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GUTHRIE - EQUINE INFLUENZA IN SOUTH AFRICA, 2003 OUTBREAK

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Summary

Equine-2 influenza virus (H3N8) infection was confirmed among naïve horses in South Africa on 9 December 2003. The virus was introduced following the importation of horses. There was no evidence of direct contact between the imported horses and the local horse population and thus, viral transmission was most probably indirect. The control measures and implications of the introduction of equine influenza to South Africa are also discussed.

Introduction

Despite the widespread use of inactivated equine influenza vaccine since the 1960s, the incidence of disease attributable to equine-2 influenza A virus (H3N8) has increased (Newton & Mumford, 2004). Equine-2 influenza has become enzootic among equine populations of North America, Europe and Scandinavia (Newton & Mumford, 2004) and epizootics have been reported from South Africa in 1986 (Guthrie, Stevens, & Bosman, 1999), India in 1987 and China in 1989 (Newton & Mumford, 2004) and Hong Kong in 1992 (Powell, Watkins, Li et al., 1995). This paper describes the circumstances surrounding the outbreak of equine influenza in South Africa in December 2003, its subsequent spread, and control.

Introduction of the disease

A group of 32 horses were imported into South Africa on 26 November 2003. This comprised 25 horses from the United States of America, 1 from Argentina, 3 from the United Kingdom, 1 from France and 2 from the United Arab Emirates. The equine influenza vaccination status of the horses from the UK and UAE was satisfactory whereas that of the remaining 27 horses was sub-optimal. The generally low equine influenza antibody titres observed in samples collected from these horses on 1 December 2003 support this observation. There is no evidence to confirm that these horses did not have contact (direct or indirect) with other, possibly infected horses, following their arrival at the New York Holding Facility on 21 November 2003 until their departure for Cape Town from Ostend, Belgium, on 25 November 2003. Furthermore, 25 of these 27 horses seroconverted to equine influenza between 1 December 2003 and 6 January 2004. Since all of the horses received equine influenza vaccine on 4 December and 29 December 2003, one cannot determine if the observed changes in antibody titres were due to exposure to vaccine or natural infection.

Spread of the disease

The 2003 South African equine influenza outbreak was characterised by the simultaneous observation of clinical signs in horses in Cape Town and Port Elizabeth on 9 December 2003. The initial infection of horses in these two outbreaks would have occurred between 6 and 10 days before the observation of clinical signs (between 29 Nov and 3 Dec 2003). This primary infection would have been limited to individual horses, which would have become infectious 3 to 5 days after infection. The secondary spread of infection from these infected individuals to other in-contact animals was, therefore, observed on 9 December. The limited number of horses involved in the initial spread of the virus was probably responsible for Equine Influenza not being diagnosed during the primary infectious cycle.

There is no evidence to suggest that there was direct contact between the imported horses in post-arrival quarantine and local horses. Equine influenza virus is a relatively labile virus, but it has been shown to survive in the environment, on persons or equipment, for a variable time, depending on the conditions. Therefore, it is proposed that the virus was transmitted from the imported horses to local horses by indirect means (on persons, vehicles or equipment).

The imported horses were transported from a temporary Quarantine Facility (Durbanville) to the State Quarantine Station (Montague Gardens) on the afternoon of Saturday 29 November in 3 vehicles.
number of persons, equipment and/or vehicles came into contact with the imported horses at either Durbanville and/or Montague Gardens between 26 November and 8 December 2003 and may have, subsequently come into contact with horses at the Milnerton Training Centre in Cape Town. Numerous shortcomings in the post-arrival quarantine procedures and facilities provided ample opportunity for the indirect spread of equine influenza. The Montague Gardens Quarantine Station is situated within 3km of the Milnerton Training Centre and the possibility of wind or fly-borne transfer of virus, whilst extremely remote, cannot be excluded either. The lack of clinical evidence of equine influenza in any one of South Africa's neighbouring countries prior to, or subsequent to, the outbreak in South Africa in December 2003 excludes the possibility of this virus having been imported from there.

On Monday, 1 December 2003, one of the vehicles used to transport the imported horses from Durbanville to Montague Gardens was used to transport 10 local adult horses and 3 foals from the Cape to Port Elizabeth. One of these horses was moved from a racing yard in Cape Town to a racing yard in Port Elizabeth. All the horses that were in contact with this horse in the racing yard in Port Elizabeth were observed to have clinical signs of equine influenza on 9 December 2003.

On Monday 8 December, 3 horses left the Milnerton Training Centre destined for Randjesfontein Training Centre in Johannesburg. These horses left Cape Town prior to the initial development of clinical signs in horses in the Milnerton Training Centre. On arrival at Randjesfontein all the horses appeared to be clinically normal but subsequently developed signs indicative of equine influenza. This resulted in the direct spread of the infection to the vast majority of the horses at Randjesfontein. As the movement of these horses occurred prior to the initial diagnosis of equine influenza infection in Cape Town, the spread was totally unavoidable.

Laboratory diagnosis

Duplicate nasopharyngeal swabs were collected from 10 horses showing clinical signs indicative of equine influenza in a training yard at the Milnerton Training Centre on 9 December 2003. Following collection, the nasopharyngeal swabs were placed in approximately 4 ml of transport medium and transported on ice. One of each of these samples was tested for the presence of influenza A antigen using the Directigen™ Flu A Test (Becton, Dickenson and Company; catalogue number 256 020) according to the manufacturers recommendations. Seven of the 10 samples tested positive for the presence of influenza A antigen.

The other samples were sent to the OIE’s Reference Laboratory for Equine Influenza at the Animal Health Trust in Newmarket, UK for virus isolation, typing and molecular characterization. Results of these investigations revealed that the virus was derived from the North American lineage of H3-subtype equine influenza virus with an HA1 sequence identical to that of a virus isolated in Wisconsin (Peek, Landolt, Karasin et al., 2004) in 2003 (J. Daly, Personal Communication, 2004).

Emergency response and control procedures

The Milnerton Training Centre was placed under Quarantine by the State Veterinary Authorities on 9 December 2003 due to the detection of clinical signs indicative of equine influenza. Following the confirmation of the presence of equine influenza virus, the National Horse Racing Authority (NHRA) issued a notice prohibiting the movement of any horse from any training facility without their authorisation. Furthermore, the NHRA suspended all race meetings in Cape Town and Port Elizabeth with immediate effect. The subsequent spread of equine influenza to Johannesburg also resulted in the cancellation of race meetings in this area.

At the time of the outbreak there were a total of approximately 600 doses of licensed equine influenza vaccine available in South Africa. These were all purchased and utilised within a few hours of clinical signs being detected. Furthermore, it was established that there were a total of 10,000 doses of equine influenza vaccine licensed for use in South Africa available internationally. Arrangements were made for the immediate import of all of this vaccine.

The NHRA immediately implemented a vaccination programme for all racehorses in training and purchased 5,000 doses of vaccine (Equilis Equenza T, Intervet) for this purpose. Arrangements were made for the vaccine to be administered to all horses in training in the yards where no clinical signs of
equine influenza had been observed. The vaccine was delivered on 12 December 2003 and the initial vaccination of all horses was completed by 16 December 2003.

An application was made to the Medicines Control Council to import additional vaccine which was not licensed for use in South Africa under the provisions of Section 21 of the Medicines and Related Substances Control Act, 1965 (Act 101 of 1965). An initial permit was issued authorising the import of a total of 100,000 doses of the following vaccines; Duvaxyn IE Plus (Fort Dodge), Equilis Influenza NN (+T) (Intervet) and ProteqFlu (+TE) (Merial). The first of these vaccines arrived in South Africa on 18 December 2003. The NHRA purchased a further 10,000 doses of ProteqFlu (Merial) for the booster vaccinations of horses in training.

The primary aim of the vaccination programme instituted by the NHRA was to achieve an acceptable level of immunity in as many horses in training as possible in as short a time as possible in order to limit the duration of disruption to the racing calendar. Following consultations with the manufacturers (Merial) it was decided that the second dose of vaccine should be given at an interval of at least 14 days following the first vaccination. All the horses in training were, therefore, revaccinated between 27 December 2003 and 2 January 2004.

Racing in the Western Cape Province (Cape Town) and Eastern Cape Province (Port Elizabeth) were most seriously affected by the outbreak of equine influenza. In Cape Town, a total of 18 race meetings from 10 December to 7 February were cancelled. In Port Elizabeth a total of 10 race meetings from 10 December to 31 January were cancelled. A total of 21 out of 37 race meetings were cancelled in the Johannesburg area from 17 December 2003 until 31 January 2004. The impact of the outbreak on the horse community outside of racing was limited.

Discussion

The virus isolated from the 2003 South African Equine Influenza outbreak was identified by the World Reference Laboratory for Equine Influenza, Animal Health Trust, Newmarket, UK. The HA1 sequence of the virus was identical to that of a virus isolated in Wisconsin, USA in 2003. The HA1 sequence of the virus responsible for the outbreak of Equine Influenza in South Africa in 1986 is substantially different from that of the virus that caused the most recent outbreak (at least 15 amino acid differences) (J. Daly, Personal Communication, 2004). There has been no clinical or virological evidence of Equine Influenza in South Africa between September 1987 and December 2003. In the absence of evidence of ongoing infection, it is highly unlikely that the 2003 South African virus could have originated from mutations of the 1986 South African virus. The genetic similarities between the 2003 South African virus and the 2003 Wisconsin virus confirm that the virus responsible for the 2003 South African outbreak probably originated in the USA in 2003.

The control measures that were instituted during this outbreak of equine influenza were reactionary and in general played a role in limiting the overall extent of the incident. The reintroduction of compulsory vaccination of all horses under the auspices of the NHRA with vaccines that meet the OIE's recommendations on the composition of Equine Influenza vaccines will play a significant role in reducing the impact of equine influenza on the South African racing industry should the virus be reintroduced into the country.

References


