ASSOCIATION OF A PARVOVIRUS WITH AN OUTBREAK OF FOETAL DEATH AND MUMMIFICATION IN PIGS

A. J. FORMAN, B.V.Sc., D.T.V.M. (Edin.), Ph.D., C. LENGAUS, B.V.Sc.,

Regional Veterinary Laboratory, Bendigo, Victoria, 3350

SUMMARY: A parvovirus was isolated during an outbreak of mummifications and abortions in a commercial piggery. Stillborn piglets from which virus was isolated or in which parvovirus antibody was detected had widespread inflammatory lesions. Lesions were also seen in apparently healthy piglets from affected litters.

Introduction

Porcine parvovirus has been isolated from pigs in apparently good health and also in association with various manifestations of reproductive failure (Cartwright et al. 1969; Johnson and Collings 1969; Mengeling et al. 1975). In 1971, Smith first provided serological evidence for the presence of porcine parvovirus in Australia and Queensland from normal, stillborn and mummified foetal pigs.

This paper reports the isolation of a parvovirus from an outbreak of mummifications and abortions in a commercial piggery and the virological, serological and pathological studies carried out on affected litters.

Materials and Methods

Animals

The outbreak occurred in a large, intensive piggery with most cases being presented over a four-week period. Details of the outbreak have been documented (Gillick, 1977). All aborted or stillborn piglets which were detected were submitted for autopsy prior to, during and subsequent to the outbreak. In addition, healthy neonatal piglets were obtained from some affected litters for comparative studies.

Tissue Culture

Secondary pig kidney monolayers were prepared from healthy neonatal piglets. The kidneys were trypsinised and the cells grown to confluent monolayers in Roux flasks. The growth medium used was 199* supplemented with 0.08% NaHCO₃ and 7.5% foetal calf serum (FCS)*. Monolayers in the Roux flasks were trypsinised and the cells dispersed into tubes which were used for virus isolation attempts when the monolayers were 50% to 75% confluent. Monolayers were maintained in 199 with 0.16% NaHCO₃ and 2% FCS.

Cultures of PS cells, a continuous porcine kidney cell line (Inoue and Ogura 1962) were prepared on cover slips in tubes and used prior to monolayers becoming confluent. The same medium was used for growth and maintenance, as described above.

Virus Isolation

Specimens were prepared as 10% w/v extracts in phosphate-buffered saline (PBS) by homogenisation of

*Commonwealth Serum Laboratories, Parkville, Victoria

the tissue followed by centrifugation at 2000 g for 10 min. The supernatants were decanted and used for virus isolation. Samples of 0.2 ml were inoculated onto secondary pig kidney monolayers in tubes, which were held at 37°C for 1 hour for adsorption, washed with 2 ml of PBS and incubated at 37°C on a roller apparatus.

Inoculated tubes were examined for 5 to 7 days for the development of cytopathic effect (CPE) and supernatant fluids were tested with guinea-pig erythrocytes for haemagglutination (HA) of virus. Cultures with no evidence of HA were passed onto fresh monolayers after freezing and thawing of the tube contents and examined again in an identical manner. Cultures with positive HA were confirmed as parvovirus by haemagglutination-inhibition (HAI) tests using a known porcine parvovirus antiserum.

Serology

The HA and HAI tests were performed as described by Johnson (1973), except that the tests were performed in microplates with reagent volumes reduced to 50 μl.

Pathology

Following a routine post mortem examination, a wide range of tissues was collected from several stillborn piglets in affected litters and samples were immersed in 10% formalin. Recently dead foetuses were also examined. Tissues collected included brain, spinal cord and ganglia, eye, thymus, thyroid, oesophagus, trachea, tonsil, lymph nodes, heart, lung, liver, kidney, spleen, adrenal, gonads, pancreas, salivary gland, stomach, small and large intestine, skin, peripheral nerve, skeletal muscle and placenta. Tissues were embedded in paraffin, sectioned at 4-6 μ and stained with haematoxylin and eosin.

Results

Virus Isolation and Characterisation

The first isolation of virus was made, subsequent to reports of the clinical disease, from autoculture of neonatal pig kidney tissue prepared as described above for secondary pig kidney tissue cultures. Primary monolayers appeared normal, but after trypsinisation, secondary monolayers failed to establish. Testing of supernatant fluids revealed an HA titre of 1/128 and specific HAI was obtained with parvovirus antiserum.

Further studies confirmed the identity of the virus. Tissue-culture supernatant fluids were
References


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