



Case Report

Treatment of transient prosopagnosia with a tyrosine kinase inhibitor in a case of brain metastasis from EGFR-mutated lung adenocarcinoma

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ABSTRACT

Background: Prosopagnosia is a rare form of apraxia, in which a person has normal memory and vision, but has impaired cognition of human faces that are manifested through symptoms such as not being able to recognize the face of a familiar person, one has known or not being able to remember the face of a person. Here, we report the case of a patient with transient prosopagnosia associated with brain metastasis from epidermal growth factor receptor (EGFR)-mutated lung adenocarcinoma who was treated with tyrosine kinase inhibitors (TKIs).

Case Description: A 52-year-old right-handed man with lung adenocarcinoma was introduced to our department because brain metastasis. On admission, he complained that he could not recognize his wife's face, but he could recall her face based on her voice. MRI revealed a right temporo-occipital enhancing lesion with perifocal edema and dissemination that were indicative of brain metastasis from lung adenocarcinoma. Two weeks after open biopsy, he was started on TKI therapy with osimertinib at a dosage of 80 mg/day. An MRI scan taken 1 month later revealed shrinkage of the metastasis. In addition, he had recovered from transient prosopagnosia and returned to normal life.

Conclusion: In this study, the TKI osimertinib was administered to a patient with brain metastasis of EGFR-mutated lung adenocarcinoma who presented with prosopagnosia, and the patient's lesion shrunk and his symptoms were reversed with this treatment.

Keywords: Brain metastasis, Lung adenocarcinoma, Prosopagnosia, Tyrosine kinase inhibitor

INTRODUCTION

Prosopagnosia is a neurocognitive disorder that selectively disrupts facial recognition caused by brain injury.^[3] The patients with prosopagnosia have normal memory and vision, but has impaired cognition of human faces. However, knowledge of the person is preserved, so it is possible to recall the face based on senses other than sight (e.g., hearing the voice) and, thereby, identifies the person.^[3] Cerebrovascular disease, epilepsy, trauma, brain tumor, encephalitis, and carbon monoxide poisoning have been reported as the causes of acquired prosopagnosia.^[1,2,4-7,9,11]

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With regard to brain tumors, lesions in the right lingual and fusiform gyrus are generally considered to be responsible for prosopagnosia.^[8]

For lung adenocarcinoma with epidermal growth factor receptor (EGFR) mutation, tyrosine kinase inhibitors (TKIs) have become the first-line drugs of choice. In particular, TKIs are expected to be effective in cases with metastatic brain tumors, because they have good CSF transferability, unlike other anticancer agents.^[10] Here, we report the case of a patient with transient prosopagnosia associated with brain metastasis from EGFR-mutated lung adenocarcinoma who was treated with TKIs.

CASE REPORT

A 52-year-old right-handed man was introduced to our department, because he had presented at a local clinic with headache and was diagnosed with brain tumor based on magnetic resonance imaging (MRI) findings. Two years before the visit, the patient had been diagnosed with lung adenocarcinoma (stage pT1cN0M0), but MRI of the brain taken at that time did not show any brain metastases. The patient underwent video-assisted thoracoscopic surgery (VATS) for the lung adenocarcinoma at another hospital and was subsequently administered chemotherapy with uracil/tegafur at a dosage of 400 mg/day. After VATS, computed topography indicated that the lung cancer had not recurred for 2 years after the procedure. MRI taken at our department revealed a right temporo-occipital enhancing lesion with perifocal edema and dissemination that was indicative of brain metastasis [Figure 1]. This case was evaluated by a multidisciplinary team that included neurosurgeons, neuroradiologists, and radiation oncologists, who together determined the most appropriate therapy. Due to the atypical radiological findings without the recurrence of lung cancer, open biopsy was recommended for accurate pathological diagnosis.

On admission to our department, the patient complained that he could not recognize his wife's face, but he could recall her face based on her voice. The preoperative mini-mental statement examination score was 30/30; IQ was 118 according to Kohs block-design test; and verbal IQ was 147 according to Wechsler Adult Intelligence Scale-III. These results did not indicate cognitive decline. On the Visual Perception Test for Agnosia, he was able to distinguish facial expression, age, sex, and gender, but had difficulty in recognizing and identifying unknown facial features. Further, he scored 44% on the Cambridge Face Memory Test at the time of admission.

The pathological diagnosis in the present case was EGFR-mutated adenocarcinoma. Two weeks after open biopsy, he was started on TKI therapy with osimertinib at a dosage of 80 mg/day. An MRI scan taken 1 month later

revealed shrinkage of the metastasis. In addition, he had recovered from transient prosopagnosia and returned to normal life. His score for the Cambridge Face Memory Test conducted 1 month later after the start of osimertinib treatment improved to 75%. There has been no tumor recurrence after administration of osimertinib for 12 months [Figure 1].

DISCUSSION

There has been a long history of debate on the responsible foci for face recognition, and functional brain imaging studies have revealed the importance of the right lingual and fusiform gyrus in face recognition.^[8] As an input system for face recognition, face information input into the visual cortex is transmitted to the fusiform gyrus in the ventral part of the occipitotemporal lobe. After that, the information is matched with the memory system between the fusiform and the hippocampus, and the person is considered to be identified. In agreement with these findings, Lang *et al.* reported a case of prosopagnosia after cerebral infarction in the right posterior cerebral artery region covering the right fusiform gyrus to the lingual gyrus.^[9] However, unilateral lesions in the right hemisphere alone do not cause prosopagnosia, and some studies have reported the role of bilateral lesions.^[2] Accordingly, Corrivetti *et al.* reported a case of bilateral glioma, in which the right occipital lobe was resected first, and a year later, after resection of the left frontotemporal lobe, the patient presented with prosopagnosia.^[2] These findings indicate that prosopagnosia may be associated with unilateral or bilateral lesions. In the present case, MRI showed brain metastasis with dissemination from the right temporal lobe to the occipital lobe; in particular, the brain metastasis in the right inferior temporal gyrus was accompanied by strong edematous changes in the surrounding area. This implies involvement of the fusiform and lingual gyrus – the foci considered to be responsible for face recognition. Thus, the common denominator in many case reports, including the present one, is the right lingual and fusiform gyrus, which supports the role of these regions in face recognition.

Lang *et al.* reported a case of prosopagnosia caused by infarction of the right fusiform gyrus that gradually improved over the course of 1 month.^[9] In their case, fMRI results showed activation of the left fusiform gyrus, which was indicative of brain plasticity.^[9] In our case, the lesion rapidly shrank and the edema improved with the use of osimertinib, and the prosopagnosia also improved rapidly. The latest MRI shows damage to the right inferior temporal gyrus, but the medial temporal lobe structures are preserved. These findings indicate that the right lingual and fusiform gyrus were transiently affected by the brain metastasis, but not permanently damaged and the condition was reversible.

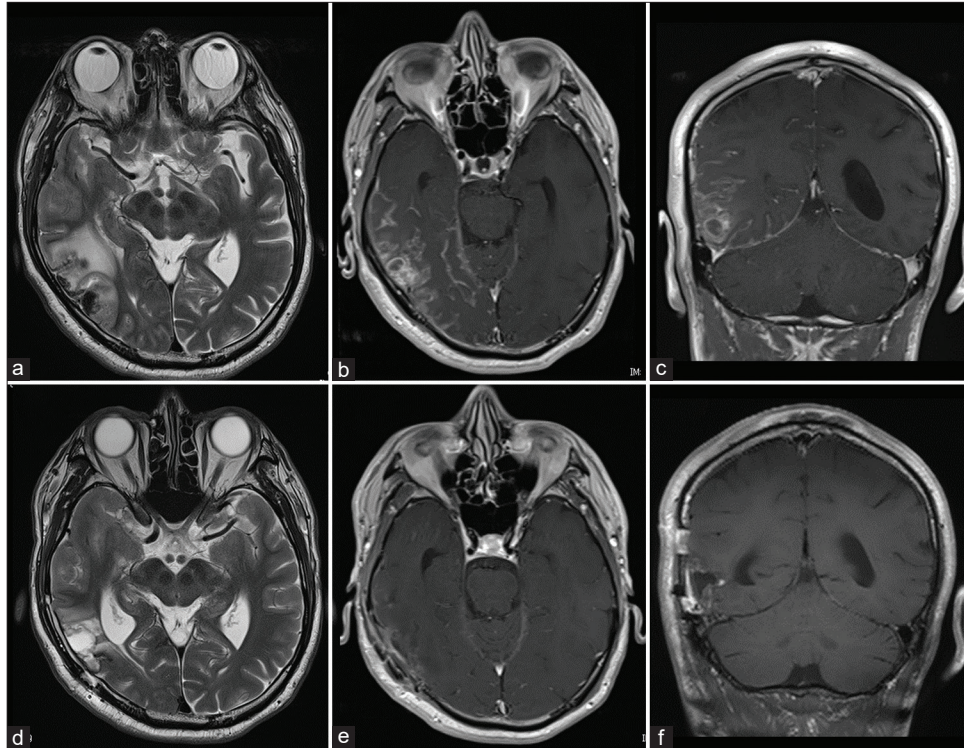


Figure 1: MRI findings indicative of brain metastasis. Pretreatment MRI T2-weighted image showing brain metastasis with perifocal edema in the right inferior temporal gyrus. (a) Preoperative enhanced MRI image showing brain metastasis with dissemination. (b and c) Posttreatment MRI showing shrinkage of the brain metastasis after the administration of the TKI osimertinib. (d: T2-weighted scans, e and f: enhanced MRI scan).

CONCLUSION

In this study, the TKI osimertinib was administered to a patient with cerebral metastasis of EGFR-mutated lung adenocarcinoma who presented with prosopagnosia, and the patient's lesion shrunk and his symptoms were reversed with this treatment. Thus, appropriate treatment of the causative factor of prosopagnosia can reverse the symptoms.

Declaration of patient consent

Patient's consent not required as patient's identity is not disclosed or compromised.

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Conflicts of interest

There are no conflicts of interest.

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