BRIEF NOTE

Hepatic Abscess in Fattened Dairy Steers

Masamitsu KANOE, Yūji IZUCHI, Masayuki KEMI, Mitsuyoshi TODA and Yukio HARA

Division of Veterinary Science, Faculty of Agriculture,
Yamaguchi University, Yamaguchi-shi, Yamaguchi 753

(Received for publication June 22, 1978)

The occurrence of hepatic abscess in intensively or traditionally fed beef cattle has been reported in many countries [4, 5, 15]. *Fusobacterium necrophorum* has quite frequently been isolated in pure form or predominantly from the abscess. Similar findings have recently been observed in several districts of Japan [6, 17, 19]. Few systematic studies, however, have hitherto been made with respect to the incidence of hepatic and reticulo-ruminal lesions. Clinico-chemical examination of sera from those animals, and bacteriological and seroepizootiological investigation of abscess and serum have also hardly been performed. This brief note describes results obtained from systematic studies on these lesions found in fattened dairy steers.

A total of 64 Holstein steers supplied from a farm in Fukuoka Prefecture over a period of 1975 to 1977 were inspected by referring to the previous report [8] at the Yahata Meat Center in Kitakyushu-shi, Fukuoka Prefecture, Japan. They had mostly been fed concentrates for 6 to 12 months on the farm. As shown in Table 1, hepatic abscesses were found in 18 (28.1%) and reticulo-ruminal lesions in 33 (51.8%) of the animals. Of those steers affected with hepatic abscess, 13 (72.6%) had also reticulo-ruminal lesions.

These lesions were also detected from 20 (43.5%) steers of those without hepatic abscess.

Clinico-chemical examination was performed on sera from the animals with hepatic abscess by referring to the methods previously described [11, 13, 14, 16, 18]. The results obtained are shown in Table 2. A relative decrease of A/G ratio was observed in them.

BAP, DHL and Sabouraud agar were employed for the isolation of aerobes, and M 10 [2], BFM [8], media for *Bacteroides* and GAM (Nissui Seiyaku Co., Ltd., Tokyo) were for that of anaerobes. Cultivation, identification, enumeration and differentiation of isolates were made by referring to previous reports [1, 3, 7, 8, 12]. As shown in Table 3, all the abscesses were positive for the phase A organism of *F. necrophorum*, the average count of which was $10^{6.2}$ per gram. *Bacteroides*, *Corinebacterium* and *Enterobacteriacaeae* were detected predominantly from three samples.

The agar gel double diffusion test of bovine serum was performed by the method described previously [9] with concentrated antigen of the VPI 2891 strain. A definite precipitation line was demonstrated by 10 of 18 sera from cattle with hepatic abscess.
and a faint line by 4 of these sera. These lines were also presented by 5 of 45 sera from cattle without lesions. The tube agglutination test was also conducted by the method described in a previous report [9]. As shown in Table 4, serum agglutinin titers ranged from 1:64 to 1:1024 in 14 of the 18 cattle with the abscess and were 1:32 or lower in 40 of the 45 cattle without lesions.

A few workers [4, 19] reported a significant correlation between bovine hepatic abscess and bovine rumenitis or rumen
parakeratosis. In the cattle examined in this study the incidence of reticulo-ruminal lesions, including rumen parakeratosis, rumenitis, reticulitis and scar, was higher than in cattle fed traditionally [8]. These findings indicate that each of these lesions, especially rumen parakeratosis, is considered as one of the predisposing factors for hepatic abscess formation.

In the authors’ previous reports [7, 8], the phase A organism of F. necrophorum was detected from most of the hepatic lesions with a relatively high colony count as well as in this study. These results support the opinion that the phase A organism plays the most important role in the etiology of bovine hepatic abscess and that it penetrates practically from the ruminal content into veins of the injured or thin ruminal wall to reach the tissue. In future, it is also necessary to clarify the definite significance of Bacteroides and Corynebacterium in the infection.

Attempts have been made to characterize the affected animals by applying the clinico-chemical tests [5, 10]. A decrease of A/G ratio was observed in the present study. It seems, however, to be no specific phenomenon for this infection. As mentioned above, the presence of gel precipitin and agglutinin of relatively high titer was proved in most of the sera from animals with abscess, as compared with those without abscess. This result may indicate the importance of F. necrophorum as a cause of this infection. For the serological diagnosis of hepatic abscess the gel precipitation test seems to be more available than the agglutination test. The latter has at least two difficulties; that is, spontaneous agglutinability and the existence of different antigenic properties of bovine isolates. For the practical application of the gel precipitation test, it is necessary to prepare a concentrated antigen which will have more sensitive and specific properties than this one.

The problem how the organism penetrates into the tissue remains still to be solved. Attempts should be made in future to solve it. The settlement of that problem will contribute much to the prevention and control of this infection.

References


要約

乳用雄若令肥育牛の肝臓癌（短報）：鹿江雅光・井土裕夫・花見正幸・戸田光敏・原行雄（山口大学農学部獣医学科）——乳用雄若令肥育牛 64頭について検討したところ、肝臓癌が18頭（28%）に、第一胃等の損傷が33頭（51.8%）に認められ、また、前者の15頭に第一胃等の損傷が観察された。肝臓癌牛ではA/Gの減少がみられた。細菌学的には、肝臓癌全例から*F. necrophorum* phase Aに属する菌が分離され、その菌数は平均10^4.2/μgであった。本菌のVPI 2891株を抗原とした寒天ゲル内沈降反応では肝臓癌牛血清のうち14例が陽性を示し、また、凝集反応では本血清の多くが1:64から1:1024の凝集価を示した。