Recent Research on Managing Strangles Outbreaks
Ashley G. Boyle, DVM, DACVIM
Assistant Professor of Medicine, Section Field Service
Department of Clinical Studies, New Bolton Center, University of Pennsylvania
382 West Street Rd. Kennett Square, PA
boylea@vet.upenn.edu

PATHOPHYSIOLOGY

*S. equi* subsp *equi* is inhaled or ingested after direct contact with mucopurulent discharge from infected horses or contaminated equipment. The bacterium attaches to the crypts and epithelium of the lingual and palatine tonsils. The organism enters the mandibular and pharyngeal lymph nodes. Clinical signs develop 3 to 14 days after exposure.\(^1,2\)

CLINICAL SIGNS

The first clinical sign of strangles is acute-onset fever (often >103°F), followed by lethargy, depression, bilateral mucopurulent nasal discharge, lymphadenopathy, and abscessation of the retropharyngeal and mandibular lymph nodes. Occasionally, the parotid and cranial cervical lymph nodes are affected. Retropharyngeal lymph node enlargement can lead to narrowing of the pharynx, resulting in upper respiratory noise, dysphagia, and neck extension. Empyema results when the retropharyngeal lymph nodes drain pus into the guttural pouches. Horses may develop respiratory distress due to retropharyngeal abscesses that are not externally mature. Clinical signs are more severe in immunologically naïve (1 through 5 years of age), geriatric (older than 20 years), and immunocompromised horses.\(^1,2,3\) Some horses may develop complications such as metastatic abscessation, purpura hemorrhagica, and myositis.

TRANSMISSION

Shedding of *S. equi* subsp *equi* begins 2 to 3 days after onset of fever. In most cases, shedding persists for a minimum of 2 to 3 weeks. Horses that have recovered from strangles have been shown to shed for an additional 6 weeks.\(^1\) If organisms are harbored in the guttural pouches, horses have been shown to shed *S. equi* subsp *equi* for up to 2.5 years. These outwardly healthy horses (i.e., carriers) that still shed organisms are a source of infection when introduced into a new population of horses.\(^6,7,8\) Transmission occurs through nose-to-nose contact; proximity; equipment (e.g., water buckets, feed buckets, tack, twitches); clothing; and equipment of owners, caretakers, farriers, and veterinarians.\(^1\) Under laboratory conditions, *S. equi* subsp *equi* has been shown to persist on wood for 63 days at 35.6°F and for 48 days on glass and wood at 68°F.\(^9\) One study modeling field conditions revealed that the organism was found to persist for less than 4 days,\(^23\) but moist environments (e.g., water buckets) allow the organism to persist for extended periods.\(^1,2\) Seventy-five percent of horses that have been infected with *S. equi* subsp *equi* and have not been treated with antimicrobials develop lasting immunity for approximately 5 years or longer.\(^1,2,10,11\)

DIAGNOSTIC TESTING

Early definitive diagnosis is essential for containing this highly infectious disease. Cytologic evaluation reveals gram-positive extracellular cocci in long chains supports a diagnosis of a β-hemolytic streptococcus organism. Historically, the gold standard for diagnosis is bacterial culture of abscess aspirates, nasopharyngeal swabs, nasopharyngeal revealing *S. equi* subsp *equi*. This is the preferred method on aspirates of mature abscesses, but takes a minimum of 24 hours to obtain results. In our clinical practice, we now use polymerase chain reaction (PCR) testing to detect the DNA of the organism as the gold standard which can also be performed on nasopharyngeal swab, nasopharyngeal wash, and guttural pouch wash samples.\(^1\) Nasopharyngeal washes are preferable to nasopharyngeal swabs due to a larger sampling area, but guttural pouch sampling is the most reliable, although more expensive and
requires specialized equipment. PCR testing is more sensitive than bacterial culture and should always be used in combination.

**TREATMENT**

The goal of treating strangles is to control transmission and eliminate infection while providing future immunity to the disease. Uncomplicated cases of strangles are often left to run their course with supportive care, providing lasting immunity. Affected horses should be isolated in a clean, dry stall and fed moist, palatable food. NSAIDs should be used judiciously to decrease swelling and promote eating. Hot compresses or topical 20% ichthammol can be used to accelerate maturation of abscessation. Mature external abscesses should be lanced to allow drainage, followed by daily lavage of open abscesses using dilute povidone iodine solution. This speeds resolution of abscessation as well as alleviation of compression of the pharynx.

**METHODS OF OUTBREAK CONTROL**

Most outbreaks are thought to originate from introduction of an infected horse to a naïve population. All new horses should be isolated for 3 weeks and monitored for any signs of disease, including fever. If cost is not prohibitive, horses should be screened for *S. equi* subspp equi infection using nasopharyngeal washes. Many farms with repeated infections have resorted to screening for infection via endoscopic evaluation and PCR testing of guttural pouch lavages. The Animal Health Trust in the United Kingdom recently developed a new serologic test that detects antigens differently than the SeM ELISA. This new test appears to be more sensitive for detecting animals with recent exposure (as little as 2 weeks) to *S. equi* subspp equi and has been used as a screening tool to determine who needs endoscopic examinations upon arrival to a farm during quarantine prior to introduction into the herd. However, this test is currently not available in the United States and there is no way to distinguish vaccinated animals from recently exposed animals.

Once an outbreak has occurred, twice-daily monitoring of rectal temperatures of all horses on the farm is essential to contain the outbreak. Because febrile horses do not shed disease for the initial 2 days, immediate identification of febrile horses enables caretakers to isolate these horses before shedding occurs. All movement of horses to and from the farm should be stopped until they are determined to be noninfectious. All equipment (e.g., pitchforks, buckets, grooming tools) for an affected horse should be isolated and used only for that horse. Personnel handling infected horses should wear barrier precautions (i.e., gowns, gloves, plastic boots that cover shoes) and, ideally, should not handle noninfected horses or should handle infected horses last. Water buckets should be disinfected daily. Facilities and equipment should be cleaned first to remove all organic material and then disinfected with phenols, iodophors, or chlorhexidine compounds or steam cleaned. Surfaces and equipment must be allowed to dry thoroughly. Paddocks that hold infected horses should be rested for 4 weeks. A minimum of two weeks after all cases of strangles have resolved, one guttural pouch lavage along with an endoscopic examination for empyema or chondroids should be obtained from convalescing horses and their contacts at approximately weekly intervals and tested for *S. equi* subspp equi via PCR to detect carriers. This is preferable to the previously recommended three nasopharyngeal washes. Horses have been found positive in their guttural pouches despite three negative nasopharyngeal washes. A series of 3 nasopharyngeal swabs, collected 1 week apart, will result in detection by a positive culture on at least one of the swabs in approximately 60% of carrier animals. Concurrent testing of these swabs by PCR increases the likelihood of detection to over 90% of carrier animals. For the purpose of efficiency, I recommend treating each guttural pouch with penicillin at the time of endoscopic examination unless there is gross contamination of the guttural pouch which would require aggressive lavage. A minimum of three weeks should be waited prior to retesting a treated, previously positive guttural pouch via PCR. The percentage of carriers per outbreak could be as high as 10%. It is important to remember that SeM ELISA does not detect carrier status.
The use of vaccination during an outbreak is controversial. The 2005 ACVIM Consensus Statement recommends that live vaccine should be administered only to healthy animals with no known exposure to infected horses during an outbreak, but no published data show that use during an outbreak is detrimental. The AAEP Infectious Disease Committee does not recommend vaccination during an outbreak. It is suggested that horses recovering from infection should not be vaccinated for 1-2 years.

Eradication of this disease will not be possible until the subpopulation of carriers is eliminated and the development of new vaccines that distinguish vaccinates from exposed are available.

REFERENCES