FEATURE

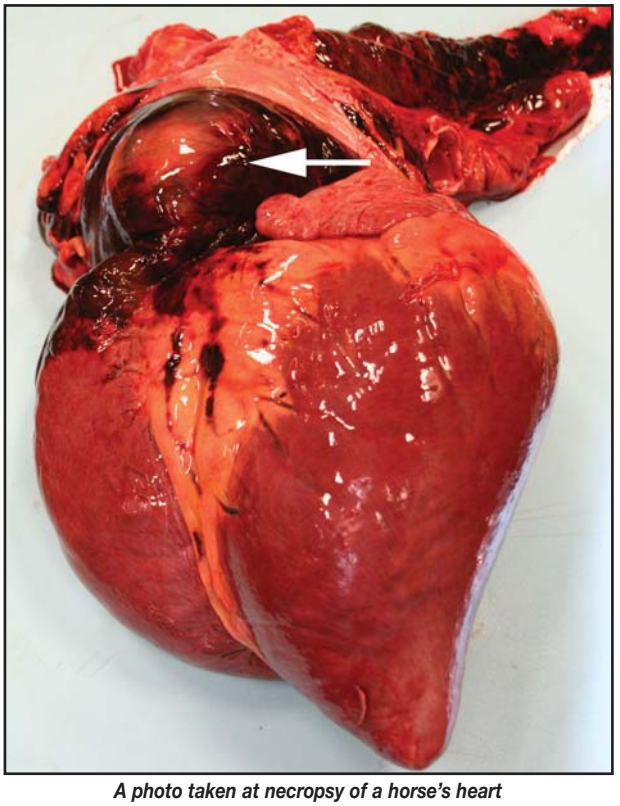
Horse Care

Heart Disease In Horses

by HEATHER SMITH THOMAS

The horse is an athlete and has a large, strong heart, pumping blood to service the body's needs and working muscles—delivering oxygen and nutrients to all tissues and organs. The heart is one of the strongest muscles in the body. Heart disease can affect horses, however, interfering with this important task. It may be congenital (present at birth) or may develop later in life. The most common abnormalities involve the valves and muscles of the heart. Any disruption of the heart's normal function can have serious consequences for the animal.

Dr. Alan Loynachan, a pathologist at the Veterinary Diagnostic Laboratory, University of Kentucky, says people often use the term "heart attack" to refer to sudden death in horses associated with heart disease, but this is incorrect usage. In humans, heart attacks are commonly caused by clogged blood vessels that reduce blood flow to the heart, resulting in damage or death of that muscle. Horses, however, do not suffer from coronary artery disease like humans do.



A photo taken at necropsy of a horse's heart with a ruptured aortic artery indicated by the arrow.

A horse may die suddenly during exertion—due to a heart problem—but it's a different type of situation. Equine heart disease can develop rapidly or slowly, depending on the underlying cause and the location of diseased tissue. "There are many different probable causes of equine heart disease. It may be disease of the heart itself, or may develop secondarily to disease in other organs," says Loynachan.

"We sometimes see congenital heart anomalies in young foals, and they often develop clinical signs at an early age," he says. There may be defects at birth—in the heart's chambers, valves or blood vessels. By contrast, other problems may appear later in life and develop slowly. If the heart can't pump blood efficiently, the horse won't be able to perform at peak athletic ability.

Acute heart disease usually results from direct insult to the heart or disruption of its electrical signaling system. This can happen when there is disruption of blood flow to the heart, toxic or drug-induced disruption of electrical signals, arrhythmia, snakebite, traumatic insult, or a bacterial, hormonal or toxic insult to the heart muscle. Acute heart disease may result in sudden death.

Chronic heart disease develops more slowly, due to the heart's ability to temporarily compensate for abnormalities by increasing in size. In the horse, chronic heart disease may result from birth defects, previous insult to the heart or its valves, cancer, or disease in other organs that alter the blood flow into and out of the heart. Chronic heart disease hinders efficient delivery of oxygen to body tissues. Eventually, the heart becomes overworked in its attempt to pump enough blood and can't keep up with the body's oxygen needs. This results in heart failure.

"The causes of heart disease we see in horses that come through our diagnostic lab (primarily racehorses, but some pleasure horses) are infectious causes, traumatic insult—such as horses getting hit by cars (though this is rare)—or toxic causes, or diseases of unknown origin. Some of the ionophores (common feed additives for cattle) are toxic to horses and may cause sudden death by affecting the heart," he says.

Infectious causes include septicemia. "If a horse becomes septicemic, bacteria can cause disease of the heart muscle itself or its valves, or the pericardium (the sac surrounding the heart). Infectious agents are fairly common causes of heart disease," says Loynachan. The bacterial infection alters the heart's normal function and it can't beat as strongly and is less efficient. If the valves become infected, they may not be able to close properly. There is blood flowing back into the previous chambers or tissues, leading to heart inefficiency.

"In racehorses who collapse while running, this is thought to be associated with probable arrhythmia—an electrical conduction issue. We typically don't find any

heart lesions in these instances. Human heart attacks are primarily due to cholesterol buildup, and horses don't have this problem," he says.

The best way to study electrical conduction abnormalities is when the horse is alive. After the horse dies, it's difficult to determine the actual problem because there are no lesions. "Speaking as a pathologist who examines tissues at necropsy, it's almost impossible to trace it back to why this malfunction developed. It's my job to relate it back to what could have happened, but in these instances it's hard to speculate," he says.

"The conduction system essentially tells the heart when and how to beat. Any type of arrhythmia or out-of-place beats can disrupt the heart and throw it out of sync. If a horse drops dead, the owner should not just assume that the horse died of heart disease. It's important to have a necropsy performed by a veterinarian and tissues examined by a laboratory. We can see if there are any other predisposing factors, such as disease in other tissues, or if it was a primary heart complication," says Loynachan.

"With an arrhythmia, there are no post-mortem changes and this in itself is a hint that it was most likely an electrical conduction problem. It takes a while for tissues to become diseased. If something happens very quickly, the tissues will all look normal. By contrast, if something started happening a few hours earlier, the horse may be showing some type of clinical signs. In these instances, we are better able to identify the underlying causes because we start seeing lesions at necropsy," he explains.

"We don't see heart disease very frequently in horses. From 2000 to 2009, for instance, we only identified 261 horses with heart disease (174 cases of acute heart disease, 107 cases of chronic heart disease and 20 horses with both acute and chronic lesions), among the thousands of horses who were presented to the University of Kentucky necropsy service. It's very rare to hear of horses dropping dead during training or a race," he says.

Sometimes an episode occurs that makes national news, however, like the group of polo ponies who all died suddenly in Florida a few years ago due to a drug miscalculation. "This is an example of a potential toxologic insult to the heart. Various toxins can cause disease of both the electrical conduction system or the heart muscle itself," he explains.

Heart disease is a complicated issue. "There are a lot of pressures within the heart, and if something is out of normal parameters—such as amount of heart blood, cardiac output, the amount of blood being provided to the tissues—it can cause some abnormalities. This can happen very quickly or it may take months to develop heart disease. It depends on the underlying insult," says Loynachan.

Humans and horses are similar in that there are ways to compensate for heart inefficiency. "We can increase the volume of blood, for instance, or increase vascular tone. The vascular tone in the circulatory system can increase or decrease somewhat, in order to compensate. The heart's job is just to pump blood to all the other tissues, and any time we disrupt that job too much, it can cause serious problems." Equine heart abnormalities can negatively impact their health and longevity.

Continued on next page

Congenital Heart Disease

Dr. Peter Physick-Sheard (veterinarian and Associate Professor, Department of Clinical Sciences, University of Guelph, Ontario, Canada) says things like a hole in the heart, or tubes not connected properly, can be serious. "A pleasure horse with a placid temperament might have a congenital hole in the heart and never show any signs of heart trouble. But the majority of congenital heart problems will ultimately have an impact on the horse's ability to perform. If the horse is expected to do any significant intensity of exercise, he won't be able to manage it."

A small percentage of congenital anomalies will result in the animal's death at just a few months of age, but the mere presence of a murmur doesn't necessarily indicate a serious problem. "Unless the foal is showing clinical signs that suggest the problem is severe, I generally tell clients to ignore it and come back in two or three months, and have another look. Young foals often have bizarre murmurs that just disappear," he explains.

"But if there are clinical signs such as shortness of breath, discolored membranes, difficulty getting up and down, becoming easily exhausted, etc., you need to check it out right away. The foal could die if they're that severely affected. There are tests that can be done, to help define what's going on. Some congenital heart problems can be fixed. For the newborn foal showing severe signs, it's worth getting a diagnosis immediately," says Physick-Sheard.

"If the foal is otherwise healthy, vigorous and active, wait a week and have another listen. If it's still there, keep an eye on it, and eventually get an ultrasound done, to find out what's going on. Unless the foal has clinical signs and needs to be checked earlier, you can get a better idea when the foal is two or three months old. It's easier to restrain the foal at that age, and safer to sedate him for the examination," he says.

Horse Care Cont'd.

Rhythm Disturbances

"Serious and persistent rhythm disturbances in very young foals are not common. If a foal is sick and also has a rhythm disturbance, most likely the disturbance merely reflects the primary problem. Usually fixing the primary problem gets rid of the arrhythmia. It's not usually a primary cardiac problem," says Physick-Sheard.

"Rhythm disturbances are divided into two types—supraventricular (atrial) arrhythmias and ventricular arrhythmias. Most horses have supraventricular rhythm disturbances that are perfectly normal. If a horse has a rhythm disturbance and the resting heart rate is within normal range, the only way to confirm that the disturbance is normal is to do an ECG. Probably more than 98 percent of these horses have no abnormalities. These disturbances are just variations on normal," he says.

"Ironically, the fitter the horse, the more likely he is to show those variations in rhythm. Don't panic, especially if the resting heart rate is normal. If the rhythm disturbance completely disappears when the horse becomes excited or is working, this is even better." The engine smoothes out and works perfectly when the horse is exercising. It's like having a very fancy engine; it runs roughest at the lowest RPM.

"There are only three supraventricular rhythm disturbances that are of clinical significance. One is atrial fibrillation (AF) and the other two (third degree heart block and supraventrical tachycardia) are relatively rare," says Physick-Sheard. AF is an electrical disorder in which the atrial electrical waves become chaotic, causing the upper half of the heart to twitch irregularly. Atrial contractions do not occur properly. Unable to establish a steady rhythm, the heart can't pump blood efficiently and the horse becomes incapable of prolonged exertion.

"AF is treatable," says Physick-Sheard. It is most often treated with drugs, such as quinidine, given orally or intravenously. In uncomplicated cases, particularly those of recent onset in young, light horses, this treatment is quite effective (in 83 to 92 percent of cases).

"The downside is that some horses don't handle the drugs well, and may become quite ill (side effects include colic and laminitis) before the arrhythmia is corrected. Occasionally, adverse reactions to the drug can become life-threatening and require withdrawal of the drug before the rhythm converts to normal. Chronic cases and cases of arrhythmia in older, heavy horses—particularly if they also have pre-existing heart disease—can be exceedingly difficult to treat," he says.

Another treatment option is transvenous electrical cardioversion (TVEC). "This procedure involves positioning catheter-mounted electrodes in the heart and pulmonary artery via the jugular vein, anesthetizing the horse and delivering a defibrillating electrical shock to the heart. In our clinic, this treatment has been effective in all 170 uncomplicated cases treated thus far, with a recurrence rate of about 20 percent, which is similar to cases treated with drugs," says Physick-Sheard.

"AF tends to reappear in about 20 percent of horses and can be treated each time. AF can be a problem because even though the horse is not likely to drop dead and will probably live a long life, the arrhythmia will limit his ability to work."

If it's a pleasure horse, you may not notice anything. "But if a horse with atrial fibrillation has some other condition on top of it—maybe gets sick and has low blood pressure—then the horse may become unsteady or faint," he says.

"But if atrial fibrillation is the only problem, you won't know it unless you listen to the heart—if you aren't using the horse in serious work. This is a problem that has to be fixed, however, if the horse will be used for strenuous work," he says.

"The ventricular rhythm disturbances (in the lower part of the heart) are more complicated and tend to be much more significant. You'd only know they were there if you did an ECG. If the horse's resting heart rate is normal, it's probably not serious. But if the resting heart rate is elevated, it is likely to be significant," he says.

"Spontaneous rhythm disturbances in the bottom part of the heart most often occur in association with systemic disease—a secondary consequence. Ventricular rhythm disturbances, without the horse being sick, are very uncommon. There are a few, like cantharadin poisoning ("blister beetles") in hay. Another would be when a horse suffers ionophore poisoning, after ingesting cattle feed containing this class of drugs," says Physick-Sheard.

"A horse with ventricular rhythm disturbances as a spontaneous phenomenon is very uncommon. In most cases, these disturbances accompany systemic disease and are a secondary consequence—and are best treated by treating the underlying problem."

If a horse has ventricular rhythm disturbance, safety issues become significant. "If the horse has a leaky valve (murmur), if and when it does start to cause problems, he tends to tire at a level of work he previously tolerated; it's like having a governor on the engine. You can only go so fast and can't push beyond that speed."

The clinical signs tend to be progressive. "With a heart murmur, we see a tendency to tire or for the horse to hit a ceiling in terms of how hard it can work. But if a ventricular rhythm disturbance starts up, there could be a spontaneous drop in the horse's ability to work; the horse could faint and suddenly collapse. Horses with ventricular rhythm disturbances pose a serious safety issue; there's possibility of the horse having a fainting spell or becoming unsteady when ridden," says Physick-Sheard.