

A Rare Cause of Lung Metastasis - Glioblastoma Multiforme

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ABSTRACT

Glioblastoma multiforme (GBM), comprised of astrocytes, is the most common brain tumor of the central nervous system. Although extracranial metastasis of GBM is very rare (<2%), when it occurs, the lungs are the most common site. Presently described are the cases of 2 male patients, aged 55 and 69 years, who were ultimately diagnosed with pulmonary metastasis of GBM. A lesion that appears to be a primary malignancy on lung imaging may, in fact, be a metastasis. Treatment of the primary malignancy can lead to regression. A detailed anamnesis, evaluation of accompanying diseases, and a pathological diagnosis are of vital importance.

INTRODUCTION

Glioblastoma multiforme (GBM), which is comprised of astrocytes, is the most frequently seen brain tumor of the central nervous system. It constitutes 15.4% of all brain tumors, and 60% to 75% of all astrocytic tumors.^[1] The potential for malignancy is high because astrocytes multiply very rapidly and are supported by large vascular networks. These tumors are known to be fast-growing and fatal.^[2] Such glial tumors are prone to local recurrence; however, distant intracranial metastasis has been reported in the literature (<2%).^[3]

Extracranial metastases are seen most frequently in the lungs, the posterior cervical soft tissue, and the lumbar intradural space.^[4] Metastases are usually seen after resection of the primary tumor.^[5] In the presently described cases, a mass lesion suggestive of primary pulmonary carcinoma was detected, but the pathological diagnosis was pulmonary metastasis of GBM.

CASE REPORT

Case 1– In December 2016, a left frontal mass was observed on a computed tomography (CT) image of the brain of a 55-year-old male patient who admitted to the hospital with complaints of forgetfulness and speech impairment (Fig. 1). The patient underwent surgery and total excision of the cranial mass was achieved. The histopathological diagnosis was a high-grade glial tumor.

A thoracic CT performed as part of the preoperative evaluation had revealed a cavitary mass lesion measuring about 6x5 cm with an irregular, thickened wall located in the apical right upper lobe segment of the lung. The radiological appearance was consistent with a primary lung malignancy (Fig. 2). A CT-guided transthoracic needle biopsy was performed. The pathological diagnosis was metastasis of a high-grade glial tumor.

Adjuvant radiotherapy (RT) of 30 grays (Gy) administered in 10 fractions was delivered as cranial RT and for the

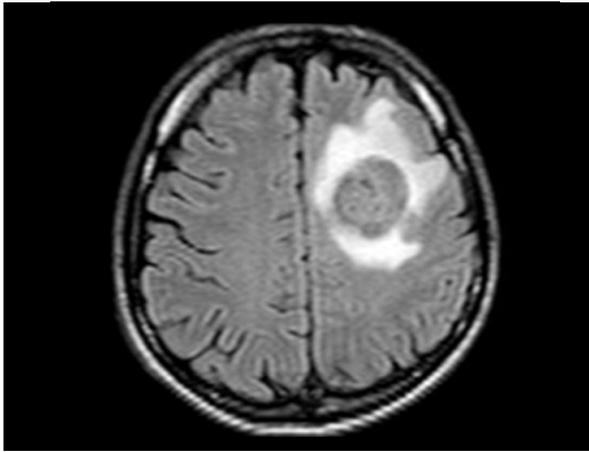


Figure 1. Case 1 – Left frontal mass observed on a computed tomography image of the brain.

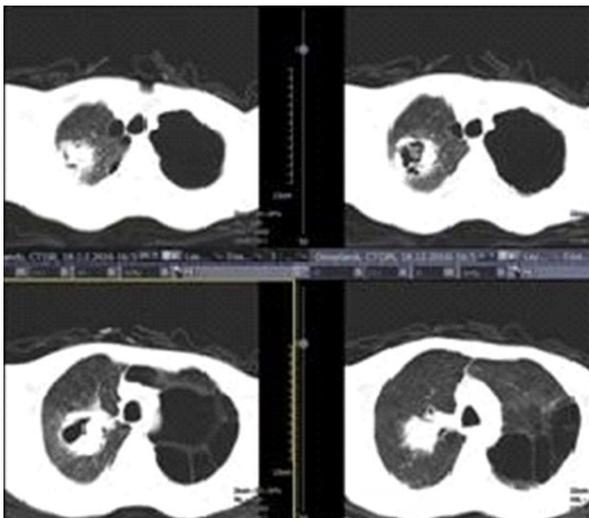


Figure 2. Case 1 – A mass lesion measuring approximately 6x5 cm was seen in the apical segment of the upper lobe of the right lung.



Figure 3. Case 1 – Complete regression seen after 30 Gy of radiotherapy delivered in 10 fractions directed at site of metastasis localized in the apical segment of the right lung.

metastatic focus at the apex of the right lung. Follow-up radiological imaging indicated that there was complete regression of the metastatic lesion in the lung.

Case 2– A right frontal mass was observed on a cranial magnetic resonance image (MRI) of a 68-year-old male

patient who complained of headaches and occasional forgetfulness with gradually increasing severity for 6 months.

Complete resection of the tumor was performed in July 2017. The histopathological examination revealed that the tumor was consistent with GBM. The patient was then treated with 6 cycles of CT and 28 sessions of RT.

A mass lesion was detected in the left main bronchus on a thorax CT image performed following the development of hemoptysis in November 2017. A CT-guided transthoracic needle aspiration biopsy was performed. The histopathological examination of the inguinal biopsy sample was reported as consistent with metastasis of GBM. RT and chemotherapy of 25 Gy in 16 fractions was administered to the site of metastasis (Fig. 3).

DISCUSSION

Extracranial metastases of GBM are very rare (<2%). It may, however, occur in the lungs, the soft tissue of the posterior cervical region, or the lumbar intradural space. The lungs are the most common site.^[3,4] Pulmonary metastasis of GBM was observed in both of the cases currently presented.

GBM is molecularly divided into 2 subtypes: primary GBM and secondary GBM. Secondary glioblastoma, which indicates malignant progression of the astrocytoma, constitutes 5% of GBMs and is seen mostly in young patients.^[6] The patients in our case were at 55 and 68 years of age and the tumors were classified as the primary GBM subtype.

Extracranial and intracranial metastases of GBM are generally known to occur after resection of the primary tumor, usually about 8.5 months after the diagnosis of the primary tumor.^[7] Craniotomy procedures and intraventricular shunting during the operation are thought to enable tumor cells to reach other regions of the body via lymphatic and hematogenous pathways.^[5] In Case 1, lung metastasis was detected preoperatively before resection of the cranial tumor. In Case 2, lung metastasis developed after an initial cure was achieved with adjuvant CT and RT after the operation.

The treatment modalities for primary tumors and metastases involve surgical procedures and adjuvant chemoradiotherapy directed at the primary tissue.^[4] It is thought that the use of chemotherapy after the development of metastasis is particularly helpful to improving survival. Chemotherapy was applied with RT for lung metastasis of GBM in both case 1 and case 2.

CONCLUSION

Some theories associated with the developmental pathways of extracranial metastases of GBM have been pro-

posed, but the mechanism of metastasis has not yet been fully explained. The incidence of extracranial metastasis of GBM has increased in recent years, and this is thought to be due to improved diagnostic devices and methods, as well as extended survival after effective treatment of the primary tumor.

Informed Consent

Written informed consent was obtained from the patient for the publication of the case report and the accompanying images.

Peer-review

Internally peer-reviewed.

Authorship Contributions

Concept: E.T.P.; Design: G.T.; Data collection &/or processing: C.D.; Analysis and/or interpretation: S.B.S.; Literature search: N.K., A.F.; Writing: G.T.; Critical review: S.S.C.

Conflict of Interest

None declared.

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Nadir Görülen Bir Akciğer Metastazı - Glioblastoma Multiforme

Glioblastoma multiforme (GBM) astrositlerden köken alan ve merkezi sinir sisteminin en sık görülen beyin tümörüdür. GBM'nin ekstrakraniyal metastazları oldukça nadir görülmekle birlikte (<2) metastaz yaptığı yerlerin başında akciğer gelir. Bu olgularda akciğerde primer akciğer karsinomu düşündürür. Bu yazıda kitle saptanan ve GBM'nin akciğer metastazı olarak tanı alan 55 ve 69 yaşında iki erkek hasta sunuldu. Akciğer görüntülemesinde primer maligniteyi düşündüren lezyonlar metastaz tanısı alabilmekte ve primer malignitenin tedavisi ile regrese olabilmektedir. Bu nedenle ayrıntılı anamnez, eşlik eden hastalıkların değerlendirilmesi ve patolojik tanı hayati önem arz etmektedir.

Anahtar Sözcükler: Akciğer tanseri; akciğer metastazı; glioblastoma multiforme.