

Equine Rescue and Rehabilitation:

How to Deal with Starved, Unwanted and Abandoned Horses and Work Effectively with Law Enforcement, Animal Control, and Rescue Organizations

Lisa Kivett, DVM, MS, DACVIM-LA

Author's address—Foundation Equine, PO Box 481, Southern Pines, NC 28388; e-mail: lisakivett@gmail.com.

Take Home Message—Equine starvation and neglect cases can be challenging but rewarding for veterinarians involved in their treatment and rehabilitation. Knowledge of refeeding and management strategies, prognosis, and expected complications, as well as legal processes and public relations will help the veterinarian increase likelihood of a successful outcome.

I. INTRODUCTION

Unwanted horses are defined as those “which are no longer wanted by their current owner because they are old, injured, sick, unmanageable, fail to meet their owner's expectations, or their owner can no longer afford them.”¹ Estimates of the true number of unwanted horses in the United States vary and current statistics are not available. In 2009, the number of unwanted horse was estimated at 170,000.¹ “Unwanted horses” do not encompass all cases of starvation, neglect, or abandonment encountered by veterinarians and animal control or welfare organizations. Many of these cases involve animals that are wanted, but whose owners have not provided proper care due to mental illness, lack of financial resources, or ignorance of proper husbandry practices. In addition, horses may be starved due to individual physical maladies or herd dynamics causing inability to access or utilize feed.²

Veterinarians are often called to evaluate and treat horses seized or surrendered to law enforcement, humane organizations, or rescue organizations.² Knowledge of the expected course of events in the equine rescue and rehabilitation case, as well as the possible legal processes and outcomes, will assist the veterinarian in their examination, treatment, record keeping and communication on these cases.

II. SEIZURE AND SURRENDER OF ANIMALS

When becoming involved in the treatment of an equine starvation or neglect case, it is critical to know whether the ani-

mal was seized or surrendered to humane authorities. In the case of a seizure, custody of the animal is assumed by the legal entity investigating the case, typically law enforcement or animal control. Seizure is made against the owner's will, and official ownership is retained by the owner until rights are severed in court or the animal is forfeited due to mounting costs.

Expenses incurred in the treatment, rehabilitation, and maintenance of seized animals are usually paid by the seizing authority and would need to be reimbursed by the owner to resume possession of the animal. Veterinarians treating seized animals should keep detailed invoices and should not discount services if it will make it more likely that a rightfully accused owner will be able to regain custody. It is important to remember that final ownership transfer of seized equines may take months to years due to delays and postponements of court proceedings. There is always a chance that seized horses will ultimately be returned to the accused abuser.

Animals voluntarily surrendered to legal authorities or humane organizations are a much simpler situation. In the case of voluntary surrender of animals, cruelty charges may still be filed against the former owner. Unlike a seizure case, ownership is immediately transferred to a legal authority or humane organization, and the animal can be offered for public sale at an agency auction or transferred to a rescue organization adoption. All expenses incurred are the responsibility of the person or group currently in possession of the animal.

III. INITIAL EVALUATION

Initial documentation of examination findings is critical for later prosecution of the former owner. If the animal is examined on-site at the farm on which the alleged cruelty occurred, notes on the condition of the premises and available feed and water should be kept. Photos should be taken when possible.³ Initial intake procedures for seized horses have been well-described previously.²

As part of the initial examination, the following findings should be documented: weight as estimated by weight tape, body condition score according to the Henneke Body Condition

Scoring system,⁴ temperature, pulse, respiration rate, mucous membrane color, capillary refill time, condition of skin, eyes, and hooves, and findings of abdominal auscultation. Any visible wounds, injuries or unsoundness should be documented. The horse's age and breed should be documented as "estimated" so that a defense attorney cannot discredit the veterinarian by presenting evidence or testimony of any variance of age or breed.³ Photos of the horse and any noted abnormalities should contain identifying information, which can be printed on paper or an erasable board and held visible in the photo.³ Since photos may be used as evidence in court, attempts should be made to accurately show the animal's condition. Photos taken from behind or above the animal may help to show emaciation and lack of muscle mass.

Common findings on initial examination include low body condition, unkempt haircoat, dermatitis, chronic open wounds, dull or depressed demeanor, increased haircoat length or hirsutism due to lack of adipose stores to maintain body warmth, and abnormalities of the hooves. Thrush, chronic laminitis, white line disease and cracked or overgrown hooves can indicate lack of farriery.³ Atrophy of the frogs of the hooves is a common finding due to thrush, wet/dirty environment and lack of exercise or sufficient space. Tachycardia or heart murmurs as a result of anemia or systemic disease may be noted.

Initial labwork should consist of a fecal egg count, which may be important in later prosecution,^{3,5} and a Coggin's test.³ If possible, a CBC and serum biochemistry profile should be performed.³ Expected findings of initial bloodwork include anemia and hypoproteinemia.² Anemia is most likely a result of chronic lack of nutrients resulting in decreased viability of erythrocytes and inability to replace aged erythrocytes.⁶ If the horse has been recumbent, elevated CK and AST may be noted. Initial findings and case progress should be promptly and rigorously documented in the animal's medical record. Considerable delays between the initial seizure/surrender and a court case may occur. Detailed records will be invaluable for the veterinarian in formulating appropriate testimony at a later date.

IV. TRANSPORT OF EQUINE NEGLECT CASES

Weak, emaciated horses at risk for collapse should be transported in an open box-style trailer when possible. At-risk horses should not be tied in the trailer, since catastrophic injury can occur if the horse collapses with the head tied. Deep bedding and a perimeter of hay bales, bagged shavings or other protective material may be useful should the horse become recumbent in transit. Head protection and leg wraps may be applied. Turning the horse to face the rear of the trailer may create an easier scenario if the horse collapses. Venous access and strap placement for dragging maneuvers is significantly safer and easier with the head toward the rear opening of the trailer. If the horse collapses during transport, it can be removed by utilizing a forwards-drag or backwards-drag configuration with 3-4 inch wide webbing straps.⁷ A rescue glide is useful when available, or a tarp or plywood can be used to relocate a

recumbent horse. Slings, manufactured or makeshift, should not be used inside horse trailers due to lack of structural stability of the side walls or roof.

V. REFEEDING THE STARVED HORSE

Refeeding syndrome is a well-recognized sequela to the re-introduction of food in previously deprived animals. This syndrome occurs in many animal species including humans and horses.^{6,8} It is characterized primarily by hypophosphatemia, hypokalemia, and hypomagnesemia.⁶ The process begins when the introduction of carbohydrates, specifically glucose, causes insulin release. Insulin prevents the release of free fatty acids and causes an intracellular influx of glucose and selected electrolytes. This, in turn, decreases serum concentrations of these substances.⁶ Depletion of ATP results in RBC dysfunction and inability to release oxygen to tissues.⁶ Resultant heart, respiratory, and kidney failure contribute to death in affected animals.⁸ Neurologic signs may or may not be present preceding death in horses affected with refeeding syndrome.⁹ Onset of clinical signs may occur from 1-19 days following re-introduction of feed.⁹ Further complicating matters, animals that have been deprived of feed have delayed gastric emptying and slowed absorption of nutrients.^{6,10} Careful re-introduction of feed to starved animals is recommended to minimize the risk of refeeding syndrome, and to avoid complications with delayed gastric emptying.

Several equine re-feeding strategies have been previously described.^{2,6,8-10} All advocate for the initial provision of calories at a level below the daily requirement for digestible energy. Since insulin release contributes to the development of re-feeding complications, feeds low in starch or non-structural carbohydrates should reduce risk. Most publications on the subject recommend initial re-feeding with small, frequent quantities of forage.^{2,6,8-10}

A clinical trial designed to assess the metabolic responses of chronically starved horses to refeeding with three different diets showed lower postprandial glucose and insulin concentrations in horses fed hay diets than those fed with a combination of hay and commercial ration. Alfalfa hay and oat hay were used in the refeeding diets due to their low starch contents. Serum magnesium concentrations were improved in horses consuming the alfalfa hay diet, which contained the most magnesium. All horses in the study were fed at a rate of 50% of the horse's calculated daily digestible energy (DE) requirement during days 1-3 of re-feeding, increasing to 75% of daily requirements during days 4 and 5 and 100% of their daily DE requirement on day 6.⁶ 13.6% of the study horses were euthanized, one with signs typical of refeeding syndrome. A subsequent study demonstrated that substituting corn oil for part of the alfalfa as a calorie source offered no advantages.⁸ Results of these studies indicate that initial re-feeding with small, frequent quantities of low-starch forage may offer the best results in animals at-risk for refeeding syndrome. Additionally, alfalfa hay that is higher in phosphorous and magnesium may offer an advantage over other grass hays.

Wilson and Fitzpatrick described their approach to the intake and re-feeding of large numbers of malnourished horses at the 2004 American Association of Equine Practitioners annual convention. Horses with no oral intake for 24 h were offered frequent handfuls of grass hay at least once per hour for the first day. After day 1, horses were given restricted hay access by means such as hay nets placed outside of the bars of the stall. Horses that had had some feed access prior to admission were permitted full access to grass hay. Concentrate feeding was gradually introduced to all animals on day 4, using 0.5 lb of a complete feed, twice daily for average size horses. The amount or frequency of concentrate feeding was increased every other day to a maximum of 3 lb per feeding as long as the horse was consuming the full amount offered and maintaining a normal manure consistency. A trace mineral block was provided after day 4, but was removed if excessively consumed. In those cases, loose trace minerals were provided with the concentrate at the manufacturer's daily recommended amount. Though the exact number of horses rehabilitated with this protocol was not given, the authors described no fatalities or euthanasias as a result of refeeding complications.

In contrast to the approach of initially providing limited quantities of forage, Whiting et. al. described the introduction of about 50 horses in a single seizure case to free-choice long stem hay. The horses were offered barley-corn silage after 10 days. No colic or diarrhea occurred in any of the horses, and 9 horses (18%) died subsequent to refeeding during the first 19 days. In that report, horses who were unable to rise after 24 hours were euthanized.⁹

The author prefers an approach similar to that of Wilson and Fitzpatrick, utilizing hay with a documented low non-structural carbohydrate content when possible. Many commercially available compressed hay bales have reported NSC concentrations ranging from 10-11%. Another viable option for low-NSC feeding in the absence of a hay with an existing NSC analysis is bagged forage products. Many of these products have NSC contents at or below 10%. In the absence of a guaranteed forage analysis, alfalfa hay may be the best option to select.

VI. RECUMBENT HORSES

Severely emaciated horses may be too weak to rise. Starvation cases may be initially recumbent, or may develop weakness and inability to rise during the refeeding period. In the author's experience, starvation cases may initially "fight" to stay standing for days, later succumbing to weakness or laying down to sleep down but lacking the ability to rise.

Horses that have been down for 12-18 hours may be unable to attain sternal recumbency, but can raise their heads. They are still interested in feed. These horses are unlikely to be able to stand unassisted, and will likely stand for only a few minutes when supported in a sling. Horses down for 36-48 hours will become unaware of surroundings and exhibit paddling, tetany, and bruxism. They may still attempt to eat if feed is placed in

their mouths. After 48 hours, horses will become totally anorectic and semi-comatose.¹¹

It may not be possible to accurately predict prognosis based on initial presenting body condition score.⁹ Prognosis has been reported as poor for horses that are involuntarily recumbent and it has been suggested that horses will not recover after >24 hours of recumbency.² Rapid response in cases of recumbency is warranted. If the horse cannot be assisted to stand within four hours, regular turning should be instituted. Turning every 2-6 hours is necessary to provide adequate perfusion of the skin and musculature, as well as providing perfusion and ventilation of the lower lung.¹² If the horse is able to maintain a sternal position, this should be encouraged and assisted with hay bales or other support. Down horses should have deep bedding, but emaciated horses will likely develop pressure necrosis over bony prominences despite all efforts at prevention. Padding potential pressure points with doughnut-shaped foam or other devices was once recommended¹³ but has been called into question more recently as having potential to exacerbate pressure necrosis.¹²

Horses that are unable to rise but can bear weight once standing will benefit from assistance to stand. Once the horse is down, he should be allowed to rest for a few hours, and intervention should occur when efforts to stand are made, or when the animal begins to struggle. While slings can be used to return a horse to a standing position, a simple vertical lift using webbing straps and three to five assistants may be sufficient. To perform a simple vertical lift, 4-8 inch wide webbing of 8 feet or longer, preferably with loops sewn into the ends, can be used. The webbing should be load-rated for an amount over the weight of the animal, preferably at least twice the weight of the animal. Webbing straps can be purchased at companies selling cargo or tow straps, or long webbing straps can be purchased at local farm and implement supply stores. Handlers should wear helmets and be aware of safety around a potentially struggling horse. One webbing strap is placed under the flank region, and the other strap under the sternum, behind the elbows. Straps are best placed using a strop guide⁷ designed for this purpose, but other rigid devices of appropriate length, such as a lunge whip or manure fork handle, may be utilized. In the absence of such devices, webbing can be "flossed" underneath the animal from the head or tail.⁷ Straps that must be "flossed" should be long enough to keep handlers away from the horse's extremities during manipulation. The horse should be rolled into sternal recumbency and encouraged to participate in the standing effort. Initially, four people to "lift" from the strap ends, and a fifth person to handle the head will likely be required, depending on the size of the animal and strength of the handlers. As the animal gains strength and can attain a dog-sitting position on its own, fewer handlers are required. The simple vertical lift procedure may be challenging on taller horses, but can work well on smaller horses and ponies.

In situations in which a simple vertical lift is inappropriate, or the animal needs assistance to stand for longer periods of time, slings can be utilized. Commonly-used slings include the Anderson^a sling and Liftex^b sling.⁷ Becker slings are also available and are suitable for lift procedures, but are not

intended to be used for longer than 20-30 minutes. Some emaciated horses may benefit from short periods in a sling to allow rest without self-trauma or exacerbating decubital ulcers. Manipulation of down horses is best handled by trained personnel. Those certified and experienced in large animal emergency rescue are an excellent resource. Rescue teams exist all over the United States and are often equipped with most or all of the equipment necessary to assist a weak or recumbent horse. A listing of large animal equine rescue providers is provided at www.LAERN.org. This listing may not be complete, so practitioners are encouraged to inquire within their communities about whether any large animal rescue teams are available.

VII. ADDITIONAL TREATMENT AND EXPECTED COMPLICATIONS

Debilitated and malnourished horses will likely require medical care beyond the provision of a refeeding plan. For the dehydrated, recumbent horse, IV fluids may be considered. Antibiotic therapy may be necessary in horses that have been down and have developed decubital ulcers or potential pneumonia. Immune competence declines as a result of food deprivation,¹⁰ further increasing risk for infections.

Temperature regulation can be a challenge in emaciated horses. Thin horses in cold weather may need warmth provided in the form of blankets or heat lamps. A combination of pressure sores and blanketing may lead to chronic irritation of wounds. The author has had success using a slinky and small inflatable inner tubes secured with adhesive to protect sores over the tuber coxae when blanketing is required. Emaciated horses often develop excessive haircoats due to lack of adipose tissue.³ Increased metabolic rates with re-feeding and indoor stabling may contribute to overheating and the development of tachypnea.² Affected animals may require fans or body clipping.

Development of distal limb edema is common and responds well to hand-walking to encourage circulation.² Horses that have difficulty standing or are at risk for becoming recumbent should not be walked.¹¹ Severely emaciated horses will easily trip and fall, ending up down in unsafe locations. As previously mentioned, recumbency may occur several days into the refeeding period as a result of generalized weakness or exhaustion.

Transient increase in fecal water content and decreased fecal ball formation is common in the first week of re-feeding. This change in fecal consistency should not compromise appetite or hydration status.⁶ Signs of colic or illness may prompt salmonella testing. Paraphimosis may occur in geldings and stallions suffering from malnutrition and cachexia. Hydrotherapy, massage, purse-string sutures, and support sling devices may be considered for treatment. Full resolution may not occur for months. Pregnant mares who deliver foals while still undernourished may be unable to produce adequate milk. Observation of the foal's hydration status and nursing behavior may indicate a need for provision of milk replacers.

Anemia is common in starved horses and RBC, Hct and Hct may continue decline in the first 10 days or more of the refeeding period.⁶ Anemia may contribute to tachycardia and this may persist for up to several weeks. Monitoring of serum electrolytes, especially phosphorous and magnesium may help evaluate progress and detect deficiencies. Phosphorous concentrations can be expected to decrease slowly in the first days to weeks.⁶ This decline does not necessarily mean that the animal will succumb to refeeding syndrome.

Consideration should be given to postponing deworming in horses that may later be the subject of a court case. Cases may be defended on the basis that the animal was suffering from parasitism and the defendant cannot be held responsible due to resistance of equine cyathostomes to common anthelmintics. The defense may argue that the administration of anthelmintics at or after seizure/surrender was responsible for the improvement in condition.⁵

Elective procedures such as dental work, vaccination, and castration should be postponed if possible until the horse has achieved a BCS of at least 2, is eating well, and gaining weight.²

VIII. PROGNOSIS

Reported fatality rates for equine starvation cases range from 14-20%.^{6,9,11} These reported rates may include cases that were euthanized for failure to rise unassisted,⁹ which may be avoided if the veterinarian and financially responsible party choose to continue with supportive care after this point. In one report, time to death ranged from 1-19 days after the institution of a refeeding program, with an average of 7.9 days.⁹

Horses that recover can be expected to suffer no long-term effects from the ordeal unless they were very young and growing at the time of starvation. These young horses may develop contracted tendons if brought back too rapidly.¹¹ Horses with severe decubital ulcerations may have permanent scarring. Return to normal body condition can vary, and has been reported as 60-90 days¹¹ up to 6-10 months.¹⁴ Most reports have observed a return to normal within 3-10 months.^{6,9}

IX. ANTICIPATED FINANCIAL EXPENDITURES

Rehabilitating the severely malnourished horse can require a large financial expenditure. Uncomplicated cases may require only a few hundred dollars invested,⁹ but animals requiring intensive care, antibiotics, bloodwork, and slinging or assistance to stand can accumulate expenses in the thousands. Considering that the cost for euthanasia is reported to be around \$385 per animal,¹⁵ financial expenditures may be difficult to justify in many cases. While an immediate cost assessment may make rehabilitation of an extremely malnourished horse seem impractical, these cases may have a positive cash-flow benefit for a non-profit rescue. When an emaciated horse is rescued and rehabilitated, publicizing the efforts may result in increased donations to a rescue that exceed the cost for returning that animal to health. This can obviously be a complicated issue, and

veterinarians can be placed in an awkward position when attempting to formulate a prognosis and plan. It can be a challenge to suspend judgment about the lengths to which a responsible party will go, with regard to both finances and outlay of effort. It can also be a challenge to determine if attempts are being made to rehabilitate an animal with a hopeless prognosis, thereby prolonging its suffering.

X. TESTIFYING IN COURT

Veterinarians may hesitate to become involved with seizure and surrender cases due to the possibility of being summoned to testify in court. While this is a possibility, in the author's experience it does not happen in the majority of cases. While there is certainly time involved in court cases, it can be very rewarding to help prosecute cases of animal abuse. Expert witnesses will also be paid a very fair rate for time in court, time commuting to court, and time spent reviewing records and preparing.

Veterinary examination, documentation, and expert testimony can play a pivotal role in a misdemeanor or felony criminal charge or conviction. In most cases, a misdemeanor charge or conviction requires proof of "intent" or "intentional wrongdoing" and a felony charge or conviction requires proof of "malice" or "malicious intent." Investigating authorities may have limited, or no, experience with horses or their care, therefore findings during physical examinations, diagnostic testing, or observations made of the animal's appearance or original environment by a veterinarian may be the basis of the investigation which otherwise may have gone unnoticed or undocumented.

XI. PUBLIC RELATIONS

Cases of severe starvation and neglect can generate significant public attention, both locally and on a broader scale due to social media and the internet. Veterinarians should limit public comments to the medical condition of the horse(s), empathy for the animal's condition, and positive comments that can be made about any improvements in the condition. The veterinarian should refrain from public comments about the horse's owner or divulging the person's identity. Media interviews can be an excellent opportunity for public education, to promote equine health care, and may lead to public contributions to support the affected animals.

Veterinarians should be aware that public outcry for perceived justice against the horse's owner will often be swift and emphatic. The veterinarian may face judgment for his or her involvement in treatment, particularly if the animal's condition is exceptionally poor. The author has been both publicly lauded and simultaneously accused of "abuse" when trying to rehabilitate an animal with a guarded prognosis.

Communication with the starved horse's caregivers is also a potentially tricky situation. Cases of severe malnutrition can experience many "ups and downs" and changes in treatment are

often unwarranted. Those providing the daily nursing care for the animal may request examination and input from the veterinarian multiple times per day as the horse experiences minor shifts in condition. Changes in respiratory rate, changes in fecal water content, variations in appearance of wounds or pressure sores, changes in distal limb edema and other minor alterations may prompt immediate inquiries to the veterinarian. It is helpful to establish clear boundaries with caretakers about when you will be available for evaluation of the animal, and what constitutes an emergency. Well-trained personnel can mitigate an overreliance on the veterinarian for daily input.

Caregivers will often need to be advised multiple times of the slow process of rehabilitation. Inexperienced people will want to hasten re-feeding and request elective procedures before the animal is ready. The veterinarian must often act as gate-keeper to prevent over-handling and over-stressing the horse in the early phase of recovery. Grooming should be limited to soft cloths and brushes, since the skin is often fragile and emaciated animals may experience discomfort when being groomed. The author usually advises caretakers not to attempt to bathe the animal until weight gain has been established, since the animal's prior handling and training are usually unknown.

REFERENCES AND FOOTNOTES

1. Unwanted Horse Coalition. 2009 unwanted horse survey. <http://www.unwantedhorsecoalition.org/wp-content/uploads/2015/09/unwanted-horse-survey.pdf>
2. Wilson JH, Fitzpatrick DA. How to manage starved horses and effectively work with humane and law enforcement officials, in *Proceedings*, Am Assoc Equine Pract 2004;50:428-432.
3. Mason, CA. How to prosecute cases of equine abuse, in *Proceedings*, Am Assoc Equine Pract 2011;57:305-309.
4. Henneke DR, Potter GD, Kreider JL, et al. Relationship between condition score, physical measurements and body fat percentage in mares. *Equine Vet J* 1983;15:371-372.
5. Green P. The role of the attending veterinary surgeon in equine welfare cases, in *Proceedings*, British Equine Vet Assoc Congress 2011;50:259-260.
6. Witham CL, Stull CL. Metabolic responses of chronically starved horses to refeeding with three isoenergetic diets. *J Am Vet Med Assoc* 1998;212:691-696.
7. Gimenez R, Gimenez T, May KA. Technical Large Animal Emergency Rescue. Ames: Wiley-Blackwell, 2008;239-252.
8. Stull C. Nutrition for rehabilitating the starved horse. *J Equine Vet Sci* 2003; 23:456-457.
9. Whiting TL, Salmon RH, Wruck GC. Chronically starved horses: Predicting survival, economic and ethical considerations. *Can Vet J* 2005;46:320-324.
10. Kronfeld DS. Starvation and malnutrition of horses: recognition and treatment. *J Equine Vet Sci* 1993;13:298-304.
11. Finocchio EJ. Equine starvation. *Large Anim Vet* 1994;49:6-10.

12. Nout YS, Reed SM. Management and treatment of the recumbent horse. *Equine Vet Educ* 2005;17:324-336.
13. McConnico RS, Clem MF, DeBowes RM. Supportive medical care of recumbent horses. *Comp Cont Educ Pract Vet* 1991;13:1287-1295.
14. Poupard DB. Rehabilitation of horses suffering from malnutrition. *J Equine Vet Sci* 1993;13:304-305.
15. Lenz, TR. The unwanted horse in the United States: an overview of the issue. *J Equine Vet Sci* 2009;5:253-258.
 - a. Liftex, Inc., Warminster, Pennsylvania, USA.
 - b. Care for Disabled Animals, Potter Valley, CA 95469.



Pressure sores in typical locations for a down or emaciated horse.



Photos taken from elevated angles may help to illustrate the animal's condition.



Removal of a down horse from a trailer using a rescue glide and forwards drag webbing configuration.



Placement of short webbing straps for an assisted lift.



Transport of a down horse and preparation for removal from a trailer using a rescue glide and webbing straps (002).



Use of long webbing straps for an assisted lift.



Use of the Anderson sling for long-term standing assistance.



Use of the Becker sling for short-term standing assistance.