Levels of Passive Antibodies against Aujeszky's Disease Virus in Piglets Derived from Infected Sows

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ABSTRACT. Levels of colostrum-derived antibodies in piglets born to sows naturally infected with Aujeszky's disease virus were determined, and isolation of the virus from the unweaned piglets with the antibodies was carried out. The antibodies were diminished at constant rates approximately similar among different litters and reached negative levels at 45- to 60-day-old. The viruses were isolated from kidneys and brains of the neonatal piglets at 2-day-old. These results indicate that piglets with colostrum-derived antibodies undergo subclinical Aujeszky's disease virus infection. -- KEY WORDS: Aujeszky's disease, colostrum antibody, ELISA.

From January to May, 1985, serial outbreaks of Aujeszky's disease (AD) occurred in Tochigi Prefecture, Japan. The earliest signs were anorexia and pyrexia in sows, gilts and/or fattening pigs, and these were usually followed by the nervous signs, neonatal death, and/or abortion of pregnant sows. Towards the end of the natural epidemic, breeding animals such as pregnant sows and gilts showed positive antibodies against AD virus in high titers. The recovered sows subsequently delivered normal piglets, and unweaned piglets showed no clinical signs. Recovered pregnant sow apparently transferred antibodies to their offsprings via colostrum [4]. A previous study showed that colostrum-derived antibodies persisted in piglets until 5 to 7 weeks of age [3].

In the present investigation, colostrum-derived antibodies against AD virus were determined with piglets born to naturally infected sows. Concurrently virus isolation attempts were made from the piglets.

Eighteen piglets derived from four litters of pregnant sows were used. The sows were located on two farms in which AD virus infection was confirmed. Piglets were weaned at 30-day-old and placed in conventional units. Blood samples were collected from the piglets starting at 15-day-old until 70- to 80-day-old at approximately 8 to 15 day intervals. Blood samples were also collected from the sows. Colostrum-derived antibody titers against AD virus were examined with the enzyme-linked immunosorbent assay (ELISA). The ELISA was followed according to the method used in that of bovine leukemia virus [5], except that infected PK-15 cells treated with Nonidet P-40 were used as the positive antigen and rabbit anti-pig-IgG peroxidase conjugate (Cappel, USA) was employed. The antibody titers were expressed as difference in optical density (OD) values of positive and negative antigen-wells at 492 nm. An OD value greater than 0.2 was expressed as positive.

Antibody levels in piglets of each litter were shown in Fig. 1-A to 1-D. All the piglets, except one from sow #82 and one from #91, showed antibody titers between

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0.5 and 1.3 OD value at approximately 14- to 15- day-old. Ranges of OD were within 0.4 among piglets in each litter. We did not find the reason why the antibody titers of the two piglets were substantially higher than the others. After 20-day-old the antibody levels diminished at uniform rates within each litter, reaching less than 0.2 OD at 45- to 60-day-old. As shown in Fig. 1, the diminution patterns were not linear, and there appeared in a reversed relationship with their growth curves (Ogawa, unpublished data). Therefore, the decreasing rates at the begining may be preferred to those at a half life time of antibodies. On the other hand, as shown in Fig. 1-A, it seemed that OD values of affected sow rose slowly until 14 days after parturition and remained at constant levels thereafter.

McFerran and Dow indicated that upon
internasal challenge exposure with virulent AD virus, piglets derived from naturally infected sows with maternal immunity were protected against the clinical illness, but against the subclinical infection [4]. Andries et al. also indicated similar phenomenon in their vaccination experiments [1]. During the present investigation, weaned piglets possessing colostrum-derived antibodies from infected sows neither died nor showed clinical signs. Antibody levels did not rise in the piglets. The results do not exclude a possibility that some piglets might not have been exposed to AD virus during the investigation. However, most of them appeared to be infected with AD virus in subclinical condition, because these farms were obviously contaminated with AD virus. To verify this point, virus isolation attempted from organs of the neonatal piglets with colostrum-derived antibody from two affected sows when they were sacrificed and examined at necropsy.

A ten % (w/v) suspension was prepared from the kidney or brain with Earle’s basal salt solution containing 0.5% lactalbumin hydrolysate and antibiotics. The suspension was centrifuged at 1500×g for 10 min. Six tubes of the cloned porcine kidney (CPK) cell line [2] were inoculated with 0.2 ml of the supernatant and incubated at 37°C in a rotary state. The inoculated cultures were observed for cytopathic effect (CPE) at 2 days after the inoculation. The cell cultures showing typical CPE (Ref.) were subjected to the fluorescent antibody method, in which reference antiserum against AD virus (Ref.) were used, for the positive identification. As shown in Table 1, AD viruses were isolated simultaneously from kidney and brains of two neonatal piglets. In the pathological examination, the two piglets showed intranuclear inclusion bodies in their brains (Data not shown).

The results indicate that piglets, even in the presence of colostrum-derived antibodies, were exposed to AD virus infection. Thus, in order to eliminate AD from contaminated farms, affected pregnant sows must be removed immediately after parturition and their piglets should be maintained in isolation.

REFERENCES

要約
オーエスキー病ウイルス感染母豚から生れた子豚における乳汁由来抗体の減衰パターン（短報）：駒庭英夫・真壁朝光1）、福田雅彦・小河孝2）、豊山英夫2）（宇都宮家畜保健衛生所、栃木県家畜衛生研究所）、農林省家畜衛生試験場）——オーエスキー病ウイルスに自然感染した母豚から生れた子豚における乳汁由来の移行抗体の減衰について追跡調査し、同時に抗体保有の哺乳豚からウイルスの分離を試みた。各個体別の抗体は日齢の増加とともに負の成長曲線的に減衰し、45日から60日齢で軽減した。そして抗体保有の新生豚の脳と腎で同時にウイルスが分離された。これらの結果から哺乳豚は、本病ウイルスの感染を十分にまぬがれないものと思われた。