CASE REPORT

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Rapid Recurrence of Glioblastoma After 12 Days Despite Gross Total Resection

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Abstract

To present a unique case of rapid recurrence of glioblastoma after 12 days despite gross total resection. Glioblastomas are highly mortal and aggressive tumors. Despite advancements in therapy, gross total resection, radiotherapy, and chemotherapy, the recurrence rate is high and overall survival is short. We report a unique case of a patient with recurrence of glioblastoma in just 12 days despite gross total resection, which has not been previously reported in the literature. A 65-year-old woman complained of headaches and disturbance of speech for three days. On magnetic resonance imaging (MRI), a 5x4.5 cm diffuse contrast-enhanced mass lesion was detected. The patient underwent elective surgery in which the lesion was completely removed. Postoperative MRI scans revealed that the tumor was completely removed. She was released from the hospital on her postoperative 6th day. On the postoperative 12th day the patient was brought to our hospital with seizures and somnolence. On radiological images, a mass lesion in the same surgical area was detected. She underwent surgery in which the recurrent mass lesion was completely removed. Biopsy results correlated with those of the previous surgery. The reason why glioblastomas are such mortal tumors is their high recurrence rate. Overall recurrence occurs between 32-36 weeks after surgery. Serial neuroimaging should be performed to monitor potential relapse. Early recurrence before 3 months is very rare. A case like ours in which the tumor re-occurred just 12 days after total resection shows that there is still research to be done to understand the recurrence characteristics of glioblastoma.

Keywords: Glioblastoma, recurrence, brain tumors, neuro-oncology

INTRODUCTION

Glioblastomas represent 15% of all brain tumors and are the most common malignant tumor of the central nervous system in adults (1). Previously known as glioblastoma multiforme, according to the World Health Organization (WHO) 2016 classification of central nervous system tumors, they are now situated in the subgroup of diffuse astrocytic and oligodendroglial tumors and are divided into isocitrate dehydrogenase (IDH) mutant and wild-type glioblastoma (2). IDH-wildtype represents approximately 90% of all glioblastomas and occurs mainly in patients over 55 years of age. The IDH-mutant type arises primarily from prior lower grade diffuse gliomas and is mostly seen in younger patients (3). The term "not otherwise specified" is used for tumors in which the IDH evaluation could not be performed (2). Development and risk factors remain unclear, but patients with genetic disorders such as neurofibromatosis and Li-Fraumeni syndrome and radiation exposure are shown to have a higher risk of developing glioblastoma (4). Symptoms may change due to the size and location of the mass and may vary from simple headaches to seizures, motor deficits, or coma. The treatment goal is maximum safe resection followed

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by radiotherapy and in some cases chemotherapy. Despite good surgical outcomes, the common length of survival is 12 to 15 months. Only 3-7% of all patients survive for more than 5 years. People who have not undergone any treatment usually die within 3 months (5). The reason for the high mortality of glioblastoma is the high recurrence rate. Most patients show relapse of the tumor 8 months after surgery. Recurrence before 3 months, especially after removal of more than 98% of the tumor and adjuvant radiotherapy or chemotherapy, is very rare (6). Patients with a high Karnofsky performance score (KPS) before surgery usually have a longer survival time. Biopsies showing O-6-methylguanine-DNA methyltransferase (MGMT) translation have a higher suitability to temozolomide (TMZ), thus showing a better long-time survival (7). Also, an IDH1 mutation or adjuvant use of the antiangiogenic agent bevacizumab might lead to a more favorable prognosis (8). To summarize, patients with the IDH1 mutation and the MGMT methylation combined have the longest survival, the ones with either one of them intermediate survival, and patients with none of them the shortest (9). We report a unique case of a patient with recurrence of glioblastoma in just 12 days despite gross total resection, which has not been previously reported in the literature.

CASE PRESENTATION

We present the case of a 65-year-old woman complaining of headaches and disturbance of speech for three days. Glasgow Coma Scale (GCS) score was 15. The general condition was good, but she had problems with articulation. Cranial magnetic resonance imaging (MRI) was scheduled in which a 5x4.5 cm diffuse contrast-enhanced mass lesion was detected (Figure 1). The patient was informed about the pathology, and informed consent documents were obtained. She underwent elective surgery, and the postoperative images showed that the lesion was completely removed (Figure 2). The biopsy was reported as glioblastoma [WHO grade IV, IDH wild-type, GFAP (+), ki67 (+), SMA (-)] (Figure 3). She was released from the hospital on her postoperative 6th day without any deficits and scheduled for radiochemotherapy 10 days later. On the postoperative 12th day the patient was brought to our hospital with seizures and somnolence. GCS on admission was 10 (E3V3M4). On MRI, a mass lesion in the same operation area was detected (Figure 4). She underwent surgery in which the recurrent mass lesion was completely removed. The biopsy results correlated with the same as the previous surgery (Figure 5). The patient was transferred to the radiation oncology department for radiotherapy and chemotherapy after 10 days without any neurological deficits.

DISCUSSION

Glioblastomas are the most aggressive primary brain tumor. Despite advancements in therapy standards, gross total resection, radiotherapy, and chemotherapy, the recurrence rate is high and overall survival is short. Survival for longer than 2 years is only 2.2% (10). Only a few single cases survive for longer, but potentially wrong pathology results must be taken notice. The reason why glioblastomas are such mortal tumors is their high recurrence rate. Overall recurrence occurs between 32-36

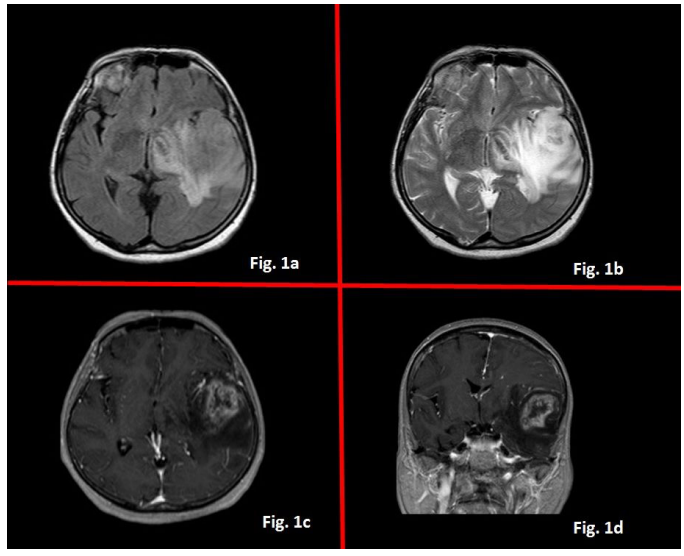

Figure 1. Cranial MRI of the patient before the first surgery. T1 axial (1a), T2 axial (1b), contrast-enhanced T1 axial (1c), and contrast-enhanced T1 coronal (1d) views. A 5x4.5 cm diffuse mass lesion in the temporal area was detected
MRI: Magnetic resonance imaging

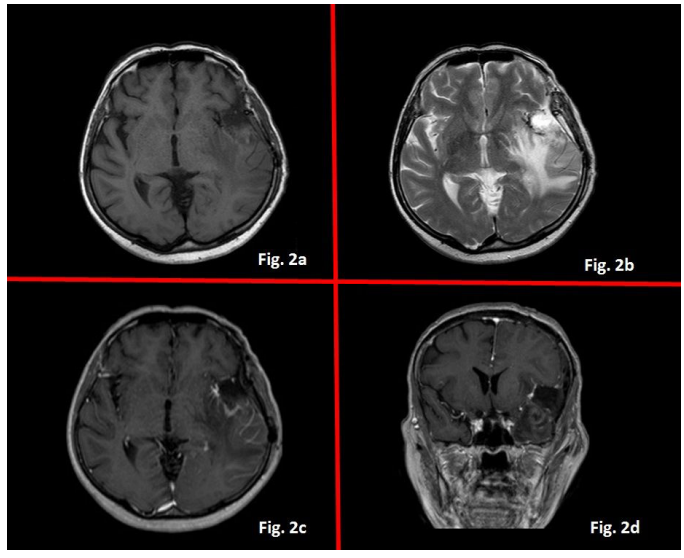

Figure 2. Cranial MRI of the patient after the first surgery. T1 axial (2a), T2 axial (2b), contrast-enhanced T1 axial (2c), and contrast-enhanced T1 coronal (2d) views. Gross total resection of the entire tumor is observed
MRI: Magnetic resonance imaging

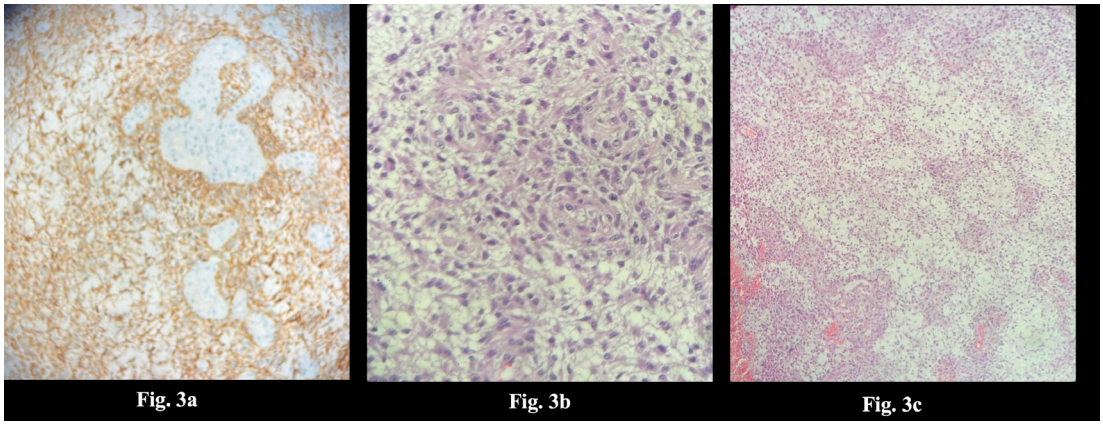

Figure 3. Images of the pathology slices after the first surgery. (3a) Positive immunohistological GFAP positivity and microvascular proliferation areas (IHKx200), (3b) Cellularity of tumoral cells and nuclear atypical proliferations (HEx400), (3c) Crest imaging and cellularity (HEx200). All findings indicate glioblastoma (WHO Grade IV)

WHO: World Health Organization, GFAP: Glial fibrillary acidic protein

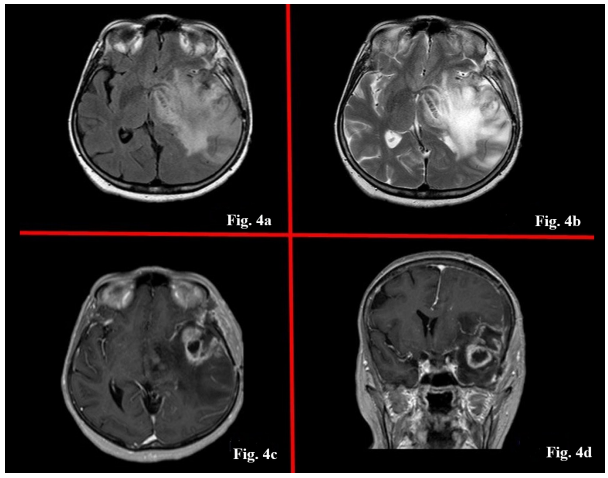

Figure 4. Cranial MRI of the patient 12 days after surgery. T1 axial (3a), T2 axial (3b), contrast-enhanced T1 axial (3c), and contrast-enhanced T1 coronal (3d) views. A recurrent mass lesion in the same surgical area is detected

MRI: Magnetic resonance imaging

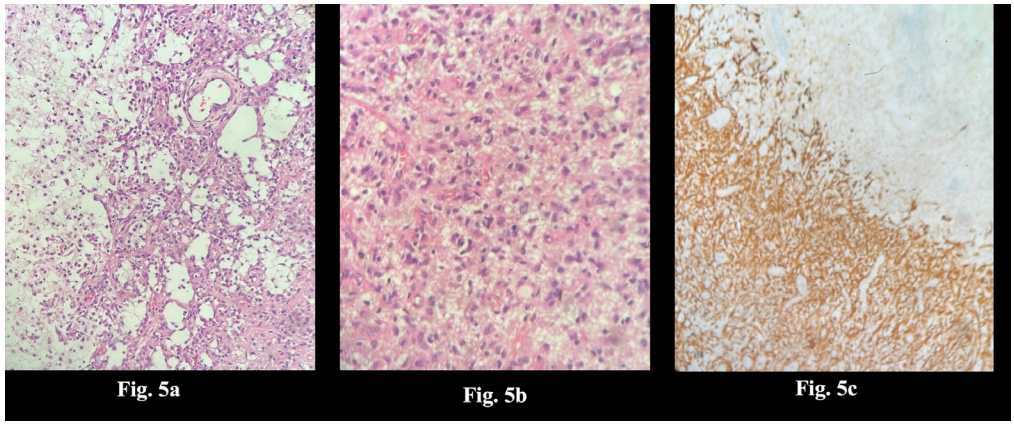

Figure 5. Images of the pathology slices after the second surgery. (4a) Necrosis area (HEx200), (4b) Cellularity and atypical proliferation (HEx400), (4c) GFAP positivity and tumor necrosis area (IHKx200). All findings indicate recurrent glioblastoma (WHO Grade IV)

WHO: World Health Organization, GFAP: Glial fibrillary acidic protein

weeks after surgery and increases 90% of the original tumor location (6). Some are thought to develop in the form of new lesions due to continuous growth patterns or dissemination (11). Serial neuroimaging should be performed to monitor potential recurrence, but differentiating from pseudoprogression or radionecrosis may be difficult. Especially after radiation and TMZ treatment, pseudoprogression can occur in 20-30% of cases (12). Additional imaging modalities such as diffusion-weighted imaging and perfusion MRI with contrast MRI might be necessary to make this differentiation. The management of recurrent gliobastomas remains controversial. Overall KPS, involvement of eloquent areas, and size of the lesion must be taken notice. Reoperation, reradiation, and systemic chemotherapy or a combination of these are the options (13). Because our patient developed new symptoms after the post-operative 12th day and did not receive any radiotherapy or chemotherapy, we did not suspect any pseudoprogression or radionecrosis in such a short time frame and suspected a relapse of the tumor, which was later confirmed by the pathology results.

CONCLUSION

Glioblastomas are highly mortal and aggressive tumors with a high recurrence rate. Even gross total resection in combination with radiochemotherapy is not sufficient to avoid relapse. Early recurrence before 3 months is rare. A case like ours in which the tumor re-occurred just 12 days after total resection shows that there is still research to be done to understand the recurrence characteristics of glioblastoma.

Ethics

Informed Consent: Informed consent form was obtained from the patient.

Authorship Contributions

Surgical and Medical Practices: M.A.Ç., Concept: O.B., Design: S.Ş., Data Collection or Processing: Y.K., Analysis or Interpretation: Y.K., Literature Search: O.B., Writing: İ.A.

Conflict of Interest: No conflict of interest was declared by the authors.

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