GUIDELINES ON STRANGLES

GUIDELINES ON STRANGLES

The Disease

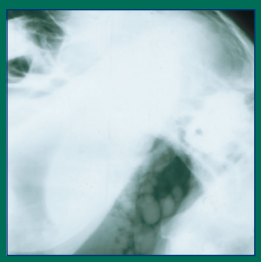
Strangles is a disease of the lymph nodes of the equine upper respiratory tract. It is caused by the bacterium *Streptococcus equi subspecies equi* (*S. equi equi*) and is endemic within the horse population of the United Kingdom.

Notification Procedures

There are no legal notification requirements for strangles in the UK, although it is advisable to inform the national breeders' associations if infection occurs. Under the Rules of Racing (Section C30 Duty to report communicable diseases), racehorse trainers are obliged to report likely or confirmed strangles to the British Horseracing Authority (BHA) when it occurs among horses in training.

Clinical Signs

Affected horses typically have a high temperature, cough, poor appetite, nasal discharge and swollen or abscessed lymph nodes of the head, which can appear as open sores. Some infected horses may become very ill and the disease may become fatal if the bacterium spreads to other parts of the body ('bastard strangles') or the respiratory tract is occluded by swollen lymph nodes (hence the term 'strangles'). However, in some horses, a nasal discharge without glandular swelling is sometimes all that is seen.



Transmission of Disease

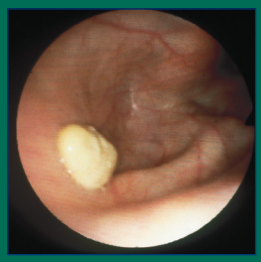
Direct contact between infected horses is the most obvious means of transmitting the infection but the hands and equipment of staff, farriers or veterinary surgeons can spread it indirectly. The bacterium is discharged (shed) from draining abscesses and the nose, and it may survive in the environment, particularly in water troughs. Good hygiene is therefore essential in controlling the disease. The incubation period (the time between infection occurring and clinical signs developing) is usually about one week but may be longer. Horses incubating the disease may shed *S. equi equi* before the onset of obvious clinical signs and so may spread the infection to in-contacts before the first case becomes apparent.

A small but important proportion of horses that have recovered from strangles become persistently infected (most commonly in their guttural pouches) with *S. equi equi* for months or even years. These 'carriers' are less susceptible to reinfection, and they may have no obvious clinical signs of disease but can intermittently shed *S. equi equi*, which can then infect naive horses. These subclinical carriers are probably the most important factor in persistence of infection on premises between outbreaks and can initiate new outbreaks following their inadvertent movement to new premises.

Prevention

In disease outbreaks, prevention of spread from infected animals relies on the use of strict biosecurity and quarantine. Traditionally, structured disease prevention has relied upon attempts to create disease free populations, by isolation and testing of animals on arrival onto a new premises. This has relied upon testing using blood tests (serology) and confirmatory testing by PCR from samples within the respiratory tract, especially the guttural pouch.

Ideally, all horses entering any stud or stable premises should be quarantined for a period of 3-4 weeks and monitored closely for any clinical signs of an infectious disease, including daily temperature monitoring, particularly in the period immediately after arrival. Any horse that develops a nasal discharge or other signs consistent with strangles should be isolated and tested for the presence of, or exposure to, *S. equi equi*. To prevent the introduction of *S equi equi* onto a premises, quarantine alone is less effective, in part because animals that are chronic asymptomatic carriers may show no clinical signs at all. The most effective way to confirm that a new arrival is free of disease is to perform endoscopy of both gutteral pouches, collect lavages and test for *S.equi equi* at the end of a period of quarantine.



Strangles blood tests can be used to identify horses with increased antibody response to infection that have been recently exposed to infection. Paired serology is most useful to determine animals that have been most recently exposed, as an increasing result will demonstrate a response to infection. Results of single blood tests can be more difficult to interpret, since exposure may be historic and can lead to false positive results. Similarly horses that are chronic carriers may not show an increase in antibody concentrations. Chronic carriers are best identified by sampling of the guttural pouches, usually using endoscopy.

Interpretation of Strangles serology

In an individual horse

1. A low result: Does not rule out that the horse does not harbour a subclinical infection within the guttural pouches and does not exclude the need for guttural pouch sampling to confirm freedom from disease.
    a. A moderate result: Frequently indicates that the horse has come into contact with an infected horse or carrier but adult horses are often not themselves affected, but must be checked for evidence of disease (see freedom from disease).
    b. A high result: Usually indicates recent exposure or disease and consideration of the most appropriate tests to confirm freedom from disease is needed, since infection may not yet have burst into the guttural pouch.
2. In a group of horses
    a. If all horses have low titres, then this would suggest a disease free herd at that time point
    b. If animals have results that include higher, moderate and low results, this suggests that either a carrier is present within the group or that horses are being exposed by mixing with external populations of horses

Given frequent horse movements due to sporting activity, the concept of 'disease free' status can be difficult to maintain, as horses may mix with other populations and difficulties in repeating isolation procedures every time a horse competes. In such there are dynamic groups of horses, owners should discuss the value of vaccination to provide more sustainable disease control than previously applied.

A new subunit vaccine (Strangvac; Dechra) is currently available for the control of Strangles. Unlike previous Strangles vaccines, it is unable to induce clinical signs of disease, is given by intramuscular injection, and does not interfere with diagnostic testing. The vaccine has been used in a variety of clinical settings as reviewed here https://beva.onlinelibrary.wiley.com/doi/10.1111/eve.14032

Diagnosis

Strangles is diagnosed either directly by detection of *S. equi equi* itself or indirectly by detection of rising levels of antibody against *S. equi equi* in blood samples, although presence of antibodies against *S. equi equi* does not necessarily indicate that an animal is still infectious to other horses. Direct detection of *S. equi equi* is either by laboratory isolation or by qPCR detection of its DNA from nasopharyngeal swabs, abscess contents and/ or guttural pouch washes or contents (empyema/ chondroids). It should be noted that low bacterial numbers, the concurrent presence of the closely related *S. zooepidemicus* or recent antibiotic treatment, may make the detection of *S. equi equi* by culture more difficult and less sensitive than qPCR.

When taking nasopharyngeal swabs, it is particularly important to sample the back of the pharynx around the opening of the guttural pouch, using specially designed elongated swabs with enlarged absorbent heads (see 1 below). There is no need to use smaller, guarded swabs as the main purpose of swabbing for strangles is to optimise the chances of detecting the organism if it is present. Shedding of *S. equi equi* into the nasopharynx often occurs intermittently, so repeated swabbing is recommended to confirm negative results. *S. equi equi* should be more reliably confirmed or excluded following testing by qPCR alone or by culture and qPCR of frank pus from obvious draining abscesses, nasal discharges or guttural pouch washes or contents (empyema or chondroids).

The carrier state (continued presence of *S. equi equi* infection in the absence of clinical signs) may be diagnosed or excluded by sequential nasopharyngeal swabs or, preferably, endoscopic examination ('scoping') of the guttural pouches and submission of guttural pouch washes or contents (empyema or chondroids) for testing by qPCR alone or by culture and qPCR. A series of three nasopharyngeal swabs, usually collected one week apart, will result in detection, by positive qPCR, on at least one of the swabs in >90% of carrier horses. As the sensitivity of *S. equi* detection for identifying guttural pouch carriers on three nasopharyngeal swabs is broadly equivalent to testing bilateral guttural pouch samples, the latter approach is the recommended sampling protocol for determining infectious status in seropositive, healthy horses.

Recent investigations of the blood ELISA in detecting chronic carriers have highlighted that negative blood ELISA results, either as single or paired samples, do not guarantee absence of a carrier state. It is therefore preferable for all potential carriers irrespective of their serological status, especially those of high or unknown

risk status, to be examined by guttural pouch endoscopy and sampling with screening for *S. equi equi* by qPCR alone or by culture and qPCR.

Control of Infection

The spread of *S. equi equi* may be limited by the early detection of shedders among newly affected horses and their in-contacts by appropriate testing (see above). Any suspected cases should be isolated immediately.

Young and elderly horses are most susceptible to infection and should be monitored closely. All infected horses and their in-contacts should remain in strict isolation, under the direction of the attending veterinary surgeon, and with the highest possible standards of hygiene.

Regular disinfection of water troughs should be performed in order to minimise the infectious dose that in-contact horses receive and so reduce the severity of disease.

Horses should not enter affected premises unless they can be kept in strict isolation from all possible sources of infection. No infected or in-contact animal should be released from isolation or veterinary supervision until they have been tested conclusively negative for active shedding and the carrier state, as described above.

Treatment

The treatment of horses with clinical signs of strangles using antibiotics remains controversial and any essential treatment will be determined by the attending veterinary surgeon, who will be best placed to consider all relevant risks. For further advice regarding the treatment of carrier horses please consult the attending vet.

Confirmation of Freedom from Disease

Shedding of *S. equi equi* usually ends rapidly after complete recovery but may continue intermittently for several weeks after clinical signs have resolved in some carrier horses. Therefore, no convalescent horse or in-contact horses can be considered free from infection until either three negative nasopharyngeal swabs have been obtained or the horse has been tested negative on bilateral guttural pouch samples. Negative results for *S. equi equi* by qPCR alone or by culture and qPCR indicate freedom from infection and the carrier state in the large majority of cases, but not all, so vigilance must be maintained.

In deciding on the best time to commence testing to confirm freedom from infection after an outbreak of strangles it should be noted that this is likely to be a trade-off between starting sooner and finding a proportion of convalescing horses that continue to harbour

S. equi equi that would if left longer have cleared the infection naturally and starting later and identifying fewer true subclinical *S. equi equi* carriers that require treatment and re-testing. Experience suggests that the best compromise is for clearance testing to commence at least four weeks after the last clinical signs of strangles have been observed.

Testing horses prior to their introduction to new premises

Horses entering new premises should be quarantined for 3-4 weeks in case they are incubating diseases such as equine influenza or strangles. infected horses may or may not have clinical signs or they may be subclinical carriers. All new arrivals should be examined for signs of illness (high temperatures, dullness, not eating, nasal discharge, swollen or abscessed lymph glands around the head or neck). Any horses with such signs should be immediately isolated and veterinary advice sought.

Routine use of the strangles ELISA blood test during isolation can identify previously infected and potentially infectious horses quickly. Samples should be taken on arrival and after three weeks isolation to check for rising antibody levels (seroconversion) indicating an immune response after exposure to *S. equi equi*. If any of the quarantined horses are ELISA blood test positive on either the first or second test then further swab/wash testing (using qPCR or culture and qPCR) is required in order to determine whether the positive animals are carrying *S. equi equi* (see Diagnosis above). As previously stated, serology may not be valuable in identifying chronic carriers, and guttural pouch sampling should be considered the gold standard for the detection of such animals.

Export Certification

Strangles is not notifiable by law. However, no horse with clinical signs or recent contact with this disease should be exported.

Further information for veterinary surgeons

Detection of *Streptococcus equi* subspecies *equi* using a triplex qPCR assay: https://www.sciencedirect.com/science/article/pii/S1090023312003103

Combining two serological assays optimizes sensitivity and specificity for the identification of *Streptococcus equi subsp. equi* exposure: https://www.sciencedirect.com/science/article/pii/S1090023313000567

Streptococcus equi subsp. equi infections: current best practice in the diagnosis and management of 'strangles': https://www.magonlinelibrary.com/doi/full/10.12968/ukve.2021.5.2.S.3

Streptococcus equi subsp. equi Infections in Horses: Guidelines for Treatment, Control, and Prevention of Strangles—Revised Consensus Statement: https://onlinelibrary.wiley.com/doi/full/10.1111/jvim.15043

Rendle, D., Bowen, M., Cavalleri, J., De Brauwere, N., Grondahl, G., van Maanen, K. et al. (2024) Strangles vaccination: A current European perspective. Equine Veterinary Education, 00, 1–8. Available from: https://doi.org/10.1111/eve.14032