Extraneural Metastasis Of Glioblastoma Multiforme Case Report

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Abstract : The case of a 26-year-old man with extraneural metastasis from intracranial glioblastoma multiforme is presented. The patient was operated on three times in five years. After the second operation, metastasis occurred direct to the cranium and to the dura mater and remote metastasis to the left cervical region. We discuss the incidence, treatment and outcome with a review of the literature.

Key Words : Extraneural metastasis, Glioblastoma multiforme.

INTRODUCTION

Metastatis of intracranial tumours and particularly of gliomas is uncommon. The first case with the spread of extraneural metastasis was reported in 1928. Since then, nearly 100 cases of metastatic glioma have been reported (1,3,5,7,10,16,18,19,21).

It is generally noted that most of the extraneural metastases have been observed after craniotomy and diversional cerebro-spinal fluid (CSF) shunt proceedures for treatment or diagnosis (2,5,9,10). Spontaneous extraneural metastasis of glioblastoma and cranium invasion are extremely rare (1,3,6,11,12,13). In this report we present a case of glioblastoma multiforme with cervical region metastasis arising from dura and cranium invasion after the second surgical craniotomy.

Case Report

A 28-year-old man was admitted to the Neurosurgical Department on April 5, 1987, because of severe headache, nausea and vomiting, seizures and blurred vision for two weeks. There were no significant systemic physical findings. Neurological examination revealed marked papilledema bilaterally and right-sided hemiparesis. EEG demonstrated generalised abnormality. CT-scan with contrast medium showed a cystic mass lesion in the left parieto-occipital region. Gross total tumour excision was performed on April 17, 1987. Histopathological examination revealed a glioblastoma.

Brain radiation was begun on May 5, 1987, (total 7000 Rad.). The patient appeared to be clinically stable and there were no complications in the postoperative period. On November 23, 1987 chemotheraphy (Adriomycin, Endoxan, Oncovin, Decarbazine) was started and the patient was discharged symptom free on December 4, 1987.

Grand mal seizures and dysphasia were observed on September 26, 1990. CT-scan with contrast medium demonstrated tumour recurrence in the left parieto-occipital region (Fig. 1) which was totally removed on September 30, 1990. Reflecting the scalp, part of the tumour, 2 cm in diameter was revealed, protruding through the craniotomy defect into the subgaleal space. The dura mater was found to be tightly adherent to the parietal bone and the underlying brain. Microscopic examination disclosed grade IV astrocytoma with extradural and extracranial

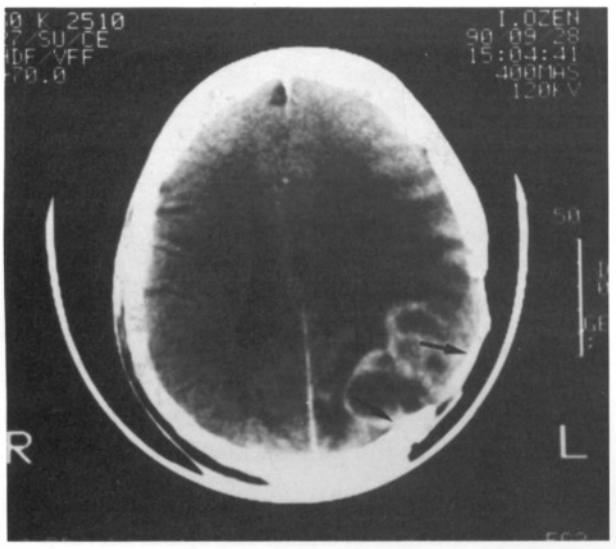


Fig. 1 : CT scan with contrast shows extension of recurrent glial tumour with ring contrast enhancement in the left parieto-occipital region. Tumoral lesion infiltrated dura mater and cranium (arrows).

extension (Fig. 2) The patient was discharged on the 9th post-operative day in good health.

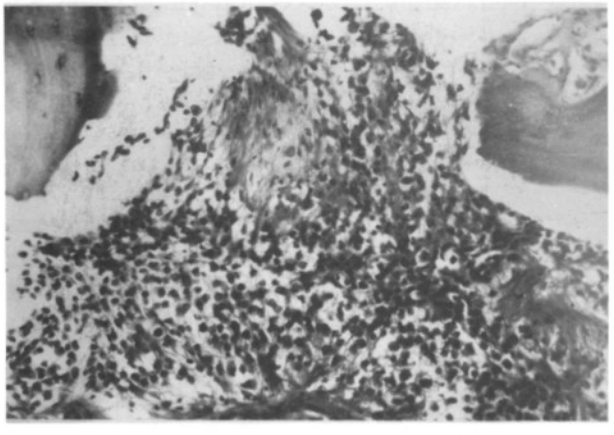
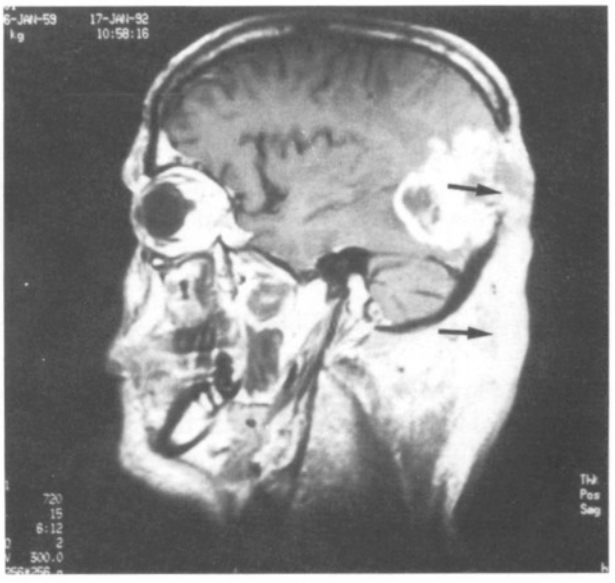


Fig. 2 : Cranial bone trabeculae infiltrated by the tumour (Hematoxylin-eosin X 200).

The patient was readmitted on January 26, 1992, because of left occipital headache, pain and swelling in the left upper middle cervical region. Neurological and overall systemic examination were normal. MRI in the PD, T2-weighted axial and T1-weighted coronal series after Gd-DTPA injection showed invasive neoplastic tissue in the left occipital and cervical regions (Fig. 3-A). On February 5, 1992, subtotal tumour excision was performed. Solid tumour was found to be attached to the surrounding soft tissue, muscles, great vessel and upper part of the left brachial plexus. Histopathological examination showed metastatic glioblastoma multiforme. In the post-operative period, additional radiotherapy was given. After 3 months lympha accumulation was observed in the tumour cavity (Fig. 3-B). Since the extraneural metastatic tumour continued to grow, on May 5, 1992, a second course of chemotherapy was started and the patient was later discharged with no neurological deficit.



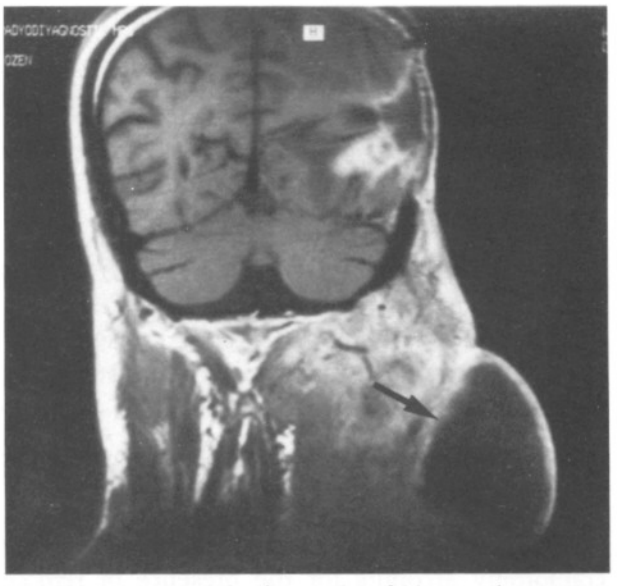


Fig. 3 A,B : (A), T1 weighted coronal, and (B), sagittal MR images with Gd-DTPA showing a mass lesion with digital edema in the left parieto-occipital location. Invasion of the tumour through craniotomy defects to soft tissues in the left occipital and cervical region (small arrows). Lympha accumulation was observed in the tumour cavity after subtotal tumour resection in the cervical region (large arrow).

On November 13, 1992, the patient was readmitted with complaints of respiratory distress and monoplegia in the left upper extremity. On physical examination, regrowth of the tumour in the left occipital, middle and lower anterior cervical region and respiratory distress were observed. Neurological examination was normal, except for confusion and left upper monoplagia The patient was put on respiratory support after endotracheal intubation together with medication but died the following day of sudden respiratory and circulatory arrest. Autopsy revealed glioblastoma multiforme in the left parietal and occipital lobes attached to the regional dura mater and cranium. Tumour metastasis was observed in the left occipital and cervical regions, upper mediastinum, left paratracheal-bronchial lymph nodes and attached great vessels. Histopathological examination indicated glioblastoma multiforme.

DISCUSSION

As we know, intracranial tumours rarely lead to metastasis. It has been noted that the frequency of extracranial metastasis of cerebral gliomas is around 2 % (5,14,16,17,21). Extraneural metastasis are generally observed in adults. The relative frequency of central nervous system (CNS) tumours with metastasis in children, broadly speaking, corresponds to the fact that CSF shunt treatment is more common in these ages (7, 9, 19).

There has been a variety of theories to explain extracranial metastasis, most of which occur after craniotomy or shunt operations for diagnosis and treatment and radiation therapy (1-3, 5-8, 10, 19).

It has been reported many times that tumours from the craniotomy area develop metastasis directly to the dura, cranium and scalp or to the remote parts of the body by rich venous or lymphatic routes (2, 6, 9, 10, 13, 19).

Repeated operations have also been suggested as a major cause of extraneural metastasis (20).

The fact that metastasis occurs following craniotomy accounts for the presence of remote metastatic deposits in the lymph nodes and also for direct cranium and scalp involvement. Invasion of tumour tissue appears on the extradural area as a result of distraction in the unit of the dura mater in the dense collagenous structure which covers the central nervous system (2, 11-13). In a case with extraneural metastasis of glioblastoma after primary tumour resection, and in a study with Thallium-3021-C, Carvalho at al, (4) claim that the collapse of barriers preventing metastasis and neovascularity contributes to the metastatic tumour.

It has also been reported that CNS tumours produce close and remote extraneural metastasis without surgical treatment (2, 9-12). Spontaneous extracranial metastasis is less frequent and is observed in three instances:

1) By infiltration of tumour tissue which develops a hernia through the perivascular and dural clefts.

2) By drainage of CSF into extracranial tissue along the dural membrane of cranial and spinal nerves (6-9).

3) By tumour enlargement through meningeal veins, and the lymphatic system channels or a direct dura mater defect (1, 3, 8, 10-14, 16, 18-20).

Remote metastasis of glioblastoma multiforme occurs mostly in the lungs liver, lymph nodes and vertebrae (1, 2, 4-6, 10, 11, 13, 18, 19, 21). In our case, remote metastasis to the cervical lymph nodes was identified. In this connection, El-Gindi (7) and Labitzke (12) have stated that metastasis to the lymph nodes may gain access to channels which drained the operation area and our case seems to support their view.

It is very unusual that extraneural metastases attach the bones, and particularly the cranium, and most of these cases are glioblastoma (1, 7, 9, 12, 15, 22). In our case, cranium metastasis was present.

To diagnose extraneural metastasis in glial tumours, computerised tomography (CT), CT-with myelography and magnetic resonance imaging (MRI) with contrast are known to be very sensitive in the demonstration of subarachnoid and meningeal infiltrating lesions. MRI also renders it possible to indicate the profusion and nature of the lesion with its ability of multiplaineer demonstration (9).

Survival in extraneural glial metastasis is relevant to the age and general condition of the patient as well as to the primary lesion, effectiveness of treatment, localisation of the metastatic lesion and response to treatment (2, 9). The incidence in a 5-year survey of children is reported 30-40 %. Dissemination in residual tumours is 45 % (9).

We reached the conclusion that age of patient, localisation of metastatic lesion, early diagnosis, radical and prompt surgical treatment of primary and metastatic lesions and radiotherapy in the early postoperative period play a leading role in the outcome. Radical excision, radiation therapy and chemotherapy should be applied as soon as possible in primary glial tumours. With respect to occult or remote metastasis, patients should be scanned particularly using contrast - enhanced MRI with Gd-DTPA. Following surgery, radiation therapy and chemotherapy should be administrated to metastatic glial tumours.

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