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Partial Remission with Transarterial Embolization in a Case of Metastatic Adrenal Cortical Carcinoma

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A case of metastatic adrenal cortical carcinoma in which partial remission was achieved with transarterial embolization is presented as probably the first reported case in the literature to date. A 29-year-old woman was admitted because of adrenal cortical carcinoma which had not responded to mitotane. A left adrenalectomy with segmentectomy of the involved liver had been done previously. Abdominal computerized tomography demonstrated multiple large metastatic tumors in the liver. Transarterial embolization with Gelfoam and 20 mCi of ^{131}I-labeled lipiodol was performed and resulted in a decrease in tumor size and biochemical parameters. Transarterial embolization can be one of the therapeutic modalities for metastatic adrenal cortical carcinomas.

Key Words: *Adrenal cortex neoplasms, Embolization, Lipiodol*

INTRODUCTION

Adrenal cortical carcinoma has been managed traditionally with surgery, radiotherapy, chemotherapy, or ketoconazole(Samaan and Hickey, 1987;Verhelst et al., 1989). Although transarterial embolization(TAE) or hepatic artery ligation has been employed for unresectable primary hepatoma(Yamada et al., 1983) and metastatic hepatic neoplasms including metastatic endocrine tumors(Chung and Wallace, 1981;Passaro and Gordon, 1974;Fortner et al., 1973;Doppmen et al., 1978), there seems to be no report of application of this therapeutic measure in the management of metastatic adrenal cortical carcinoma.

We present a case of metastatic adrenal cortical carcinoma in which partical remission was achieved with TAE.

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CASE REPORT

The patient was a 29-year-old woman who presented with clinical manifestations of Cushing's syndrome in August 1989. A left adrenalectomy with segmentectomy of the involved liver had been performed at a hospital in February 1989 with the impression of adrenal cortical carcinoma with Cushing's syndrome. The biopsy result of the liver was a metastatic adrenal cortical carcinoma. Postoperatively, she had been ingesting mitotane up to 12 gm per day without clinical improvement and visited the Korea Cancer Center Hospital.

On examination, she was a chronically ill-looking woman with acne, moon face, and hirsutism. Her liver was palpable 7 cm from the costal margin at the right midclavicular line, 12 cm from the xiphoid process, and 3

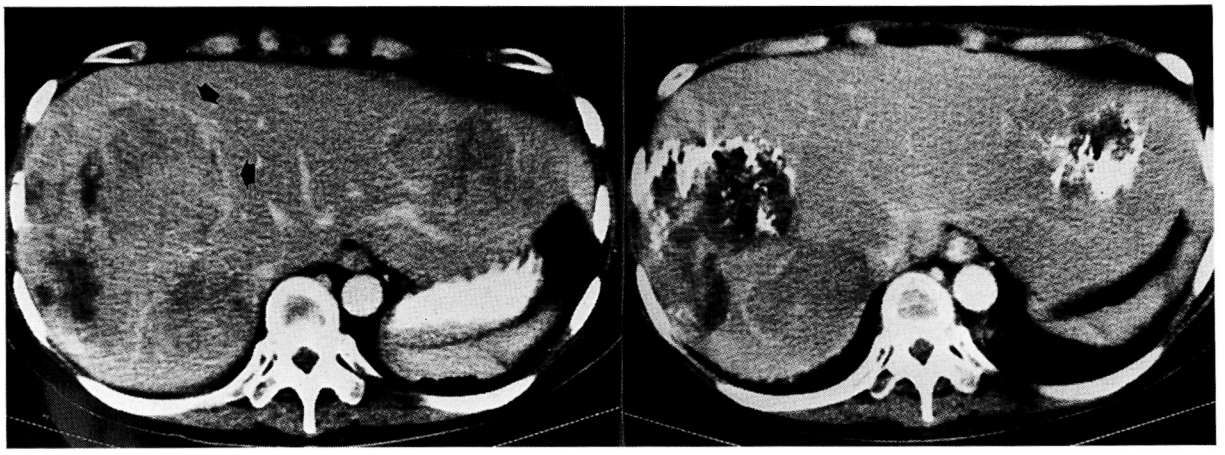

Fig. 1. Computerized tomographic findings of the abdomen before(left) and after(right) TAE. Lipiodol was visible in the tumors 4 weeks after transarterial embolization(TAE) (right). The arrows mark the margin of the tumors before TAE. Follow-up computerized tomography of the abdomen disclosed shrunken hepatic masses with the evidence of liquefaction necrosis. The size of the lesion in which lipiodol did not collect increased, substantiating further the effect of ^{131}I-lipiodol combined with Gelfoam. TAE=transarterial embolization

cm from the costal margin at the left midclavicular line.

Serum alanine aminotransferase/aspartate aminotransferase was 1.73/1.27 μkat/L. Total bilirubin was 58 μmol/L. Serum alkaline phosphatase was 18.5 μkat/L. Serum Na/K/Cl was 142/3.6/103 mEq/L with 200 mEq potassium supplement and 300 mg spironolactone per day. Without potassium and spironolactone, serum potassium decreased to 1.4 mEq/L. Urinary excretion of 17-ketosteroids was 231 μmol/day and that of 17-hydroxycorticosteroids was 170 μmol/day. Serum cortisol at 8 a.m. was 2,570 nmol/L and that at 10 p.m. was 2,120 nmol/L. Twenty-four hour urine cortisol was 19,140 nmol/day, and serum corticotropin was below 2 pmol/L. Serum aldosterone was 690 pmol/L. Serum dehydroepiandrosterone sulfate(DHE-A-S) was 19.1 μmol/L, and testosterone was 16.6nmol/L. Computerized tomography of the abdomen showed multiple ill-defined huge masses in the liver without evidence of recurrent adrenal mass(left side of Fig. 1).

In September 1989, TAE with 5 ml Gelfoam and 20 mCi ^{131}I-labeled lipiodol(Korea Atomic Energy Research Institute, Seoul) was performed via the common hepatic artery uneventfully. Serum morning cortisol became 1,290 nmol/L one week after TAE. Two weeks after TAE, serum morning cortisol, aldosterone, and DHEA-S were 1,630 nmol/L, 650 pmol/L, and 17.3 μmol/L, respectively. Urinary excretion of cortisol was 12,450

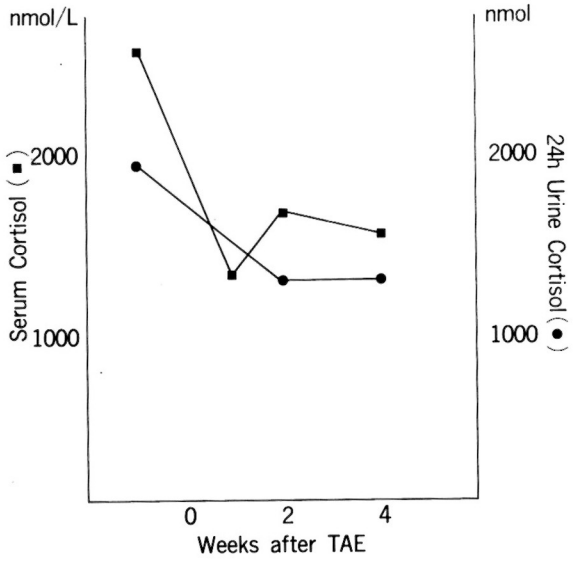

Fig. 2. Changes of serum morning cortisol and 24h urine cortisol after TAE. Both decreased significantly after embolization. TAE=transarterial embolization

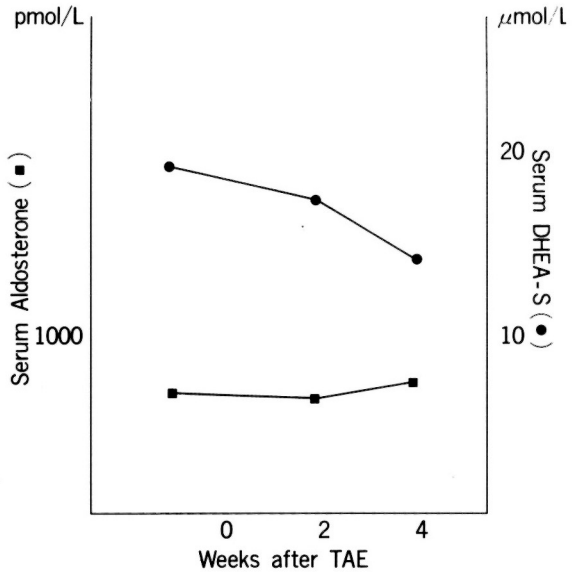

Fig. 3. Changes of serum dehydroepiandrosterone sulfate and aldosterone after TAE. The serum aldosterone level was not so high before TAE despite the severe clinical hypermineralocorticoidism and did not decrease after embolization, thus indicating the role of the other mineralocorticoids. TAE=transarterial embolization ; DHEA-S=dehydroepiandrosterone sulfate

nmol/day. Four weeks after TAE, serum morning cortisol, aldosterone, and DHEA-S were 1,560 nmol/L, 770 pmol/L, and 14.3 μmon/L, respectively. Urinary excretion of cortisol became 12,490 nmol/day(Fig. 2, 3). Palpable liver size became 3 cm from the costal margin at the right midclavicular line, 8 cm from the xiphoid process, and 3 cm from the costal margin at the left midclavicular line. Follow-up computerized tomography of the abdomen disclosed shrunken hepatic masses with the evidence of liquefaction necrosis(right side of Fig. 1).

Another TAE was tried 5 weeks after the first trial, but failed because of obliteration of the common hepatic artery which was believed to have been caused by a vascular injury during the first TAE. This patient rejected further therapy except for oral medication and expired at home in January 1990.

DISCUSSION

TAE or hepatic artery ligation has been employed for primary or metastatic hepatic neoplasms. Since collateral circulation develops rapidly in cases of proximal embolization or hepatic artery ligation, peripheral embolization has been suggested to be more preferable(Chung and Wallace, 1981;Fortner et al., 1973). Gelfoam had been considered to be a kind of peripheral vascular occlusive agent; however, it reaches only the second-and third-order hepatic artery rather than the arterioles(Chung and Wallace, 1981). Furthermore, the duration of vascular occlusion with Gelfoam has been reported to be temporary, explaining the failure of Gelfoam as a single embolization material(Chung and Wallace, 1981, Ohishi et al., 1985). Therefore, we employed radioiodinated lipiodol which selectively accumulates in the hepatic neoplasms and exerts cytotoxic activity(Ohishi et al., 1985, Yoo et al., 1989) and combined Gelfoam to prevent washout of lipiodol and to induce obstruction of the main feeding vessels(Yoo et al., 1989). Calculated dose of radiation to the tumor was about 10,000 rad (Yoo et al., 1986).

TAE in metastatic endocrine cancer seems to be an attractive method because "debulking" of the tumor mass by TAE leads to diminution of the endocrine symptoms, which is the mainstay of the therapy in endocrine malignancy. In this case, serum and urine cortisol levels were not normalized but decreased significantly after a single TAE. The decreases were evident 2 weeks after TAE, showing similar temporal pattern to the change of serum alpha feto-protein in the treatment of hepatoma(Ohishi et al., 1985). Serum DHEA-S level also decreased. The serum aldosterone level was not so high before TAE despite the severe clinical hypermineralocorticoidism, and it did not decrease after TAE. The mineralocorticoids other than aldosterone seem to be responsible for the clinically evident mineralocorticoid excess in this patient(Ehrlich, 1989). In addition to the improvement of biochemical parameters, the sizes of the hepatic masses

also decreased significantly which was evi dent by both physical exmination and serial computerized tomographic findings. The sum of the products of the perpendicular dia meters of all the measured lesions decrea sed by approximately 50% after TAE. Meanwhile, the size of the lesion in which lipiodol did not collect increased, substantiating further the effect of ^{131}I-lipiodol combined with Gelfoam in the management of this patient(right side of Fig. 1).

The cause of obliteration of the common hepatic artery, which made the second TAE impossible, is not apparent. A vascular injury, which might have been caused by a catheter in the first TAE, is the most probable cause because selection of hepatic arteries was very difficult due to stretching of the vessels aroud the tumor masses. If repeated TAE had been possible, a further decrement in hormone levels and symptoms might have been attained.

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