Meningioma and Glioblastoma Adjacent in the Brain

Beyinde Birlikte Görülen Meningioma ve Glioblastoma

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Abstract: An unusual case of two primary brain tumors, meningioma and glioblastoma adjacent in the brain is presented. The cause of such combined tumors is uncertain. Simple coincidence may be the likely explanation in most cases, because both meningiomas and gliomas are relatively common. Preoperatively, these two separate lesions were detected on computerized tomography and magnetic resonance scans. Gross total removal of both tumors was accomplished at a single operation. The modern imaging methods such as computerized tomography and magnetic resonance not only provide the conditions for a better diagnosis before the operation but also direct the operation plan to excise both tumors in one procedure.

Key Words: Adjacent tumors, glioblastoma, meningioma, multiple brain tumors

Özet: İki primer beyin tümörünün, meningioma ve glioblastoma, beyinde nadir görülen komşulukları sunulmaktadır. Bu birlikteliğin sebebi bilinmemektedir. Meningioma ve glioblastoma beyinde göreceli olarak sık bulunduklarından, olguların çoğunda rastlantı tek sebep olabilir. Bu iki ayrı lezyon, bilgisayarlı tomografi ve magnetik rezonans tetkikleri ile preoperaif olarak saptanmışlardır. Her iki tümör de, tek girişimle gross total olarak çıkartılmışlardır. Bilgisayarlı tomografi ve magnetik rezonans gibi modern tetkik yöntemleri, ameliyat öncesinde yalnızca tanı sağlamakla kalmayıp aynı zamanda da her iki tümörün tek girişimle çıkartılabilmesi için plan yapmamıza da olanak vermektedirler.

Anahtar Sözcükler: Glioblastoma, komşu tümörler, meningioma, multipl beyin tümörleri

INTRODUCTION

The coincidence of multiple primary brain tumors of different cell types in the same patient has been reported occasionally (1,2,3,4,5, 7,8,9,10,11,12). An extensive review of this subject was reported previously (2,3). In some cases, although one tumor was found at the operation, the other tumor was demonstrated at autopsy (7,8). There are few case reports represented in the literature that these tumors were diagnosed and operated on during life (2,4).

The terms of "collision" and "juxtaposition" have been used when the tumors are intermixed or close to each other. The criterion for saying they are separate is the existence of the brain tissue in between (11).

CASE REPORT

A 30-year- old man was admitted to the Neurosurgery Clinic of Haydarpaşa Numune Hospital due to occipital headaches and numbness of the right arm. Neurologic examination showed bilateral papilledema and hyperactivity of deep tendon reflexes. He had bilateral Babinski sign. Computerized tomography (CT) showed two separate mass lesions in the left hemisphere. One of the tumors, localized in the left frontotemporoparietal area, showed extensive homogenous contrast enhancement (Fig. 1). This lesion also exhibited the characteristic findings of the extra-axial masses such as shifting the gray-white matter junction and the distal branches of middle

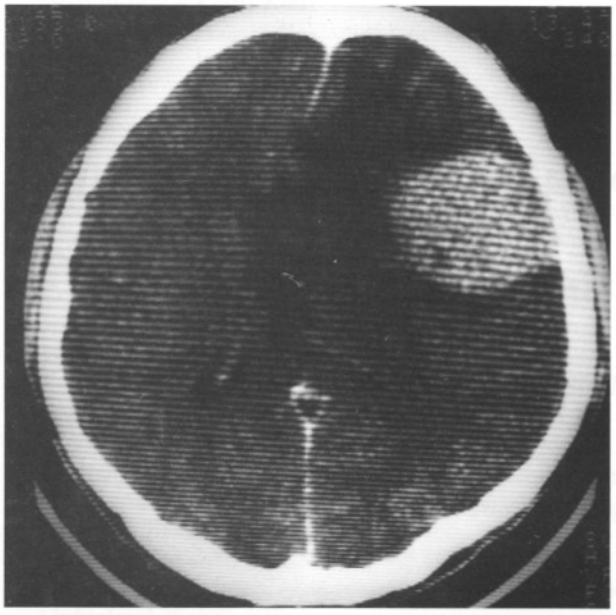

Figure 1: Post contrast CT scan shows a homogenously enhancing left fronto-parietal round lesion (meningioma).

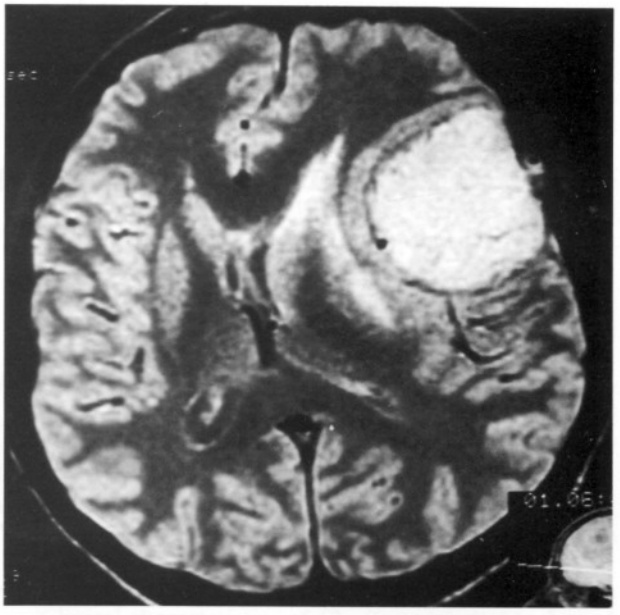

Figure 2: PD weighted axial MR scan of the lesion seemed in figure 1.

cerebral artery to the midline in PD (proton density)-weighted magnetic resonance (MR) images (Fig. 2). The second lesion was localized intra-axial, near the vertex in the left frontal lobe, showed non-homogenous contrast enhancement and extensive edema on CT scan and T2 weighted axial MR images (Fig. 3,4).

For such reasons, an accurate diagnosis could not be obtained on CT and MR scanning; furthermore, and the the lesions had mass effects; therefore, a left frontotemporal craniotomy was performed. As the first step, a nodular tumor attached to the dura at the temporal region was totally removed. Then the other tumor located in the

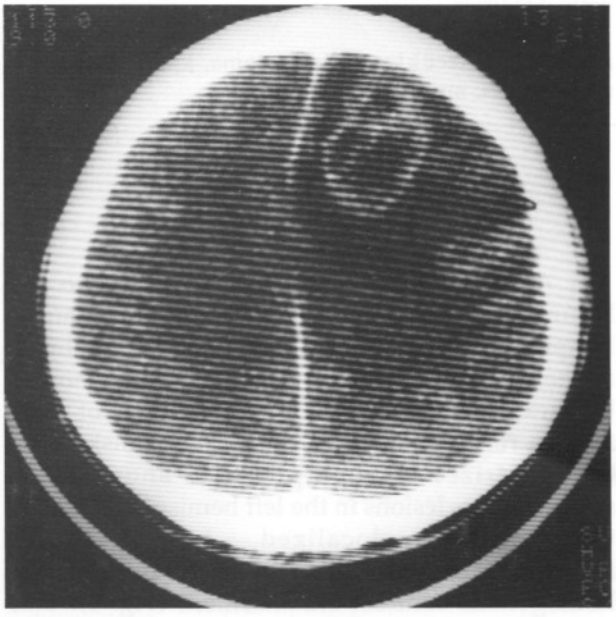

Figure 3: CT scan reveals a left frontal non-homogenous contrast enhancing mass with hypodens peripheral edema (glioblastoma).

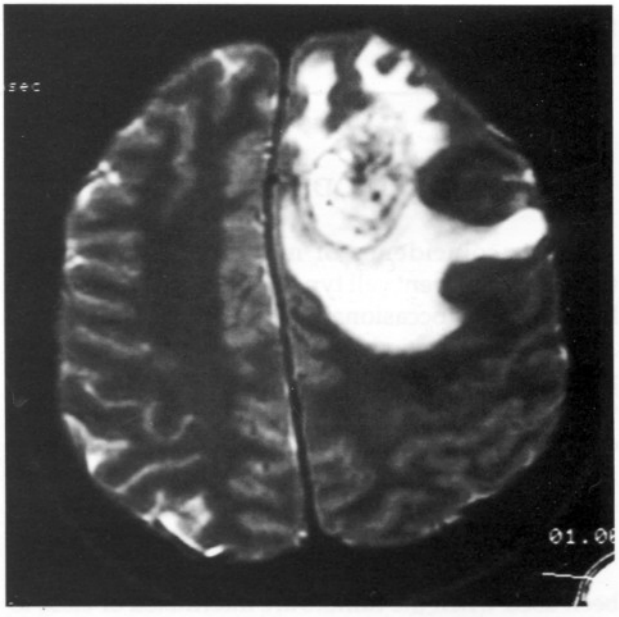

Figure 4: T2 weighted axial MR scan the lesion seemed in figure 2.

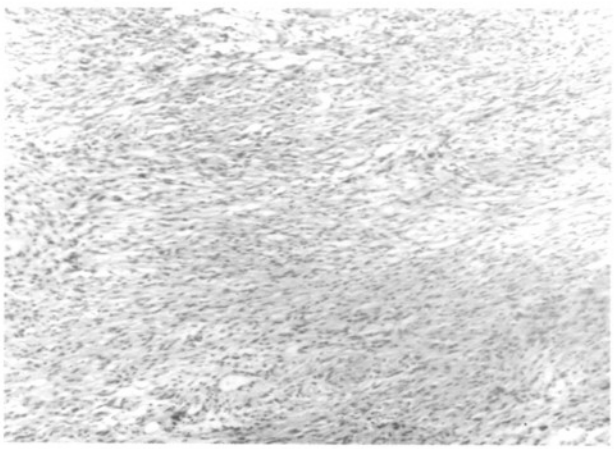

Figure 5: Section of a fibroblastic meningioma is composed of markedly elongated cells. There is no prominent whorls or lobularity. (H & E, x 100)

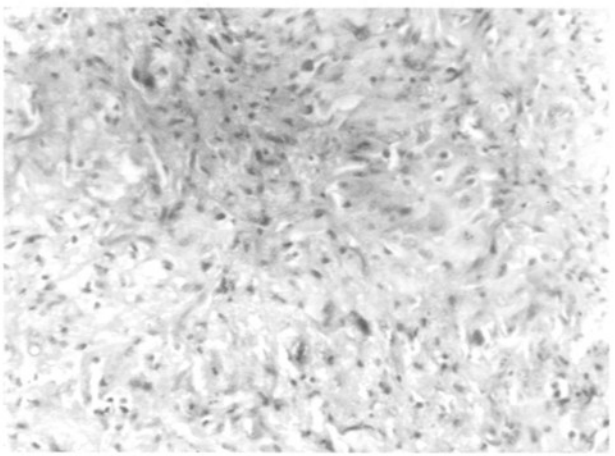

Figure 6: Densely cellular anaplasia in glioblastoma with excessive multilayered vascular endothelial proliferation. (H & E, x 400)

frontal lobe was removed gross-totally.

Pathologic examination of the first lesion, revealed encapsulated tumor tissue consisting of spindle-shaped cells that did not show pleomorphism arranged in parallel bundles without whorl formation. Tumor infiltrated into dura mater. This appearance was consistent with fibroblastic meningioma (Fig. 5). Pathologic examination of the other lesion showed that tumor tissue consisted of anaplastic glial cells with frequent palisading around a central area of necrosis. Vascular endothelial proliferation was present within and adjacent to the tumor. The appearance was consistent with GBM (Fig. 6). GFAP (glial fibrillary acidic protein), Cytokeratin, EMA (epithelial membrane antigen), Vimentin, Laminin immunohistochemistry were performed using the alkaline phosphatase immunohistochemical method. Only the glioblastoma cells were stained with GFAP.

Postoperative course was uneventful and the patient was discharged on the 10th postoperative day. Postoperative radiation therapy at a dose of 5000 cGy was delivered. The patient died 5 months later.

DISCUSSION

The simultaneous occurrence of multiple primary brain tumors of different histological type not due to the radiotherapy or phacomatosis are rare, accounting for 0.4% of all the primary brain tumors (2,5). These tumors, having different histological types, can be situated closely or far from each other in the brain (1).

Obtaining an early diagnosis of both tumors with these patients is an important problem. The use of plain skull x-rays (3) and cerebral angiography (11) in diagnosis has been reported.

Before the CT era, when meningeal and glial tumors occur at the same time, the diagnosis has been rarely made before the operation and not confirmed until an autopsy was performed. In most of the reported cases, one tumor was removed and the second tumor was diagnosed at autopsy (2,8,11).

Martins et al. (7) and Nagashima et al. (9) discussed the importance of the preoperative diagnosis for managing the patients with multiple primary brain tumors of a different histological type.

Sackett et al.(11) stressed that operative and postmortem examinations were also quite difficult when meningeal and glial tumors occurred at the same time.

Gass and Van Wagenen (4), first reported a meningioma and an underlying oligodendroglioma adjacent in the brain and they successfully removed both tumors at a single operation.

When radiological studies reveal multiple brain tumors, it is advised to recommend a biopsy or removal of one tumor at least (6).

As the lesions have mass effects and as histopathological diagnosis is required for optimal therapy, we have planned to excise both lesions.

The cause of such combined tumors is uncertain. Because both meningiomas and gliomas are relatively common among the intracranial neoplasms, it may be reasonable to suppose the simple coincidence (5,8). This assumption is supported by the statistical analysis of Russel and Rubinstein (10). Fischer (3) detected a meningioma on one side of the brain followed within a year by a malignant glioma in the opposite hemisphere. For such kind of tumors, in different lobes or hemispheres, as in his case, chance alone may be the only explanation.

Factors such, as genetic predisposition to multiple neoplasms, surgical trauma, ionizing radiation may influence tumor development (8). Other mechanisms that have been suggested are a neoplastic transformation of the reactive glial cell which is commonly found in the brain tissue surrounding a convexity meningioma or conversely transformation of the arachnoid cell in response to the growth of a subjacent glioma or induction of one tumor by radiotherapy for another (2,10,11).

Davis et al. (2) identified an important aspect, an underlying genetic predisposition to forming multiple tumors.

Vaquero, et al. (12) reported convexity meningioma and glioblastoma in collision. In their case, a nodular tumor attached to the dura mater was removed and the tumor was included within a soft and friable tissue, which was subtotally removed. They thought their case supported the possibility of a malignant transformation within the gliosis surrounding the meningioma.

Our case was not associated with phacomatosis and also no previous surgical trauma and ionizing radiation had been recorded in his history. The close proximity of two tumors suggests that local causes are probably responsible in our patient.

CONCLUSION

Although it's rare, multiple primary intracranial tumors of diverse histological types must be considered in differential diagnosis. Modern imaging methods like CT and MR not only help the diagnosis before the operation but also direct the operation plan for excising both tumors in one procedure.

This sort of cases of adjacent primary brain tumor of different histological origin seem to support the hypothesis of induction of growth of one tumor by other. This paper has already been presented at the 10th Turkish Neurosurgical Congress.

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