

Common Veterinary Tests Used to Diagnose Conditions Causing Colic (CCC's)

Your horse is showing signs of colic. You have asked us to provide emergency veterinary care, or your local veterinarian has referred you to us for additional diagnostic testing and treatment.

We want to be clear about the value you get from the diagnostics and treatments we perform, as the costs add up quickly and we don't want to surprise you with them.

The purpose of this handout is to educate you about how we evaluate horses experiencing colic, and to describe some of the more common tests we use to identify the Condition(s) that are Causing the Colic – the CCC's. If you have questions about the exam or any of the diagnostics performed, please feel free to ask.

You can also find much more detailed information in Horse Side Vet Guide®, which is a constantly growing encyclopedia of equine health information that we created. The website is free – www.HorseSideVetGuide.com – and the mobile app is just \$5. available on iTunes & Google Play. Below we have included some links to HSVG, which contain more detailed information about each diagnostic.

COSTS & FINANCIAL CONSTRAINTS

Cost is only one of many factors we consider when assisting you in your decision-making. That said, it is very helpful to know if you want us to “do everything possible” or if you are faced with money constraints.

We will recommend diagnostic tests that yield the most helpful information while striving to work within your budget. After all the diagnostics are performed, we will recommend various

treatment options. Again, the question of cost will arise, and you need to be prepared for that conversation.

Although less than 10% of all colic cases are surgical, you should be prepared to decide whether or not your horse is a candidate for surgery. See our related article *Colic Surgery: What Horse Owners Should Know* for more information.

HISTORY

If possible, we will ask you a series of questions about the horse. During this conversation we often gather important clues that help us determine why the horse is ill. This information is critical to our understanding of the disease processes that might be affecting the horse.

Questions we might ask include:

- Management and feeding of the horse, including any recent changes.
- What specific signs of colic has your horse been demonstrating? For how long?
- Have you (or your referring vet) given your horse any medication? If so: what, how much and when?
- What is your past approach to preventative healthcare for your horse?
- Any recent vaccinations? Deworming? Dentistry? Farriery? Other treatments?
- What is your horse's past medical history?
- Have they experienced colic before? If so, how recently?
- What do you do with your horse (pleasure, performance, pet)?
- Do your other horses appear ok?
- *We may ask many other or different questions, depending on the circumstances...*

If you have additional information that you think may be helpful, be sure to tell us! Sometimes seemingly irrelevant information can turn out to be a valuable and relevant clue to the underlying cause.

THE PHYSICAL "COLIC" EXAM

We start with a careful physical exam tailored to the horse showing abdominal pain (colic). How detailed an exam we do depends, in part, on the degree of pain the horse is experiencing. If the horse is in severe pain, our exam may be very brief because we are forced to provide pain relief and sedation to allow examination. Once these medications have been given, it can be harder to reach helpful conclusions from the exam results.

We always consider the horse's general health –including their age, body condition, attitude, coat and weight. We take basic vital signs including temperature, pulse, respiratory rate and character, and we look at mucous membrane (gum) color, capillary refill time, pulse quality, intestinal motility, and the presence or absence of digital pulse. An examination of the mouth and teeth, or other areas of the body might also be important.

Of particular importance in horses experiencing abdominal pain include:

- Pain level and duration, and our ability (or inability) to control the pain with various drugs.
- Cardiovascular status: including heart rate, gum color, pulse strength and capillary refill time.
- Rectal temperature can indicate the presence or absence of infection or intestinal damage.
- Intestinal motility (the presence or absence of normal intestinal movement.)
- The presence (or absence) of bloating (abdominal distention).

RESPONSE TO PAIN RELIEVERS

Bute & banamine can be useful, but it is important to understand their limitations.

In some cases, you or your regular veterinarian will have already given your horse flunixin meglumine (Banamine®) or

other medications. Keep in mind that pain-relieving medications may make your horse look better to you than he actually is.

These drugs often mask the signs of pain, without solving the underlying condition. Once the pain medication wears off, the horse may return to showing signs of pain. See *Bute & Banamine: What Horse Owners Should Know*.

We consider the effects of previously administered drugs when we examine your horse, and we try to see past their expected effects.

When we give pain medications, we expect to see a certain response. Specifically, we expect certain conditions causing colic (CCC's) to be more or less responsive to pain medications. Consequently, how a particular horse responds to pain medication is one more clue about the Condition Causing Colic.

Note: Most sedation drugs also cause slowdown of the normal movement of the intestine. This is generally not good, so we try to avoid giving sedatives whenever possible.

PASSAGE OF NASOGASTRIC TUBE

The tube is placed through the nasal passage down the esophagus & into the stomach.

One of the first steps in diagnosing a horse in abdominal pain is to pass a nasogastric or stomach tube. Horses have a small stomach, and our first job is to determine whether it is under pressure from backed up gas or fluid. What comes out of the stomach into the tube (gas, fluid or nothing) gives us clues to the nature and location of the intestinal problem.

The long, flexible plastic tube is inserted through one of the nostrils, goes through the nasal passages, pharynx, and follows the esophagus into the stomach. In the average adult horse the distance from the nostril to the stomach is 4 to 5 feet.

In passing a stomach tube, the veterinarian must be sure that the tube passes through the correct nasal passage, encouraging the horse to swallow the tube to begin passage into the esophagus, and then guides the tube through the tight valve into the stomach. When the tube enters the stomach there is usually a rush of gas and a typical fresh grass or hay smell.

Of course the tube must not end up in the lungs. If fluid is pumped into the lungs, it will likely be fatal to the horse. *Never try this procedure yourself!*

Passing a stomach tube is a common skill practiced in equine vet medicine, but smooth, easy stomach tubing IS AN ART that requires HORSEMANSHIP. Some horses tolerate the procedure well, while others resent it and could require a twitch. How well the horse tolerates it generally relates to how well they are trained on the ground and the vet's skill. Horses that normally get their way may resist this procedure strongly. Very rarely, a horse has insufficient training in hand to tolerate this and they require sedation in order to safely pass a tube. In most cases though, a skilled vet can make the passage of a stomach tube look easy, usually without a twitch.

Rarely, a horse experiences a bloody nose during or following this procedure. This results from abrasion to delicate membranes in the nasal passages by the tube. It usually results from the horse struggling when the tube is being passed, but it can also result from the tube going in the wrong passage and hitting a particularly vascular "dead end nasal passage".

While a blood nose looks terrible and we hate it when it happens, keep in mind that even a bad nose-bleed is relatively minor hemorrhage for a horse, so it is usually not a problem.

Passage of a nasogastric tube can be used diagnostically, or as part of a treatment regimen.

As a Diagnostic Test: Nasogastric intubation helps determine

the presence or absence of fluid or gas accumulation in the stomach. In a normal horse, there should be little fluid accumulation in the stomach.

If there is significant fluid accumulation, it can mean that there is a blockage (either physical or functional) of the upper part of the intestinal tract (the small intestine), which is causing backup of fluid into the stomach. We call this abnormal accumulation of fluid "reflux." Knowing whether or not there is reflux is important diagnostic information.

As a Treatment: To relieve overfilling of the stomach and intestine with reflux in cases where this is causing pain or contributing to the disease process. Or, to administer fluids and other medications into the stomach, when appropriate and when the stomach is not already full.

RECTAL EXAM

In a rectal exam, a veterinarian places a gloved, lubricated arm into the horse's rectum in order to feel the anatomy of the back half to two-thirds of the abdomen. The rectum is thin walled, and with careful examination, an experienced equine veterinarian can feel and evaluate many of the abdominal organs through it.

Structures such as the left kidney (the only one of the kidneys we can reach), the large colon and other parts of the intestine, the inguinal rings, the bladder and parts of the reproductive system can be evaluated.

A specific problem with the intestine or other organ is sometimes diagnosed with this exam. More often though, we are able to determine what GENERALLY is going on by feeling gas or fluid distension patterns or a specific segment of intestine in the wrong position in the abdomen. Sometimes the rectal exam findings are completely normal, and this in itself is very helpful information.

Most horses tolerate rectal exam pretty well, but in some cases we may need to sedate or twitch horses for this

procedure for better relaxation of the horse and the rectum.

A very rare, but potentially severe complication of rectal examination is tearing of the delicate rectal wall. While this is a very uncommon complication, a severe rectal tear can be fatal. It is important that you understand that there is a small risk associated with rectal exam.

MANURE RELATED DIAGNOSTICS

Tests for blood or protein in the manure may suggest bleeding or protein loss into the gastrointestinal tract.

Sand Sediment Test in Glove

Sand accumulation is a common CCC in certain geographic areas. A sand sediment test is often performed to indicate the presence of sand in the manure, a potentially important finding. But a negative sand sediment test does not absolutely rule out the presence of sand in the GI tract.

Although often performed in horses showing colic signs, Fecal Egg Counts may or may not be useful in determining whether parasitism is the CCC. Fecal Egg Counts are an indicator of shedding of parasite eggs but not necessarily parasitic disease.

ABDOMINAL ULTRASOUND

Ultrasound probe is placed on the left abdominal wall. Image courtesy of The Glass Horse.

In most hospital and referral cases, we use ultrasound of the abdomen as an additional diagnostic tool. Abdominal ultrasound may be used either trans-rectally (through the rectum) or through the abdominal wall from the skin. In colic cases, it is mostly performed through the abdominal wall (trans-abdominal).

The ultrasound emits sound waves that pass through tissue at various speeds depending on specific tissue characteristics. The sound waves bounce back to the transducer and a digital picture is produced by computer analysis of the returning

sound waves.

Ultrasound is a wonderful tool for gathering more information about the equine abdomen. It can give additional valuable information regarding the position and state of various parts of the intestine. It is also used for evaluation of the tissue characteristics of liver, spleen and other abdominal organs.

One limitation of ultrasound is its inability to penetrate gas-filled structures or solid feed. Another limitation is the relatively shallow penetration of the sound waves- only 6-12" at the most. How deep we can image depends upon the ultrasound machine and probe.

Ultrasound image of the left kidney & spleen. Image courtesy of The Glass Horse.

Like many other diagnostics, the quality of the information is only as good as the skill of the veterinarian performing the procedure.

BLOOD WORK, LAB TESTS & CBC

Serum chemistry and hematology tests are performed using sophisticated and expensive equipment in our laboratory. We have chosen to purchase this equipment so that we can offer you the very best care for your horse.

The in-house lab gives us important information to allow us to make decisions quickly, rather than having to send samples away and wait for days for a result. Sometimes we do choose to send blood or samples away to a reference laboratory to have the testing done there. This is usually because the lab offers particular tests that we cannot perform in our hospital.

A complete blood count (CBC) includes a count of red blood cells and several populations of white blood cells. A complete blood count gives valuable information about the health of the horse, its hydration status and characteristics

of the disease process. A white blood cell count is especially helpful in supporting a diagnosis of bacterial infection or can suggest intestinal damage or endotoxemia. This test is performed within 10 minutes, in our hospital.

BLOOD CHEMISTRY

The blood chemistry is a battery of individual blood tests for levels of about 20 enzymes and molecules within the blood. Serum enzyme level increases can indicate damage to specific organs.

An example of a serum enzyme is LDH (lactate dehydrogenase). This enzyme is found only in liver and muscle cells. Large elevations in this enzyme can mean that either liver or muscle cells have been damaged and their enzymes released into the blood.

We use the rest of the exam and other blood work findings to interpret the significance of individual test results. Examples of other levels measured are glucose (blood sugar), creatinine (an indicator of kidney function), and many others. Total protein and albumin can be indicators of hydration status. A decrease in these can indicate loss of protein through a damaged intestinal wall.

Electrolyte values say something about the general health and hydration status of the horse and can also provide clues about needed resuscitation and treatment.

BLOOD & ABDOMINAL FLUID LACTATE LEVELS

Lactate measurement can be a helpful diagnostic test for horses showing signs of colic.

Lactate (lactic acid) is produced by tissues that are deprived of oxygen for any reason. In horses showing colic signs, high lactate levels can be associated with severe dehydration, shock. Blood Lactate also rises when segments of intestine are damaged or have poor blood supply.

We perform lactate analysis on blood and abdominal fluid. Each

provides useful information. The difference between blood and abdominal fluid lactate levels can also be helpful.

Sometimes we repeat this test over time to monitor the change in lactates. Changing levels of plasma and peritoneal lactate can indicate whether a case is improving or worsening with treatment.

A belly tap is the sampling of fluid that bathes the abdominal organs. A sterile needle is used to collect this fluid.

ABDOMINOCENTESIS a/k/a BELLY TAP

An important and common test used in cases of abdominal illness in horses is abdominocentesis, commonly known as "belly tap." This involves the collection of a sample of the free fluid from the abdominal cavity. This fluid bathes the outside of the intestine and abdominal organs.

Changes in this fluid, both the appearance of the fluid and the laboratory results, give critical information regarding the health of the abdominal organs, especially the intestine.

Certain changes in the fluid suggest damage to intestine and so can help determine the need for colic surgery or intensive care and can provide information about prognosis.

The Belly Tap procedure involves clipping a specific site on the lower belly. This site is then carefully disinfected. A needle is introduced carefully into the abdomen, using special care not to puncture intestine or other organs. The needle is maneuvered until fluid is encountered, and a small sample of this is caught in 2 types of tubes.

In our hospital, we are successful at obtaining fluid in about 70% of cases by using this technique. In cases in which we are unsuccessful, we resort to using a larger, blunt tube and a different, slightly more complicated procedure. We perform belly tap after ultrasound when possible. Ultrasound allows us to locate small pockets of fluid within the abdomen.

Unfortunately, sometimes it is just not possible to collect

abdominal fluid. This is usually because there is very little fluid in the abdomen. In other cases, clots of inflammatory material or feed can block the needle or tube.

Normal abdominal fluid is clear and pale straw/yellow colored.

Once we collect abdominal fluid, we analyze it in our lab for certain cell and fluid parameters. We commonly measure total protein. Total protein in normal abdominal fluid should be very low (less than 1.0 g/dl). Total protein over 2.5 generally indicates a severe disease process going on in the abdomen.

As intestine is damaged, the intestinal vessels become leaky and allow protein to escape from these tissues and enter the fluid. We then see an increase in total protein in the fluid. Changes in abdominal fluid characteristics can be useful in determining progression of the disease.

Cloudy yellow abdominal fluid indicates the presence of inflammatory cells.

The risk of this procedure is usually very low. The risk is a little greater in foals but still not great. The main risk is puncture of intestine, leading to leakage of bacteria-laden intestinal contents, causing inflammation and/or infection of the abdomen.

Reddish-orange abdominal fluid indicates intestinal damage.

Limitations on this test include lack of fluid, inability to obtain fluid, and contamination of the fluid by prior attempts and abdominal decompression, feed or blood.

ABDOMINAL RADIOGRAPHS

Obtaining abdominal radiographs of a full-sized horse is only possible using very powerful x-ray generators. The mass of the abdomen is difficult to penetrate. For this reason, this diagnostic test is usually only performed at large referral hospitals and vet schools that have this equipment. Abdominal radiograph's greatest value is in visualizing enteroliths

(intestinal stones) and sand accumulation.

Abdominal Radiograph with Enterolith (Intestinal Stone)

Abdominal x-ray may be very valuable for smaller ponies and foals and may give additional diagnostic information in those equines, which may be impossible to perform rectal exam on.

CONCLUSION

As we gather all of the information from the diagnostics above (and possibly other diagnostics that are tailored to a particular circumstance), we put it together to begin to identify the CCC – the Condition Causing Colic. The presumed diagnosis of the CCC, coupled with the systemic health and pain level of the horse determines the best treatment options. Which treatment options you choose depends on many factors, including economic constraints.

Keep in mind that all of this information only gives us a rough picture of what is going on in the abdomen. Hopefully it can provide us a good enough idea that we can select effective treatment.

If you have any questions as we work, please do not hesitate to ask. In emergency circumstances, we work very quickly to gather this information and present it to you for discussion. Sometimes this can be a confusing process and we want you to fully understand what is going on with your horse from the beginning, so that you can make the right choices for you and your horse.

By Douglas O. Thal DVM Dipl. ABVP, Board Certified in Equine Practice of Thal Equine LLC

Last Updated September 2015