

# Glanders

## INTRODUCTION

Glanders is a contagious bacterial disease affecting primarily equidae (horses, mules and donkeys) and is caused by the bacterium *Burkholderia mallei*. Cats, dogs, goats, camels and bears can also be affected and most importantly, humans can become infected by contact with infected animals. The most common sources of infection are from discharges from the respiratory tract or from ulcerated skin lesions found in food and water. Direct horse to horse contact also plays a part in transmission between horses with active skin lesions and discharging lymph nodes and also horses coughing with lesions in the lungs and upper respiratory tract. In addition, spread occurs via contaminated equipment, clothes and tack by people working in close contact with ill horses. Often subclinical carriers (horses without obvious clinical signs) pose more of a threat to transmission of the disease when compared to clinical cases because the disease threat is unrecognised.

During the early part of the 20th century, glanders was prevalent throughout the world and was a major problem facing the horses, riders, veterinary surgeons and handlers in the cavalry and artillery during the First World War. If left untreated in humans, the disease is fatal in 2-4 weeks and the causative organism, as a result, is considered a potential bioterrorism agent.

Glanders was eradicated from Great Britain in 1928. In the present day the disease continues to be reported sporadically in the Middle East, Africa, South America and Asia. Most recently, a single case was reported in Germany in December 2014.

## UK LEGISLATION

Glanders is classified as an exotic notifiable disease, which means that it is not normally present in Great Britain and anyone suspecting a case is must report it, by law, to the Animal and Plant Health Agency (APHA) which is an agency of the Department for Environment, Food & Rural Affairs (DEFRA). From there vets working for the APHA will investigate and if found to be positive, the outbreak will be controlled in line with the contingency plan for exotic notifiable diseases. The main legislation covering the control of glanders is the Infectious Diseases of Horses Order 1987.

## CLINICAL SIGNS

The incubation time varies from days to months depending upon the route, amount of exposure and intrinsic factors of the animal. There are three recognised forms of the disease:

### 1. Nasal Form

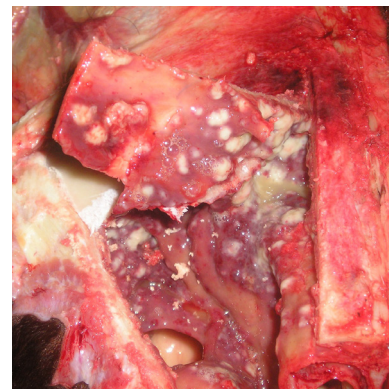
- High fever, reduced appetite and laboured breathing with a cough.
- Yellow-green, thick, mucopurulent nasal discharge, which is highly infectious (a purulent discharge around the eyes may also be present).
- Nodules in the nasal mucosa, which burst and become ulcerated. These ulcers spread in the upper respiratory tract and form star-shaped scars.



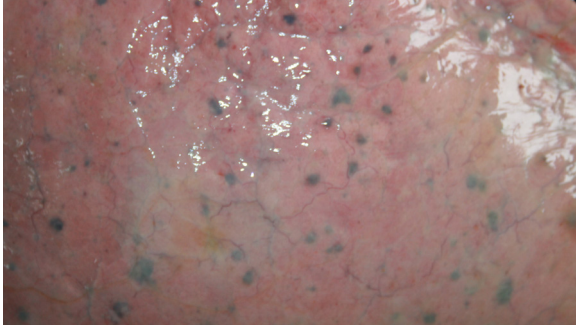
**Figure 1:** Nasal discharge in a donkey with glanders disease.



**Figure 2:** Mucopurulent nasal discharge in a horse with glanders.



**Figure 3:** Nodules and ulcers in the nasal conchae in a horse with glanders at post-mortem.



**Figure 4:** Black miliary granulomas (nodules) found in the lung post-mortem in a horse with glanders.



**Figure 5:** Dry, glanderous skin ulcers on the left lower jaw of a horse with glanders.

## 2. Pulmonary Form

- May take several months to develop but will initially develop as fever, laboured breathing with a persistent dry cough.
- Increase in urination and diarrhoea may be seen.
- Progressive loss of body condition.
- Lung lesions in the form of nodules become calcified and discharge their contents spreading the disease to the upper respiratory tract.
- Occasionally, lesions will also form in the liver, spleen and kidneys.

## 3. Cutaneous Form (Farcy)

- This form is also referred to as 'farcy'.
- Initially seen as fever, difficulty breathing, coughing and enlargement of lymph nodes.
- Nodules appear under the skin along the course of lymphatics of the legs, ribs and belly. Upon rupturing, these also excrete an infectious, purulent discharge.
- Leads to persistent ulcers connected along tortuous, thickened lymphatic vessels.

## WHICH DISEASES CAN GLANDERS LOOK LIKE?

Due to the vague and non-specific nature of clinical signs seen with Glanders (fever, cough, increased respiratory effort, mucopurulent nasal discharge and skin nodules) it is important to rule out many other important diseases with similar clinical features such as:

- Strangles
- Equine Viral Arteritis (EVA)
- Fungal Pneumonia
- Ulcerative Lymphangitis
- Pseudotuberculosis
- Epizootic Lymphangitis

## CONFIRMING THE DIAGNOSIS

In countries where the disease is endemic (i.e. known to occur on a regular basis), Glanders can often be suspected by development of the clinical signs seen in the nasal, pulmonary and cutaneous form. In Great Britain, however, diagnosis would be confirmed by testing for the suspect case for evidence of an immune response (serology) and/or specific identification of the causative agent.

**1. Identification of the agent:** While this might seem the obvious way to confirm infection, this can be challenging because isolation of *B. mallei* requires pus obtained from the lung or nasal mucosa. Glanders abscesses do not contain many bacteria and samples taken from the respiratory tract are often contaminated with other bacteria normally present in the respiratory tract of horses which can out-number *B. mallei* so that it is not found in the laboratory sample. As a result identification rates can be disappointing with conventional bacteriological culture techniques. Handling of suspect samples in the laboratory requires strict biosecurity controls to prevent transmission to scientists.

**2. Serological testing:** This is currently the only test approved by the OIE (World Organisation for Animal Health) for international trade of horses for the identification of Glanders. Blood is taken and tested for evidence of infection by the Complement Fixation (CF) test, which is an accurate serological test, however, false positive results can occur and occasionally some horses require more than one blood test before a confident result can be given.

Historically, the Mallein Test was used extensively from 1890, especially in the identification of carriers, however, is not generally recommended in the present day due to animal welfare concerns and has been superseded by serological testing. It involves inoculating the mallein purified protein derivative,

extracted from the bacterium *Burkholderia mallei*, in to the skin of the lower eyelid (intradermal-palpebral test), eye drops into the corner of the eye (ophthalmic test) or under the skin in the middle of the neck (subcutaneous test). The horse is then monitored for swellings of the eyelids or neck (depending on which test is used) with or without a purulent ocular discharge and an increase in temperature in the case of the lower eyelid inoculation, which is the most reliable and sensitive of the above tests.

## CONTROL

Due to the potential economic impact and the severity of the effects of Glanders, it is listed as a notifiable disease by law. As result of this, horses imported from countries outside the EU are subject to control and testing for Glanders.

Currently there are no vaccines available against glanders which means prevention is through the means of strict biosecurity measures. Control depends on early detection and the subsequent humane destruction of seropositive animals to stop the spread of the disease via highly infectious discharges and from subclinical carrier animals. Affected carcasses and disposable materials used on the premises where an animal tests positive should be burned and all equipment disinfected. In addition, any in-contacts should be located, quarantined and subjected to testing for the disease immediately in order to contain the outbreak as quickly as possible. Euthanasia of positive cases and eradication is the best policy to keep a country free from disease.

Whilst *B.mallei*, like many other bacteria, is sensitive to antibiotics, glanders is not a condition that is treated since treatment does not necessarily lead to a cure and is likely to lead to chronic subclinical carrier cases with the potential to spread disease to other

animals and humans. However, antibiotic treatments have been used in endemic zones where the disease occurs regularly. The case fatality rate in glanders can be up to 95% without treatment. If humans contract the disease, survival is dependent upon early detection and intensive treatment with appropriate antibiotics.

## FURTHER INFORMATION ON GLANDERS

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Photos Courtesy of: Dr. Ulrich Wernery of the Central Veterinary Research Laboratory (CVRL), Dubai, UAE.