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Clinical and epidemiological studies on porcine *Pneumocystis carinii* pneumonia

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An epidemic of porcine *Pneumocystis carinii* (Pc) pneumonia broke out in a farrow-to-finish pig farm in Kitahiroshima, Hokkaido. The disease with abdominal breathing and respiratory distress was observed in pigs six to eight weeks of age. Death occurred 2 to 3 days after the onset of the illness and survivors took about a month to recover. Histopathological lesions included pulmonary septal thickening with an infiltration of mononuclear cells and swelling of the alveolar lining, an intra-alveolar exudate and the presence of Pc organisms. During the epidemic, the pork pig production decreased by 32%. Prophylactic trials with chemotherapeutics successfully eliminated the disease from the farm.

In the immunohistochemistry, a monoclonal antibody reacted well with cysts and trophozoites of porcine Pc in paraffine sections and demonstrated 5 to 28 times as many organisms as shown by Grocott's silver methenamine technique, on the air way of lungs of pigs.

Serological titers to Pc were measured by an indirect fluorescent-antibody technique. In the endemic herd, pigs had high titer of maternal antibodies to Pc but antibodies seemed ineffective for the prevention of Pc infection, as the infection was demonstrated on a 15 days old pig by immunohistochemistry. Biochemical and serological examination ruled out congenital immunodeficiency in the pigs.

In an immunohistochemical retrospective

study, Pc infection was found in pigs under 7 months of age. The peak of the infection was between 1 and 3 months of age with a positive rate of 64%. Pigs from herds where suckling and weanling pigs shared the same air space had significantly heavier Pc infection than those from the herds where they were separated from each other. There was no regional difference nor seasonality in Pc infection and any single diseases were not associated with Pc infection.

The products of the polymerase chain reaction on porcine Pc from Hokkaido revealed single-base polymorphisms in the alignment with the previously reported sequences of the mitochondrial large subunit ribosomal RNA of Pc derived from Danish pigs and those of 5 S ribosomal RNA of Pc derived from humans, rats and mice.

In conclusion, porcine Pc pneumonia, an exudative and proliferative pneumonia with many Pc organisms in histopathology, occurred on pigs between 6 to 8 weeks of age. The mortality rate was high, although it was preventable with prophylactic administration of chemotherapeutics. Porcine Pc infection was prevalent in young pigs in Hokkaido without seasonality or locality. The airborne transmission from weaners to sucklers was important for the dissemination. Porcine Pc was a genetically distinct type from those parasitized on other mammalian species including the human.