PATHOMORPHOLOGICAL AND PATHOGENIC CHARACTERISTICS OF VIRAL GASTROENTERITIS OF SWINE

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[Following is the translation of an article by Professor F. M. Ponomarenko, Associate Professor A. I. Yatsyshin and Senior Laboratory Worker O. M. Skirta, published in the Russian-language periodical Veterinariya (Veterinary Science), Vol. 38, 1961, #8, pages 39-40. Translation performed by Sp/7 Charles T. Ostertag Jr.]

While taking part in a complex study of infectious gastroenteritis of pigs, we investigated the pathomorphological changes in animals with this disease.

For this we performed autopsies on 62 pigs that had died or were killed. Of these, 15 were naturally diseased at the "Kievskiy" farm and 14 pigs were experimentally infected. The remaining animals, including five healthy ones, were autopsied for verifying the pathoanatomical and histological changes detected by us.

A typical form of the course of illness, based on our observations, is characterized by the fact that with expressed intensive diarrhea the pathoanatomical changes in autopsies often were quite smooth: Hyperemia of the mucous membrane of the stomach and the intestines was sometimes spread for a considerable length of the intestine. In individual cases hemorrhages were observed in the mucosa, most often punctate. As a rule the mucous membrane of the stomach and intestines was always covered by a turbid, mucous fluid, and swollen -- particularly in a section of the large intestine.

In several cases on the mucous membrane, most often on the duodenum and colon, we found diffuse or limited superficial necrosis.

The contents of the stomach were almost always dry, but in a section of the small and large intestines they were diluted, mucous, effervescent, of a yellowish color with an admixture of an insignificant amount of feed matter.

In the parenchymatous organs congestive phenomena were noted. Several lymph nodes were hyperemic and succulent in a cross section.

During bacteriological investigation of the parenchymatous organs, pathogenic microflora were not isolated.

In the event of complication of the disease with various pathogenic microflora (from the paratyphoid and pasteurella group), we detected expressed hemorrhagic diathesis, deep necrotic changes and other pathoanatomical features peculiar to bacterial complication.

By pathohistological methods, we investigated the material from 10 pigs that were naturally ill, 13 that were in the tests based on the artificial reproduction of disease (by means of physico-chemical influences and bacterial or viral infections), and 11 pigs that had died or were killed following various diseases. The material from these 11 animals, as well as that from the 5 healthy ones that were killed, was investigated for control and for defining certain data obtained by us during the analysis of the histological changes in the naturally diseased animals, and also in animals that had become ill in the tests on the infection of pigs with bacterial and viral material. The examination of more than 2,000 histological preparations permitted us to not only study the various shades of the histological picture, characterizing the nature of pathohistological changes in the stomach and intestines of pigs of all the stated groups, but also to use these changes for the identification of natural cases of the disease from artificially reproduced ones.

During the investigation of the material from the naturally diseased pigs, the following pathological changes were detected in the stomach and intestines: Unique stellate and spherical inclusions in the glandular epithelium of various parts of the intestines, tissular eosinophilia in the wall of the intestines, intensified mucous formation in the glandular epithelium; significant desquamation of the superficial epithelium of the intestinal villi. Less seldom sharp disorders were noted in blood circulation, down to extravasation; necrosis of the superficial layers of intestinal epithelium, often accompanied by desquamation of this epithelium; round-celled histiocytic infiltration in the thickness of the intestinal villi; hyperplasia of the follicles, etc.

Pathoanatomical (macroscopic) changes in naturally diseased pigs and those that were infected were closer than this was observed during autopsy of pigs in the tests on the reproduction of gastroenteritis in pigs at fattening points by means of the influence on the gastrointestinal tract of certain physical or chemical reagents (tests by the therapy faculty) or by the method of infecting pigs with various bacterial cultures (tests by the microbiology faculty).

Conclusions

1. A disease of pigs, observed on a number of farms in the Ukraine, based on pathomorphological features, should be classified as acute desquamative-catarrhal gastroenteritis, often accompanied by superficial necrosis of the mucous membranes of the stomach and intestines.

2. In contrast to gastroenteritis in pigs of another nature, a pathogenic peculiarity of this disease is that along with it, sharp functional changes on the part of the stomach and intestines are not accompanied by significantly expressed morphological changes of the mucous membranes, if the disease is not complicated by secondary infections.

3. Judging by the pathomorphological changes in the stomach and intestines, the virus is apparently epithelialtropic. The sharp desquamation of the intestinal epithelium may explain the great contagiousness, since during profuse diarrhea a considerable dissemination takes place of the cells of the intestinal epithelim containing the causative agent of the disease into the surrounding medium.

Footnote: Also taking part in the work were assistant A. I. Popov and anatomist's assistant G. A. Yankovoy.