

Spontaneous Regression of Pulmonary and Adrenal Metastases Following Percutaneous Radiofrequency Ablation of a Recurrent Renal Cell Carcinoma

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The spontaneous regression of metastatic lesions from renal cell carcinoma (RCC) is extremely rare, but may be encountered following cytoreductive treatments. We report a case of a recurrent RCC with multiple metastatic lesions which spontaneously regressed after undergoing radiofrequency ablation of the renal tumor.

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The spontaneous regression of metastatic lesions from renal cell carcinoma (RCC) occurs rarely, but is well known as a surprising event following a nephrectomy (1-3). The spontaneous regression of metastatic lesions undergoing are most commonly detected in the lung, but other frequent sites include the liver, bone, and brain (4). The incidence of spontaneous regression of metastatic lesions from RCC has been reported as less than 1% of all RCC metastasis cases (5).

Recently, we experienced a case of a patient with a recurrent RCC with multiple metastatic lesions which spontaneously regressed after a cytoreductive radiofrequency (RF) ablation of the RCC was performed. We report this case, with an emphasis on the clinical and imaging features, due to its rare incidence in relation to an RF ablation.

CASE REPORT

The institutional review board approved this case report prior to any review of medical records. An 80-year-old man was transferred to our institute because of an incidentally detected renal tumor. The patient underwent a right partial nephrectomy due to a previously diagnosed RCC eight years prior. Recent routine follow-up CT images, which covered the lung and abdomen, revealed a right renal mass, a right adrenal mass, and three pulmonary nodules; all of which were not seen on prior CT images (Figs. 1A-C). The right renal tumor and adrenal tumor had maximum diameters measuring 2.0 cm and 1.8 cm, respectively. In addition, the pulmonary nodules, with maximum diameters ranging from 8 to 10 mm, were seen in the right upper lobe, left upper lobe, and left lower lobe. The treatment modality decided upon was an RF ablation for the cytoreductive removal of the right renal tumor. However, the histological results were not confirmed before the ablation as these lesions were clinically considered to be recurrent or as metastatic lesions from the previously removed RCC.

An internally-cooled RF system (Radionics, Burlington, MA) was used for the ablation of the right renal tumor, along with an electrode (Cool-tip, Valleylab, Boulder, CO) that was kept below 20°C by means of chilled water supplied by a peristaltic pump. We selected an RF electrode with a 2 cm active tip, which

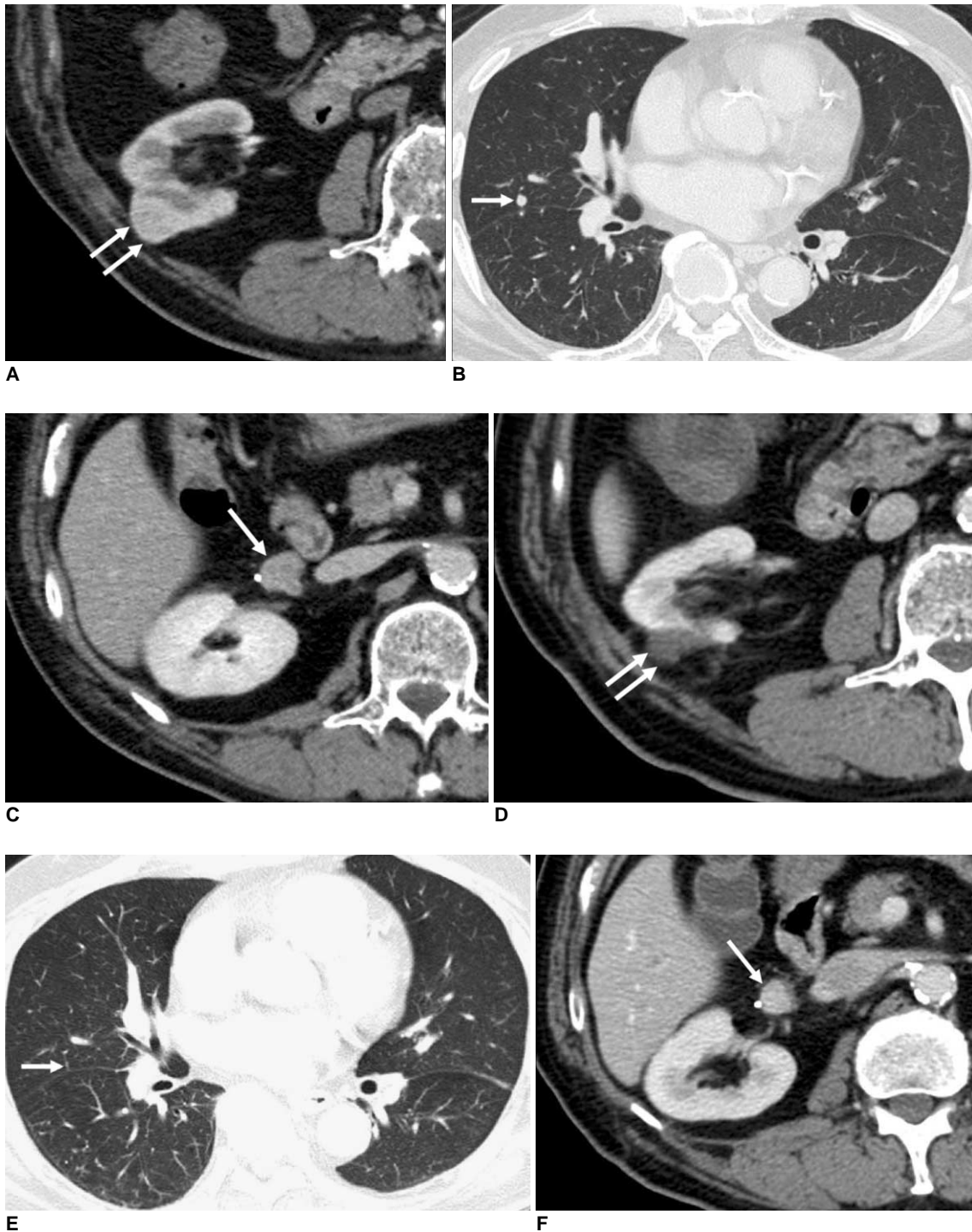


Fig. 1. 80-year-old man with multiple metastatic lesions from previously removed renal cell carcinoma.
A. Pre-ablation abdomen CT shows well-enhancing solid tumor (arrows) arising from site of previous partial nephrectomy, which suggests recurrent renal cell carcinoma.
B. Chest CT, which was performed prior to radiofrequency ablation, shows well-defined metastatic nodule in right upper lobe of lung (arrow). Lesion has maximum diameter of 10 mm.
C. Pre-ablation abdomen CT shows well-enhancing tumor (arrow) arising from right adrenal gland. Lesion has maximum diameter of 1.8 cm. CT image was obtained in supine position of patient.
D. Post-ablation abdomen CT performed 10 months after radiofrequency ablation shows lack of tumor enhancement within tumor, which suggests complete ablation (arrows).
E. Chest CT performed 10 months after radiofrequency ablation reveals that nodule (arrow) is significantly reduced and maximum diameter cannot be measured.
F. Post-ablation abdomen CT shows that right adrenal mass (arrow) decreases to one-half volume (1.4-cm maximum diameter). This CT image was obtained in prone position of patient.

corresponded to the size of the right renal tumor. The electrode was appropriately targeted in the center of the renal tumor under ultrasound (US) guidance and performed two cycles of RF ablation. For the first ablation cycle, electrical power was delivered at the highest electrical energy for 12 minutes. For the second RF cycle, reduced electrical power (80 W) was delivered for 3 minutes due to severe pain. For pain relief, a total of 50 mg of pentidine HCl (Hana Pharmacy Corporation, Hwasung, Korea) was intravenously infused during the RF ablation.

A post-ablation CT performed 10 months after the ablation showed a lack of tumor enhancement within the right renal tumor (Fig. 1D). The size of the recurrent renal tumor decreased to a maximum diameter of 1.4 cm. All of the metastatic pulmonary nodules became too small to be measured on CT images (Fig. 1E). In addition, the right adrenal tumor decreased in size to a maximum diameter of 1.4 cm (Fig. 1F). Chemotherapy and immunotherapy was not performed due to the poor general condition and old age of the patient. The patient was clinically well for 15 months following the RF ablation.

DISCUSSION

Spontaneous tumor regression has been reported to occur for some types of malignant tumors, although the incidence is rare. This phenomenon may be defined when the tumors partially decrease or totally disappear without any treatment. An RCC can be a spontaneously regressing tumor and is in fact known to develop in less than 1% of RCC cases (1-5).

The pathological mechanism of spontaneous regression is still unclear. Spontaneous regression of metastatic lesions from an RCC have occurred frequently following a nephrectomy, radiotherapy, or embolization (1-4, 6). As with our case, metastatic pulmonary lesions were reported to spontaneously regress following an RF ablation of a tumor (7). These cytoreductive treatments seemed to play a major role in the spontaneous regression; however, the role of nephrectomy accounted for only less than 50% of all reported cases with spontaneous regression (4). Immunological responses to an RCC are also quite controversial, but the use of interferon to strengthen the hosts immunity, which may ultimately improve the survival of patients with advanced stage RCC should be performed (8).

In general, there has been a consensus that an RF ablation can be used in treating patients with a localized RCC, which is difficult to remove surgically. Recently, this

treatment modality has been considered as a good alternative treatment option because of its minimally invasive nature and excellent clinical outcome. For this reason, an RF ablation might be as beneficial as a nephrectomy at inducing the spontaneous regression of RCC, although their mechanisms are unknown. Both the RF ablation and a nephrectomy may be involved in stimulating the host's immune system as if these treatments naturally kill the cells of RCC as with the use of immunotherapy using interferon. A literature search revealed that our case was found to be the second case report on the spontaneous regression of pulmonary metastases following an RF ablation of the recurrent RCC (7). However, we could not find any cases with spontaneous regression of adrenal metastasis from the RCC following ablation. The RF ablation might be recommended as a good alternative treatment when a cytoreductive nephrectomy is required in patients with metastatic lesions, but are in poor general physical condition.

In conclusion, spontaneous regression of metastatic lesions from an RCC is extremely rare, but can result following the RF ablation of the tumor.

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