Case Report

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Gallbladder Metastasis of Renal Cell Carcinoma: A Case Report

담낭에 전이된 신세포암: 증례 보고

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The gallbladder (GB) is a rare site of renal cell carcinoma (RCC) metastasis. To the best of our knowledge, only a few reports of CT findings of GB metastasis exist in the literature. Herein, we report a case of histologically proven GB metastasis of RCC in a 55-year-old male who underwent CT for an intraluminal polypoid mass simulating a primary GB lesion.

Index terms Renal Cell Carcinoma; Gallbladder; Metastasis; Computed Tomography, X-Ray

INTRODUCTION

Although metastasis to the gallbladder (GB) is rare and usually manifests at a late and advanced stage of malignancy, it has recently garnered increasing attention by virtue of advances in the fields of medical oncology and surgery (1). In a single-center Korean series (2), metastasis represented only 4.8% (20/417 cases) of all pathologically proven GB malignancies treated in a 9-year period. In this study, the primary malignancy was the kidney in 2/20 cases. GB metastasis from renal cell carcinoma (RCC) is extremely rare, and is usually found at autopsy with a rate of less than 0.6%. A correct preoperative diagnosis can be difficult because of the rarity of GB metastasis (3, 4). The tumor vegetation or solid portion can be confused with GB sludge or polyp, and can be easily overlooked, particularly if the clinician is unaware of the complete patient history or has little experience in GB metastasis. We report a case of GB metastasis from RCC in a 51-year-old male, with a focus on serial CT findings and review the previous literatures.

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CASE REPORT

A 51-year-old male presented with mild left flank pain of three weeks duration. History of trauma, urinary tract infection, and calculi were ruled out. Laboratory investigations were unremarkable. He underwent a Kidney, Ureter and Bladder study that was reported to be normal. Contrast-enhanced abdominal CT revealed an 8.2 cm × 7.2 cm × 6.0 cm sized, bulging, irregularly demarcated, heterogeneously enhancing mass with early enhancement and wash-out in the upper pole of the left kidney without invasion of the renal vein or inferior vena cava (Fig. 1A). There was no evidence of enlarged lymph node or distant metastasis. He underwent a left radical nephrectomy and the histopathologic examination revealed a diagnosis of clear cell carcinoma, Fuhrman grade 3. Interestingly, at the time of CT, a tiny, 0.6 cm sized polypoid lesion was noticed in the GB. A tiny polyp showed arterial enhancement with portal wash-out configuration (Fig. 1B). We assumed that the lesion was a benign GB polyp and recommended a follow-up CT examination. Tumor marker test such as carbohydrate antigen (CA) 19-9 was not performed. And other radiologic evaluation such as ultrasound (US), MRI, PET was not performed.

After 12 months, the follow-up scan revealed that the polypoid lesion had doubled in size to approximately 1.2 cm in size (Fig. 1C). The treating clinician recommended laparoscopic cholecystectomy, but the patient refused and wanted to be follow-up. On follow-up, 36 months after the first surgery, the lesion measured approximately 2.2 cm on the CT images (Fig. 1D). The patient underwent a radical laparoscopic cholecystectomy under the clinical suspicion of primary GB cancer. The final histopathologic examination revealed tumor cells with clear cellular cytoplasm, indicating RCC (Fig. 1E). The lesion is confined to the wall of the GB in which mucosa is intact. The patient remained asymptomatic over the next 1 year and follow-up imaging studies showed no evidence of any residual or recurrent mass.

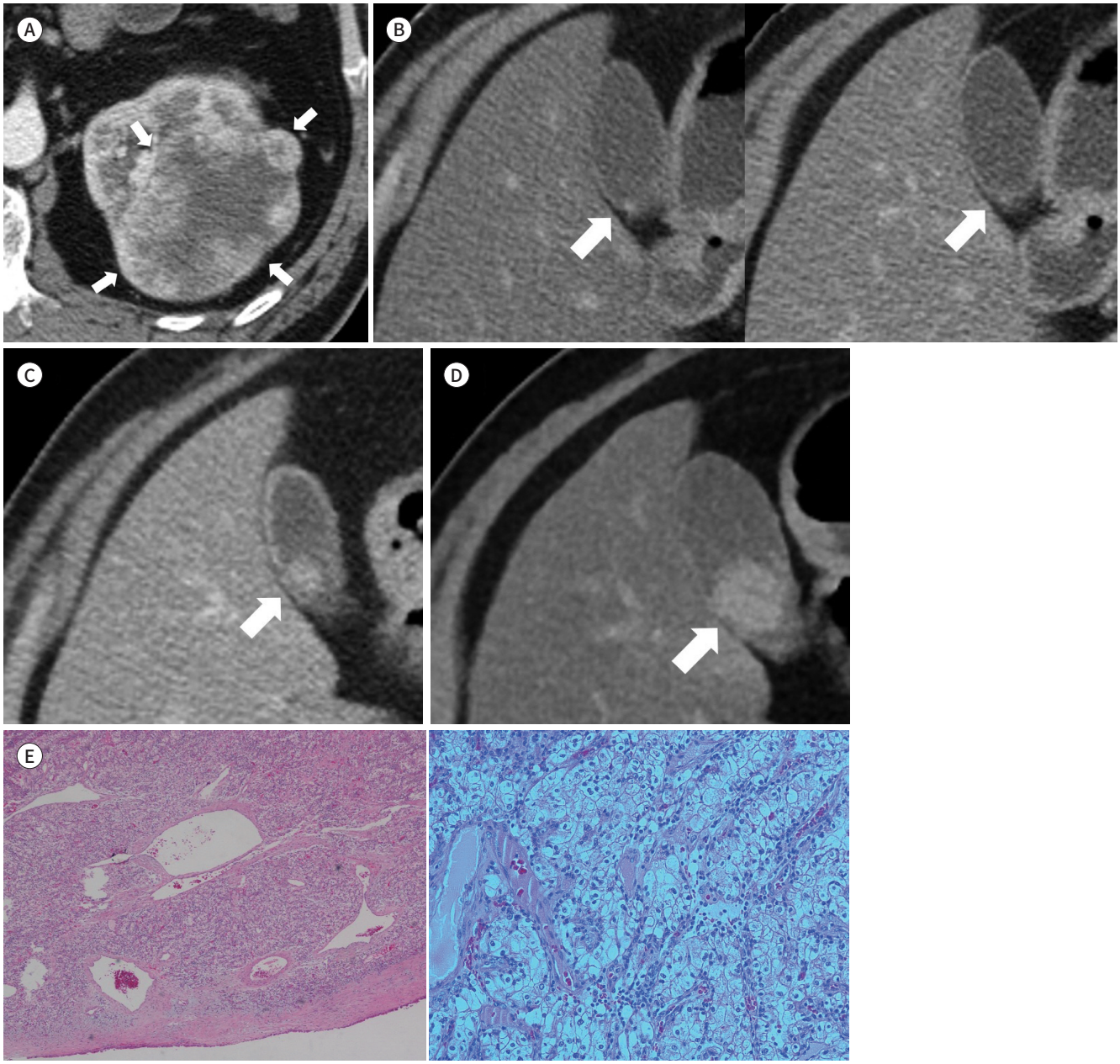
DISCUSSION

Most patients with GB metastasis have widespread disease at the time of diagnosis, with multi-organ metastases and poor survival (1-3). Nevertheless, in a few patients, the GB may represent the first metastatic site. When metastasis is limited to the GB, surgical treatment is indicated to avoid symptom development or tumor complications and can theoretically improve the survival rate (3). Patients with solitary metastasis to the GB may benefit from resection of the lesion, usually by way of laparoscopic cholecystectomy (4). Therefore, it is important that these cases, although rare, are diagnosed correctly and at an early stage.

The CT findings of GB metastasis differ significantly among the various histological types of primary tumors. More specifically, adenocarcinomas that metastasize to the GB manifests as infiltrative wall thickenings with persistent enhancement while metastatic RCC, hepatocellular carcinoma (HCC), or melanoma of the GB appears as polypoid lesions with early wash-in or wash-out enhancement. The results show that metastatic tumors typically show similar morphologic and enhancement features as those of primary tumors (5). Our finding showed a hypervascular polypoid tumor, which showed early, strong arterial enhancement and portal wash-out on CT. Our results may be helpful for clinicians and radiologists in mak-

ing differential diagnosis of GB metastasis in patients with primary RCC and GB lesions simultaneously or metachronously. For instance, if a patient with alleged RCC has a well-enhanced polypoid lesion in the GB, the possibility of metastasis should be considered first,

Fig. 1. A 51-year-old male with gallbladder metastasis from left renal cell carcinoma.
A. Contrast-enhanced abdominal CT shows an irregular-shaped and bulging contour mass with heterogeneous enhancement in the upper pole of the left kidney (arrows).
B. At the time of diagnosis of renal cell carcinoma, a tiny polyp with arterial enhancement (left image, arrow) is observed in the gallbladder. Portal wash-out configuration (right image, arrow) is noted.
C. The 12-month follow-up abdominal CT shows an enlargement of the enhancing gallbladder polyp (arrow) to approximately 1.2 cm.
D. The follow-up abdominal CT scan, 36 months after left radical nephrectomy, shows an enlargement of the enhancing gallbladder polyp (arrow) to approximately 2.2 cm.
E. Pathological examination of hematoxylin and eosin stain. The lesion is confined to the wall of the gallbladder with intact mucosa (left image, × 40). The tumor cells with clear cellular cytoplasm indicate renal cell carcinoma (right image, × 200).



rather than that of GB polyp or polypoid cancer, facilitating a curative resection.

CT findings of GB metastasis are nearly indistinguishable from those of primary GB cancers. All GB metastasis manifest as infiltrative wall thickenings or as polypoid lesions, which are two of the three morphologic features of primary GB cancer, namely infiltrative, polypoid, and mass-forming. The intact overlying mucosa or epithelium would be frequently found on CT in patients with GB metastasis, whereas patients with primary GB cancers would not have an intact mucosal layer. This finding provided an important diagnostic clue in our patients. However, as the GB metastasis spread to the subepithelial, lamina propria layer immediately below the intact, single cell-lined epithelium, tumor spread into the subepithelial lamina propria layer cannot be detected even with high resolution CT due to its limited capacity to separate the histologic layers between the epithelium and lamina propria layer. Although GB metastasis is rare, this possibility should not be overlooked or misinterpreted when imaging a patient with RCC. With the results of histopathology, this may be a method of differentiating GB metastasis from primary GB cancers when imaging technology improves sufficiently to distinguish between these layers.

Usually, US is the initial and most widely used study for GB disease. Single or multiple, moderately hyperechoic, broad based masses (> 1 cm in diameter) are typical finding of GB metastasis on US (6). It shows minimal or no acoustic shadowing and may involve serosal layer of GB, preserved with mucosal layer. Primary GB cancer is usually detected at advanced stage with diffuse and irregular mural thickening of entire GB or mass replacing GB and infiltration of GB bed and adjacent liver. Echogenic shadowing from gallstone, porcelain GB, or tumor calcifications may be present (7).

On MRI, primary GB carcinoma is usually presented as a mass with hypo- to isointense signal intensity on T1-weighted sequence and moderately hyperintense signal intensity on T2-weighted sequence (7). Jung et al. (8) reported that diffuse nodular thickening without layering is suggestive finding of GB carcinoma. And intense, irregular enhancement may be observed at the periphery of mass on early arterial phase and enhancement may be retained on portal venous and delayed phase (7). Because the metastatic tumors usually show similar imaging finding of primary tumor, GB metastasis from hypervascular tumor such as RCC, HCC, and melanoma are tend to be presented as early, strong arterial enhancement and portal wash out on MRI or CT (5).

Gastric cancer was the most common primary tumor metastasizing to the GB, followed by RCC, HCC, and colorectal cancer (9, 10). Considering that RCC increases globally, with incidentally detected lesions during imaging studies, the prevalence of GB metastasis from this tumor may well reflect the incidence of these primary tumors.

In conclusion, although the prevalence of GB metastasis from RCC is low, it should be included in the differential diagnosis when a well-defined enhancing polypoid lesion with arterial enhancement and portal washout is observed on CT.

Author Contributions

Conceptualization, all authors; investigation, K.C.G., K.S.H.; project administration, K.C.G., K.S.H.; resources, K.C.G., K.S.H.; supervision, K.S.H.; visualization, K.C.G., K.S.H.; writing—original draft, K.C.G., K.S.H.; and writing—review & editing, K.C.G., K.S.H.

Conflicts of Interest

The authors have no potential conflicts of interest to disclose.

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담낭에 전이된 신세포암: 증례 보고

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담낭은 신세포암이 드물게 전이되는 장기이다. 신세포암의 담낭 전이에 대한 컴퓨터단층촬영(이하 CT) 소견의 증례 보고는 거의 없다. 저자들은 담낭의 원발성 병변처럼 보였으나 조직학적으로 신세포암의 담낭 내 전이로 확인된 55세 남성의 담낭 내 용종성 종괴의 CT 소견과 증례를 보고하고자 한다.

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