# Glioblastoma Located in Posterior Fossa

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**Özet**

Sekiz ay önce posterior fossa yerleşimli glioblastoma (GB) tümörü nedeni ile opere edilmiş 63 yaşında kadın hasta baş ağrısı, stupor, bulantı ve kusma şikayetleri ile acil servise getirildi. Çekilen beyin BT ve MR tetkiklerinde posterior fossada kistik-nekrotik görünümlü tümör nüksü tespit edildi. Tümör ameliyatla tama yakın çıkarıldı. Ancak operasyon yerinde dirençli beyin omurilik suyu (BOS) fistülü oluştu ve daha sonra çoklu antibiyotik drenci olan Acinetobacter baumanii tarafından enfekte edildi. İki ay sonra hasta septisemiden kaybedildi. Posterior fossa yerleşimli GB, yetişkin ve çocukta oldukça nadir olup iki farklı şekilde ortaya çıkar: de novo (primer tip) ve sekonder GB. Her ne kadar bizim hastamızın tümör alt tipini immunhistokimyasal olarak yeterince aydınlatılamasa da hastadaki tümörün beyinde başka tutulum alanının olmaması, GFAP, vimentin gibi boyalarla güçlü boyanması ancak p53 mutasyonunun olmaması gibi nedenlerle de novo kökenli olduğu düşünüldü.

**Anahtar Kelimeler**

Glioblastoma; De Novo; Fistül; Menenjit.

**Abstract**

A 63-year-old woman operated eight months ago for glioblastoma (GB) located in posterior fossa was admitted to emergency room for stuporous, nausea, vomiting and headache. CT and MR showed recurrence of posterior fossa cystic-necrotic tumour without any other intracranial contrast enhancing lesion. Tumour was removed near totally. Perseverative cerebrospinal fluid (CSF) fistula from the incision was occurred and contaminated by multidrug resistant Acinetobacter baumannii. Two months after the tumour removal she was expired because of the septicaemia. GB located in posterior fossa is uncommon in both adults and children; and it appears as two different subsets: de novo (primary type) and secondary glioblastomas. Although our patient's immunohistochemical findings werenot enough to demonstrate the tumour subset, we have thought that her tumour was de novo because of no other brain involvement, staining with GFAP, vimentin, and nearly absent p53 mutation.

**Keywords**

Glioblastoma; De Novo; Fistula; Meningitis.

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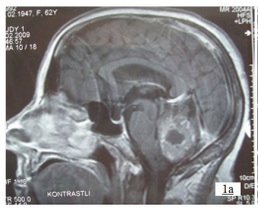
## Introduction

Glioblastoma (GB) rarely appears in the posterior fossa, and accounts for just 0.24 to 3.4% of all cases of GB [1]. GBs located in posterior fossa are not yet completely understood for their pathogenesis and prognosis due to their rarity [2]. Here we report a posterior fossa GB in an adult patient.

## Case Report

A 63-year-old woman operated eight months ago for posterior fossa GB (Fig. 1) was admitted to emergency room for stuporous, nausea, vomiting and headache with a Glasgow coma scale score of 10. Computed tomography (CT) scan and magnetic resonance (MR) imaging showed recurrence of posterior fossa cystic-necrotic tumour in diameter with 40x50x50 mm without any other intracranial or spinal contrast enhancing lesion (Fig. 2). She underwent surgery through previous midline suboccipital approach. After passing of the deep servical muscles dura mater like thick, dense granulomatous tissue which could be produced by an artificial dura mater used in first operation was seen. After opening of this granulamatous tissue a rubber like, pink and partially encapsulated tumour was removed totally except subtentorial part. The dura mater like granulamatous tissue was primarily closed tightly. Postoperative MR scan confirmed near total removal of tumour (Fig. 3). Histopathological diagnosis was GB. Anaplastic and poorly differentiated tumour was composed of multinucleated astrocytic cells with marked nuclear atypia and brisk mitotic activity; and showed pseudopalisading and ischemic necrosis in the white matter of the cerebellum. Intranuclear cytoplasmic inclusions were also conspicuous at the nucleus of the tumour cells. The tumour cells showed cytoplasmic positivity for glial fibrillary acidic protein (GFAP), vimentin and S-100; but poor reactivity for p53 mutation with immunohistochemical staining (Fig. 4).

Three days later, because of the cerebrospinal fluid (CSF) fistula from the incision an external ventricular drainage catheter was inserted. Despite of external drainage, CSF fistula persevered and ten days later she again underwent surgery to be repaired the dural defect through first incision. After duraplasty, she became hyperpyrexic and drowsy. The cultures of the CSF revealed Acinetobacter baumannii which was sensitive just to imipenem, amicasin, colomycin and vancomycin. Intravenous (IV) meropenem, and vancomycin were initiated. Amicasin was also administered intratechally. CSF fistula recurred; and in the second session for the management of infection and CSF fistula, the cranial base was obliterated by using vascular pedicle of trapezius muscle flap (Fig. 5). Because the infectious microorganism persevered to contaminate the CSF, the antibiotic regimen was exchanged to colomycin 1,000,000 U IV and 50,000 U intrathecally. Fifth days later the CSF fistula recurred once again and she became comatose condition with septicaemia, hypotension, and multiorgan failure. And then two months after the tumour removal she was expired.



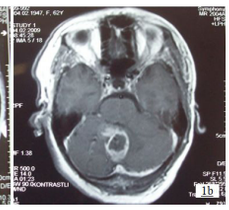
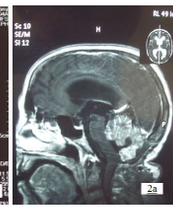




Figure 1. (1a, 1b) preoperative MR scans obtained six months ago reveal the cyctic-necrotic malignant posterior fossa tumour.



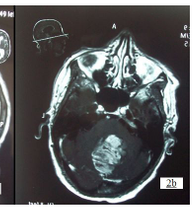
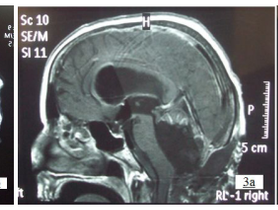




Figure 2. (A-B) preoperative MR scans dis- close the recurrent tumour which infiltrates the tentorium, right cerebellar pedincle and medulla oblongata.



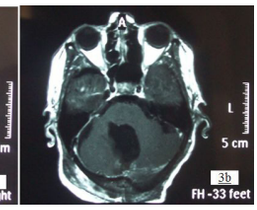
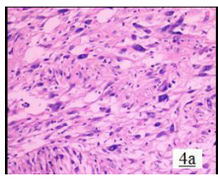
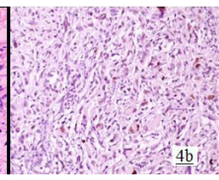




Figure 3. (A-B) postoperative MR scans show the near total removal of the tumour.



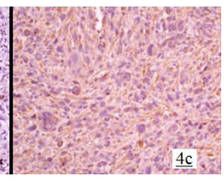




Figure 4. (A) multinucleated astrocytic giant tumour cells with inclusions (H&Ex200); (B) the tumour cells show poor cytoplasmic positivity for p53 mutation (IHCx200); and (4c) the tumour cells showed cytoplasmic positivity for glial fibrilary asidic protein (GFAP) (IHC x200)

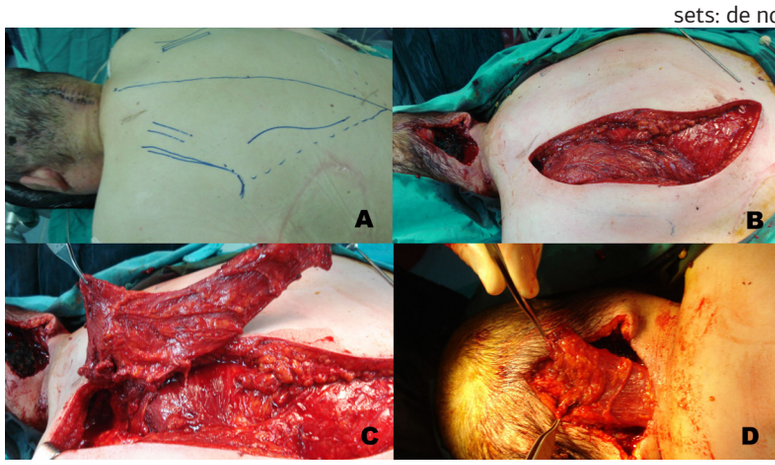



Figure 5. Steps of the second surgical session in obliteration of the posterior fossa with trapezius muscle flap. (A) the skin incision planned; and (B) preformed; (C) trapezius muscle flap prepared based on transverse cervical artery and vein; and (D) insertion to the posterior fossa after preparation of the subcutaneous tunnel.

## Discussion

GB located in cerebellum and/ or posterior fossa is uncommon and can be seen all ages and both gender. Grahovac et al [1] reported in their review that this tumour are two different subsets: de novo (primary type) and secondary glioblastomas. They suggested that primary glioblastomas develope more frequently in elderly patients and are generally characterized by absence of heterozygosity 10q (70%), EGFR amplification (36%), and TP53 mutation (30%). They also concluded that the lost of the entire chromosome 10, no TP53 mutation and EGFR/ PTEN/Akt/ mTor signaling pathway is typical for primary glioblastomas [1, 3]. There is no apparent reason why these tumours rarely occur in the cerebellum and posterior fossa [2]. Although our patient's immunohistochemical findings were not enough to demonstrate the tumour subset, we have thought that her tumour was de novo because of no other brain involvement, staining with GFAP, vimentin, and nearly abscent p53 mutation. Although the development of GB following pilocytic astrocytoma, medulloblastoma and other poste-

rior fossa midline tumours has been described [2], this description of this transformation could be difficult by possibility to anaplastic astrocytic evolution of those cells. On the other hand there is controversy concerning the primary origin of GB or secondary anaplastic change from diffuse astrocytomas to GB. The expression of GFAP is used to distinguish astrocytic neoplasms from epithelial or mesenchymal tumours that may on occasion mimic a glioma. The detection of GFAP is also useful in the investigation of tumour histogenesis and differentiation both in vivo and in vitro [3]. On the other hand most stem cells where they locate hippocampus, subventricular zone of lateral ventricles, and external granular layer of the cerebellum have characteristic of glial cells, such as GFAP expression. In literature it has been proposed that the first oncogenic hit might involve these stem cells [4]. In our patients we noticed intraoperatively that recurrent tumour was tightly attached to the cerebellar vermis and right medial site of the cerebellar cortex.

There are no characteristic CT and MR imaging findings of cerebellar glioblastoma so it could not be differentiated from metastatic tumours, cerebellar infarcts, abscess or astrocytic tumors. The relative cerebral blood volumes choline levels in the peritumoural areas calculated with perfussion-weighted MR imaging and MR-spectroscopy are clearly higher in gliomas than in metastases. Inspite of primary or metastatic tumours, GB could be seen high signal intensity on diffusion-weighted MR images and decreased centrally signal intensity on ADC map [2].

The biological behavior of posterior fossa and supratentorial GB is similar. The median survival for this tumour is approximately 19 months [2]. In literature, it has been suggested that achievement of the complete tumour extirpation increases the survival especially in patients with recurrent high grade gliomas. After surgery, external beam radiotherapy and/ or chemotherapy has been also recommended [1]. To avoid postoperative complications, an adequate surgical exposure and reconstruction of the cranial base are required. The cranial base is usually reconstructed with abdominal fat graft, rotation of local and distant pedicled muscle flaps, and free muscle flaps vascularized with microsurgical vessel anastomosis [5]. In our patient we used to vascular pedicle of the flap of the trapezius muscle, however because of inefficient dura closure by using a dural-substitute in the first operation eight months ago, the CSF fistula showed perseverence because of dense semivital granulation tissue.

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