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Clear Cell Renal Cell Carcinoma with Meckel's Cave Metastasis as Primary Presentation

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Abstract

Background: Renal cell carcinoma (RCC) accounts for 8% of all brain metastasis; however, spread to the cranial nerves and their ganglia is uncommon. To the best of our knowledge, we report the 3rd case of RCC metastatic to Meckel's cave, which was diagnosed secondary to new trigeminal sensory symptoms.

Methods: An 80-year-old man had presented with history of right sided facial numbness since last 1 year. Patient had reduced sensation of hot and cold over the right half of his face. Magnetic resonance imaging demonstrated heterogeneous enhancing mixed solid-cystic lesion with haemorrhagic changes in the right CPA cistern extending into the right Meckel's cave.

Results: As the lesion is causing significant mass effect on the pons and right middle cerebellar peduncle with edema. Compression of the fourth ventricle causing mild obstructive hydrocephalus. Operative resection was recommended.

Conclusion: We have reported a case of RCC presenting with numbness via metastatic spread to Meckel's cave. Although uncommon, metastasis is an important diagnostic consideration for enhancing cranial nerve lesions. Our case has demonstrated that, although a history of malignancy, multiple lesions, or systemic/constitutional symptoms are typical, rare cases can demonstrate isolated central nervous system findings.

Keywords: Case Report, Cranial Nerve, Metastasis, Renal Cell Cancer, Skull Base, Trigeminal Nerve.

Introduction

RCC accounts for 85% of malignant renal tumors and 3% of all adult malignancies. There is a significant chance that this malignancy may spread. The lungs (45.2%), bone, lymph nodes, liver, adrenal glands, and brain (8.1%) are the most common locations for metastases [1]. Rarely does it spread to the ganglion or trigeminal nerve. There have been isolated reports of colorectal adenocarcinoma, thyroid, lung, breast, and lymphoma metastases to the trigeminal nerve/ganglion [2]. To the best of our knowledge, there have only been two documented occurrences of trigeminal RCC metastases. Benign tumors, such as trigeminal lymphoma, meningioma, or trigeminal schwannoma, are common differential diagnoses [2]. Reporting an index case of metastatic RCC that presented by metastasis to Meckel's cave was the aim of the current investigation.

Case Description

An 80 year old male with comorbidities of Type 2 Diabetes mellitus, Hypothyroidism, Chronic Kidney Disease and Coronary artery disease. He presented to our institution with history of right sided facial numbness since last 1 year. It was insidious in onset and gradually progressive. Patient had reduced sensation of hot and cold over the right half of his face. Patient also had difficulty in clearing food from the right gingivo-buccal area. Patient later had imbalance while walking.

Magnetic resonance imaging (MRI) showed a heterogeneous enhancing mixed solid-cystic lesion with haemorrhagic changes in the right cerebellopontine angle (CPA) cistern extending into the right Meckel's cave with a lobulated component within causing extra-axial projection in to the right medial temporal region. The lesion is causing significant mass effect on the pons and right middle cerebellar peduncle with edema. Compression of the fourth ventricle causing mild obstructive hydrocephalus [fig 1]. The CT scan does not show bony erosions or remodelling. Based on the clinical assessment and MRI findings, the principal hypothesis was trigeminal schwannoma.

The patient underwent a right paramedian suboccipital Craniotomy-lateral Supracerebellar Infratentorial Approach and excision of lesion with intra-operative neuromonitoring. Intraoperatively, the lesion was red in colour, soft suckable, highly vascular and had cystic areas. Lesion was internally decompressed and removed totally in piecemeal. Pathological examination of the operative specimen resulted in the diagnosis of clear cell carcinoma.

He underwent a positron emission tomography scan which identified a heterogeneously enhancing exophytic mass lesion with surrounding stranding seen involving the lower pole of

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the right kidney measuring 51 x 51 x 55 mm (AP X T X CC) with no obvious involvement of the pelvis, it is abutting right psoas muscle [fig 2]. Post-operative MRI brain showed bleeding within the op cavity with pre-pontine extension and post-contrast images showed no residual enhancing residual lesion. Radical nephrectomy was recommended. Patient had sepsis with multi-organ failure during the late post-operative period and expired.

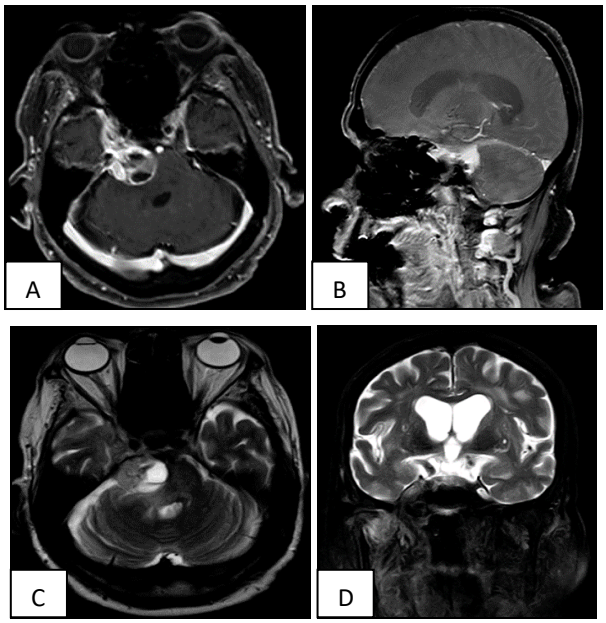

Fig 1: Magnetic resonance images of the brain

Figure 1. Magnetic resonance images of the brain. (A and B) T1-weighted gadolinium-enhanced magnetic resonance images in the (Left) axial and (Right) sagittal planes showing a heterogenous contrast-enhancing lesion noted in the right CP angle cistern extending in to the right Meckel's cave with a lobulated component within causing extra-axial projection in to the right medial temporal region (C and D) T2-weighted images in the (Left) axial and (Right) coronal planes showing a heterogeneous mixed solid-cystic lesion noted in the right CP angle cistern with fluid-fluid levels within the cystic component and the lesion is causing significant mass effect on the pons and right middle cerebellar peduncle with edema.

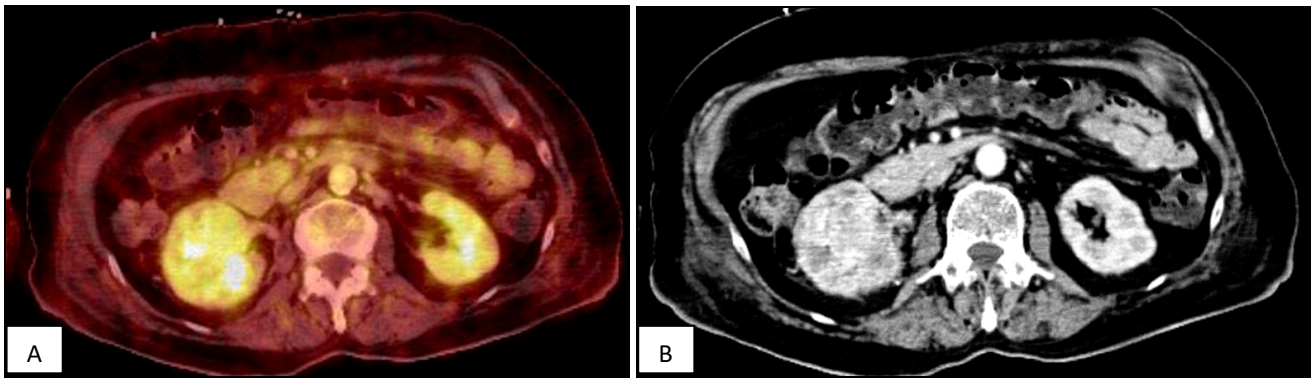

Fig 2: Positron emission tomography scans

Figure 2. Positron emission tomography scans (A and B)- Showing a partly exophytic mass lesion with surrounding stranding seen involving the lower pole of right kidney, it is abutting right psoas muscle with suspicious infiltration. A tiny lymph node seen in medial aspect of this lesion (FDG non avid). No filling defect seen in right renal vessels.

Discussion

To the best of our knowledge, we have documented the third instance of stage IV RCC where the metastasis at the MC level resulted in facial numbness. Clear cell RCC was the ultimate pathology diagnosis. Eighty percent of kidney cancers are clear cell renal cell carcinomas, the most prevalent histological type of RCC [1]. The median overall survival (OS) for patients with brain metastases from RCC is less than 10 months, and their quality of life is negatively impacted [2]. Clinical features (Karnofsky performance score, or KPS), age, extracranial metastatic spread, the time between the initial diagnosis of RCC and the occurrence of metastatic disease, and certain brain metastasis characteristics (number of BM, cumulative intracranial tumor volume superior or inferior to 4 cm^3) are among the scores that can be used to predict survival [3].

There have been some developments in systemic treatment for RCC. Vascular endothelial growth factor is released by RCC, a hypervascular tumor linked to numerous arteriovenous shunts. The potential for RCC to spread through blood circulation is high. Regarding the overall survival prognosis, metastatic RCC is a diverse group. It has been demonstrated that surgical excision of the metastasis is substantially more effective than systematic treatment (immunotherapy, antiangiogenic therapy), giving patients a chance for recovery. Whether through surgery or radiation therapy, local treatment of RCC metastases is still a crucial but contentious

process. After nephrectomy, the survival percentage is 41% at 2 years and 13% at 5 years when solitary metastatic lesions of RCC are removed [4].

Patients with brain metastases of RCC currently have three therapeutic options: stereotactic radiosurgery, corticoid therapy, and surgical resection. The current treatment algorithms involve radiation therapy and radiosurgery in conjunction with resection and systemic chemotherapy due to the RCC's relative radioresistance to conventional fractionated radiation administration [5-6].

Metastatic lesions make up about 0.2% of the lesions discovered in the CPA. Primary neoplasms of the lung, breast, prostate, nasopharynx, and oropharynx are common origins. The symptoms of metastatic cancers in this area progress quickly and affect the lower cranial nerve. It is rare for metastatic cancers to affect the ganglion or trigeminal nerve [7]. There have been reports of solitary trigeminal nerve/ganglion metastases from colorectal adenocarcinoma, lung cancer, breast cancer, and lymphoma. To the best of our knowledge, only one instance of melanoma trigeminal metastases and one case of occult follicular carcinoma of the thyroid have been documented [8]. With the exception of optic nerve lymphoma, primary cranial nerve lymphoma is exceedingly uncommon. The brief duration of symptoms is the most crucial indicator for the preoperative diagnosis of trigeminal lymphoma [1].

It is extremely uncommon for RCC to cause trigeminal metastases. Because the clinical symptoms and MRI of benign and malignant trigeminal tumors are identical, it is challenging to make a definitive diagnosis. However, the duration of symptoms is frequently shorter in cases of malignancy. It appears necessary to do a complete body CT scan in order to look for a primary tumor if the symptoms are not typical of a benign trigeminal tumor (such as meningioma or schwannoma). Three therapy options are available if the trigeminal tumor is isolated. These options are determined by the trigeminal tumor's mass effect on MRI, the quick onset of clinical symptoms, and whether or not there is a history of RCC [9-10].

It would be essential to remove the trigeminal tumor completely or partially, followed by radiation therapy, if it was squeezing the midbrain. Based on the MRI and clinical symptoms, the patient's status can be actively watched if there is no history of RCC and no compressive hazard. Several methods, such as retrosigmoid, subtemporal, transsphenoidal, pteryonal, and percutaneous into the foramen ovale for biopsy sampling, can be used for biopsy or removal if there are clinical symptoms or abnormalities on MRI.

The optimum course of treatment may involve radiosurgery (or hypofractionated stereotactic radiation therapy) in conjunction with resection and systemic chemotherapy due to the RCC's relative radioresistance to conventional fractionated radiation delivery.

Conclusion

As far as we are aware, this is the third instance of RCC that started out as face numbness and progresses to an isolated cranial nerve metastasis. An open approach was recommended for our patient, who presented with a good KPS score. This allowed us to decompress the Gasserian ganglion and trigeminal nerve while also establishing the tissue diagnosis. Although RCC is undoubtedly an extremely uncommon underlying etiology, metastases have generally been very common among clinically and radiographically "unusual-appearing" lesions and should be carefully taken into account when evaluating a symptomatic enhancing cranial nerve lesion. MC lesions are diverse.

References

1. Zhang WQ, Bao Y, Qiu B, Wang Y, Li ZP, Wang YB. Clival metastasis of renal clear cell carcinoma: Case report and literature review. *World Journal of Clinical Cases*. 2018; 6(9):301.
2. Kachhara R, Nair S, Radhakrishnan VV, Pandey M, Ahmed MI, Kumar A, Bhattacharya RN. Solitary Metastasis From Occult Follicular Carcinoma of the Thyroid Mimicking Trigeminal Neurinoma—Case Report—. Neurologia medico-chirurgica. 2001; 41(7):360-3.
3. Salaud C, Roualdes V, Thillays F, Martin SA, Buffenoir K. Trigeminal ganglion metastasis of renal clear cell carcinoma: Cases report and review of the literature. World Neurosurgery. 2019; 128:541-6.
4. Casabella AM, Kiyofuji S, Perry A, Graffeo CS, Eschbacher KL, Link MJ. Renal cell carcinoma with primary presentation via metastasis to the trigeminal ganglion. World neurosurgery. 2019; 126:30-6.
5. Agarwal A. Intracranial trigeminal schwannoma. The Neuroradiology Journal. 2015; 28(1):35-41.
6. Ogiwara T, Horiuchi T, Sekiguchi N, Kakizawa Y, Hongo K. Primary malignant lymphoma of the trigeminal nerve: case report and literature review. World Neurosurgery. 2015; 84(2):592-e3.
7. Escudier B, Porta C, Schmidinger M, Rioux-Leclercq N, Bex A, Khoo V, Grünwald V, Gillessen S, Horwich A. Renal cell carcinoma: ESMO Clinical Practice Guidelines for diagnosis, treatment and follow-up. Annals of Oncology. 2019; 30(5):706-20.
8. Sperduto PW, Kased N, Roberge D, Xu Z, Shanley R, Luo X, Sneed PK, Chao ST, Weil RJ, Suh J, Bhatt A. Summary report on the graded prognostic assessment: an accurate and facile diagnosis-specific tool to estimate survival for patients with brain metastases. *Journal of Clinical Oncology*. 2012; 30(4):419-25.
9. 9. Dziggel L, Segedin B, Podvrsnik NH, Oblak I, Schild SE, Rades D. Ein Überlebensscore für Patienten mit Hirnmetastasen von gering strahlensensiblen Tumoren nach alleiniger Ganzhirnbestrahlung.
10. 10. Zhao H, Tang DZ, Zhu J, Zhang X, Li ST. Diffuse large B cell lymphoma presented as trigeminal neuralgia: 2 cases reported and literature review. World Neurosurgery. 2019; 123:383-9.