

Gastrointestinal and musculoskeletal diseases and neoplasia of the Older Horse

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Introduction

Gastrointestinal tract is the most common system to be involved in diseases of the older horse. (Brosnahan, Paradis) In comparison to younger horses, horses ≥ 20 years of age were more likely to experienced colic, dental disease and tumors. Presenting clinical signs that indicate gastrointestinal involvement vary with the part of the gastrointestinal tract that is involved. They may include weight loss, quidding, passage of whole grain in the manure, foul breath, abdominal pain, dysphagia, and ptyalism. This paper will begin at the beginning, the mouth, and describe particular problems in the gastrointestinal tract as they relate to the older horse.

Oral Cavity

Dental problems in the older horse may be due to the normal or abnormal wear. Horses have hypsodont teeth which have a long reserve crown in the young animal and they constantly erupt throughout the horse's life. Wear of these teeth depends on many things such as forage versus grain diets. In general, the eruption time equals the wear time which is about 2-3 mm/year for horses on a primarily forage diet. (Dixon,1999) This equates to 4-6 cm lost by the time the horse is 20 years old and 6-9 cm by the time the horse is 30 years old. As the teeth become completely worn down, the premolars and molars lose their normal enamel ridges and become smooth. Hence this condition is called "smooth mouth". Without a grinding surface to the cheek teeth, the older horse is unable to crush many of its feed. The grinding of food begins the normal digestive process by allowing saliva and digestive enzymes to begin working on the starches whole grains and in forage. Horses with smooth mouth or any dental problem will often present with whole grain in their feces or spit out lumps of chewed hay, quids, from their mouths.

Other dental conditions that are commonly encountered in the older horse include wave mouth, step mouth, hooks and shear mouth. Wave mouth is the uneven wearing of the cheek teeth. Because molars are always permanent teeth, the first molar or 4th cheek tooth is the oldest tooth in the mouth. In wave mouth often the upper PM4 and M1 are worn to the gum line while the lower opposing teeth are longer creating an arcade that wears and grinds food abnormally. A step mouth is similar but is usually caused by the absence of 1 tooth and the overgrowth of the opposing tooth. Hooks develop on the upper 1st cheek tooth and the lower 6th cheek tooth in response to malocclusion of the dental arcade and decreased wearing surfaces. Shear mouth is a condition where the lingual points of the lower teeth come in contact with the hard palate. Laceration of the gums or palate may occur in these problems.

Brosnahan and Paradis found in a survey of owners of older horses that dental disease in the older horse was often unrecognized by the owner. 10 % of geriatric horse owners reported that their horses had dental problems. But in that same survey, another 15% of owners reported that their horses displayed dysfunctional mastication, such as quidding. 11% of owners of older horses reported that they had their horses teeth floated, ≤ 1 time per year. From the medical records examined in our study, it was evident that in general, geriatric horses were not presented because of dental disease. Horses with esophageal choke, large colon impactions, and maldigestion of whole grain cereals were examined closely for dental abnormalities and severe premolar and molar arcade disorders were often found.

Esophageal disorders

Older horses with esophageal choke should have a thorough dental examination. Bad teeth result in the swallowing of improperly chewed boluses of hay or feed. Horses with esophageal choke, generally present in distress with food regurgitation from their noses. Confirmation of the problem can be done by passing a nasogastric tube. This will help you to determine where the choke is located and how firmly it is lodged. Endoscopy of the esophagus will allow one to visualize the material that is causing the obstruction. The use of different endoscopic loops or biopsy forceps may be useful in relieving persistent obstructions.

Several complications can occur secondary to esophageal choke. They include aspiration pneumonia, esophageal tears and the development of esophageal strictures. Aspiration pneumonia is fairly common during a choke, especially if the obstruction is located in the cranial part of the esophagus. Food material and saliva are immediately deposited into the nasopharynx after attempts to swallow. Because of this the bacterial population in these pneumonias is a mixed bag of gram negative and gram positive aerobic and anaerobic organisms. Affected animal should be placed on a broad spectrum of antibiotics immediately. Delays in treatment can result in severe pleural pneumonia with abscess formation.

Gastric disease

The only gastric disease that is specific to the older horse is gastric squamous cell carcinoma. Squamous cell carcinoma is the most common stomach neoplasia in the horse is usually seen in middle to older aged horses. Horses will present with signs very similar to those of poor dentition. They include weight loss, malodorous breath, dysphagia, ptyalism, intermittent esophageal obstruction and colic. Diagnosis is best made with gastroscopy and biopsy of any abnormal tissue that is seen. Hypercalcemia may also be noted on serum chemistry.

Colic

Colic was the most common problem for which geriatric animals were evaluated at TUSVM/LAH during the period of our study. Several studies have investigated the association of age and the incidence of colic, with different results. Many of these studies were focused particularly on horses that were > 20 years of age. In our study at TUSVM/LAH, strangulating lipomas of the small intestine were the second most common specific disease problem of geriatric horses. This finding is supported by results of studies that indicate a significant increase in the incidence of strangulating lipomas with increasing age of horses. In our study, 44% of horses evaluated because of a small intestinal lesion had a strangulating lipoma. This was a higher percentage than has been reported among horses of all ages, and also suggested that strangulating lipomas are more prevalent in older horses.

Large colon impaction was the fifth most common specific disease diagnosed in the horses of the study reported here. The physiologic or anatomic changes that develop in the gastrointestinal tract of horses as they age, and how these changes might be associated with colic and other diseases, have yet to be fully elucidated. Examination of a group of horses that were 20 to 35 years of age revealed that these geriatric horses had a notable reduction in the ability to digest crude protein, phosphorus, and fiber, compared with findings in a group of younger horses.

Physiologically, this was attributed to decreased digestive or absorptive processes in the large intestine, possibly secondary to ongoing tissue damage caused by intestinal parasites. Dental disease may also contribute to a decrease in digestibility of nutrients and result in large fibers entering the large colon, thereby predisposing animals to simple intestinal tract obstruction.

For many horses with colic, the question of whether surgery should be considered as a treatment option eventually arises. For owners and veterinarians of geriatric horses, this decision is associated with specific humane, emotional, and financial considerations. Studies to assess prognosis after surgical treatment of colic have revealed various results. Results of 1 study indicated that advanced age is a risk factor for having an abdominal lesion that required surgical intervention, and for an unsuccessful outcome (death) to occur from the surgery. The overall survival rate of all horses with colic that were treated surgically in that study was 44%, which is less than the rate calculated in the TUSVM study. Of the 69 horses with colic that underwent celiotomy in our study, 50% improved and were discharged.

Rectal tears

There are antidotal reports of spontaneous rectal tears in geriatric horses. It is hypothesized that older horses with equine Cushing's disease may be more susceptible to this problem. Care should always be taken to minimize any trauma to rectal tissue during a per rectal examination.

Body condition and Nutrition

In the TUSVM survey study, 68% of owners gave their geriatric horses a body score of moderate to good. Surprising results were that while only 4% were considered to have a poor body condition, 28% were considered fat. In the same survey, it was found that most older horses were fed either grass or alfalfa hay with 7 % of horses receiving a hay substitute and 4% receiving no hay at all. 51% of the geriatric horses received feeds formulated specifically for geriatric horses. The most common supplements included general vitamins and minerals and joint care products.

Specific research into the nutritional differences in the older horse versus the younger horse suggests that the geriatric horse has a decreased ability to digest fiber. It was concluded that feeding higher quality roughage may be helpful in keeping good body condition in the older horse. Ralston recommends increasing the crude protein in the geriatric feeds to 14-16% which is approximately double what the younger horse needs. Studies in geriatric rats have found that the addition of leucine to the diet helps to stimulate protein synthesis. It has been speculated that the addition alfalfa hay which is high in leucine may aid in preventing muscle wasting in the older animal.

Not much is known about the needs of the older horse in regards to macro and micro-nutrients and vitamins. There is some evidence the geriatric horse may have deficiencies in phosphorus, chromium and vitamin C.

Often feeding of the geriatric horse comes down to feeding whatever they will eat. Horses with poor dentition will have problems with hay and whole grains. The use of current senior diet formulations can be helpful in keeping weight on the geriatric animal because of the increased digestibility. One needs to be careful when switching to a senior feed. Some of these feeds are not calorie dense and can not be fed on a volume basis. By continuing to feed the same volume one may actually be decreasing the total calorie intake for the animal which may result in an unexpected weight loss.

Weight Loss in the Older Animal

Perhaps the challenge in the older horse in regards to body condition is the actual recognition of weight loss, particularly in horses affected with dysfunction of the pars intermedia of the pituitary gland in the winter. These horses tend to grow excessively long shaggy hair coats that don't shed out in the spring. Owners may observe that their older horses are quite round and fuzzy but they may miss the fact the horse is actually very thin under this excessive hair coat. It is important to emphasize that one must actually palpate the underlying skeletal structure to evaluate the body condition of a horse.

The diagnostic work up for weight loss in the older horse is the same as it is for any age horse. The amount of weight that is gained or lost is dependent on the calories that are taken in versus the calories that are used up. Cause for decreased intake in the older animal may be due to lack of good quality feed, poor appetite secondary to a debilitating

disease, poor dentition, maldigestion and malabsorption. Reasons that an older horse may have an increased utilization of calories may relate to environmental cold, increased level of exercise (less likely) and increased catabolism secondary to a debilitating disease. Recurrent airway obstruction is a good example of a debilitating disease in the older horse. Not only does the increased respiratory rate and effort increase the caloric need of these animals, the affected animals can not take time away from breathing to actually eat enough to meet this need.

Neoplasia should be on a list of differential diagnoses for weight loss in the older horse. Though it is not as common as it is in other species, it is still seen. Abdominal neoplasia may include lymphosarcoma, squamous cell carcinoma, adenocarcinoma, leiomyosarcoma, melanoma and mesothelioma.

Your diagnostic workup for weight loss in the older horse is very similar to that of any horse. A good nutrition history is important and it should include grain and forage analysis. A thorough physical examination and a CBC and chemistry profile should provide a minimum data base. From this point, a per rectum examination and an abdominal ultrasound will be important to check for abdominal masses. An abdominocentesis is helpful in ruling out peritonitis but less helpful in diagnosing neoplasia because tumor cells are rarely shed by the tumors. Gastroscopy is useful in determining the presence of gastric ulcerations and squamous cell carcinoma of the stomach. A rectal biopsy may be useful in diagnosis of inflammatory bowel disease. If a diagnosis is not found after this workup then an exploratory laparotomy may be the best option.

Musculoskeletal Disease of the older horse

Seventeen percent of horses in Brosnahan study were evaluated at TUSVM because of lameness. Musculoskeletal problems were the second most common body system affected in the older horse. Approximately 40% of these lame horses had degenerative lesions of the musculoskeletal system. Many of these problems are probably an accumulation of past injuries and wear and tear of cartilage. Changes that occur in bone, cartilage and tendons as the animal ages most likely contribute to the stiffness and lameness that we see. Age-related changes have been found in components of articular cartilage and flexor tendons of horses. Though GAG's remains constant throughout life, there is an age-related decrease in proteoglycan size though the loss of GAG chains in horses. Older horses also have greater pentosidine crosslinks which may predispose older horses to osteochondral disease due to stiffer and more brittle cartilage.

The veterinary management of musculoskeletal disease in geriatric equids is likely to increase in scope and importance as more of these older horses are expected to perform athletically. The types of musculoskeletal disease most commonly identified in TUSVM data differed somewhat from those found at necropsy in the study of geriatric horses conducted in Kentucky. At necropsy, the most common musculoskeletal diseases detected in equids between 15 and 45 years of age included fractures, laminitis, arthritis, and trauma (in decreasing order). In our study, laminitis was the most specific musculoskeletal problem identified and fractures were reported in < 2% of horses.

Many horses still continue to work past the age of 20. Ten percent continue to compete while others change their careers for something less physically demanding. If we look at recommendation for older people, regular exercise and resistance training improves muscle tone and mobility. Conversely confinement and lack of movement weakens muscles and bones. Even in the oldest group of horses, movement in a pasture is preferred to stall confinement. McKeever and Malinowski compared the aerobic capacity of unfit old mares with that of unfit young mares and found that the older mares had a substantially lower aerobic capacity. This finding may be important in how we develop training programs for older horses.

Treatment of osteoarthritis in the older horse is directed at pain management to improve the quality of life as well as maximize function. Sixty five percent of the older horses in the survey that were receiving medication were receiving some form of analgesic/chondroprotective medication. Nonsteroidal anti-inflammatory drugs are the most widely used analgesic with phenylbutazone being the most common. The effects of chondro-protective agents such as Adequan and Cosequin have shown some anti-inflammatory and analgesic effects. Complimentary therapies have also been used by owners to help with musculoskeletal pain relief in the older horse.

Neoplasia

In older horses, squamous cell carcinomas have been reported to be most common tumor, principally of the eye and male genitalia. This is similar to the findings of the study reported by Brosnahan. The lesions may be single or multiple. They are generally seen in older geldings – one study affected had mean age of 16.5 years of age. Lighter, non-pigmented skin is more susceptible to development of this tumor. Metastasis to corpus cavernosum penis and inguinal lymph nodes can occur. Treatment options include cryotherapy in early stages, topical 5-FU in nonmetastatic disease and en bloc resection with penile retroversion – if lymph nodes involved. Markel reported that 8 out of 9 horses had no recurrence of neoplasia after this surgical procedure during a 6 -96 month follow-up period.

Other tumors commonly recorded for the horses of our study were melanoma and lymphosarcoma. Melanomas incidence increases with age. Findings of a necropsy study of geriatric horses in Kentucky indicated pituitary adenoma, melanoma, squamous cell carcinoma, and lymphoma to be the most common tumors (in descending order).

Owners of older horses have generally owned them for a long period of time. They have developed a bond that is similar to that of the companion animals. Their desire to have their animal's age gracefully with comfort and mobility has stirred research in the field of equine geriatric medicine. Hopefully the diseases discussed in this talk will highlight areas where research can be most helpful.

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