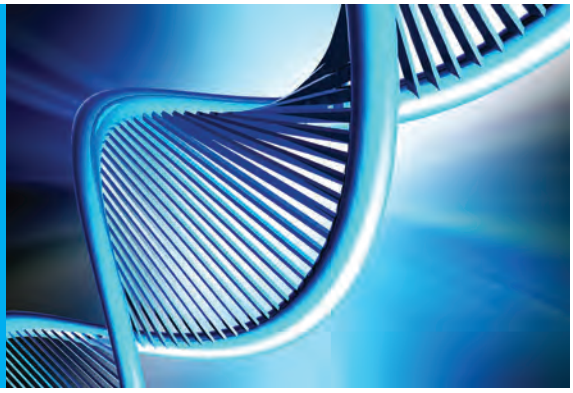
SUMMER 2019

Lab Link

THE NEWSLETTER OF MAIN LINE HEALTH LABORATORIES



Babesiosis

By Olarae Giger, PhD
Microbiology Consultant

In the warmer months of the year, many people spend time on outdoor activities which can put them at risk for contracting tick-borne illnesses. In the United States, babesiosis has most frequently been reported from the Northeast and the upper Midwest. However, there have recently been increasing numbers of cases reported within the Delaware Valley. Recently, Dr. Liu at Bryn Mawr Hospital reviewed cases of babesiosis diagnosed at Main Line Health hospitals from 2008-2017 (Liu, H.H. et al. 2019. Increasing babesiosis in Southeastern Pennsylvania, 2008-2017. Open Forum Infectious Diseases https://doi.org/10.1093/ofid/ofz066. He noted that our four-hospital system saw a rise from 7 or fewer yearly cases of babesiosis in 2008-2014 to 26 cases in 2015.

Epidemiology

Many different species of Babesia parasites have been found in animals, only a few of which have been found in humans. *Babesia microti*, which usually infects white-footed mice and other small mammals, is the species that causes the majority of human disease in the U.S. Occasional cases are caused by other species.

B. microti is most often transmitted to humans by the bite of infected *Ixodes scapularis* ticks, commonly referred to as deer ticks or blacklegged ticks. The young, nymph stage of the tick most actively seek blood meals during warm summer months in wooded areas, brush or tall grass. Infected people may not recall a tick bite because *I. scapularis* nymphs are very small, about the size of a poppy seed.

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Main Line Health Laboratories Receives HAP Award

By Karen Kofalt, Vice President of Professional Services

Congratulations to Main Line Health on receiving the 2019 Hospital of Pennsylvania (HAP) Award for its success in implementing a Multifaceted Blood Product Management Program. A thirteen-member interdisciplinary team, lead by Pradeep Bhagat, MD, medical director, and Judy Ann Gilbert, MT(ASCP), lab system director, was responsible for implementing a multifaceted approach to reduce the misuse of blood projects which included two initiatives: (1) Restriction of criteria for blood product transfusions and (2) implementation of ordering of one instead of two units of packed red blood cells.

The team created a system clinical advisory which summarized best practice guidelines for blood product utilization, conducted a provider education campaign and implemented an audit and feedback mechanism for ongoing provider ordering practices. In phase II of the project, the clinical indications were hard-wired into the Epic system EMR. This included creating an alert in Epic to remind providers to only order one unit of RBCs instead of the usual two units, and then reassessing the patient so that, if additional blood product was necessary, it would be made available in the hemodynamically stable patients.

Numerous tactics were implemented to reduce RBC and platelet wastage, including: creating an internal transfer of platelets among system facilities; implementing the Red Cross transfer dashboard to post and share products among other local hospital systems; modifying transcatheter aortic valve replacement (TAVR) surgery cases orders to reserve one platelet per day instead of one platelet per patient; revising cardiac surgery preadmission platelet ordering practices (reserving 1-2 units, instead of the original 4 units); and conducting monthly anesthesia blood product meetings.

Main Line Health has made considerable progress towards achieving target utilization. Utilization is currently below baseline across the system for all blood products. These

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Patient Safety: Driving Down Pre-analytical Errors

Medical laboratories began adopting patient safety measures in earnest in the 1960s[1]. Quality control/assurance procedures have since been ingrained in all three phases of laboratory testing: Pre-analytical, analytical and post-analytical. The pre-analytical phase incorporates test selection, specimen collection, identification and preparation, specimen transport and the lab intake process. The analytical phase involves the actual performance of testing and applying numerous levels of quality control to assure the validity of results. The post-analytical phase involves data delivery to the clinician, results interpretation and clinical decision-making.

Advancements in instrumentation, automation and information technology have greatly reduced errors in analytical processes. The pre-analytical phase is where up to 75 percent of laboratory errors occur.[2] Specimen transported to the lab, especially from physician offices, offers a plethora of opportunities for quality deviance.

Specimens are usually transported by dedicated laboratory couriers trained to handle specimens to ensure optimum integrity. Main Line Health Laboratories offers courier service from physician offices in the Main Line Health service area utilizing trained, MLH-employed couriers and a contracted professional service, Priority Express Couriers of Boothwyn, Pennsylvania. Couriers arrive at offices on a pre-arranged schedule or on an on-call basis. They may arrive during office hours and receive a direct hand-off from office personnel or after office hours. This ensures that all specimens collected that day have been delivered to the lab for optimal turnaround time.

All laboratories, including MLH Labs, provide insulated specimen lock-boxes to ensure that specimens are kept viable, safe and confidential prior to transportation to the lab. The following are procedures that should be followed when using these boxes:

- **Place the lock-box in a convenient location** for both your staff and the lab courier. Free access is essential to ensure specimens can be picked up at all times. Physician offices located in medical office buildings may wish to place the box in the atrium of the building or near a back door or alternate entrance. The courier must be made aware of the box location in advance. Notify the MLHL Client Services Center at 484.580.4200 regarding changes to the lock-box location as soon as possible.
- **Specimen labeling and packaging:**
  - Specimens must be properly labeled with, at minimum, two patient identifiers—last and first names and date of birth. A lab requisition matching the tube labels must accompany all specimens.
  - Specimens must be placed in biohazard-labeled bags, one patient per bag. Multiple blood specimens from the same patient may be placed in a single bag if all have the same recommended storage temperature. However, urine and stool specimens should be bagged separately from blood.
  - Individual patient biohazard bags are placed into a larger bar-coded bag. The barcoded bag is sealed and labeled with the number of enclosed individual bags. There is an outside pouch for a patient log sheet and a tear-off barcode number for complete record-keeping.
- **Lock 'em up!** To ensure confidentiality, lock-boxes should remain locked at all times. Recently, we have been made aware of several incidents of specimen tampering from unlocked lab boxes. All MLHL couriers have the appropriate key to gain access. Contact Client Services at 484.580.4200 for replacements or additional keys.
- **Not too hot, not too cold:** Temperature extremes may affect patient results. Lock-boxes are insulated to maintain ambient temperature. If boxes are located outside a building, limit the time specimens are in the box prior to pick-up by placing specimens in the lock-box as close as possible to the scheduled pick-up or at the end of the work day. Scheduled pick-up days and times are shown on the lock-box.
- **Frozen specimens:** Main Line Health Laboratories provides Thera-Pak® frozen specimen transport containers. Thera-Paks must be stored frozen to be effective. The specimen must also be completely frozen before placement in the Thera-Pak. The Thera-Pak will keep the specimen frozen for at least 12 hours. Contact Client Services at 484.580.4200 for a stat pickup if the specimen cannot be

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Babesiosis *(continued)*

Babesia can also be transmitted via blood transfusion or congenitally during pregnancy. In 2012, 7 of 911 cases reported to the Centers for Disease Control and Prevention were classified as transfusion associated, and 1 case was attributed to congenital transmission. To date, no *Babesia* tests have been licensed for screening blood donors.

Disease and risk factors

Babesia infection can range from subclinical to severe and life-threatening. Symptoms, if any, usually develop within a few weeks or months after exposure but may appear many months later, particularly in persons who are or become immunosuppressed. Hemolytic anemia and nonspecific flu-like symptoms (fever, chills, body aches, weakness, and fatigue) are the most common clinical manifestations. Some patients have splenomegaly, hepatomegaly or jaundice.

Risk factors for severe babesiosis include asplenia, advanced age, and other causes of impaired immune function (malignancy, corticosteroid therapy, HIV). Severe cases can be associated with marked thrombocytopenia, disseminated intravascular coagulation, hemodynamic instability, acute respiratory distress, myocardial infarction, renal failure, hepatic failure, altered mental status and death.

For acutely ill patients, findings on routine laboratory testing frequently include hemolytic anemia and thrombocytopenia. Additional findings may include proteinuria, hemoglobinuria and elevated liver enzymes, blood urea nitrogen and creatinine.

Diagnosis

In symptomatic patients with acute infection, Babesia parasites typically can be detected by light-microscopic examination of blood smears, although multiple smears may need to be examined. For specimens submitted to Main Line Health Laboratories, order a Babesia smear and collect blood specimens in an EDTA tube (purple top).

Babesia infection can also be diagnosed by positive *Babesia* polymerase chain reaction (PCR) analysis. *Babesia*-specific antibody detection by serologic testing can provide supportive evidence for the diagnosis but does not reliably distinguish between active and prior infection.

Note: Deer ticks can be co-infected with *Borrelia burgdorferi* and/or *Anaplasma phagocytophilum* in addition to *B. microti*. In his review of MLH patients with documented babesia infection, Dr. Liu noted that concurrent Lyme disease was very common (42/84 patients 50%).

Treatment

For ill patients, babesiosis is treated for at least 7-10 days with a combination of two medications, either atovaquone and azithromycin or clindamycin and quinine. Treatment decisions should be individualized, especially for patients who have or are at risk for severe or relapsing infection.

Most patients without clinical manifestations of infection do not require treatment. However, consider treating persons who have had demonstrable parasitemia for more than 3 months.

Prevention

There is no vaccine to prevent *Babesia* infection. Preventative measures are especially important for those at increased risk f or severe babesiosis. During outdoor activities in tick habitats, precautions should be taken to keep ticks off the skin:

- Walk on cleared trails and stay in the center of the trail to minimize contact with leaf litter, brush and overgrown grasses, where ticks are most likely to be found.
- Minimize the amount of exposed skin by wearing socks, long pants and a long-sleeved shirt. Tuck pant legs into socks so that ticks cannot crawl up the inside of the pants. Wear light-colored clothing to make it easier to see and remove ticks before they attach to the skin.
- Apply repellents to skin and clothing, following the instructions on the product label.

After outdoor activities, conduct tick checks and promptly remove any ticks that are found. Ticks must usually stay attached to a person for more than 36 hours to be able to transmit infection, however, *I scapularis* nymphs that typically spread Babesia infection are very small and may be easily overlooked. Showering within two hours of coming indoors has been shown to reduce the risk of tick bites.

Removal of attached ticks: Bare hands should not be used to remove ticks, due to the risk of exposure to the tick's fluids or feces. If gloves are not available, use tweezers or shield the fingers with a tissue or paper towel. The tick should not be squeezed, crushed

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Patient Safety: Driving Down Pre-analytical Errors

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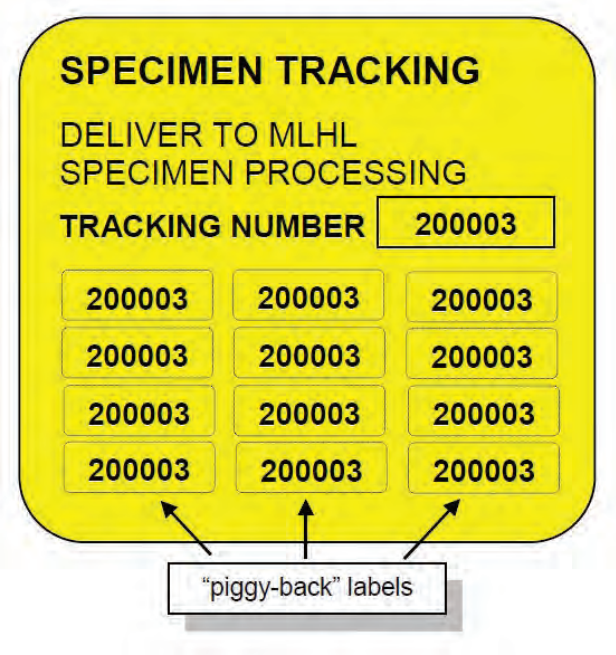
transported in this manner. Be sure to tell the representative that the courier needs to carry dry ice.

- **Keep it clean:** Remove used cold packs, papers and other unnecessary items from the box before placing specimens. If the box becomes damaged, rusted or unsightly, please contact the Client Services Center for a replacement.



Irreplaceable specimens: Certain specimens, such as tissue biopsies are irreplaceable. Loss of one of these specimens can have a catastrophic effect on patient care. MLHL provides and requires an additional mechanism to follow these specimens through the testing process. Gold-colored specimen tracking labels (see illustration) are used to follow the route of transportation from the time of pickup until their arrival at MLH Labs. Each label is numbered. There are twelve, smaller, "piggy-back" labels on each which are to be placed on the lab requisition, specimens, patient chart and other lab documents. These have proved to be very effective in tracking the location of irreplaceable specimens within the pre-analytical processes.

If you have any questions, please contact Donna Burkhardt, 484.580.4215, burkhardtd@mlhs.org or Jack Galamb, 484.580.4006, galambj@mlhs.org.

1. Zaman, Gaffar Sarwar; History and Scope of Quality Control in Laboratories; 2018/intertechopen.com.74593.

2. Hammerling, Julie A.; A Review of Medical Errors in Laboratory Diagnostics and Where We Are Today; Laboratory Medicine, Vol. 43, issue 2, February 2012.

HAP Award

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interventions have saved the system $433,000 to date (13 months), with an estimated impact of $810,000 by the end of Fiscal Year 2019 ($750K for utilization reduction + $60K avoided costs through wastage reduction)

On May 22, the team was honored at the HAP Leadership Summit in Harrisburg, for their continued efforts in blood management. The judges also invited Judy Ann Gilbert to present the project at the HAP annual Patient Safety and Quality Symposium in September. Please join the executive sponsors along with John Schwarz and me in congratulating Judy Ann, Dr. Bhagat, Liz Klinger, and all of the multidisciplinary team on their efforts towards this initiative.

Babesiosis

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or punctured. Tick removal techniques such as the use of hot matches or petroleum jelly may stimulate the tick to release additional saliva and could increase the risk of infection. The removed tick may be frozen in a plastic bag for identification in case of subsequent illness.

If you have questions you may contact Dr. Giger at 484.476.3514 or Daniel Lindao, MS, M(ASCP)CM, microbiologist, at 484.476.8424.

Editor's note: This is an update of a previous LabLink article by Dr. Olarae Giger and Dr. Gary Daum.

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MLH.08-19.DL.0617