit of 30%. Results showed that there was no significant difference in 30 day all-cause mortality and severe morbidity between the two groups. Interestingly, patients who received RBC transfusions had a longer ICU and hospital stay. In addition, the number of transfused RBC units was an independent risk factor for worse outcomes, including mortality.

Today, there is much debate in the medical community as to whether cardiac patients should be maintained at higher hemoglobin levels to avoid cardiac complications. The FOCUS trial was designed to address this issue (N Engl J Med 2011.DOI:10.1056/NEJMoa1012452). In this study, 2016 patients with a history of ischemic heart disease, who were undergoing surgical repair of a fractured hip, were randomly assigned to one of two groups once their postoperative hemoglobin level fell below 10 g/dL. The liberal-strategy group received single unit RBC transfusions to maintain hemoglobin levels above 10 g/dL, while the restrictive- strategy group were transfused at levels below 8 g/dL. The primary outcome (death or inability to walk 10 ft without human assistance) did not significantly differ between the two groups even though the restrictive group received only half the number of transfusions administered to the liberal group. Furthermore, in hospital myocardial events, other coexisting illnesses, and final discharge destination did not differ between the two groups, although this was not the focus of the study.

The Blood Conservation Team utilizes a comprehensive multidisciplinary approach encompassing pharmaceutical therapy, technology, and blood conservation strategies to conserve patients' own blood and to enhance blood cell production. The program is driven by evidence-based medical and surgical concepts. Patients benefit from this approach with earlier identification and treatment of anemia as well as the reduced need for a blood transfusion.

The Blood Conservation Team is led by Dr Haseeb Ahmed, Medical Director, and Shannon Lynn, Physician Assistant. Their team of clinicians and nurses are available for inpatient and outpatient consultation for anemia management, preoperative optimization of hemoglobin, support of Jehovah Witnesses, and education . Consults can be arranged by calling 816-932-6183.