

## Metastatic Hepatocellular Carcinoma of Spleen in a Holstein Cow

Won-il Jeong, Sung-bong Son<sup>1</sup>, Da-hee Jeong,  
Dong-hyung Noh, Sun-hee Do, Gi-ppeum Lee,  
Hae-sun Yun, Oh-deok Kwon and Kyu-shik Jeong  
*Dept of Vet. Pathol., College of Vet. Med., Kyungpook  
National Univ., Daegu, Korea*  
<sup>1</sup>*Gyeongbuk Vet. Service Lab., Daegu, Korea*  
E-mail: daheej@orgio.net

### Introduction

Hepatocellular carcinoma (HCC) is major type of cancer causing deaths on worldwide and has been reported in numerous species, including dogs, cats, sheep, pigs, fowl, woodchucks, trout and cows. The precise incidence data or complete age distribution of cattle is not known because this information was derived from abattoir. Moreover, there are very few reports in bovine HCC [1]. This report presents findings of bovine HCC with metastasis to the spleen, a very rare tumor in ruminant oncology, found in a Holstein cow during routine inspection at the abattoir.

### Materials and Methods

Liver and spleen were taken from a cow for histopathology. Tissue was fixed immediately in 10% neutral buffered formalin for light microscopy and stained with H&E, PAS and immunohistochemistry.

### Results

In gross, small white-gray spots were scattered on the liver surface. The spleen was enlarged and its cut surface revealed many hemorrhagic and bulging follicles from 0.3 ~0.5 mm in diameter. Microscopically, in the liver, these spots were composed of hepatoid tumor cells with pseudoglandular structures and packets of these cells were embedded in an obvious fibrous stroma. In the spleen, there was replacement of follicular lymphocytes by tumor-like cells with clear cytoplasm similar to those of the liver. Interestingly these clear cells both in the liver and spleen had strong PAS positive reaction with many glycogen granules. In IHC,  $\alpha$ -SMA positive cells in the fibrous stroma surrounded the pseudoglandular tumor cell clusters in the liver. Moreover, Positive tumor cells for CK18 were detected in both organs.

### Discussion

Since difficulty has arisen in distinguishing HCC with pseudoglandular pattern from cholangiocarcinoma, positive reaction for CK18 antibodies was useful marker for a differential diagnosis [2]. Recent evidence suggested that this fibrous stroma mainly consisted of collagen fibers which were produced by activated hepatic stellate cells (myofibroblasts) and these were mostly  $\alpha$ -SMA-positive [3]. Taken together above data, we concluded that these cells were hepatocellular carcinoma (HCC) with metastasis to spleen. This case is also valuable information to veterinary practitioners working at abattoir likely to encounter cases of metastatic hepatocellular carcinoma in cows.

### References

1. Kithier, K., al-Sarraf, M., Belamaric, J., Radl, J., Valenta, Z., Zizkovsky, V. and Masopust, J. J. *Comp. Pathol.*, 1974, **84**, 133-141.
2. Shiga, A., Shirota, K. and Enomoto, M. *J. Vet. Med. Sci.* 2001, **63**, 483-486.
3. Ishizaki, M., Ashida, K., et al. *Virchows Arch.* 2001, **438**, 574-580.