How to Manage High Fevers in the Adult Equine Patient

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1. Introduction
The equine ambulatory clinician sees a variety of emergencies. A common reason for seeing adult equine patients urgently is for high fever accompanied by anorexia. The purpose of this presentation is to review some of the specific causes of fever and to give a practical approach to working up acute fever in the adult horse as well as how to handle sample collection, isolation, client communications, and budgetary constraints of the situation.

For the purposes of this discussion, we are talking about true fever, not hyperthermia. In true fever, cytokines alter the hypothalamic set point for body temperature. Fevers of this sort are caused by infection, inflammation, neoplasia, or immune-mediated pathways.¹

2. History
Obtaining an accurate and complete history is important in evaluating the horse with fever. Questions to consider are as follows:

When was the horse last observed to be acting normally?
When did you first detect that horse had a fever?
Has there been a change in appetite and water intake? When did that begin?

Is there any change in the consistency or volume of manure?
What medications have been administered recently? By what route of administration were these given?
Is there recent history of any articular therapy?
What is the vaccination history?
Has the horse traveled recently? Have herd mates been traveling recently?
Have there been recent arrivals added to the herd?
Are there any other horses on the farm with fever?
Have there been any sick horses on the premises in the last few weeks?
Are there staff members who work with horses on other farms?

3. Physical Examination
A complete physical exam is necessary to detect subtle signs that may help with diagnosis. Owners often have their own ideas about the source of the infection, based on the horse’s medical history or previous farm situations. This can be helpful but can also lead you astray. However, it is essential that you acknowledge the owner’s input as valuable and indicate that you will consider all of their ideas. A focused examination that proceeds methodically
that you are accustomed will ensure that no parts are left out. Because many fevers result from infectious upper respiratory tract disease that do not always present with classic signs, it is prudent to do a re-breathing exam on these patients. Consider performing a rectal examination if indicated. Evaluate the horse outside of the stall for the presence of laminitis or neurologic deficits. Depending on the findings of your exam, there may be some value in thoracic or abdominal ultrasound at this time.

As in many situations encountered by veterinarians, a budget often must be considered when making diagnostic and treatment decisions for patients. Make sure you can give accurate estimates to your clients for diagnostic testing, imaging, and examinations so they can make informed choices. Diagnostic testing can be expensive, but it is worth discussing with the client, especially for horses that are part of large herds where infectious disease is a consideration. Often a stepwise approach is most efficient, with additional testing undertaken if initial treatment based on “best guess” is unsuccessful.

4. Diagnostics

Because each region of the country, and in fact the world, have diseases that are seen commonly, it is essential to be well versed in the conditions seen most frequently in your area. For example, a common cause of high fevers in the Northeast is Ana plasma phagocytophilia, whereas in the western and southwestern regions of the United States, strangles and upper respiratory viruses may be more common. Knowing the most prevalent disease conditions of your region will help you keep your investigation within the budget of your client.

In most patients, a complete blood count (CBC) and serum chemistry profile are indicated to provide a minimal data base. This is especially helpful in patients that have no clear findings on the physical examination. If budgetary concerns limit the blood work, start with a CBC and fibrinogen.

Because treatment can alter the results of diagnostic testing, it is prudent while at the farm on the first visit, to obtain whatever other samples you feel could be useful before starting any therapy. Holding samples at the clinic to see how the horse responds is inexpensive. Going back for samples is not cost-effective and, if taken after start of therapy, may be useless. Consider taking the following samples to have available to submit if the need arises:

Two to 3 tubes of serum for chemical and potential titers

Two to 3 tubes of whole blood (EDTA) for CBC/Fib and polymerase chain reaction (PCR)

Nasal swabs stored in red-top tubes with a small volume of sterile saline for PCR

Feces in sterile container for fecal PCR panel with/without culture

5. Initial Treatment

In deciding on a treatment course for these patients, it is important to involve the owner. Offering therapy based on your “best guess” as to the cause of the high fever, despite the fact that you have no confirmatory diagnostic testing, is often appropriate and may be exactly what the client wishes. In some cases it can be important to undertake treatment which could produce more benefit for the horse by early initiation than the possible harm done by waiting for diagnostic testing. An example would be treating for presumptive Potomac horse fever; prompt aggressive treatment can be life-saving. It is difficult to go to these emergency calls and have clients perceive that nothing has been done to “solve the problem”; offering empirical treatment can calm the client’s concerns as well as often begin to ameliorate the cause of the fever.

It is important to find out exactly what has been done for and administered to the patient before your arrival. Very often, these patients have received nonsteroidal anti-inflammatory drugs (NSAIDS) such as phenylbutazone or flunixin meglumine before the examination. Because these medications can have negative side effects when given in high doses or at inappropriate intervals, this information is essential to avoid overdose. If no antipyretic has been given, then a dose of flunixin meglumine or phenylbutazone is advised but should not be given more frequently than every 8 to 12 hours. The recommended dose of flunixin meglumine as an antipyretic is 0.22 to 1.1 mg/kg, q 8 to 12 hours IV or PO. In some regions, intramuscular administration of flunixin meglumine is strongly associated with Clostridial myositis, so it is advised to use this medication IV or PO. Phenylbutazone at 2.2 to 4.4 mg/kg, q 12 hours IV or PO q 12 hours, is effective in reducing fever, as is ketoprofen at 1.1 to 2.2 mg/kg, q 24 hours IV.

Internists receiving cases that have had ongoing fever over a period of several days strongly caution against the overuse of NSAIDs in treatment of fever. Be sure that patients are well hydrated during the time these drugs are being used. The use of gastroprotectants is advised as prophylaxis in those patients off feed. A baseline creatinine and follow-up creatinine levels are also advised to assess renal function if the patient is to be maintained on NSAIDs for an extended period of time, has had significant dehydration, or has experienced any endotoxemia.

It is important to formulate a list of possible diagnoses that could account for the signs and physical exam findings and consider the treatment that each of these would entail. The owner should be informed about the possibilities and told which disease is most highly suspected. It is important that the owner be aware that treatment decisions are based on a “best guess” until more diagnostic test results become available. In cases in which failure
to treat promptly could be detrimental (eg, Potomac horse fever), encourage your client to allow you to initiate treatment based on your clinical acumen. Beginning treatment based on your experience, and those of your colleagues, is often possible and successful. Because some fevers that arise without obvious signs from the physical exam can be viral, if the horse is not in distress, the owner is amenable, and you have taken into account other recent cases of fever in your region, it may be worth the wait to evaluate the results of your laboratory submissions before choosing a treatment plan.

While still at the farm, it is prudent to determine whether or not to provide the horse with oral and/or IV fluids. During febrile episodes, horses tend to go off feed and decrease their water intake. In most cases of fever in the absence of any other serious clinical findings, oral fluids via nasogastric tube will be sufficient if the fever is acute. It is wise to initiate laminitis prophylaxis in at-risk patients.

As previously discussed, it must be emphasized to the client that the cause of the fever is not known and that it may not become known even with many diagnostic tests. Owners can become quite frustrated when there is not a clear answer about what is causing the fever. They also often have questions about where the infectious agent came from. Educating clients about the diseases common to their region can be helpful. It is important to be clear from the very beginning that the answers to these questions are very difficult as well as costly to obtain.

6. Biosecurity

In patients where the origin of fever is clear, such as with Streptococcus equi ssp outbreaks, it is essential to isolate them from the members of the herd that have not yet been exposed. In those where the origin of fever is unclear but there are historical reasons for concern (recent travel; recent stay at a hospital facility), isolation is also strongly recommended. Because it is typically difficult to determine the cause of a fever, minimizing contact between the patient and other herd members is prudent until more information is available. Make the caregivers aware of the risk of the spread of disease by feces, nasal secretions, and aerosolized pathogens. If at all possible, the sick horse should be cared for by the same individual, and that individual should have no contact with the rest of the herd until clothing and footwear are changed and hands are washed. Suggest that owners and barn personnel use a foot bath where fecal contaminants are of concern. Veterinarians should also use appropriate means of reducing the risk of contaminating other farms by using gloves, changing clothes and shoes, and washing hands.

7. Follow-Up

Evaluation of the CBC and serum chemistry can be helpful in identifying horses that would benefit from specific antibiotics. Further treatment can be based on the results of the laboratory work submitted.

When queried about the most common causes of fever seen in patients showing few signs initially, a group of internists provided this list:

- Anaplasma phagocytophilum
- Corynebacterium pseudotuberculosis
- Eastern equine encephalomyelitis
- Equine Herpes Virus-1 (EHV-1)
- Equine Herpes Virus-4 (EHV-4)
- Equine arthritis virus
- Equine infectious anemia
- Influenza
- Equine rhinovirus
- Metritis
- Peritonitis
- Piroplasmosis
- Pleuropneumonia
- Potomac horse fever—Neorickettsia risticii
- Salmonella spp
- Streptococcus equi ssp

The patient infected with Anaplasma phagocytophilum or Neorickettsia risticii may be neutropenic. Often they have hyperbilirubinemia as well. Those with Potomac horse fever may have mild to profound hypoproteinemia and hypocalcemia. These patients can be started on 6.6 mg/kg oxytetracycline, q 12 to 24 hours IV. If the tentative diagnosis is correct, a reduction of fever should be observed in 12 to 24 hours, and the horse should begin to improve clinically. It is also important to address hydration, hypoproteinemia, and other concerns that are beyond the scope of this report.

To confirm the cause of disease in those patients who appear to respond to the oxytetracycline treatment, blood obtained before treatment can be submitted for Neorickettsia risticii or Anaplasma phagocytophilum PCR. In addition, an indirect immunofluorescence assay (IFA) should be submitted, as it can be difficult to “catch” the organism still in the bloodstream. Anaplasma phagocytophilum inclusion bodies can also be seen onuffy coats smears prepared with Geimsa or Wright’s stain.

In horses with minimal response to oxytetracycline treatment, passing soft feces, or experiencing persistent fever, submission of feces for PCR panel is advised. A toxin ELISA can be included to look for evidence of Clostridial infection. Consider submitting the samples of whole blood and nasal swabs for EHV-1 and equine influenza PCR, especially if there is presence of nasal discharge, coughing, or malaise. History of travel or stress or multiple horses affected will make this diagnosis more likely.

If the hemogram shows leukocytosis and neutrophilia, a bacterial cause should be considered. Strongly consider doing more diagnostic testing before starting antibiotics. The follow-up visit will involve another physical examination as well as additional diagnostics. Based on the clinical impression, an ultrasonic evaluation of the thorax and/or...
abdomen may be considered. Obtaining samples from the respiratory tract with transtracheal wash may be indicated. Abdominal paracentesis may be warranted as well. In cases in which *Streptococcus equi* spp is suspect, endoscopy of the guttural pouches should be considered. Remember that once the horse has had antibiotics, it will be more difficult to get information from these samples. However, once samples have been obtained, while awaiting results, it is prudent to start broad-spectrum antimicrobials in the febrile patient that is anorectic and depressed. Further treatment can be based on the results of the laboratory work submitted.

8. Referral

Persistent nonresponsive fevers can be very puzzling for clinician and owner alike. When the patient fails to respond and diagnostic tests are inconclusive, it is often in the patient’s best interest to be evaluated by a specialist. Asking the owner to consider referral is not an admission of failure but a demonstration of your commitment to the best interests of your patient. It is imperative that the referring veterinarian provide a complete medical history for the patient to the specialist, including exam findings and lab work. Owners must be prepared properly with accurate expectations for the expense, potential outcomes, and the possibility of failure to find an answer. In a study of 63 horses presented for persistent fever, 43% were found to have an infection, 22% were caused by neoplasia, 6.5% were immune-mediated, 19% were from miscellaneous causes such as parasitism, renal disease, and toxic hepatopathy, and 9.5% remained undiagnosed.7

9. Summary

Acute fever in the adult patient is not always a mystery. The horse with cellulitis, purulent nasal discharge, or swollen mandibular lymph nodes may have marked pyrexia, but the diagnosis and treatment plan for these patients is generally straightforward, and response to therapy is reasonably predictable. However, the case of the febrile horse without obvious clinical signs is common, requires the use of clinical judgment in the absence of early diagnostic results, and may warrant referral if not resolving within a few days. Judicious empirical use of NSAIDs and antibiotics is appropriate. Careful thought should be given at the time of the initial examination to the collection of samples that may be needed to get to a diagnosis. Communication and education about spread of disease is paramount to prevent a possible outbreak.

References and Footnote
