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Glanders: A Re-emerging Disease of Equine

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Introduction

Glanders is one of the oldest known infectious disease of Equidae (horse, donkey, mule) caused by the Gram-negative bacillus bacteria Burkholderia mallei. Cats, dogs, goats, camels and bears can also be affected and most importantly, humans can become infected by contact with infected animals. Glanders can be considered as a re-emerging disease as the number of outbreaks in solipeds and other animals, for example zoo carnivores (tigers and lions) and camels has steadily risen during the last two decades (Wittig et al., 2006; Wernery et al., 2011; ProMED, 2011a). Because of the contagious and fatal nature of the disease in humans, B. mallei is considered to be a potential agent of bioterrorism.

Glanders is classified as an exotic and transboundary animal diseases notifiable to the World Organisation for Animal Health (OIE) in terms of its economic impact on international trade of animals and their by-products. Glanders as 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).

Epidemiology

However, 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. A major outbreak of glanders occurred in India starting in 2006 from Maharashtra (26 cases). The disease has been reported later on from six other states namely Uttar Pradesh (70),

Uttarakhand (21), Punjab (3), Andhra Pradesh (16), Himachal Pradesh (6) and Haryana (1) till 2007.

Glanders is being reported in Rajasthan after nearly four years, said officials. It was first detected in Rajakhera in Dholpur district on November 15, 2016. A horse and a mule had to be euthanized while the owner of another mule absconded with the animal, and a donkey had died of the disease at that time. Three horses and 16 ponies were infected in Udaipur in 2017. Very recently two horses have tested positive for glanders in Jhunjhunu district, Rajasthan

Etiology

Burkholderia mallei is a Gram-negative, non-motile, nonsporulating and an obligate intracellular mammalian pathogen. Its size ranges from 0.3 to 0.8 lm in width and 2–5 lm in length and can only be weakly stained with simple dyes. The presence of lipoid granules is the cause of the irregular staining character of B. mallei (Worley and Young, 1945).

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 recognized forms of the disease:

1. Nasal Form

- High fever, reduced appetite and labored 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.

2. Pulmonary Form

- May take several months to develop but will initially develop as fever, labored breathing with a persistent dry cough.
- Increase in urination and diarrhea 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.

Diagnosis

Glanders can often be suspected by development of the clinical signs seen in the nasal, pulmonary and cutaneous form.

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 Organization 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 test 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.

Reference

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