Ultrasonographic Observations of Experimental Traumatic Reticuloperitonitis in Cattle

Takashi KUROSAWA, Kazuo YAGISAWA, Kanji YAMAGUCHI, Kiyoshi TAKAHASHI, Tadao KOTANI¹⁾, Yoshiaki ANDO¹⁾, and Mitsuo SONODA

Department of Veterinary Internal Medicine I and ¹⁾Veterinary Surgery I, School of Veterinary Medicine, Rakuno Gakuen University, Ebetsu, Hokkaido 069, Japan

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The diagnosis of bovine traumatic reticuloperitonitis is based on clinical signs and hematological findings; however, neither of which results in the confirmation of the disease [1]. The radioscopic examinations on this disease have also been reported [10]. This method clearly showed the movement of the reticulum and the presence of the metallic substance, but not the abscess formation and fibroblastic proliferation on the peritoneum.

Several ultrasonographic observations have recently been tried on various bovine diseases [2–9, 11, 12]. However, there are no available reports on the bovine reticulum diseases by the ultrasonographic examination. In this experiment the possibility of the ultrasonographic diagnosis on the disease of the reticulum was examined.

The reticulum of 12 normal cows were examined to determine the proper position of the probe by a ultrasonograph (3.5 MHz, EUB-26, Hitachi-Medico, Co., Ltd., Tokyo, Japan). The reticulum was observed at 9 points of the abdomen as shown in Fig. 1. At 5 (A, B, C, E and G) of 9 points, the reticulum was observed in high probability (96–100% of 12 cows). The reticulum image at point G was not so clear. At point A the relation between the reticulum and the atrium ruminis or the abomasum was clearly observed. At this point, the fundus reticuli was on the peritoneum and this image is described as the echogenic arch at caudal dorsalis of the fundus reticuli (Fig. 2-a). Many spot echos were floating in the abomasum which appeared between the atrium ruminis and the peritoneum.

Two stages of constriction of the reticulum were recorded at intervals of 30 to 60 seconds without rumination. In the first stage the fundus reticuli got off from the peritoneum and constricted towards the dorsal cranialis (Fig. 2-b). After a moment, it stopped, constricted more strongly and then disappeared from TV monitor at the second stage (Fig. 2-c). After the second stage of constriction, the fundus reticuli returned slowly to the resting position. The atrium ruminis constricted after the constriction of the fundus reticuli. During the constriction of the fundus reticuli, the abomasum got into the space between the fundus reticuli and the peritoneum. In rumination, the third stage, that is another constriction, was recorded just before the first stage of the constriction of the fundus reticuli.

Twelve to twenty-four metallic wires (2 mm in diameter and 8–9 cm in length) were given orally to 3 normal cows

to induce traumatic reticuloperitonitis. The cows were observed by an ultrasonograph and a radioscope for 23–32 days. Very strong constrictions of the fundus reticuli were observed in all three cows on the peritoneum at the static stage as observed by ultrasonography before given the wires. After 4–18 days, as observed by ultrasonograph the fundus reticuli was displaced at a distance of 2–4 cm dorsal from the peritoneum, and some echogenic masses with the echofree space were observed under the fundus reticuli and the atrium ruminis (Fig. 3-a). These masses were mentioned as the fibroblastic proliferation with abscesses [6].

The fundus reticuli moved only 4–7 cm dorsally from the resting position and the motility was intensively weakened in the second constriction. These are suggestive of adhesion between the reticulum and the diaphragm or the peritoneum (Fig. 3-b, c). The echogenic line observed clearly in this case strongly suggested the presence of wires. By a radioscope, 7–10 days after the metallic wires struck into the reticulum wall, the abscesses and the fibroblastic proliferation were not detected (Fig. 4).

Fig. 1. A-I are the points of observation of the reticulum (II), the omasum (III), the abomasum (IV) and the horizontal line (HL) through the elbow.

Fig. 2. The ultrasonogram of the reticulum movement at point A in the normal cow.

2a: The fundus retuli (Fr), the atrium ruminis (Ar) and the abomasum (Ab) in relation to the resting position of the reticulum(Ret). Fr is on the diaphragm (D), and Ar is at the dorsocaudalis of Fr. 2b: Fr is moved to dorsocranialis as drawn by the reticulum in the first stage of constriction. 2c: Fr disappeared in the second stage of constriction.

Fig. 3. The ultrasonogram of the reticulum movement 18 days after giving the wires.

3a: The resting positions of Fr and Ar are more dorsal than those before giving the wires. The echogenic mass with echofree space exists under Fr and Ar. This seems like abscess (Abs) with fibroblastic proliferation. 3b: The slight change in the positions of Fr and Ar at the first stage of the constriction of the reticulum. 3c: The slight displacement of Fr in the second stage of constriction.

Necropsy findings confirmed the fibroplastic proliferation between the diaphragm and the peritoneum in all cows.

From the results described above, it is highly recommended that the ultrasonographical examinations be adopted as a useful diagnostic method for bovine trauma-

Fig. 4. Radiographical findings on the reticulum (Ret) 18 day after giving the wires. 4a: The resting position of the reticulum (Ret), 4b: The first stage of constriction, 4c: The second stage of constriction.

tic reticuloperitonitis.

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