Renal Cell Carcinoma in a Cow

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ABSTRACT. Renal cell carcinoma in a 14 years old cow was reported. Grossly, the lesions were yellowish or whitish milky in color of various sizes in the renal cortex. The neoplastic cells were oval or polymorphic in shape with foamy eosinophilic cytoplasm. The round or oval nucleus was tended to be located eccentrically. Neoplastic transformation of the renal epithelial cells was suggested morphologically. Metastatic lesions were also found in the renal and hepatic lymphnodes, spleen and omentum.—KEY WORDS: bovine, kidney, renal cell carcinoma.


Primary tumors derived from renal tubular epithelium are comparatively rare in domestic animals [7, 8, 11, 13, 14], though there are several reports concerning the clinical signs on the tumor in the dog [1, 3, 5, 9]. A detailed report concerning the bovine renal cell carcinoma has been only recorded by LUTZ [6]. This report describes clinical and pathological findings of renal cell carcinoma in a 14 years old Japanese Brown cow.

Clinical examination disclosed normal body temperature, loss of vigor and appetite, staggering gait, decreasing gastrointestinal peristalsis, tympanitic resonance in the abomasum, pollakiuria, and slightly swollen kidneys by rectal examination. Clinical tentative diagnosis was displacement of the abomasum to the left. No evidence indicating renal failure was obtained from the analytic data of the blood and urine except for proteinuria. Serum antibodies to bovine leukemia virus was negative by the ager-gel immunodiffusion-test. No specific treatment was done. The cow was emaciated and difficult to stand, and was slaughtered 19 days after the initial examination.

Autopsy revealed swelling and hard in consistency of the kidneys measuring 26×14×8 cm in the left and 24×15×7 cm in the right with numbers of neoplastic foci of various sizes, which were yellowish or whitish milky in color. Removing the capsule was rather difficult. The lesions were as large as soy-bean to hen’s egg in size and swelled up from the surface. On the cut surface, they showed slight transparency and located mainly in the cortex extending into the medulla in case of large one. They were well demarcated and surrounded by renal tissues markedly compressed and atrophic. The renal lymphonodes were swollen to hen’s egg in size and touched slightly hard in consistency. Marly appearances of whitish milky and reddish brown were observed on the cut surface. A metastatic mass in the omentum measuring 9×7×6 cm was recognized.

Tissues were fixed in 10% neutral formalin solution, and embedded in paraffin for
microscopic examination. Sections were made and stained with hematoxylin and eosin (H-E). Selected sections were subjected to azan stain and Watanabe’s silver impregnation. Electron microscopical examination was performed on formalin-fixed tissues of the neoplasms by the routine procedures [12].

Microscopically, small neoplastic foci were scattered in the cortical interstitial tissue, and the larger lesions expanded into the medulla accompanying abundant fibrous and collagenous stroma, in which normal glomerular and tubular structures were also observed. The neoplastic cells were morphologically similar to those of renal epithelium. They were oval or polymorphic in shape with foamy eosinophilic cytoplasm, and the nucleus had small nucleoli and faint chromatin network. HE stain. ×400.

The neoplastic cells were oval or polymorphic in shape with foamy eosinophilic cytoplasm, and the nucleus was round or oval in shape, contained 1 or 2 nucleoli, and tended to be locating eccentrically. The chromatin network was rather faint. The arrangement of the neoplastic cells was solid and oriented irregularly in general, and tubular arrangement was detected partially. Different from the above findings, multistratiform of the neoplastic cells suggesting neoplastic trans-

Fig. 1. Gross appearance of neoplastic foci of various sizes located in the both kidneys. Bar=5 cm.

Fig. 2. Proliferation of the neoplastic cells (left) and compressed and atrophic renal parenchyma (right) in the cortex. The lesions was well demarcated by fibrous tissue. HE stain. ×40.

Fig. 3. Proliferation of neoplastic cells and collageneous and fibrous stroma around a remaining glomerulus. HE stain. ×120.

Fig. 4. The neoplastic cells were oval or polymorphic in shape with foamy eosinophilic cytoplasm, and the nucleus had small nucleoli and faint chromatin network. HE stain. ×400.
formation and proliferation of the renal epithelial cells were occasionally observed in the tubulus. Necrosis were observed in the central area of the large neoplastic lesions. A few multinuclear cells and many mitotic figures were also recognized. In the renal lymphnode, the original structure was disappeared and marked proliferation of neoplastic cells similar to the renal lesions with marked fibrosis were observed. Metastatic lesions were recognized in the lymphatic sinus of the hepatic lymphnode, the splenic red pulp and the omentum.

Electron microscopic examination on the renal lesions disclosed round or oval nuclei and moderate number of rough-surfaced endoplasmic reticula, free ribosomes, and vacuoles in the cytoplasm. Desmosomes were occasionally detected, though the membranous structure was inadequately preserved due to formalin fixed specimens. Collagenous fibers were abundant in the interstitial tissue.

From the above findings the neoplastic cells were epithelial origin, and the case was diagnosed as bovine renal cell carcinoma of the both kidneys metastasized to the renal and hepatic lymphnodes, spleen and omentum. The clinical signs of cattle with renal cell carcinoma is still obscure [8], however, symptoms observed in the present case such as loss of appetite, emaciation, pollakiuria and proteinuria may be due to the neoplastic proliferation. Microscopic findings of the present case were solid and partial tubular and, clear and eosinophilic cell types according to the histological pattern and the cytological characteristics [8, 11]. As for differential diagnosis, bovine leukemia could be denied from the cellular morphology and without proliferation of reticular fibers in the lesions [12]. Nephroblastoma could be differentiated from the findings that there were no fetal renal structure such as nephrons [2, 4, 10, 15-18].

REFERENCES

要約
ウシの腎細胞癌の1例（続報）：佐藤繁・鈴木利行・横山亮一1）・大島寛2）・岡田幸助2）（宮城県農業共済組合連合会、1）仙台家畜保健衛生所、2）岩手大学農学部家畜病理学教室）——褐色を伴う、腫瘍は14頭牛で、両側腎に大豆大ないし卵大、乳黄色の新生物が多数認められた。腫瘍細胞は類円形ないし一部多形性で、充実性増殖を示し、腫瘍性増殖への移行を思わせる尿細管上皮の多層化増殖像もみられ、腎リンパ節のほか、肝リンパ節、脾および大網に転移巣が認められた。