An outbreak of paresis in horses associated with equine herpesvirus 1

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Summary: An outbreak of paresis occurred among 67 Hafling horses imported from Austria. Equine herpesvirus type 1 was identified by the gel diffusion test and by isolation in lamb kidney cell culture from the brain of the first horse affected, which died from paresis. Mild paresis was seen in 7 other horses which recovered gradually. Complement-fixing antibody to the virus was present in serum samples from all 7 horses. About four months later, complement-fixing antibody was present in the serum of these 7 horses, and also in 33 of 45 horses of the same group which developed rhinitis.

KEYWORDS: Equine herpesvirus - Horse diseases - India - Nervous system diseases - Neurological signs - Viral diseases.

Outbreaks of paresis associated with equine herpesvirus (EHV-1) have been reported from several countries (1). A severe outbreak of neurological disease associated with EHV-1 occurred in Austria in 1983 (3, 5).

During 1978, paresis cases associated with EHV-1 were observed in horses and mules in northern India (2).

The present paper describes an outbreak of paresis followed by respiratory disease associated with EHV-1 in Hafling horses imported from Austria by the Remount and Veterinary Corps in 1982.

MATERIALS AND METHODS

Sixty-seven Hafling horses imported from Austria were kept in a hilly tract bordering Pakistan. One horse developed paresis within a month of importation. The horse had congested conjunctiva, shivering, nervous excitement and ataxia. Post-mortem examination failed to reveal gross lesions.

About four months after the appearance of nervous disease in this unit, 52 horses (including 7 which had shown nervous symptoms) developed a watery or mucoid nasal discharge.

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Isolation of virus

The virus was isolated from the brain material of the first horse in lamb kidney cell culture as described earlier (2).

Hyperimmune serum

Serum was obtained from guinea-pigs against our standard isolate of EHV-1, whose identity was confirmed by the Animal Virus Research Institute, Pirbright, England (6). This virus, adapted to lamb kidney cells, was concentrated 100-fold with PEG 6000 and Freund's adjuvant was added. Guinea-pigs were given three injections, and were bled 10 days after the final injection. The serum was separated and stored at -20°C until required.

Reference serum

EHV-1 convalescent horse serum was received from the Director, Animal and Plant Health Inspection Service, USDA, Ames, Iowa, USA.

Serum neutralisation test

The identity of the isolated virus was confirmed by the serum neutralisation test using a constant amount of serum and varying virus dilutions.

Gel diffusion test

The technique previously described by us was used (9).

Complement-fixation test

The technique of Thomson et al. (1976) was used (10).

RESULTS

Virus isolation

Primary lamb kidney monolayer cultures inoculated with brain suspension showed a characteristic cytopathic effect within 48 hours of inoculation. Infected cells showed ballooning and syncytia formation. The cytopathic effect stabilised after three successive passages. The infectivity titre of the virus after three passages was $7.5 \log_{10} \text{TCID}_{50}/\text{ml}$. The infectivity titre of the isolated virus was reduced by $3.05 \log_{10}$ by reference serum and $4 \log_{10} \text{TCID}_{50}$ by hyperimmune serum.

Gel diffusion test

Using brain material a specific precipitation line developed with EHV-1 hyperimmune serum which fused with the line of the standard strain of EHV-1.

Complement-fixing antibodies

Serum samples collected from 7 horses 21 days after they developed mild nervous signs proved positive for CF antibodies against EHV-1. Three samples had a titre of 1:8 and four had a titre of 1:16.
Tests on serum samples from 61 horses (including 7 which developed nervous signs) collected two months after convalescence revealed the presence of CF antibodies in only three horses (two affected and one unaffected).

Serum samples from 52 horses three weeks after the development of rhinitis possessed CF antibody in 40 cases. The titre was 1:8 in 32 cases and 1:16 in 8 cases. The other twelve serum samples were negative.

DISCUSSION

Equine herpesvirus type 1 was isolated in lamb kidney cell culture from a brain specimen. This finding is supported by reports from other parts of the world where EHV-1 has been isolated from brain (7, 11, 4) although in some outbreaks of suspected EHV-1 encephalitis it has not been possible to isolate EHV-1 from brain tissue.

The gel diffusion test also revealed the presence of EHV-1 antigen in brain material. This technique provides a result within 24 hours, whereas isolation and identification of virus through cell culture take much longer.

Tests on serum samples from seven horses which had recovered from a mild nervous disorder revealed the presence of CF antibody against EHV-1. However, retesting these seven horses two months after infection showed that EHV-1 antibodies persisted in only two of them, indicating brief persistence of CF antibodies.

The rhinitis that developed in 52 of the horses about four months after the first appearance of nervous disease, and the presence of CF antibodies against EHV-1 in 40 of these horses, indicated that the rhinitis was due to reinfection or reactivation of latent EHV-1.

There is little evidence that latent infection can develop in horses infected with EHV-1. However, following respiratory infection with EHV-1, co-cultivation of equine leukocytes with susceptible cells has resulted in recovery of the virus, and it has been suggested that such cell-associated viraemia represents latent infection of equine leukocytes (8).

It was impossible to determine whether the Hafling horses had been latently infected with EHV-1 upon arrival in India or whether they acquired infection after arrival. A severe outbreak of neurological disorder associated with EHV-1 occurred in Austria in 1983 (3, 5).

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UN FOYER DE PARÉSIE CHEZ DES CHEVAUX ASSOCIÉ A L'HERPÈSVIRUS ÉQUIN 1. — S.C. Tewari et S. Prasad.

Résumé : Un foyer de parésie s'est déclaré dans un lot de 67 chevaux Hafling importés d'Autriche. L'herpèsvirus équin de type 1 a été identifié par l'épreuve de diffusion en gélose et par isolement en culture de cellules rénales d'agneau à partir du cerveau du premier cheval atteint, mort de parésie. Sept autres chevaux ont fait une parésie bénigne mais se sont rétablis progressivement. Des anticorps fixant le complément vis-à-vis du virus étaient présents dans les prélèvements de sérum de chacun des sept chevaux. Environ quatre mois plus tard, des anticorps fixant le complément étaient présents dans le sérum de ces sept chevaux, ainsi que de 33 chevaux sur 45 du même groupe qui avaient souffert de rhinite.


UN FOCO DE PARESIS EN CABALLOS, RELACIONADO CON EL HERPESVIRUS EQUINO 1. — S.C. Tewari y S. Prasad.

Resumen: Se declaró un foco de paresis en una manada de 67 caballos Hafling importados de Austria. El herpesvirus equino de tipo 1 se identificó por la prueba de difusión en gelosa y por aislamiento en cultivo de células renales de cordero a partir del cerebro del primer caballo afectado, muerto de paresis. Otros siete caballos tuvieron paresis benigna, pero se recuperaron progresivamente. En las muestras de suero de cada uno de estos siete caballos, se encontraban presentes anticuerpos que fijaron el complemento respecto al virus. Unos cuatro meses más tarde, estaban presentes anticuerpos que fijaban el complemento en el suero de los siete caballos, así como en 33 de los 45 caballos del mismo grupo que habían sufrido de rinitis.

PALABRAS CLAVE: Enfermedades de los équidos - Enfermedades del sistema nervioso - Enfermedades virales - Herpesvirus equino - India - Signos neurológicos.

REFERENCES


