NEW MEXICO RACING COMMISSION

STREPTOCOCCUS EQUI SUBSPECIES EQUI (STRANGLES)

Definition

The upper respiratory disease commonly referred to as strangles is caused by *Streptococcus equi subsp equi*. Less commonly, the bacteria affect lymph nodes in the thorax and/or abdomen, causing a syndrome known as metastatic or "bastard strangles".

Clinical Signs

- Fever, if detected, precedes other clinical signs by 24–48 hours
- Pharyngitis leading to reluctance to eat and drink. Palpation of the larynx will often elicit pain
- Soft non-productive cough that is often associated with eating
- Mucopurulent nasal discharge that can be unilateral or bilateral
- Lymphadenopathy +/- abscessation (retropharyngeal and submandibular lymph nodes are most commonly involved, but any lymph node can be involved)
- Upper airway stridor secondary to pharyngeal compression by the lymph nodes or neuropraxia-induced laryngeal hemiplegia
- Guttural pouch empyema is a frequent sequela to retropharyngeal lymph node abscessation
- Metastatic infection including abdominal abscessation, meningitis, lymphangitis, purpura hemorrhagica, myositis, and immune-mediated myopathies

Clinical signs are age and immune status dependent, with older horses typically exhibiting milder signs of shorter duration. Vaccinated animals may show mild signs. Every horse is at risk of disease when challenged with substantial pathogen dose and frequency.

Incubation Period

Translocation to the mandibular and retropharyngeal lymph nodes occurs within hours of exposure with clinical signs beginning 3–14 days after exposure. Nasal
shedding usually begins 2 to 3 days after the onset of pyrexia.

Risk Factors Commingling with many horses of unknown origin and medical history.

Transmission Direct: horse-to-horse contact

Indirect: contaminated fomites including water troughs, veterinary equipment, twitches, blankets, grooming tools, buckets, handlers, tack, hoses, etc.

Transmission can occur from horses with no clinical signs who are incubating the disease or have developed a persistent subclinical shedder status.

ACTION PLAN-Diagnostic Sampling, Testing and Handling

- **The private practitioner overseeing the suspect horse shall report a preliminary positive finding or suspect horse to the state veterinarian, Samantha Holeck at 505-414-2811 who shall then contact representatives of the NMRC, either the Equine Health and Testing Advisor Dr. D'Alonzo at 302-530-4202, the Official Veterinarian, Dr. Brandi O'Sullivan at 505-259-4663 or the Executive Director of the NMRC, Ismael "Izzy" Trejo at 505-589-6384. The NMRC representative will then notify track management of the matter. Either the State Veterinarian, as designated by the NM Livestock Board or the representatives from the NMRC shall contact representatives of the USDA in a timely fashion.**
- **The decision shall be made whether to quarantine the suspect horse and the stablemates of such horse.**
- **Consideration shall be made with the best interest of the racing population in mind.**
- **The decision to quarantine may include one of the following options: on property of the association in the quarantine barn, an entire barn on the grounds of the association, or off the property in a location known by the New Mexico Livestock Board and the New Mexico Racing Commission.**

Currently recommended diagnostic methods are summarized in **Table 1**.

PCR of nasal secretions is the recommended diagnostic test for horses that are pyrexic but not overtly draining from an external abscess. Early in the course of disease and before colonization of local lymph nodes, low numbers of bacteria are present in nasal secretions. PCR is more sensitive than culture in detecting small amounts of bacterial DNA but it does not differentiate live bacteria from dead. There is value in concurrent culture submission to rule out other pathogens that may present similarly. Horses that are PCR positive, but culture negative, should still be considered potentially contagious. The infectious potential of these animals is unknown, and negative cultures can occur if bacteria die while en route to the lab.

Samples collected early in the course of clinical disease (within 48 hours of onset of fever) may yield negative results on culture and PCR. If signs are consistent with *Strep equi* infection, repeat testing is recommended. Multiple samples from the same animal can increase the chances of organism recovery early in disease. If several animals are affected, submit single samples from as many animals as possible.

Guttural pouch lavage PCR in combination with endoscopy is the test of choice to determine the status of recovered animals, allowing for assessment of pharyngeal inflammation and examination of the guttural pouches for chondroids or purulent material.

The SeM Antibody ELISA cannot differentiate antibodies due to natural infection from those induced by vaccination and is therefore of limited use in managing disease outbreaks. Its value is limited to screening animals that might react to vaccination, (those with titers >1:3200) and to support a diagnosis of purpura hemorrhagica or metastatic disease (titers >1:12,800). **It is not a measure of protection from disease nor an indication of an active infection or carrier status.**

Table 1: Diagnostic methods for *Strep equi*

Sample	Test	Shipping	Handling	Pros	Cons
Aspirate of mature abscessed lymph node	PCR and culture	PCR-sample in plain red top tube; culture: bacterial transport media	PCR: chilled overnight; culturette is kept at room temperature	High yield of bacterial organism	Requires accessible abscesses to be present
Moistened pharyngeal swab (avoid rostral nasal swabs)	PCR and culture	Swab placed in plain red top tube; culturette with bacterial transport media	PCR: chilled overnight; culturette is kept at room temperature	Ease of sampling	False negative possible if early in disease or not shedding from guttural pouch
Naso-pharyngeal wash	PCR and culture	Fluid can be sent in leak proof container such as a plain red top tube	Chilled overnight	Ease of sampling; more sensitive than naso-pharyngeal swab	False negative possible if early in disease or not shedding from guttural pouch
Guttural pouch lavage	PCR and culture	Fluid in leak proof container such as a plain red top tube	Chilled overnight	Best detection of carrier animals (50 times more likely to find organism than naso-pharynx)	Special equipment needed; false negative possible if lymph nodes have not ruptured into guttural pouch

Treatment

Treatment consists of supportive care of the horse unless the animal is experiencing complications. Antibiotics should be used at the discretion of the attending veterinarian with the welfare of the animal in mind. Indications for antibiotic use may include animals with very high fevers and malaise, those with profound lymphadenopathy and respiratory distress, horses with metastatic abscessation, cases of purpura hemorrhagica treated with corticosteroids, and guttural pouch infections treated locally and

systemically to treat the carrier state. Antibiotics should not be used as a preventative. Their use has been shown to prevent a sufficient antibody response, potentially leaving the animal susceptible to reinfection. Penicillin is the ideal antimicrobial to target *S. equi,* although long acting cephalosporins are useful in horses that are recalcitrant to frequent intramuscular injections.

Postmortem

Strangles is rarely fatal, and most horses will recover with supportive care. Death in the acute phase of the disease can occur as a consequence of upper airway compression from retropharyngeal or peritracheal abscess formation. Complications of strangles can result in severe disease that may lead to euthanasia. Internal abscesses can form in the lung, liver, spleen, kidney, brain, mediastinum, and/or mesentery. Culture and PCR of abscesses identified during gross necropsy is usually diagnostic. Immune-mediated complications include purpura hemorrhagica, myositis, glomerulonephritis, and myocarditis. Purpura hemorrhagica leads to petechial or ecchymotic hemorrhages on mucous membranes, sclera, and visceral surfaces such as the lung. Purpura hemorrhagica can result in subcutaneous edema most commonly involving the head, limbs and trunk. Severe edema may result in oozing from the skin surfaces and sloughing of skin in the affected areas. Rhadomyolysis and infarctive myositis are also associated with purpura hemorrhagica. Significant rhabdomyolysis with progressive atrophy has been identified in Quarter Horses.

Practitioners performing necropsies in the field are encouraged to contact their veterinary diagnostic laboratory for guidance regarding optimal test selection, sample collection methods, and handling instructions to maximize the likelihood of achieving a definitive diagnosis.

Shedding of -Bacteria Following Resolution of Clinical Signs

- Typically, shedding persists for 2–3 weeks post-recovery. However, intermittent shedding may occur for months to years when bacteria persist in guttural pouches or paranasal sinuses.
- Evaluation of the guttural pouch via endoscopic examination and lavage is recommended to determine persistent *S. equi* infection. The lavage material should be submitted for PCR testing.
- In the absence of diagnostic testing to detect chronic shedders, horses should be considered infective for up to 6 weeks post resolution of all clinical signs.
- **The only way to determine if a horse is no longer shedding is to test.**

Environmental Persistence

S equi has been shown to survive 1-2 days on dry surfaces. The survival time increases to 34 days in cold weather on wet surfaces. Culture growth was most vigorous during winter weather. Contaminated surfaces should be aggressively cleaned, disinfected, and allowed to dry thoroughly. Special attention should be paid to shared surfaces such as water, hay, and feed containers.

Pastures should be allowed enough “rest” time to allow for the bacteria to denature, especially in cold, wet conditions. Two weeks is probably sufficient when surfaces are exposed to sunny, dry conditions, but 6 weeks may be needed for damp and cold conditions.

Specific Control Measures

Biosecurity Guidelines

In the face of an outbreak, animals should be separated into "clean", "exposed", and "sick" groups. Twice daily monitoring of body temperature is recommended and any horse showing pyrexia should be isolated immediately. There is a lag between the initial pyrexia and nasal shedding of bacteria, enabling clinicians to limit the spread of disease by moving febrile animals into the "sick" isolation area. The risk of personnel contamination must be balanced against the value of tracking temperatures per rectum. Leaving hand sanitizer at each stall is useful to encourage staff to disinfect their hands and be cognizant of the contagious nature of *S. equi*. When working through barns, animals should be handled in the following order: "clean", "exposed", and then "sick"; or, ideally, have designated personnel for each group. Barrier precautions should be taken including personal protective equipment (PPE) when handling sick animals. Caretakers should ensure they are not contaminating hose handles when filling water buckets.

A detailed protocol for establishing a tiered risk system of handling horses during an outbreak is available in the ACVIM Consensus Statement.

Vaccination

- Vaccination may be used as an effective method to aid in disease control in individuals and populations
- Strangles is considered to be a "risk-based" vaccine. There are two vaccines commercially available: a killed parenteral product and a modified live intranasal product. More detailed information can be found in the AAEP Strangles Vaccination Guidelines.
- After administration of the modified live vaccine a small number of horses may experience **noncontagious** transitory upper respiratory signs including nasal discharge or lymphadenopathy, especially in animals less than 2 years of age.
- Nasopharyngeal wash samples may be positive on PCR for up to 6 weeks after administration of the attenuated live vaccine strain. Culture of nasopharyngeal wash samples may grow the vaccine strain for a few days following IN vaccine administration.
- Vaccination during an outbreak does increase the risk of complications, including purpura hemorrhagica and is not recommended.
- Vaccination with IN vaccine should be carefully administered when giving other injectable vaccinations at the same time or administered at a different time than injectable products to minimize the risk of local abscessation at injection sites.

- SeM titers can be measured before vaccination with the goal to identify individuals at risk of developing complications from vaccination but are slow to rise during an outbreak.
- Titers against SeM do not indicate protection from infection.

Biosecurity Issues for Receiving Animals

Limiting exposure is the best method of prevention of an outbreak on a farm. Quarantine new arrivals for 3 weeks while monitoring temperatures. Guttural pouch lavage PCR and endoscopy should be performed prior to introduction into the farm population.

Animals with lymphadenopathy, nasal discharge, or fever should be considered potentially infected and isolated immediately.

Zoonotic Potential

Human infection with *S. equi* is uncommon but have been reported. Immuno- compromised individuals should take precautions to avoid exposure.

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