

Outbreak of Respiratory Tract Infection in the Icelandic Horse Population

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An epidemic of respiratory tract infection affected the equine population in Iceland in 2010. The disease was characterized by dry coughing and mucopurulent nasal discharge. Prior to those symptoms, serous discharge was often observed. Temperature remained normal in most horses. The duration of clinical symptoms varied from 2 - 10 weeks, most commonly 4 - 6 weeks.

The first cases were reported on the 7th of April 2010 from the equine centre at Holar University College, located in the north of Iceland. Within few days, it became apparent that the disease was already widespread throughout the country and that an epidemic could not be avoided.

Although the exact location of the index case has not been determined, epidemiological studies revealed one training station in the south of Iceland as the first centre of transmission. The first infected horses were transported from there on the 19th of February. During February and March the disease was transmitted to at least 18 new premises; the secondary centres of transmission. A questionnaire which was sent to 200 trainers and breeders all over the country in June, with a follow up in September, confirmed the distribution of the disease to the south-, west- and north of the country already in the first week of April, when the disease was first reported. For stabled horses, the epidemic was at its peak in the beginning of May. The free roaming horses became infected in the next two months. As the most traditional way of horse breeding is keeping broad mares (often with their new born foal) with a stallion for free mating in a flock of 20 – 30 mares, a second peak of the disease was identified during the summer.

The entire equine population in Iceland (80.000 horses) appeared to be susceptible to the disease, resulting in 100% morbidity. Direct contact with infected horses was the most prevalent mode of transmission, but the disease could also be spread indirectly with riding equipment and fomites. The incubation time was approximately 2 weeks. Different conditions in stables (ventilation, density of horses and time of outdoor resting) resulted in a diverse infection load, affecting both the latent period, the gravity of the clinical signs and their duration. The mortality was very low, although a few deaths were associated with complications of the disease.

In spite of extensive virological investigations, no viruses could be detected as a possible primary cause of the present epidemic.

Cultivation and testing by PCR for *Streptococcus equi* subsp. *equi* was negative.

The bacteria *Streptococcus equi* subsp. *zooepidemicus* (*S. zooepidemicus*) was cultivated from almost all nasal swabs taken from coughing horses with mucopurulent

nasal discharge. Pure cultures of *S. zooepidemicus* were isolated from nasal, pharyngeal and tracheal swabs taken from experimentally infected horses at autopsy. Characterisation by MLST (Multilocus Sequence Typing) of strains isolated in the outbreak and comparison to strains previously isolated from horses in Iceland, indicated an introduction of a new strain of the bacteria to the country. The epidemiology of the disease also suggests a strong association between this new strain and the outbreak of the disease.

Conclusion: Introduction of a new strain of *Streptococcus equi* subsp. *Zooepidemicus*, to the isolated population of horses in Iceland resulted in an epidemic of a mild but sometimes prolonged respiratory tract infection. Only few examples of complications were associated with the disease but generally the horses recovered fully. However, the disease paralyzed the equine industry for three months with grave economic losses.

Although this strain has been described to cause similar symptoms in horses in other countries, it has not previously caused a comparable outbreak.

Geographic isolation and the absence of protective immunity in the entire population was the main reason for the epidemic. The management (such as dense stabling during the winter and free mating during the summer) was also advantageous for the infectious agent, resulting in a high infectious load in many places.

Due to the mild symptoms and long incubation time, together with the tradition of frequent transport of horses between premises across the country, the disease was already widespread when first reported by practitioners. No measures were therefore taken by the Icelandic Food and Veterinary Authority to stop the epidemic. Measures to minimise the infectious load and the severity of clinical symptoms included recommending resting horses with clinical signs, reducing contact between stables, feeding the horses outdoors and putting them on pasture as soon as possible. Disinfection of the stables was also recommended.