



# Brain metastasis from renal urothelial carcinoma successfully treated by metastasectomy

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## ABSTRACT

Upper tract urothelial cancer (UTUC) arises from the urothelial lining of the urinary tract. UTUC spreads in several different ways including direct invasion, lymphatic spread, and hematogeneous metastases. Regional lymph nodes are commonly the initial site of metastasis, followed by the liver, lung, and bone. Brain metastasis is uncommon in patients with urothelial carcinoma. Here, we report an uncommon case of kidney urothelial carcinoma with brain metastasis in a 55-year-old woman presenting with dysarthria with right side limb weakness. The patient recovered well after resection of the brain lesion without any sequelae after 1 year of follow-up.

**KEYWORDS:** Brain, Metastasis, Metastasectomy, Urothelial cancer

## INTRODUCTION

Upper tract urothelial cancer (UTUC), arising from the urothelial lining of the urinary tract, accounts for about 10% of all renal tumors and 5% of urothelial malignancies. UTUCs are relatively uncommon than urothelial cancers of the urinary bladder [1]. UTUC progresses in several different ways including direct invasion, lymphatic spread, and hematogeneous metastases. Regional lymph nodes are commonly the initial site of metastasis, followed by migration to the liver, lung, and bone [2]. Brain metastasis is uncommon in patients with urothelial carcinoma. Here, we report a rare case of kidney urothelial carcinoma with brain metastasis. The patient recovered well after resection of brain lesion. The optimal method for the treatment of oligometastasis and brain metastasis in UTUC patients will also be discussed in this case report.

## CASE REPORT

A 55-year-old woman visited our neurologic department because of dysarthria with right side limb weakness for 2 weeks. Brain magnetic resonance imaging (MRI) revealed a 2-cm isolated tumor with enhancement and obvious perifocal edema over the left frontal lobe [Figure 1]. She was transferred to the neurosurgical department for further treatment. The patient had a history of left kidney high grade (3/3) papillary urothelial carcinoma with paraaortic lymph node metastasis (pT3N1M0) and had undergone a left nephroureterectomy with bladder cuff resection 10 months previously. She also received adjuvant systemic chemotherapy with the Gemzar regimen after urological surgery. On admission, the physical and neurologic examination revealed hemiparesis of right side limbs, with

muscle power of Grade 3–4 over the hand and Grade 5 over the leg.


Craniotomy with the removal of the tumor was performed and the pathology study revealed poorly differentiated metastatic carcinoma with irregular sheets infiltrating the brain parenchyma. Immunohistochemistry revealed positive nuclear staining for carcinoma cells with anti-GATA3 antibody [Figure 2]. The perioperative course was uneventful, and the patient recovered well after surgical treatment without any sequelae. Chemotherapy with the methotrexate, vinblastine, doxorubicin, and cisplatin (M-VAC) regimen was given after brain surgery. Serial follow-up with chest and abdominal computerized tomography (CT) and brain MRI after the operation showed no disease progression [Figure 3].

## DISCUSSION

Brain metastases are the most common intracranial tumors. In adults, they most commonly arise from carcinomas of the lung, breast, kidney, and colorectal cancers, as well as melanomas. Brain metastasis from urothelial carcinoma is extremely rare [3]. In patients with brain metastasis, headache is the most common presenting symptom and occurs in approximately half of patients. Focal neurologic dysfunction occurs in 20%–40% of patients and hemiparesis is the most common neurologic dysfunction [4]. Contrast-enhanced MRI has been suggested as the modality of choice for the diagnosis

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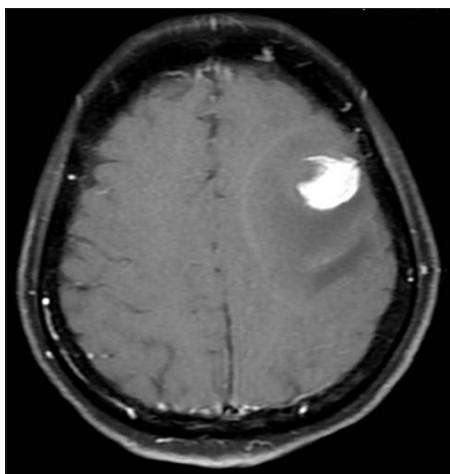
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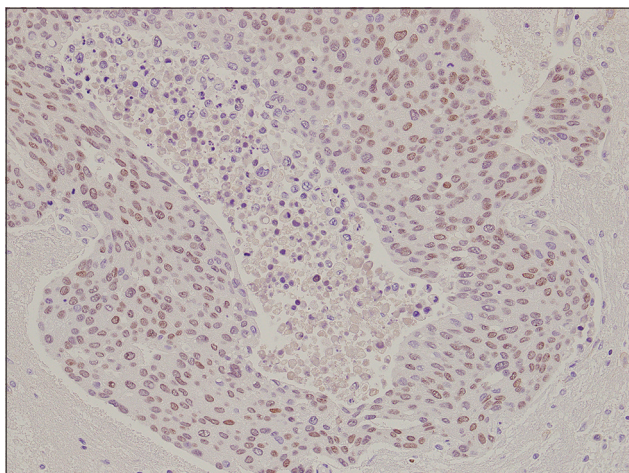
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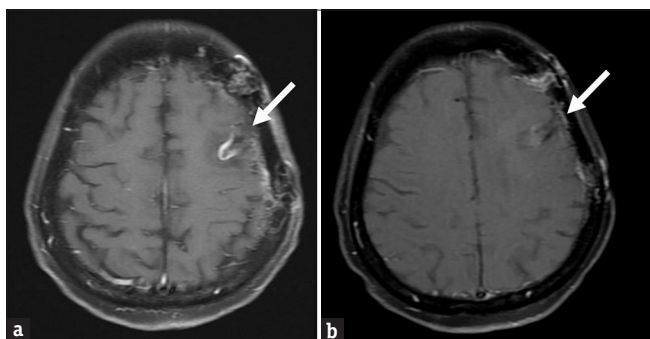
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**Figure 1:** Contrast-enhanced brain magnetic resonance imaging reveals a 2 cm enhancing lesion in the left frontal lobe with perifocal edema



**Figure 2:** Microscopically, the metastatic carcinoma shows irregular sheets infiltrating the brain parenchyma. Immunohistochemistry reveals positive nuclear staining for carcinoma cells with anti-GATA3 antibody ( $\times 200$ )



**Figure 3:** Postoperative magnetic resonance images 3 months (a) and 13 months (b) after the operation reveal focal encephalomalacia in the left frontal lobe with gyral enhancement with no interval variation which favors postoperative change

of brain metastases because brain CT may underestimate the number of brain metastatic lesions [5].

UTUCs are often associated with a poor prognosis. Up to 19% of patients with UTUC have been reported to present initially with metastatic disease. The most common sites for

metastases at autopsy were the lymph nodes, liver, lung, bone, and adrenal gland [6]. Brain metastasis is very rare in patients with urothelial carcinoma.

In patients with advanced urothelial carcinoma, adjuvant chemotherapy has been suggested as an effective treatment modality with a high response rate. In 1985 Sternberg *et al.* demonstrated the M-VAC regimen was extremely effective against locoregional and disseminated urothelial tract tumors, tumor regression was noted in 53%–89% of patients after systemic M-VAC chemotherapy [7]. However, the M-VAC regimen has significant toxicity, including neutropenia, and severe mucositis. A combination of gemcitabine and cisplatin (GC) has demonstrated progression free and overall survival rates equal to those of M-VAC, with a statistically lower incidence of adverse effects such as mucositis and neutropenia. GC is now considered a new standard chemotherapy regimen for advanced urothelial carcinoma [8].

Metastasectomy has been reported to improve the prognosis of patients with metastatic urothelial cancer. In 1981, Cowles *et al.* reported prolonged survival after thoracotomy and wedge resection in patients with a solitary pulmonary metastasis [9]. In a review of 31 patients with metastatic urothelial cancer undergoing metastasectomy, Siefker-Radtke *et al.* suggested that resection of metastatic disease integrated with chemotherapy might contribute to long-term disease control [10]. Forty-two patients who underwent resection of metastases of urothelial carcinoma were retrospectively reviewed by Abe *et al.* They advocated that long-term cancer control could be achieved in patients undergoing metastasectomy, especially those with a solitary lung or solitary lymph node metastasis [11].

Due to the limited number of case reports, the optimal modality for the treatment of urothelial cancer with brain metastasis is still unclear. However, our case report suggests resection of the metastatic lesion may benefit urothelial cancer patients with brain metastasis. This case report reminds us that brain metastasis should be considered in urothelial cancer patients with a headache or focal neurological dysfunction.

#### Declaration of patient consent

The authors certify that the patient has provided an appropriate patient consent form. In the form, the patient has given her consent for her images and other clinical information to be reported in the journal. The patient understands that her name and initials will not be published and due efforts will be made to conceal her identity, but anonymity cannot be guaranteed.

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#### Conflicts of interest

There are no conflicts of interest.

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