We report here on a case of mucinous adenocarcinoma that probably originated in the renal pelvis of a horseshoe kidney. A 61-year-old woman presented with a palpable mass in the left upper quadrant of the abdomen, and this mass had been present for several months. Computed tomography (CT) revealed a left renal pelvic tumor in the horseshoe kidney. Grossly, a 10 × 9 × 8 cm unilocular cystic mass filled with chocolate colored mucinous fluid was seen. A connection between the cystic mass and the renal pelvis was demonstrated on retrograde pyelography. Microscopically, the cyst contained anaplastic columnar mucosecretory epithelial cells. Some atypical cell clusters were freely floating in the mucinous lakes. The histopathological findings were consistent with mucinous adenocarcinoma. In addition, glandular metaplasia was noted in the cystic wall. Immunohistochemical assessment of the pelvic adenocarcinoma revealed the positive expressions of carcinoembryonic antigen (CEA) and cytokeratin 20 (CK20) and a weak positive expression of cytokeratin 7 (CK7).

Key Words: Mucinous adenocarcinoma; Kidney

A horseshoe kidney is the most common of all renal fusion anomalies, and this occurs in 0.25% of the population. The presence of a horseshoe kidney predisposes a person to urinary stasis, infection and nephrolithiasis, but the development of a tumor is rare. Adenocarcinoma of the renal pelvis of a horseshoe kidney is extremely rare. There have been several cases of adenocarcinoma of the renal pelvis of a horseshoe kidney reported in the medical literature. We report here on the first such case in Korea.

CASE REPORT

A 61-year-old woman presented with a mass that had been palpable in the left upper quadrant of the abdomen for several months. A contrast enhanced computerized tomography (CT) revealed a horseshoe kidney with a 10 × 9 × 8 cm unilocular cystic mass. Under the provisional diagnosis of a cystic transitional cell carcinoma, the patient received a hemi-nephrectomy. There was no evidence of malignancy at other sites.

Grossly, the tumor was a unilocular cystic mass filled with chocolate colored mucinous fluid (Fig. 1). A connection between the cystic mass and the renal pelvis was not definite, but this was confirmed on an abdominal CT scan (Fig. 2A) and retrograde pyelography (Fig. 2B). Microscopically, the cyst was mostly lined by urothelium that was two to three cells thick (Fig. 3A) and the cyst was focally lined by a single layer of columnar epithelium. A transition from bland columnar epithelial cells to atypical cells was noted (Fig. 3B). This suggested that the tumor developed from the renal pelvis. The bulk of the tumor consisted of anaplastic tall columnar mucosecretory epithelial cells. Some atypical cell clusters floated freely in the mucinous lakes (Fig. 3C, D). The histopathological findings were consistent with mucinous adenocarcinoma. In addition, glandular metaplasia was noted in focal areas of the cystic wall (Fig. 3E). The colonic-type mucinous epithelial cells of the glandular metaplasia showed polarity and no nuclear atypia. These findings were different from those of the other mucin producing carcinomas of the kidney, as the location of the tumor was entirely in the renal pelvis, as well as the absence of atypia and the proliferation of the cells lining the adjacent collecting ducts. The possibility of adenocarcinoma arising from retroperitoneal teratoma was excluded because the tumor showed no evidence of mixed tissue components from other germ layers. Immunohistochemical assessment of the pelvic adenocarcinoma revealed the positive expressions of carcinoembryonic antigen (CEA) and cytokeratin 20 (CK20), a weak positive expression of cytokeratin 7 (CK7) and the negative expressions of estrogen receptor (ER), progesterone receptor (PR) and MUC2. The negative expressions of ER, PR and MUC2 were helpful to ex-
clude the possibility of metastatic adenocarcinoma from other organs such as ovary and colon. There were no specific findings in the other organs on an abdominal CT scan. The patient was alive with no evidence of recurrence during 11 months of follow up.

**DISCUSSION**

Approximately 30% of horseshoe kidneys are associated with other anomalies of the urinary tract, central nervous system, heart, gastrointestinal tract or skeletal system; however, tumors developing within a horseshoe kidney are uncommon. A renal cell carcinoma is the most common tumor reported to develop in a horseshoe kidney. Other tumors such as a urothelial carcinoma, squamous cell carcinoma, adenocarcinoma, Wilms’ tumor, renal carcinoid and nephroblastoma can develop in a horseshoe kidney.

Adenocarcinoma of the renal pelvis of a horseshoe kidney is extremely rare. In the medical literature, the adenocarcinomas originating in the renal pelvis are notable for their distinctive, but variable histological appearance. Although they have not been

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**Fig. 1.** A horseshoe kidney with a cystic mass is shown. A connection between the cystic mass and the renal pelvis is suspected.

**Fig. 2.** (A) A contrast agent is shown in the cystic mass of a horseshoe kidney on the abdominal CT. (B) The renal pelvis and cystic mass are shown together on the retrograde pyelography. This confirms a connection between the cystic mass and the renal pelvis.

**Fig. 3.** (A) The cyst is lined by urothelium that is two to three cells thick. (B) A transition from bland columnar epithelial cells to atypical cells is noted. (Continued on next page)
previously categorized by their histomorphology, the majority exhibit an intestinal pattern that is either tubulovillous or mucinous. However, there is a small subgroup of adenocarcinomas that have been reported to have papillary nonintestinal and nonmucinous features. Urothelial glandular metaplasia may be a precursor lesion of adenocarcinoma in the renal pelvis. Glandular metaplasia is thought to be associated with urolithiasis and pyelonephritis. In the present case, the mucinous adenocarcinoma in the horseshoe kidney was associated with glandular metaplasia. The expressions of CK7, CK20 and CEA have been previously reported in adenocarcinomas of the renal pelvis. In the present case, the mucinous adenocarcinoma was positive for CEA and CK20 and weakly positive for CK7. The results of the immunohistochemistry in the present case were consistent with those results from prior reports.

REFERENCES


