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Pathogenicity of Korean Winter Dysentery (WD) Bovine Coronavirus to Calves

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The studies on the pathogenicity of bovine coronavirus (BoCV) causing calf diarrhea was reported during 1970 decade. However, there are no reports about the studies on the pathogenicity of winter dysentery (WD) BoCV. In addition, the relationships and epidemiology between calf diarrhea and WD BoCV has been still unknown. Therefore, we performed experimental studies in which colostrum-deprived and BoCV-seronegative calves was inoculated with Korean strain of WD BoCV and then sequentially sacrificed at 1, 3, 5, and 8 post-inoculation day (PID), respectively. Each organs and tissues were carefully examined grossly and histopathologically. Fecal virus shedding in each experimental animal was evaluated by antigen-capture ELISA, RT-PCR and nested PCR specific for BoCV. In addition, the change of antibody titer for the BoCV in each experimental animal was checked by indirect antigen-capture ELISA. Diarrhea was occurred after 1 PID and became more severe as a profuse form after 2 to 3 PID in all experimental animals inoculated with Korean strain of WD BoCV. Grossly, mild atrophy of intestinal wall was only characteristic lesion in the small intestine. Histopathologically, desquamation of villi epithelial cells, atrophy of villi, fusion of villi, increased villi vs crypt ratio, and crypt hyperplasia were detected in the small intestine of BoCV-inoculated experimental animals. Large intestine revealed desquamation of crypt epithelial cells, fusion of each lamina propria, and infiltration of lymphoid cells into lamina propria. At PID 1, the lesions were more severe in small intestines than those in large intestine. Sequentially lesions of large intestine became severe. Finally both small and large intestine had almost equal severe lesions at PID 5 and 8, respectively. Fecal shedding of BoCV was consistently detected in the feces of BoCV inoculated experimental animals from PID 1 to 8 by nested PCR but not in the feces of mock-inoculated animal. From these results, it is concluded that the Korean strain of WD BoCV had a strong pathogenicity to calves. These results can provide essential data to make protocols of quarantine and epidemiology of WD and calf diarrhea caused by BoCV in Korea.

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