

Veterinary Insights

Transport-Related Pyrexia in Horses

Daniel J. Dreyfuss, DVM, MA and Richard B. Markell, DVM, MRCVS, MBA

Key Points

- Horses are frequently transported to sites for competition, breeding, or sales.
- Transportation can have multiple physiological effects on the horse that contribute to pyrexia.
- An accurate diagnosis and etiology of fever is central to making decisions regarding case management, treatment, and competition participation.
- Successful case management of the patient depends on the underlying cause(s) of the fever.

Transportation of Horses

Veterinarians are often asked to participate in the medical management of horses traveling to and from competitive events, breeding farms, or sales. Regardless of the mode of transportation, longer distances and length of transportation time, increase the potential for stress, respiratory disease, and non-pathogenic shipping stress-related pyrexia.¹ Diarrhea, heat-related problems, muscular problems, colic, laminitis and traumatic injuries have also been reported subsequent to transporting horses.²

Prior to transportation, health certificates are usually required for interstate or international travel. This presents an excellent opportunity for veterinarians to assess the health of the patients as well as to discuss the health-related details of the trip with the horse owner and/or trainer. Potential concerns can be assessed, by a thorough physical examination, recording rectal temperature, and pre-transport complete blood counts (CBC), serum chemistries—including fibrinogen, and serum amyloid A (SAA). Required state or international infectious disease testing can be done concurrently.

After prolonged transport, it is not uncommon to observe transient elevations in rectal temperature for several hours after arrival to one's destination. Such fevers may result from a stress or non-infectious inflammatory etiology, and many of these cases are transient and do not develop into clinical disease. Other horses may have a more significant underlying cause of fever requiring a more extensive diagnostic work-up in order to design the appropriate treatment plan.

Effects of Transportation on Horses

Transportation of horses is considered a significant stress that disrupts homeostasis and normal metabolism.³ Many factors contribute to increasing the risk of post-transportation morbidities. Exposure to environmental irritants (particulate hay, dust, exhaust) and positioning of the horse with the head above the withers can compromise airway defense mechanisms. This leads to decreased mucocilliary clearance as well as decreased neutrophil and alveolar macrophage function.^{4,5} Peripheral blood neutrophils demonstrate decreased bacterial cell binding and phagocytosis for up to 36 hours following transportation.⁵ Increased tracheal inflammation and mucous scores with increased neutrophils have also been documented post-transport and may persist for up to five days.⁶ Statistically significant increases in mean bacterial numbers, mainly commensal bacteria from the oropharyngeal region, are seen in transtracheal aspirates following transportation.^{1,5}

Transportation-associated stress contributes to significant increases in shedding of equine herpes virus (EHV) due to reactivation of latent infections or increased shedding in actively infected hosts.⁷ The changes in white blood cell function may persist following transportation,⁵ and along with increased airway bacterial and viral numbers, may contribute to placing transported horses at risk for developing post-transport respiratory infections and pyrexia.

Transportation of horses often results in fever (pyrexia) as a clinical sign, with incidence increasing with increased travel time and distance.¹ A recent study by Maeda, et. al. demonstrated a transport-related pyrexia incidence of 47.2% when rectal temperatures were measured at regular intervals during and following transport of clinically normal horses with no prior history of respiratory disease.¹ In the same study, of the horses that exhibited fever, 18.9% exhibited fever at the end of transportation and 28.3% did not.¹ It is common practice for horse owners, trainers, and veterinarians to assess rectal temperature only at the end of the transport, thus potentially under-recognizing the incidence of transport-related pyrexia. Clinically, this may put horses at risk for significant undiagnosed illness. A large survey of equine transport in Australia demonstrated an overall incidence of transport-related pneumonia of 9.2%.² Sequential monitoring of temperatures during and following transport may increase detection of pyrexia.

Several additional physiological effects of transportation have been evaluated. The acute phase proteins haptoglobin and SAA have demonstrated statistically significant increases in association with elevated total white blood cell counts following transport of healthy horses.³ Loss of total body water can lead to transient weight loss and alteration of normal electrolyte levels.⁸ Plasma cortisol levels, an indicator of stress, are elevated above resting levels post-transport, even when horses are transported short distances.^{6,9,10} Increases in both plasma creatine kinase (CK) and lactate levels are indicative of transportation effects on the musculoskeletal system.⁶ While there are multiple effects of transportation on horses that result in transient, short-term physiological changes, they may also contribute to progressive clinical disease.

Management of Horses with Transport-Related Fever

The underlying cause of a fever following transportation must be determined to guide the ensuing plan for management of the horse. Respiratory infections are the most common causes of pyrexia in horses and are commonly observed associated with transport of the horse secondary to commensal bacteria and particulate matter invading the lower airway due to compromised mucocilliary clearance during transport.^{1,5} A thorough physical examination after transportation is essential because elevated rectal temperature may be due to bacterial challenge, inflammatory airway response, viral challenge, or transient non-pathological stress pyrexia. Clinicians are challenged to identify horses at risk for a self-resolving pyrexia versus a persistent established bacterial infection. Serial physical examinations, temperature monitoring, SAA testing as well as other laboratory tests are helpful in monitoring progression or resolution of pyrexia.

There may be subsequent comorbidities associated with fever. It has been demonstrated that fever can lead to decreased water consumption which can result in dehydration, electrolyte imbalances, and increase the risk for large colon and cecal impaction.^{8,11,12} Veterinarians must decide if antipyretic treatment is indicated and sufficient or if additional supportive treatment — antibiotics, intravenous fluids — is indicated. Adjunct diagnostic testing may be indicated to identify the cause of the fever.

Special Considerations for Competition Horses

Pyrexia presents a challenge to veterinarians who are responsible for ensuring the safety and wellbeing of all horses at competitions. Recent events at competition venues illustrate the potential for outbreaks of infectious diseases to occur when horses from wide geographic areas convene at one site. In addition to management of an individual horse, biosecurity measures are essential to prevent or minimize the spread of contagious diseases. Determining the underlying cause when a horse exhibits the clinical sign of fever post-transport aids in deciding whether the horse is medically fit to compete at an event without risk of exacerbating a disease process. Regulations guiding use of specific medications and medication detection times vary between individual disciplines and influence both the decision to treat and the permitted medications available for use. Monitoring the response to treatment with serial physical examinations, including monitoring of body temperature and biomarkers, contributes to sound clinical decisions in the management of competition horses with post-transport pyrexia.

Summary

Transport of horses has several demonstrated physiological effects on the horse, many that may result in developing the clinical sign of fever. Respiratory disease is the most frequent cause of post-transport fever in horses secondary to the physiological effects of transport. Determining the underlying cause of the fever, whether a transient stress-related fever or the result of an infectious disease process, is a key factor in making the appropriate clinical decisions. When dealing with competition horses — and the guidelines of the governing body for each competitive discipline — decisions must be made in the best interest of both the individual horse and the greater population gathered at the competition site. As the ease and frequency of horse transportation increase, so too may the incidence of post-transport fevers.

References

1. Maeda Y and Oikawa M. Patterns of rectal temperature and shipping fever incidence in horses transported over long distances. *Front Vet Sci.* 2019;6:27 doi: 10.3387/fvets.2019.00027.
2. Padalino B, Raidal SL, Hall E, et al. A survey on transport management practices associated with injuries and health problems in horses. *PLoS ONE.* 2016;11(9) e0162371. doi: 10.1371/journal.pone.01623.
3. Casella S, Fazio F, Giannetto C, et al. Influence of transportation on serum concentrations of acute phase proteins in horse. *Res Vet Sci.* 2012;93:914-917.
4. Raidal SL, Love DN, Bailey GD. Effects of posture and accumulated airway secretions on tracheal mucocilliary transport in the horse. *Aust Vet J.* 1996;73:45-49.
5. Raidal SL, Bailey GD, Love DN. Effects of transportation on lower respiratory tract contamination and peripheral blood neutrophil function. *Aust Vet J.* 1997;75:433-438.
6. Padalino B, Raidal S, Knight P, et al. Behavior during transportation predicts stress response and lower airway inflammation in horses. *PLoS ONE* 2018;13(3) e0194272.
7. Muscat KE, Padalino B, Hartley CA, et al. Equine transport and changes in equid herpesvirus' status. *Front Vet Sci.* 2018;5:224. doi: 10.3389/fvets.2018.00224 71.
8. Friend TH. Dehydration, stress, and water consumption of horses during long-distance commercial transport. *J Anim Sci.* 2000;78:2568-2580.
9. Linden A, Tax T, Amory H, et al. Effect of 5 different types of exercise, transportation and ACTH administration on plasma cortisol concentration in sport horses. *Equine Exer Physiol.* 1991;3:391-396.
10. Fazio E, Medica P, Aronica V, et al. Circulation β -endorphin, adrenocorticotrophic hormone and cortisol levels of stallions before and after short transport: stress effect of different distances. *Acta Vet Scand.* 2008;50:6 doi: 10.1186/1751-0147-50-6.
11. Dabareiner RM and White NA. Large colon impaction in horses: 147 cases (1985-1991). *J Am Vet Med Assoc.* 1995;206:679-685.
12. Collatos C and Romano S. Cecal impaction in horses: causes, diagnosis, and medical treatment. *Compend Contin Educ Pract Vet.* 1993;15:976-981.