Indian Farming **63**(6): 29–31; September 2013

Glanders:

A re-emerging dreaded disease of equids

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Glanders, also known by the names like Farcy, Malleus, Droes, Rotz, Equine nasal phthisis, Equinia or Maliasmus, primarily affects horses, mules and donkeys, but is also seen in animals like goats, dogs and cats. It is caused by bacteria, Burkholderia mallei. It is included in the OIE (World Organisation for Animal Health, formerly Office International des Epizooties) list of notifiable diseases as equine disease. The disease transmits by direct and indirect contact with food, water or equipments contaminated with nasal discharges from affected animals. People can also become infected through direct contact with infected animals or contaminated materials. The bacteria enter the body through the skin and through mucosal surfaces of the eyes and nose. Recovered and latently infected animals are the major source of infection to other animals and to humans.

BEING zoonotic in nature, glanders is an important occupational disease of veterinarians, equine caretakers, slaughterhouse workers and laboratory workers handling infective material. There is also concern that glanders can be used as a bio-weapon in the present scenario – by releasing the bacteria into the air or by exposing people to contaminated materials and is classified as a category B bio-threat agent. Glanders organisms have been reportedly deliberately used to infect horses, mules, civilians and prisoners of World War I and II and in Afghanistan by Soviet forces in 1980s.

Glanders is one of the oldest diseases known to man and was mentioned by early Greek and Roman writers. The disease was once widespread throughout the world, however, it has been eradicated from the United States, Canada, England, and Australia. The occurrence of the disease leads to international trading restrictions leading to huge economic losses. Glanders is endemic in parts of Africa, Middle East, Central and South America and in Asia mainly Burma, China, Egypt, India, Indonesia, Iran, Iraq, Italy, Korea, Mongolia, Pakistan, Philippines, Syria and Turkey.

Equine owner poses with glanders infected horse. White arrow shows typical nasal form (ulceration of nasal septum) of the disease

In India, glanders had been

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Arrow indicates the formation of nodules and ulcers (ruptured nodules), which gives an appearance of streaks along the hind limbs in a glanders infected horse.

reported since 1890s in UP and Maharashtra. However, after adoption of Galnders and Farcy Act, 1899, the incidence reduced drastically. In post independence era, however, many reports have been found describing glanders amongst equines, mostly from northern and north-eastern parts of the country. During recent years, glanders re-emerged in equines in India and has been reported from seven different states namely Maharashtra, Uttar Pradesh, Punjab, Uttarakhand, Andhra Pradesh, Himachal Pradesh and Haryana during 2006 and 2007 and again from Chhattisgarh, Himachal Pradesh and Uttar Pradesh during 2009-2010. In all, 164 cases have been detected. In view of the historical aspects and the observation that disease appeared to have emerged subsequent to movement of animals by traders coming from northern parts of India, it is considered that the focus of infection may be present somewhere in North India.

The disease usually progresses slowly in horses and occurs in severe and quick form in donkeys and mules. The disease has been described in three distinct forms namely nasal form, pulmonary form, and skin form. After an incubation period of about two weeks, affected animals usually have high fever (up to 106°F or 41°C) and, subsequently, a thick, nasal discharge containing both mucus and pus and other respiratory signs. Major clinical symptoms include ulcers on nasal septum, formation of small nodules all over the body, swelling or wounds on legs, cough, difficult breathing, reduced appetite and wasting of animals. Three forms of glanders described in the literature may not be distinctly seen in different animals in the event of any outbreak. Animals may exhibit one or more of these forms simultaneously. Death may occur within a few days in donkeys and mules, and may take a long course in horses. In man, generalized symptoms of glanders include fever, muscle aches, chest pain, muscle tightness and headache. Additional symptoms may be excessive lacrimation, light sensitivity and diarrhoea. The clinical and bacteriological diagnosis of glanders is difficult in a large population of equines, especially in the early stages, or if the disease is latent.

Diagnosis of the disease in the field is not very difficult which can be done easily on the basis of clinical symptoms. However, many other diseases exhibiting similar symptoms may confuse the diagnosis. Testing of horses by delayed hypersensitivity reaction test (mallein test) is internationally accepted for trade purposes. The lab confirmation of the disease in horses is based on the identification of causal agent through microbiological testing of samples like nasal swabs or pus/exudates from lesions. The causal agents may be confirmed in high biosecurity lab through cultural, morphological, biochemical, biological (lab animal inoculation tests) and molecular tools. Testing of blood serum using standard tests using internationally recognized complement fixation test apart from other less validated tests like ELISA is also of great significance, especially during an outbreak. The disease in humans is diagnosed in the laboratory by isolating the organism from blood, sputum, urine, or skin lesions.

There is no proper treatment or vaccine available for glanders, therefore, its diagnosis, prevention and control are important. In India, treatment in glanders infected or suspected animals is not allowed by law and the disease cases are governed under Glanders and Farcy Act 1899 which is a state subject. Testing of suspected clinical cases, screening of apparently normal equines, elimination of positive reactors as well as complete quarantine and rigorous disinfection of the area involved are essentially required for prevention and control of glanders. Recently the matter has been included in the 'Prevention and control of infectious and contagious diseases in animals act, 2009,' a central act.

Treatment in humans is difficult. Sulfadiazine has been found to be as effective in experimental animals and in humans. Bacteria are usually sensitive to tetracyclines, ciprofloxacin, streptomycin,

novobiocin, gentamicin, imipenem, ceftrazidime and the sulfonamides. Resistance to chloramphenicol has been reported. Various combinations of imipenem, doxycycline, ceftazidime, ciprofloxacin, piperacilin, levofloxacin, co-trimoxazole have been reported to be effective in laboratory animals and in humans.

Considering the significance of this devastating disease, it is reasonable to focus the role of all stakeholders, including the vets, state and central government, R&D organizations, non-governmental organizations (NGOs), as well as equine owners, towards its timely containment and control. Veterinarian should focus on timely diagnosis using rapid and sensitive tests with the aid of diagnostic labs. NGOs should cooperate with government departments to assist equine owners to follow the guidelines for containment as per law *in vogue*. Equine owners have a great role to play in containment and eradication of this disease from the country. Some of the steps they can take to help the system include immediate reporting of any disease condition to vets, education and awareness about disease, symptoms and potential human health hazard and cooperation with animal husbandry authorities in eradication efforts.

State and Central animal husbandry departments should follow all reporting to authorities through notification followed by test and elimination as well as monitor the situation by follow up surveillance programmes. Training of vets and awareness to farmers are integral part of eradication campaign. Policy development for disease containment and eradication must involve the technical support from experts.

National Research Centre on Equines (NRCE) is the referral laboratory of the Department of Animal Husbandry, Dairying and Fisheries (DAHDF), Ministry of Agriculture (Govt. of India) and provides technical expertise in policy development on the subject to DAHDF. Other supports include disease confirmation through quick laboratory diagnosis, technical support to State AH services as well as research and development on better diagnostics. The Centre is actively monitoring the situation nation-wide. Intense follow ups are also being continued on samples from different states of the country along with prompt and dedicated action taken by the State authorities following notification. Though the follow up on the disease throughout the country revealed negative status, further recording is necessary to ensure its eradication. Systematic testing on more samples from various states by diagnostic laboratory and physical surveillance by local authorities thereafter is essential to identify all infected animals in an outbreak. This is important in view of the possibility of latent or clinically inapparent cases.

The disease was successfully contained in the country mainly due to efforts of NRCE in coordination with Central and State Animal Husbandry Authorities.

The eradication of disease in India needs concerted efforts from all the equine stakeholders. Some of the steps to be taken up include

- Thorough surveillance for glanders among all the animals at risk in the affected area with the support of local administration should be performed.
- Regular reports should be collected from veterinary authorities regarding the surveillance to generate reliable data.
- Restriction and regulation on animal movement in affected and neighbouring areas should be imposed.
- Testing of all horses, ponies, mules and donkeys during any congregation should be made compulsory.
- Clear cut instructions may be issued for 'Dos and Don'ts' for all such congregations to the organizers.
- Due importance should be laid down on awareness and training programmes to vets and paravets with technical help and support from NRCE for capacity building of the State/regional disease diagnostic labs.
- Registration of all equine establishments by the concerned State govt. by the notification from AH departments may be done.
- NRCE should work out for suitable control strategies using epidemiological data on the disease.
- Suitable compensation, uniform across the states, for destruction/ elimination of animals should be decided as per the estimated market rates based on utility pattern of each animal viz. horses, ponies, mules and donkeys.
- Surveillance of in-contact human beings/persons at risk viz. veterinarian, equine owners, attendants etc. should also be taken up by the local medical authorities.
- Exchange of data and implementation of common prevention policies and programmes across the political boundaries through zonal or regional cooperation should be rationally followed to make the strategies more effective.

SUMMARY

Glanders is a zoonotic disease mainly affecting the equines, but it can also be transmitted to humans directly or indirectly by contact with food, water or equipments contaminated with discharges from affected animals. There is no proper treatment or vaccine available for glanders, therefore, its diagnosis, prevention and control are important.