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Spinal Cord Involvement of Glioblastoma Multiforme in an Adult Patient: A Case Report

Yetişkin Bir Hastada Glioblastoma Multiforme'nin Spinal Kord Tutulumu: Bir Olgu Sunumu

Mustafa Kandaz[1]*, Abdulhalık Gumrukcuoglu[2] and Ilker Eyuboglu[3]

[1]*Karadeniz Technical University, Faculty of Medicine, Department of Radiation Oncology, 61080, Trabzon, Türkiye.*
[2]*Karadeniz Technical University, Faculty of Medicine, 61080, Trabzon, Türkiye.*
[3]*Karadeniz Technical University, Faculty of Medicine, Department of Radiology, 61080, Trabzon, Türkiye.*

**Corresponding author e-mail: mkandaz@ktu.edu.tr*

[1]*https://orcid.org/0000-0003-1106-6227*
[2]*https://orcid.org/0000-0001-9546-9781*
[3]*https://orcid.org/*0000-0002-7732-1289

ABSTRACT

Glioblastoma Multiforme is a primary malignant neoplasm of the central nervous system which has aggressive progression and mostly seen in adults. Literature accepts the treatment for Glioblastoma Multiforme as combined process of surgical, concurrent chemo-radiotherapy, adjuvant chemotherapy. Glioblastoma Multiforme can spread in a variety of ways. Intraparenchymal spread by using white matter tracts is the most known way of spreading. Dissemination of Glioblastoma Multiforme through cerebrospinal fluid can happen, causing drop metastases, leptomeningeal spread and spinal metastasis. Treatment guideline for leptomeningeal spread in patients with Glioblastoma Multiforme has never been prepared. However, complete surgical removal of the tumor is the accepted treatment of Glioblastoma Multiforme. Surgical treatment is an important option in patients with spinal cord compression with solitary metastases. However, palliative radiotherapy and chemotherapy can be used in the treatment of patients with extensive spinal canal involvement and spinal cord compression. We present a case in which we applied radiotherapy because of spinal cord metastasis that developed after Glioblastoma Multiforme treatment in an adult patient. Through these observations, we analyze therapeutic options of Glioblastoma Multiforme with spinal cord involvement.

Key Words: Glioblastoma multiforme, Radiotherapy, Spinal metastasis

ÖZET

Glioblastoma Multiforme, merkezi sinir sisteminin agresif progresyon gösteren ve çoğunlukla erişkinlerde görülen primer malign neoplazmıdır. Literatür, Glioblastoma Multiforme tedavisini cerrahi, eş zamanlı kemo-radyoterapi ve adjuvan kemoterapinin kombine süreci olarak kabul etmektedir. Glioblastoma Multiforme çeşitli yollarla yayılabilir. Beyaz cevher yolları kullanılarak intraparenkimal yayılım en bilinen yayılma şeklidir. Glioblastoma Multiforme'un beyin omurilik sıvısı yoluyla yayılması, damla metastazlarına, leptomeningeal yayılmaya ve spinal metastaza neden olabilir. Glioblastoma Multiforme hastalarında leptomeningeal yayılım için tedavi rehberi hiç hazırlanmamıştır. Bununla birlikte, tümörün cerrahi olarak çıkarılması, Glioblastoma Multiforme'un kabul edilen tedavisidir. Soliter metastazı olan omurilik basısı olan hastalarda cerrahi tedavi önemli bir seçenektir. Ancak yaygın spinal kanal tutulumu ve spinal kord basısı olan hastaların tedavisinde palyatif radyoterapi ve kemoterapi kullanılabilir. Erişkin bir hastada Glioblastoma Multiforme tedavisi sonrası gelişen omurilik metastazı nedeniyle radyoterapi uyguladığımız bir olguyu sunuyoruz. Bu gözlemler sayesinde, omurilik tutulumu olan Glioblastoma Multiforme'un terapötik seçeneklerini analiz ediyoruz.

Anahtar Kelimeler: Glioblastoma multiforme, Radyoterapi, Spinal metastaz

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INTRODUCTION

Glioblastoma Multiforme (GBM) is a primary malignant central nervous system tumor with a poor prognosis, which is usually seen in elderly patients.[1] In all the age groups, GBM is seen in 40-60 years.[2] Its prevalence increases in the 6th and 7th decades of life. At diagnosis the median age of this disease in countries *surgical* are: In the USA 64 years, in France 63 years, in the eastern Black Sea region of Turkey 62 years. More than 25% of GBM cases occur in patients over 70 years of age.[3-5] GBM can spread in different ways. Intraparenchymal spread by using white matter tracts is the most common way of spreading. Dissemination of GBM through cerebrospinal fluid (CSF) can happens, causing drop metastases, leptomeningeal spread (LMS) and spinal cord metastasis. An uncommon way of spreading of GBM is hematogenous spread to the lungs, bones, lymph nodes, or liver.[6] The estimated incidence of LMS with signs and symptoms has been noted to be 2%.[7] It is known as its fatality and being an end-stage complication of GBM. There are no treatment guidelines for GBM with spinal canal extension. Consequently; modern literature accepts the treatment for GBM as combined process of surgery, synchronous chemo-radiotherapy (CRT) and adjuvant chemotherapy (CT).[8-10] In this report, a rare case of GBM with spinal cord metastasis is discussed by tapping in the modern literature.

CASE REPORT

A 28 years old male patient was admitted on 08.05.2022 with severe headaches, visual impairment and sudden loss of consciousness. Differential diagnosis was made to enlighten the patient's condition and to rule out other clinical conditions. In his medical and family history there has been no other situation to explain these new symptoms. His magnetic resonance imaging (MRI) demonstrated acute and sub-acute hematoma with minimal white matter edema around it, and hemorrhagic fluid-fluid levels (Figure 1). This lesion has been removed totally with surgery. Findings observed in histopathological analysis: a cellular neoplasm formed of neoplastic astrocytes with oval nuclei, several with nucleoli and hyperchromasia in a fibrillary background. Some areas were seen as tumor giant cells. Microvascular proliferation and brisk mitotic activity were detected. The patient was diagnosed with GBM. The patient was diagnosed with methyl guanine methyl transferase (MGMT) promoter-methylated GBM. Three weeks after surgery, 60 Gy radiotherapy (RT) was administered concurrently with temazolamide. Starting 15 days after RT, a total of 6 courses of adjuvant temazolamide was given. The patient presented with symptoms of bilateral weakness and loss of sensation in both lower and upper extremities seven months later. Therefore MRI demonstration was necessary for differential diagnosis due to new onset quadriplegia. On 29.12.2022, MRI revealed multiple metastatic mass lesions in the dural sac along the thoracic and lumbo-sacral spinal canal (Figure 2). In conclusion, surgery was not considered for the patient because of multiple spinal metastases. After 30 Gy palliative RT was applied to the thoracic and lumbosacral spinal canal, chemotherapy was applied again.

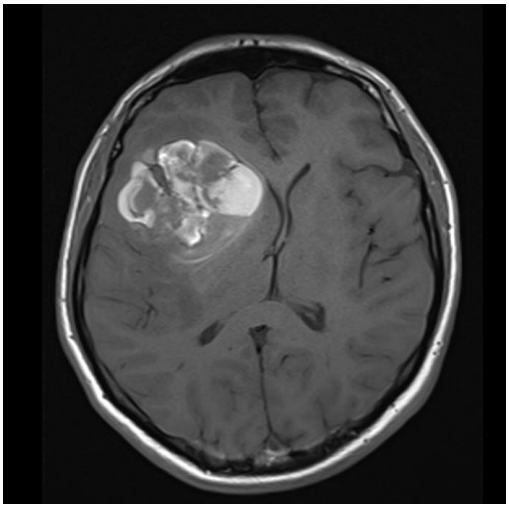

Figure 1. Brain MRI: On the axial T1-weighted image, a hemorrhagic mass of approximately 60x53 mm in the right frontal lobe with minimal white matter edema around it and hemorrhagic fluid-fluid levels is observed. Slight left shift in the midline and subfalcian herniation are observed secondary to the mass effect. There is compression in the right basal ganglia and right thalamus.

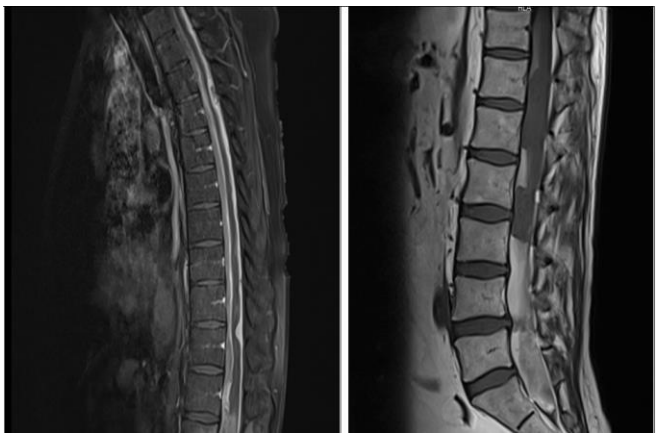

Figure 2. MRI THORACIC-LUMBAR: Multiple intra-dural metastatic mass lesions are observed in the thoracic and lumbar regions, which compress the spinal cord. In addition, there are diffuse linear enhancement and millimetric nodular metastases along the spinal cord.

DISCUSSION

GBM is a common primary malignant brain tumor with a poor prognosis.[1] Total surgical removal of the tumor is the accepted treatment and first approach of this tumor.[8] After the intervention, concurrent CT (temozolomide) and RT (60 Gy in 30 fractions) must be given due to the poor prognosis of GBM.[11] Adding bevacizumab to treatment does not improve overall survival but may increase progression-free survival.[12] Even if the symptoms of the patients regress after surgery, the tumor progresses in almost all patients. Since local recurrences are inevitable in similar cases, adjuvant treatment options should definitely be kept in mind.[19] GBM with extracranial metastases are very uncommon and it is seen in 5-10 out of 1000 individuals.[13] Spinal metastases should be commonly suspected in patients with a history of intracranial GBM who complain about symptoms not explained by the primary lesion and it may spread along compact fiber pathways such as corpus callosum, optic irradiation, anterior commisure, and fornix or via CSF pathways. But, when GBM is under apparent control, spinal metastases are clinically rarely detected. In light of new developments in medicine, a longer survival time is expected for patients.[13,14] Cheolwon Jang et al explained the complete survival of LMS with GBM was 9 months.[12] Because metastatic GBM is rare, biopsy should be performed to confirm spread of tumor. MRI is demonstrated to determine the primary lesion and distribution of spinal metastases.[15] Metastases most often be formed in the intradural space and are scattered by using CSF. Metastases can uncommonly spread to the vertebral column. It may happen by using the blood and lymphatic systems. Another cause is the mutations induced by RT.[16] While GBM is mostly seen in older ages of the life however it may rarely occurs in younger ages.[1] Our case was 28 year-old male patient. The level of spinal canal metastases correlates with patients' symptoms. In addition, increased intracranial pressure, cranial nerve palsies and hydrocephalus may be seen in patients with LMS.[17,18] Clinical worsening can be stopped using external RT, but complete clinical improvement cannot be achieved.[19] In patients with weakness and pain associated with spinal cord compression, any surgical method including resection, decompression or stabilization can improve the quality of life of patients. But the outcomes of this disease and its prognosis are still a major problem for the patients. Patients should be given detailed information about their risk or benefit profile. Palliative RT and CT may be useful in cases of GBM with spinal spread.[20] However, cases where laminectomy was performed to the involved levels and followed up have also been reported.[21] In the literature, GBM cases with spinal metastases, who received 20 Gy and 25-40 Gy RT to reduce pain and improve neurological symptoms, have been reported.[22,23] 30 Gy palliative RT was applied to our patient.

CONCLUSION

Spinal cord metastases of GBM are extremely rare. However, it is important for the clinical course and survival of patients. The patient's signs and symptoms, and physical examination are important in the diagnosis of metastasis. In addition, PET-CT, computed tomography and MRI can be used for general scanning of the body in the diagnosis of metastasis. Although surgical removal of the primary neoplasm from the brain is an appropriate and standard procedure, adjuvant CT and concurrent CRT are additionally applied for the treatment of GBM with LMS in the current literature. LMS of GBM has a poor prognosis and patients with these conditions have low survival rate. Patients may benefit from palliative RT and CT. Although involvement of the spinal cord (SC) has been noted with increasing frequency in recent years, literature provides only a few well documented cases. Therefore, more research and treatment guidelines are needed for the treatment of spinal canal metastasis of GBM.

Authorship contribution statement

Consept and desing: MK

Acquisition of data: MK, AG and IE

Analysis and interpretation of data: MK, IE and AG

Drafting of the manuscript: MK, IE

Critical revision of the manuscript for important intellectual content: MK, IE

Declaration of competing interest

None of the authors have potential conflicts of interest to be disclosed.

Ethical approval

Not applicable.

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