

## Ultrasonography Of Spleen in Native Korean Cattle

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### 한우에서 비장의 초음파상

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**요 약** : 소에서 비장의 초음파상에 관한 기초자료를 확립하기 위하여 본 연구를 실시하였다. 한우 9두에서 6개월령으로부터 12개월령에 도달할 때까지 1개월 간격으로 성장에 따른 비장의 초음파상을 측정하였다. 비장은 좌측 제8, 9, 10, 11 및 12 늑간에서 관찰하였으며, 각 늑간극에서 비장의 배측변연, 복측변연 및 두께를 측정하였다. 본 연구에서의 초음파측정 결과는 한우에서의 비장의 형태학적 변화의 진단을 위한 참고자료가 될 수 있을 것으로 사료된다.

**Key words** : native Korean cattle, ultrasonography, spleen

### Introduction

Ultrasonographic examination of the spleen is useful diagnostic method to determine the size, location, and presence of parenchymal abnormalities when a pathologic condition is suspected<sup>5</sup>. Ultrasonography of cattle has been reported for jugular vein<sup>1,7</sup>, carotid artery<sup>2</sup>, thyroid gland<sup>4</sup> and spleen<sup>3,5,8</sup>. The main indications for examining the spleen are generalized splenomegaly, mass lesions and hemoperitoneum. Diseases affecting the spleen often cause enlargement. Abdominal palpation or radiography is a successful diagnostic technique in small animals. However, in cattle, the results of abdominal palpation or radiography are not satisfactory. The ultrasonographic examination of the spleen has been used successfully for dog<sup>8</sup> and cat<sup>3</sup>.

But there have been no reports of ultrasonographic appearance of the spleen in relation to growth in cattle. The present study aims to construct fundamental data on normal ultrasonography for spleen in cattle.

### Materials and Methods

Ultrasonographic appearance of spleen according to the growth was determined from 6 to 13 months by monthly examination in 9 native Korean cattle. Cattle were lightly sedated by administration of xylazine (0.1 mg/kg i.m.) before examination.

The spleen was determined on the left side, at 8, 9, 10, 11 and 12th intercostal space. Ultrasonograms were obtained with 5.0-MHz convex and 5.0-MHz sector transducer.

The dorsal margin, ventral margin and thickness of the spleen were determined in each intercostal space.

### Results

The results of the ultrasonographic examination of spleen of native Korean cattle are summarized in Table 1. The thickness of the spleen at the 6, 7, 8, 9, 10, 11, 12 and 13 months old age were 16.5, 18.2, 21.3, 24.6, 28.0, 32.6, 35.1 and 39.8 mm, respectively.

The dorsal margin of spleen at the 12th intercostal space in the 6, 7, 8, 9, 10, 11, 12 and 13 months

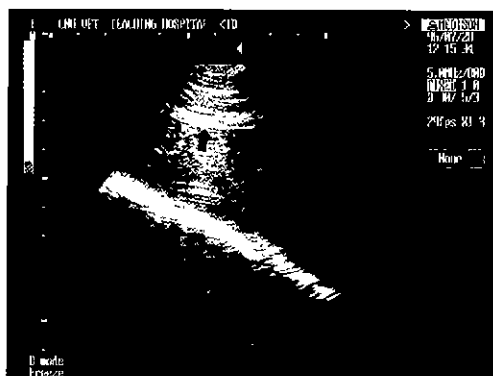
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**Table 1.** Results of the ultrasonographic examination of spleen in native Korean cattle (n=9)

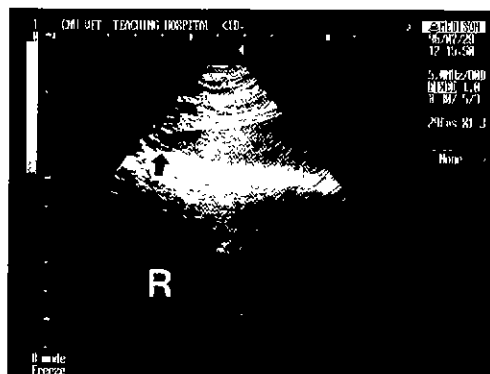
Variables	Inter costal space	Mean $\pm$ SD(mm)							
		Ages (months)							
		6	7	8	9	10	11	12	13
Body weight(kg)		135 $\pm$ 12	154 $\pm$ 15	180 $\pm$ 17	208 $\pm$ 16	250 $\pm$ 20	298 $\pm$ 18	342 $\pm$ 21	390 $\pm$ 18*
Thickness(mm)		16.5 $\pm$ 2.2	18.2 $\pm$ 2.7	21.3 $\pm$ 2.5	24.6 $\pm$ 3.1	28.0 $\pm$ 3.4	32.6 $\pm$ 4.2	35.1 $\pm$ 3.7	39.8 $\pm$ 5.0*
Dorsal margin(cm) <sup>a</sup>	12	3.1 $\pm$ 1.7	14.0 $\pm$ 1.8	15.2 $\pm$ 1.9	16.2 $\pm$ 1.8	17.1 $\pm$ 2.0	18.3 $\pm$ 2.3	19.0 $\pm$ 2.4	20.1 $\pm$ 2.6*
	11	14.2 $\pm$ 1.8	15.3 $\pm$ 2.0	16.4 $\pm$ 2.2	17.5 $\pm$ 2.4	18.6 $\pm$ 2.6	19.7 $\pm$ 2.8	21.1 $\pm$ 2.7	21.9 $\pm$ 3.0*
	10	15.7 $\pm$ 2.1	16.2 $\pm$ 2.3	17.6 $\pm$ 2.2	18.5 $\pm$ 2.5	19.9 $\pm$ 2.8	20.2 $\pm$ 2.6	22.6 $\pm$ 2.9	23.2 $\pm$ 3.2*
	9	19.7 $\pm$ 2.6	21.1 $\pm$ 2.9	22.5 $\pm$ 3.2	24.0 $\pm$ 3.1	25.6 $\pm$ 3.6	27.3 $\pm$ 3.5	28.6 $\pm$ 3.7	30.3 $\pm$ 4.2*
	8	22.3 $\pm$ 2.9	24.1 $\pm$ 3.4	25.9 $\pm$ 3.6	27.5 $\pm$ 3.5	29.3 $\pm$ 4.1	31.0 $\pm$ 4.4	32.6 $\pm$ 4.5	34.5 $\pm$ 4.3*
Ventral margin(cm) <sup>a</sup>	12	19.0 $\pm$ 2.5	21.3 $\pm$ 2.8	22.1 $\pm$ 3.1	23.5 $\pm$ 3.0	25.2 $\pm$ 3.5	26.7 $\pm$ 3.7	27.8 $\pm$ 3.9	29.4 $\pm$ 4.2*
	11	19.9 $\pm$ 2.8	21.7 $\pm$ 3.0	23.2 $\pm$ 3.2	24.6 $\pm$ 3.5	26.3 $\pm$ 3.4	27.8 $\pm$ 3.6	29.2 $\pm$ 4.1	30.9 $\pm$ 4.3*
	10	25.1 $\pm$ 3.3	27.3 $\pm$ 3.5	29.0 $\pm$ 4.1	30.8 $\pm$ 4.3	33.1 $\pm$ 4.3	34.6 $\pm$ 4.7	36.5 $\pm$ 5.1	38.5 $\pm$ 5.5*
	9	28.4 $\pm$ 4.0	30.1 $\pm$ 3.9	33.2 $\pm$ 4.6	34.8 $\pm$ 4.5	37.2 $\pm$ 4.8	39.2 $\pm$ 5.3	41.4 $\pm$ 5.9	43.7 $\pm$ 5.6*
	8	33.7 $\pm$ 4.4	36.9 $\pm$ 5.2	39.3 $\pm$ 5.5	41.9 $\pm$ 5.4	44.3 $\pm$ 6.2	47.0 $\pm$ 6.0	50.2 $\pm$ 7.0	52.6 $\pm$ 6.7*

<sup>a</sup>centimeters distal to the midline of the back

\*p<0.01



**Fig 1.** Ultrasonogram of spleen in 12 months old native Korean cattle. There are borders of the spleen (small arrows) and the left face of the rumen (large arrow). It was observed in the left 10th intercostal space, 31 cm apart from vertebrae.



**Fig 2.** Ultrasonogram of spleen in 12 months old native Korean cattle. There are the ventral extremity of the spleen (arrow) and the rumen (R). It was observed in the left 10th intercostal space, 39 cm apart from vertebrae.

old age were 3.1, 14.0, 15.2, 16.2, 17.1, 18.3, 19.0 and 20.1 mm, respectively. The ventral margin of spleen at the 10th intercostal space in the 6, 7, 8, 9, 10, 11, 12 and 13 months old age were 25.1, 27.3, 29.0, 30.8, 33.1, 34.6, 36.5 and 38.5 mm, respectively. At ultrasonography, spleen bordered by the rumen, was identified easily (Fig 1). The ventral extremity of the spleen revealed a sharp point (Fig 2).

## Discussion

The spleen has an elongated, elliptical outline, both extremities being thin, rounded and similar in size. The dorsal extremity lies under the dorsal ends of the last two ribs and may extend caudally as far as the first lumbar transverse process. The ventral extremity varies in position, but is commonly opposite the eighth or ninth rib, about a handbreadth dorsal to its sternal end. In the middle, the thickness of spleen

is about 2 to 3 cm<sup>6</sup>. However, in the present study, the thickness of spleen at 13 months old cattle was 3.98 cm. It is considered that the spleen was enlarged by xylazine sedation in the present study. The ultrasonographic appearance of spleen could be observed on the left side, at 8~12th intercostal space.

### Conclusion

The purpose of this study is to construct fundamental information about the ultrasonogram of spleen in cattle.

Ultrasonographic appearance of spleen according to the growth was determined from 6 to 13 months by monthly examination in 9 native Korean cattle. The spleen was determined on the left side, at 8, 9, 10, 11 and 12th intercostal space. The dorsal margin, ventral margin and thickness of the spleen were determined in each intercostal space. The thickness of the spleen at the 6, 7, 8, 9, 10, 11, 12 and 13 months old age were 16.5, 18.2, 21.3, 24.6, 28.0, 32.6, 35.1 and 39.8 mm, respectively.

It is concluded that the ultrasonographic values of this study provides references for the diagnosis of morphologic changes in the spleen in native Korean cattle.

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