

# Pigeon Fever

## Varying Forms of Infection in Horses

It has nothing to do with pigeons and there is often no fever associated with the most common form of infection. So what is pigeon fever and why is it called that?

Pigeon fever is an infection caused by the bacterium *Corynebacterium pseudotuberculosis* that typically causes large abscesses to form in the pectoral or ventral abdominal region of a horse. The swelling on the horse's chest resembles a pigeon's protruding breast, so the term is used to describe this clinical sign of disease. Apart from appearance, it has no relationship to pigeons. To add to any confusion, the infection is also called *dryland distemper* because it is common in arid regions like California, Arizona, New Mexico, and Texas. However, recent research supports that it now occurs in



### INSIDE THIS ISSUE...

Pigeon Fever: Varying Forms of Infection in Horses.....	1
Director's Message .....	2
External Abscesses.....	3
Internal Abscesses.....	6
Ulcerative Lymphangitis .....	6
Prevention .....	7
The Role of Ultrasound in Abdominal Pigeon Fever Infections.....	9
29th Annual Charles Heumhreus Memorial Lecture .....	14
Winner of the 2014 Rowen Fellowship.....	15

all regions of the United States, Southern Canada and Northern Mexico.

*Corynebacterium pseudotuberculosis* lives in the ground where it can survive for long periods of time—more than eight months in a study of soil samples at environmental temperatures. The organism can also survive for up to two months in hay and shavings. Horses become infected when bacteria gain access to the body through small scrapes or wounds in a horse's skin, either by direct contact with contaminated soil or objects, or with the assistance of insects that deposit the bacteria on abraded skin. A variety of insects including horn

flies, stable flies and houseflies have been implicated as mechanical vectors.

One of the most frequent equine infectious diseases found in the western United States, pigeon fever was first reported in 1915 in San Mateo County, California. The 1915 report mentioned that state veterinarian Dr. Charles Keane "had seen some seventeen years ago many horses so afflicted, in certain instances several animals of one ranch or in one stable." Dr. Keane reported

—Continued on page 3

## DIRECTOR'S MESSAGE



Dr. Claudia Sonder and Lightning

The life of an equine veterinarian is never boring. Each new day presents a series of mysteries to solve with the goal of making patients and clients feel better. Over the years, veterinarians develop long-lasting bonds with the horses and people they serve and a collective memory of the medical and physical histories of the ranches and farms they visit.

As veterinary medicine advances, the set of tools to prevent, diagnose and treat infections in horses has evolved through research. We have advanced laboratory capabilities to establish diagnosis with a new trend toward the development of stall-side tests to expedite therapeutic decisions. Mobile imaging, including ultrasound and x-ray, have provided the capabilities to identify infections within the horse and monitor response to treatment. Research also continues to yield improvements in antibiotic choices and combinations to treat specific infections. Yet, the age-old tool that directs the use of all of these remains the physical exam.

In California, a horse that presents with a large, painful abscess on its

chest or swollen, draining tracts along its belly has pigeon fever (also known as *Corynebacterium pseudotuberculosis*) until proven otherwise. Veterinarians will often make this diagnosis based on physical exam, especially if there is a history of previous infection on the ranch. Without fail, the mention of pigeon fever elicits a series of questions and concerns from the horse owner or ranch manager. Although the majority of cases resolve well with nursing care, this disease is truly dreaded because of all of the concerns surrounding its cause, transmission and the potential for the abscesses to develop in other locations.

Occasionally, horses develop internal abscesses or infection of a limb. These are more serious presentations of the disease and require different

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diagnostic and therapeutic measures. Ultrasound is an important tool for locating deep abscesses and guiding drainage and treatment. Antibiotics are usually indicated in these forms of the disease and can require prolonged administration.

The goal of this *Horse Report* is to update horse owners with the latest information on prevention, diagnosis and treatment of pigeon fever. Our team of researchers has identified the primary insect vectors, evaluated the effect of various antibiotics on the different forms of infection, monitored

the spread of pigeon fever across the country, and evaluated factors associated with internal infection.

At present, there is no vaccine for preventing pigeon fever in horses. *Corynebacterium* belongs to a family of bacteria that can invade cells, similar to tuberculosis in humans. This invasion allows them to hide from the army of antibodies that are typically induced by vaccination. Therefore, stimulation of antibodies against *Corynebacterium* is not enough to prevent infection. An effective vaccine against intracellular bacteria must also stimulate the cells to join the fight. A better understanding of the complex interaction between the bacteria, the horse's immune system, and the environment will be necessary to design and test an effective vaccine.

Thank you to all of you who support the Center for Equine Health. Much of the research we present in this *Horse Report* was funded by the generosity of people like you. As you can see, your support makes a difference. \*

## Pigeon Fever

— From page 1

that chest abscesses usually started under or in the skin of the pectoral region. At times, other parts of the body were affected, especially along the abdomen. The lesions ultimately developed into abscesses, some of which were enormous in size. Moreover, another form of infection known as ulcerative lymphangitis was observed by Weber in 1877, and probably also by Goux as early as 1842 in Paris, although there are other bacteria that can cause infection.

This historical account illustrates the medical quote: *Disease is very old and nothing about it has changed. It is we who change as we learn to recognize what was formerly imperceptible* (John Martin Charcot, 1825-1893).

Over the past 20 years, reports of abscesses caused by *Corynebacterium pseudotuberculosis* have risen steadily, and what was once considered a disease confined to California and Texas can now be found in every region of the United States. UC Davis researchers have published numerous studies to better understand how to diagnose and treat this disease in horses.

Sheep and goats harbor a variety of *Corynebacterium* that is genetically different than the variety that causes disease in horses. Cattle can be affected by either variety. Transmission from small ruminants to horses has not been shown to occur.

Pigeon fever can be seen year-round, with seasonal peaks of cases occurring during the summer through early winter, which could be indicative of peak insect activity and the lengthy incubation period for infection to manifest. Horses of all ages are affected, but there is a low incidence of disease in foals less than 3 months of age, suggesting that passive

transfer of immunoglobulins offers protection in foals.

Dr. Sharon Spier, a professor in the UC Davis School of Veterinary Medicine, has been studying *Corynebacterium pseudotuberculosis* for over 20 years. Based on her extensive research, she created the guidelines published recently by the American Association of Equine Practitioners for identifying, treating and preventing pigeon fever. We summarize these guidelines in this *Horse Report*.

Pigeon fever occurs in three main forms: (1) external abscesses, (2) internal abscesses, and (3) ulcerative lymphangitis, which is a painful infection of the lymphatics, most often involving the hindlimbs and causing swelling and oozing sores.

### External Abscesses

External abscesses are the most common form of pigeon fever and may occur anywhere on the body but most frequently in the pectoral region

— Continued on page 4



*Pigeon fever: an external abscess in the pectoral region with houseflies feeding on pus. Houseflies are able to transmit the infection.*

## Pigeon Fever — From page 3

and along the ventral midline of the abdomen. In a recent epidemiologic survey of state diagnostic laboratories, UC Davis researchers identified 2,236 cases of pigeon fever in the United States over a 10-year period. These cases were confirmed cultures sent to diagnostic labs in 23 states. Over 90% of the cases involved external abscesses.

Abscesses typically contain a tan, odorless pus. Horses may have a solitary abscess or multiple abscesses involving different regions of the body. Horses with external abscesses do not usually develop signs of systemic illness, but about 25% of them develop fever. If there are signs of systemic illness, further diagnostics should be performed to rule out internal abscesses.

External abscesses usually mature and rupture on their own, but Dr. Spier stresses the importance of veterinary intervention and cautions against trying to manage the disease alone for several reasons:

(1) It's important to confirm an accurate diagnosis based on bacterial culture to initiate the appropriate treatment. Not all abscesses are caused by *Corynebacterium pseudotuberculosis*.

(2) The severity of external abscesses can vary widely among horses, but most straightforward cases are treated with lancing and draining, with collection of the infected material. This method is preferable to allowing the horse to contaminate its environment as the abscess slowly drains.

(3) Since *Corynebacterium* can survive in soil and on objects such as hay and shavings for a long time, awareness



Another common area for an external abscess is the groin. Pictured here is a gelding with a swollen sheath due to an abscess.

will allow horse owners to act in preventing the spread or persistence of infection on their property.

The use of antibiotics to treat external abscesses is not necessary in most horses and may prolong time to resolution. Antimicrobial therapy may be justified with prolonged infection, and these cases warrant further discussion with your veterinarian.

### **A lesser known subgroup of external abscesses develop infection very deep within the musculoskeletal structures of the limbs, resulting in severe lameness.**

On rare occasions, the organism can cause osteomyelitis (infection of the bone) or septic arthritis—an intensely painful infection in a joint that carries a poor prognosis unless detected early and treated aggressively.

Horses with musculoskeletal infection can present a diagnostic challenge because often the abscesses are not visible and/or there is little suspicion for pigeon fever being the cause of lameness.

At UC Davis, Dr. Nora Nogradi and colleagues conducted a study of lameness caused by *Corynebacterium pseudotuberculosis* in 35 horses, with the aim of tracking the history, clinical signs, diagnostic methods, treatment, and outcome of this lesser known manifestation of pigeon fever. Of the 35 horses, 32 had grade 4/5 lameness, 3 had 5/5 (non-weight-bearing) lameness, and 23 of the 35 had a fever greater than 102 degrees. Diagnoses were based on aspiration or drainage of pus from the abscesses deep within the musculoskeletal structures and one of the following: isolation of *Corynebacterium pseudotuberculosis* by culture or a positive serum antibody titer ( $\geq 256$ ) as measured by the SHI (synergistic hemolysis inhibition) test. *Corynebacterium pseudotuberculosis* produces a toxin, similar to the toxins in a brown recluse spider, that allows it to spread within the skin, causing significant pain and swelling. The SHI test detects antibodies to this toxin.

Among the study horses, 25 had an abscess located in the triceps or axillary region, 2 horses had an

abscess in the stifle region, and 1 horse had an abscess in the popliteal lymph node near the stifle. Diffuse lymphangitis (explained in a later section) was seen in 4 horses, osteomyelitis in 2, and septic arthritis in 2.

Ultrasound examination showed that large abscesses deep to the triceps musculature directly overlying the heart and thoracic cavity were a prominent feature of this disease. The abscesses ranged in size from less than 1 inch to 11 inches and were located up to 4 inches under the skin surface.

Treatment involved ultrasound-directed needle-puncture of the abscesses for lancing and draining (see photos below) and antimicrobial therapy. Ultrasound examination is important for localizing the abscess and its depth to guide insertion of a drain.

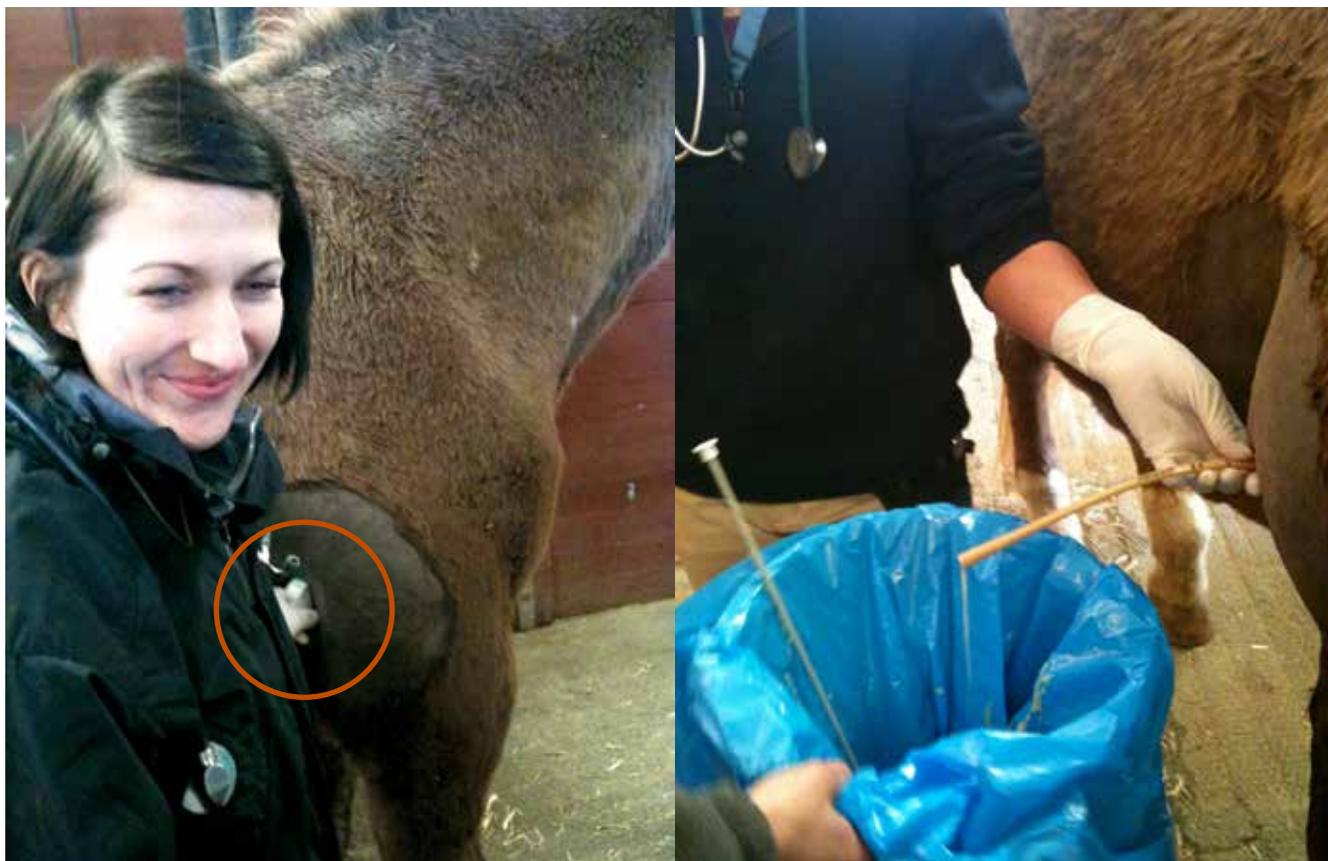
The results of this study revealed the following:

- The size of the abscess did not correlate with the degree of discomfort because all horses had severe lameness.
- Median age of the horses was 5 years.
- The long maturation process of these deep intramuscular abscesses can compromise the horse's systemic health by the ongoing inflammatory process.
- The severe lameness could pose a risk for development of support limb laminitis.
- Bacteremia (bacteria in the blood) and hematogenous (spread by the blood) infection can occur without evidence of external infection.

■ Ultrasound is required to identify areas of abscessation, ulcerative lymphangitis, osteomyelitis, or septic arthritis as well as for draining/aspirating deep muscular abscesses safely to avoid inadvertent puncture of nearby vital structures.

The study authors concluded that pigeon fever should be considered in horses with severe lameness, fever and evidence of inflammation in blood tests (inflammatory leukograms) in regions where *Corynebacterium pseudotuberculosis* is prevalent. According to Dr. Spier, "People are told to wait until abscesses mature, but these abscesses are deep and the horses are so lame that owners should not wait but call a vet to come out. The vet will locate any abscesses using ultrasound and then insert a drain. Because the

— **Continued on page 6**



Dr. Nora Nogradi uses ultrasound (left, in orange circle) to locate the musculoskeletal abscess in this horse so a drainage tube could be inserted.

## Pigeon Fever — From page 5

abscesses are often very deep (up to 4 inches deep), a drain will need to be inserted through the triceps muscle.”

After establishing drainage, antibiotic treatment with appropriate antimicrobial drugs is important. Nonsteroidal anti-inflammatory drugs ease discomfort before or after the abscess is drained. Most importantly, timely intervention is key for resolution of the severe lameness and to prevent secondary complications such as osteomyelitis or support limb laminitis.

### Internal Abscesses

About 8% of horses infected with *Corynebacterium pseudotuberculosis* develop internal abscesses, which is the most serious form of infection with a high mortality rate (30 to 40%). Diagnosis can be difficult, and long-term antimicrobial treatment is necessary for a successful outcome.

The most common organs affected by internal abscesses are the liver, lungs, kidney, and spleen. Abortion due to placentitis or fetal infection has been reported. Internal abscesses are diagnosed based on clinical

signs, laboratory testing including serology (SHI test), diagnostic imaging (ultrasound), and bacterial culture. The most common clinical signs are:

- Weight loss
- Fever
- Decreased appetite
- Lethargy
- Concurrent external abscesses or a history of abscesses in last several weeks
- Signs of respiratory disease
- Abdominal pain

Treatment for horses with internal abscesses includes long-term antimicrobial therapy using site of infection, current knowledge of antibiotic susceptibility, and the ability of the horse to absorb the antibiotic to guide drug selection. Duration of antibiotic administration can range from one to four months.

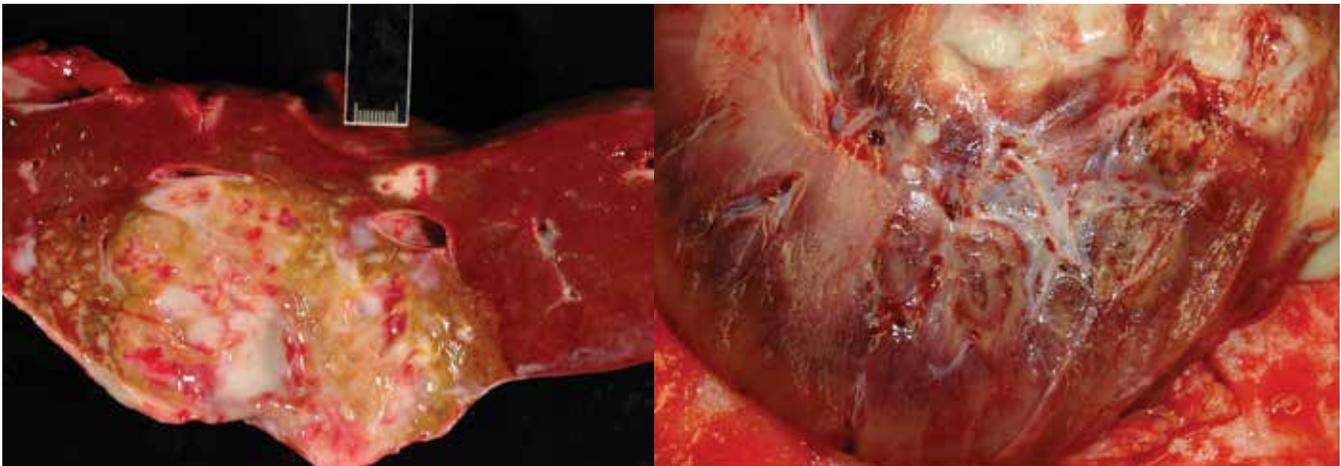
Mortality is reported to be high in cases of internal infections, reportedly in 30% of horses receiving treatment in a UC Davis study published in 2005 by Dr. Suzanne Pratt. In this study, cases evaluated had advanced disease at the time of diagnosis. Early recognition and appropriate long-term therapy offer the best chance for complete recovery. Left untreated, cases of infection within

the abdominal cavity are 100% fatal. Again, timely veterinary intervention is key to a successful outcome.

### Ulcerative Lymphangitis

This form of pigeon fever is the least common form seen in North America (1% of cases). Ulcerative lymphangitis manifests as a severe limb swelling and cellulitis, with multiple draining tracts following the lymphatics. (The lymphatics are a thin-walled circulatory system that transports white blood cells to and from the lymph nodes.) Most commonly, one or both hind limbs are affected. Horses often develop a severe lameness, fever, lethargy, and anorexia.

Horses with ulcerative lymphangitis or cellulitis should be treated early and aggressively with antimicrobials to prevent residual lameness or limb swelling. Typically, intravenous antimicrobials alone or in combination with an oral antibiotic are used until lameness and swelling improve. Subsequently, orally administered antimicrobials are continued to prevent relapse. If not treated early and aggressively, horses that suffer from ulcerative lymphangitis will have some residual lymphatic damage,



At left, pigeon fever internal abscess in the liver, and at right, pigeon fever internal abscess in the kidney.

making them prone to limb swelling and recurrence of infection.

Time to resolution reported in one study was approximately 35 days. Physical therapy, including hydrotherapy, hand-walking, and leg wraps as well as nonsteroidal anti-inflammatories are recommended.

## Prevention

Researchers are currently working on a vaccine to protect horses from *Corynebacterium pseudotuberculosis*. Typically, vaccines induce an antibody response; however, *Corynebacterium* requires a cellular response as well and this is difficult to stimulate with vaccination. Until a vaccine is developed, Dr. Spier recommends the following practices to reduce the risk of disease:

- Quarantine new horses and carefully inspect them for signs of infection.
- Isolate known infected horses when possible and practical, although Dr. Spier does not advocate stringent quarantine such as should occur with EHV-1 or strangles. She points out that pigeon fever is not as contagious as respiratory viruses and recommends using sensible judgment to prevent other horses from contact with infective pus. Often by the time infection is recognized, other horses have been exposed to the same environmental conditions (soil and insects). Having a couple of pens with washing/disinfecting areas for horses that are away from the main barn traffic is ideal.
- Control fly populations on your property. Use of a feed-through insect growth regulator has been effective in reducing the number of biting insects on individual properties. It's important that **all** horses on the property receive the feed-through. The feed-through



Pigeon fever: *Ulcerative lymphangitis*. Photo courtesy Dr. Diane Rhodes.

products containing cyromazine are safer than organophosphate products and may reduce the incidence of disease.

- Use fly repellents, especially on horses with open wounds or draining abscesses, but also on other horses to prevent transmission. Oil-based fly repellents provide longer lasting protection than water-based products. Monitor and treat ventral midline dermatitis caused by biting

insects (stable flies or *Culicoides* gnats). Hock sores or fetlock sores are a common phenomenon in the summer and can be an inlet for infection as well.

- Establish a regular manure management and sanitation program—including removing old hay, feed spills and wet bedding from barns and stables—in the pastures and feedlots to decrease insect populations.

— **Continued on page 8**

## Pigeon Fever — From page 7

- Exercise precautions to prevent transmission of the bacterium via skin or clothing. This involves using gloves and protective outerwear such as a lab coat, coveralls and boots that are used only for the infected horses.
- Wash or sanitize hands after handling infected horses. In general,

wash hands between handling different horses.

- Don't use the same items (buckets, pitchforks and other materials) for infected horses and the general horse population.
- Carefully clean and disinfect areas potentially contaminated by pus from draining abscesses. Bleach and accelerated hydrogen peroxide

disinfectants are effective sanitizers after pus and other organic material have been removed.

- Inspect stalls, paddocks and fields for sharp edges or objects that could cause wounds on your horse's skin, which might subsequently become infected. ❄

Dr. Sharon Spier (pictured below with her horse Diesel) received her DVM from Texas A&M University and a PhD in Comparative Pathology from the University of California, Davis. She is board-certified in Large Animal Internal Medicine and has received the American Veterinary Medical Association's Excellence in Equine Research Award.

Dr. Spier is currently a professor in the School of Veterinary Medicine at UC Davis, where she also heads the Equine Field Service for the William R. Pritchard Veterinary Medical Teaching Hospital. Her clinical and research interests are in *Corynebacterium pseudotuberculosis* infections and in heritable diseases of horses. She has provided emergency care and internal medicine expertise at numerous international equestrian events, including five Olympic Games and two World Equestrian Games.



# The Role of Ultrasound in Abdominal Pigeon Fever Infections

by Mary Beth Whitcomb, DVM, MBA, ECVI (LA-Associate)

The Large Animal Ultrasound Service at the William R. Pritchard Veterinary Medical Teaching Hospital has played a key role in the diagnosis, management and monitoring of pigeon fever cases over the past 15 years. Dr. Mary Beth Whitcomb and Dr. Betsy Vaughan, both faculty in the School of Veterinary Medicine, published the first papers on the ultrasonographic features of *Corynebacterium pseudotuberculosis* infections in the kidneys, liver and spleen.

In horses with abdominal infections, Drs. Whitcomb and Vaughan have found the liver to be affected most often, followed by the kidneys and then the spleen. Ultrasound has been important to show the presence and extent of infection, especially in horses with infections of more than one organ and in horses where kidney and liver values on screening blood work were normal.

Ultrasound has shown liver infections with diffuse areas of mottling or nodular hypoechoic/anechoic (dark or black) areas. In advanced cases, these areas can coalesce to form multifocal large abscesses (Figure 1). Some abscesses are located deep within the liver and are challenging to see without the modifications in ultrasound techniques developed by UC Davis faculty.

Kidney abscesses have appeared as small circular hypoechoic areas in the renal cortex or much larger abscesses in the medullary portion of the kidney (Figure 2). Splenic infections have tended to produce single or multiple, irregularly shaped, hypoechoic areas. Surprisingly, in contrast to external abscesses, visualization of a distinct capsule around abscesses in the liver, kidneys or spleen has not been a common feature of *Corynebacterium pseudotuberculosis* infection within the abdomen.

## Ultrasound-Guided Procedures in Abdominal Infections

Definitive diagnosis of abdominal infections due to *Corynebacterium pseudotuberculosis* has been achieved with ultrasound-guided aspiration of suspect abscesses, followed by culture and sensitivity of the fluid. (Sensitivity testing evaluates the effectiveness of multiple antibiotics to treat the specific bacterial isolate for each horse.) The use of ultrasound guidance to direct needles is especially important for abdominal organs. This visualization ensures accurate sampling of even the smallest lesions while avoiding injury of nearby structures such as blood vessels or bowel.

With over 2,000 ultrasound-guided procedures under their belts, Drs. Whitcomb and Vaughan have extensive experience sampling all types of lesions. Working with

— Continued on page 11



Figure 1: Ultrasound images from three horses with *Corynebacterium pseudotuberculosis* infections in the liver. Horse A shows diffuse mottling within the liver. Horse B shows a focal hypoechoic or dark area (arrows) deep within the liver. Additional abscesses were seen elsewhere in the liver (the remaining dark areas are blood vessels in this image). Horse C is a more advanced case with coalescing areas of abscessation, seen as hypoechoic or dark areas (asterisks), throughout the liver.

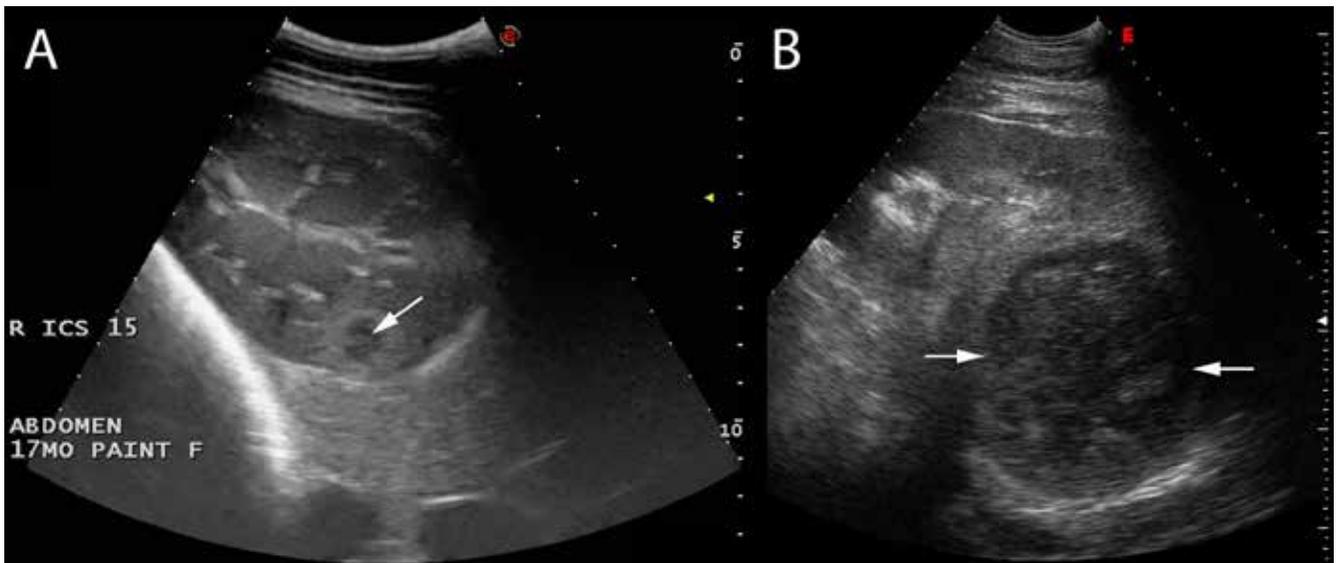


Figure 2: Ultrasound images from two horses with renal abscesses due to *Corynebacterium pseudotuberculosis*. Horse A shows a small abscess (arrow) in the kidney. This is the same horse as shown in Figure 1B. Horse B shows a very large abscess (arrows) in the right kidney. Diagnosis and treatment of this horse is illustrated in Figure 4.

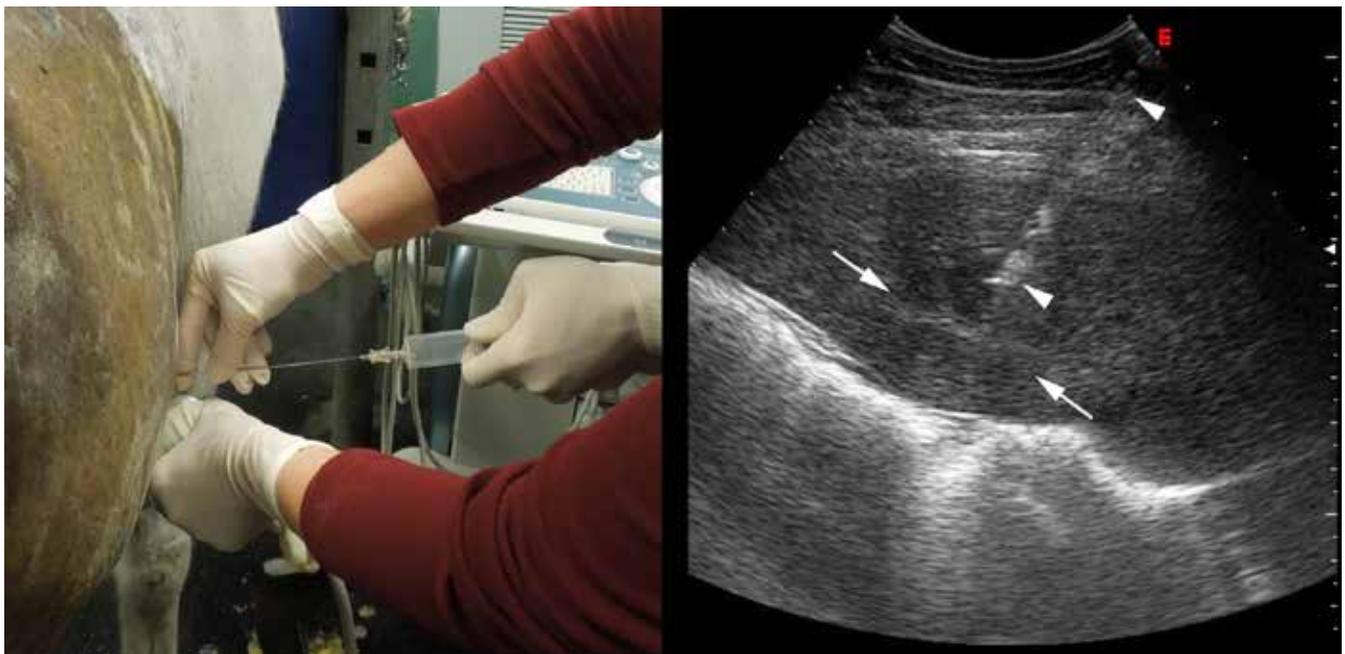


Figure 3: Ultrasound is used to guide placement of needles directly into a suspect abscess for diagnostic purposes. In the left image, Dr. Whitcomb has placed the needle (arrowheads on the ultrasound image on right) directly into the suspicious area (arrows) within the right liver lobe in a horse with recurrent fevers. Once the needle is visualized within the abscess, the needle is stabilized by the ultrasonographer to ensure that no movement occurs while another clinician attaches the syringe to perform the aspiration. Note the aspirated pus visible in the syringe hub, which was positive for *Corynebacterium pseudotuberculosis* on bacterial culture.

## Ultrasound — From page 9

faculty and residents from the Equine Medicine Service, they can place needles precisely into the smallest of abscesses and stabilize the needles so that clinicians can focus on aspirating the abscess contents. All procedures are monitored in real-time with ultrasound to ensure that the needles stay in place throughout the entire procedure (Figure 3).

## Advances in Diagnosis and Treatment

Drs. Whitcomb and Vaughan have developed minimally invasive techniques to treat intra-abdominal abscesses. Using ultrasound guidance, they can place needles directly into abscessed regions, not only for drainage, but also to flush abscesses using small volumes of fluid, after which antibiotics can be placed directly into abscesses. These procedures are performed with the horse standing under sedation.

One of the first horses to benefit from these techniques was a horse named "Peach," a 4-year-old Quarter Horse mare that presented to our Equine Medicine Service for lethargy, decreased appetite, weight loss, and 4/5 lameness. Peach had a history of external pigeon fever abscesses, and her current blood work was suggestive of internal infection. Dr. Whitcomb performed an abdominal ultrasound, which showed a large abscess within and partially surrounding the right kidney. This abscess measured about 5 inches in diameter within the kidney (see Figure 2B) and even larger surrounding the kidney.

Working with Dr. Gary Magdesian of the Equine Medicine Service, Dr.

Whitcomb placed a spinal needle into the abscess for aspiration using ultrasound guidance (Figure 4A,B). Because the abscess contents were thick and difficult to aspirate, small volumes of sterile saline were injected into the abscess to soften the contents and then immediately aspirated through the needle (Figure 4C,D). Each time fluid was injected, a larger amount of pus was aspirated. Ultimately, a net total of 300 mls of purulent material was obtained on the first day. Culture of urine and the renal abscess confirmed *Corynebacterium pseudotuberculosis* infection; SHI titer was very high.

Before removing the needle, antibiotics were injected directly into the abscess. This procedure was repeated the next day, and because the abscess contents had liquefied substantially overnight, nearly 1 liter of pus was able to be removed! Antibiotics were again injected directly into the abscess before removing the needle.

Peach tolerated both procedures extremely well and even showed rapid improvement in the right hind limb lameness that the owner had noticed two weeks earlier. While lameness from a renal abscess is unusual, rapid clinical improvement following decompression of such an extensive abscess made it the likely culprit.

Peach was discharged to home on long-term antibiotics the following day. She responded well and when she returned 5 weeks later, she had gained weight and was no longer lame. Ultrasound showed only a small amount of clear fluid in the abscess capsule, which was drained with ultrasound guidance. Although her blood work abnormalities had nearly resolved, antibiotics were continued based on the ultrasound findings. Another recheck ultrasound

performed 6 weeks later showed no evidence of residual infection, and antibiotics were then discontinued.

## Monitoring Progress

Ultrasonographic monitoring of abdominal infections throughout treatment is very important to ensure that areas of internal abscessation are responding appropriately. Recheck ultrasound exams are usually performed 4 to 6 weeks after diagnosis to ascertain that the abscesses are responding to the prescribed antibiotics. While most horses show improvement, complete resolution is not expected until their second recheck ultrasound.

Occasionally, a horse may show worsening or enlargement of abscesses at their first recheck, in which case a change in antibiotics is necessary. At UC Davis, we rely heavily on ultrasound to decide when to discontinue antibiotics. This is because bloodwork abnormalities often return to normal before complete ultrasonographic resolution is seen. Peach is an excellent example of this, since her elevated white blood cell count and fibrinogen (an indicator of inflammation) normalized at the time of her first recheck despite the presence of a small amount of residual fluid within her renal abscess. Based on the ultrasound results, we recommended continued treatment with antibiotics, which ultimately led to complete resolution of her renal infection. The photo on page 13 shows a healthy Peach! ✨

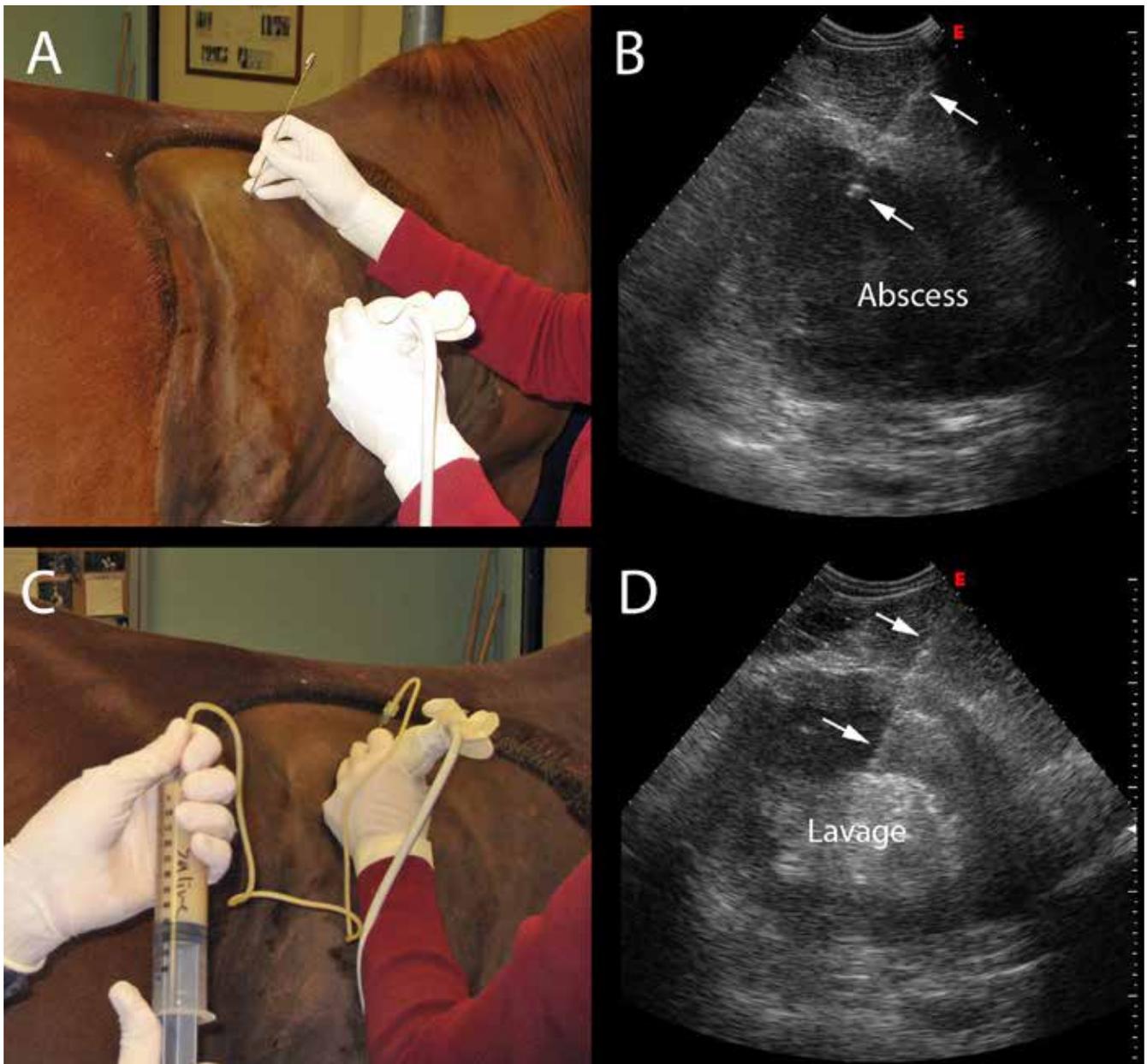


Figure 4: Ultrasound-guided aspiration and lavage (flushing) of a large abscess involving the right kidney (see Figure 2b) in a 4-year-old Quarter Horse mare named "Peach." A) Initial placement of a large spinal needle through the skin and directed into the large abscess with ultrasound guidance. B) This ultrasound image shows the needle (arrows) within the abscess. Abscess contents were extremely thick and only a small amount could be aspirated initially. It was then decided to lavage the abscess through the needle with the horse standing. C) After repeated injections of a small volume (5-10 mls) of sterile saline to liquefy the contents, aspiration yielded increasing amounts of pus. In total, a net of 300 mls were removed on Day 1 and nearly 1 liter on Day 2 through a second needle placement. Needles were removed between treatments. D) This ultrasound image was obtained during lavage on Day 2 and shows the needle (arrows) within the abscess with swirling of liquefied abscess contents.



*Peach is a Quarter Horse mare that developed a large abscess caused by *Corynebacterium pseudotuberculosis* within and surrounding her right kidney. She was successfully treated at the William R. Pritchard Veterinary Medical Teaching Hospital and responded well to the treatment. Her case is an example of how *Corynebacterium* internal abscesses can cause lameness. Peach was discharged to home on long-term antibiotics. After her first ultrasound recheck, it was recommended that antibiotics be continued, which ultimately led to complete resolution of her infection.*

*Ultrasonographic monitoring of abdominal infections throughout treatment is very important to ensure that areas of internal abscessation are responding appropriately. Occasionally, a horse may show worsening or enlargement of abscesses at their first recheck, in which case a change in antibiotics is necessary. At UC Davis, we rely heavily on ultrasound to decide when to discontinue antibiotics. This is because bloodwork abnormalities often return to normal before complete ultrasonographic resolution is seen.*

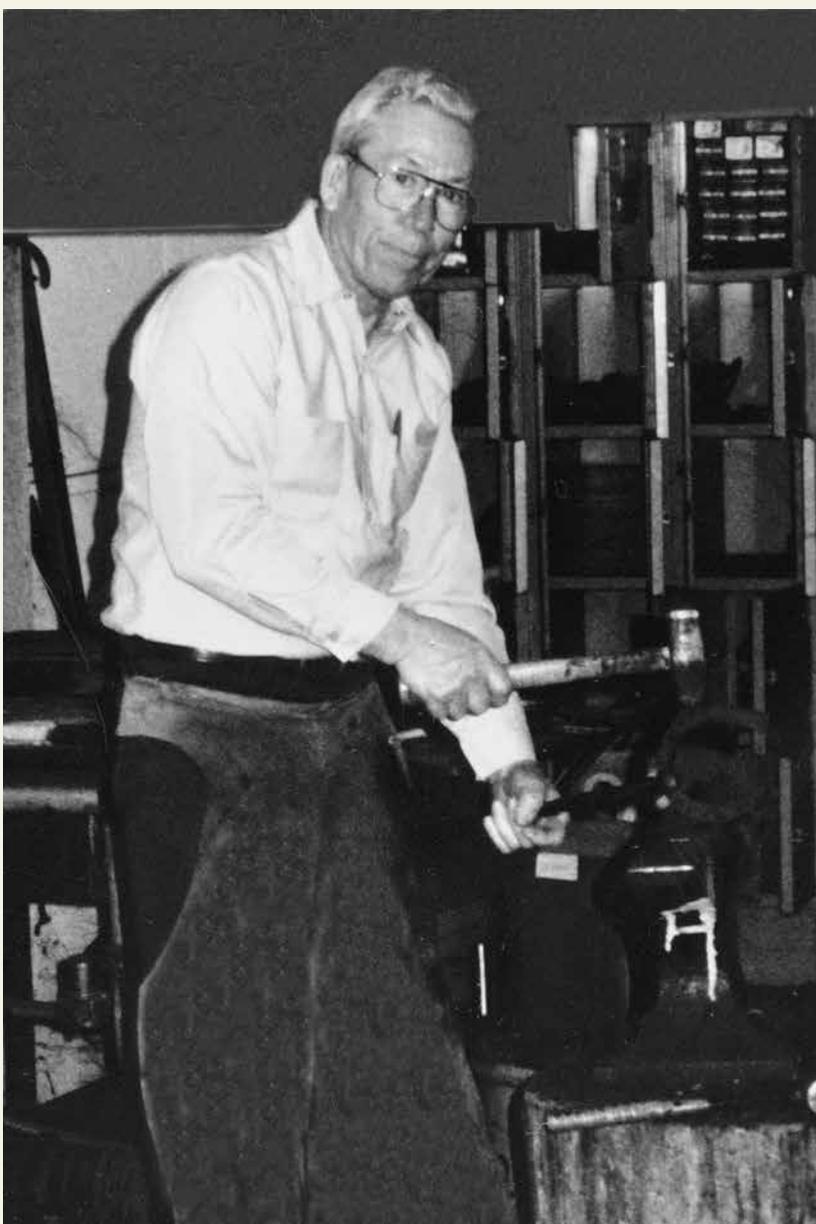
# 29th Annual Charles Heumphreus Memorial Lecture

*"The Effect of Surfaces on Injury and Shoeing in Sport Horses"*  
*"Strengthening the Veterinarian/Farrier Relationship through Better Communication—One Community at a Time"*

**Date:** January 24, 2015

**Time:** 8:00 am – 4:30 pm

**Location:** Gladys Valley Hall, Room 1020, Health Sciences Complex, UC Davis



The annual Heumphreus Memorial Lecture is for farriers, horse owners and veterinarians and honors long-time VMTH farrier Charlie Heumphreus (pictured on left). There is no cost to attend. No registration is needed for the morning lectures, but you must register for the afternoon lab because space is limited to 40 participants.

For more information, please call the Office of Veterinary Continuing Education at **530-754-9223** or visit the website: [http://www.vetmed.ucdavis.edu/CE/equine/heumphreus\\_memorial\\_lecture.cfm](http://www.vetmed.ucdavis.edu/CE/equine/heumphreus_memorial_lecture.cfm)



## Dr. Rana Bozorgmanesh Awarded the Rowan Fellowship

**D**r. Rana Bozorgmanesh, a resident in large animal internal medicine at the William R. Pritchard Veterinary Medical Teaching Hospital at UC Davis, was awarded the Louis R. Rowan Fellowship by the California Thoroughbred Foundation.

Dr. Bozorgmanesh is a graduate of the Royal Veterinary College in London. After completing an internship in internal medicine and reproduction in the UK, she accepted a fellowship in internal medicine at Hagyard Equine Medical Institute in Lexington, KY. She is currently completing a residency in large animal

internal medicine at UC Davis. Her interests include gastrointestinal disease, neonatal medicine, and medical management of the critical broodmare.

The Louis R. Rowan Fellowship, which is funded by donations from the Oak Tree Racing Association, was established in memory of one of the California Thoroughbred Foundation's founders. Lou Rowan, in addition to being a noted racehorse owner and breeder, was active in many areas that benefited people and horses in the Thoroughbred world. Congratulations to Dr. Bozorgmanesh (pictured below on left)!



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# CEH HORSEREPORT

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