Intracranial meningioma at the site of a previous cranial fracture: case report and review of the literature

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The authors present a case of post-traumatic intracranial meningioma, selected according to the criteria specified in the relevant literature. Assessment of the clinical characteristics of our patient and those reported in the literature seems to confirm that, in some cases, head trauma may be a factor contributing to the development of meningioma.

Key Words: Meningioma — Trauma.

Introduction

Many external etiological factors have been described as cancerogenous in the literature [4, 9]: physical-chemical substances, types of radiation, chronic inflammations and viruses. However, trauma as a cause of particularly meningioma and glioma remains a controversial subject [1, 4, 5, 8, 12, 13, 19], and the significance of a possible correlation would be considerable in both pathogenetic and legal terms.

The authors report their findings in a case of post-traumatic intracranial meningioma in an attempt to shed light on the possible correlation between trauma and tumor onset.

Case report

A 74-year-old man was admitted with a two-week history of subcontinuous headache and generalized epileptic seizures. Seven years before, he had suffered a head trauma characterized by a loss of consciousness clinically, and a left fronto-parietal bone fracture neurologically (X-ray plain films and CT scan) (Fig. 1). The cause of the trauma was a road accident.

On neurological examination, the patient was found to have slight right hemiparesis. Craniocerebral computed tomography (CT) revealed a left frontal lesion, with the dural attachment above the previous linear fronto-parietal fracture (Fig. 2). A mass was surgically removed from the frontal convexity.

The postoperative course was uneventful and histological examination showed that the tumor was a fibrous meningioma (WHO grade I).

The patient was discharged in good general health and free from neurological deficit. He is still alive four years after treatment and his neurological condition remains good.

Discussion

Trauma as an occasional etiological factor in the development of brain tumors has been the subject of considerable controversy [1, 2, 4, 5, 8, 12, 13, 19]. In the case of meningiomas, there have been instances and statistical studies indicating that some kind of relationship may exist. Cushing and Eisenhardt [6] believed this relationship to be common; in 295 of their cases, 93 (32%) had previously had various kinds of head trauma. Correspondences between the sites of the head injury and the growth of the tumours led Cushing to believe that there was an etiological relationship.

Other authors have drawn similar conclusions from single case reports [3, 10, 11, 14, 15-18, 20], although their findings do not always appear conclusive. It is now generally agreed that the diagnosis of post-traumatic meningiomas requires the simultaneous existence of the specific features established by Ewing [8] and Zulch [21]. These criteria are: 1) the site of the head injury and meningioma is the same; 2) the trauma was authentic and of sufficient entity; 3) the previous integrity of the region before the trauma is ascertained; 4) the time interval between the two events is significant; 5) there is continuity in the pathological changes; 6) the tumour is verified histologically. All of these diagnostic criteria were present in our patient.

The only large case-control study of meningiomas is that reported by Preston-Martin [13].
She found significantly more recall of prior head traumas on the part of 189 women with meningioma than in two corresponding control groups.

The arguments put forward by the opponents of this proposed mechanism cite the discrepancy in the sex ratios of head trauma and meningioma, coincidence, selective recall and the lack of hard evidence linking the tumour site to the locus of previous injury [7]. The reported association of head trauma and intracranial tumours focuses on meningiomas, which are more common in women than in men, whereas head trauma is more common in men. In our case, the meningioma occurred at the same locus as the trauma, as shown by both neuroradiological evidence and macroscopic findings.

As far as histopathogenesis is concerned, a trauma of sufficient entity may facilitate the development of a meningioma, particularly when there is an accompanying meningeal lesion with the implantation of foreign bodies or a granulomatous reaction [16, 19]. In such circumstances, it is possible that the meningeal tissue undergoes a neoplastic change during the reparative processes.

Barnett [3] and Reinchental [14] have shown that a correlation exists between chronic inflammation and atypias of the meningeal tissue, facilitating neoplastic growth. Cushing [6] also suggested that the following factors may favor tumor genesis: 1) local contusion of the bone; 2) a bruise occuring along a suture line; 3) a local outpouring of sites to take up the extravasation; 4) a pathological continuance of active cell division.

These factors would explain the relative frequency of post-traumatic meningiomas at the level of the bregma and the pterion, characterized by the confluence of four suture lines. In our patient, the trauma produced a bone fracture and the meningioma developed at the same level as the fracture. In this condition, as in the famous case of General Leonard Wood who developed a meningioma at the site of a sharp blow [6], the correlation between fracture and tumour site is so obvious that it seems unreasonable to exclude a priori the possibility of a cause-effect relationship.

Finally, it is interesting that several authors report a frequent finding of malignant subtypes [1, 12, 15, 19].

Sommario

Gli autori riportano un caso di meningioma intracranico post-traumatico. Il caso è stato selezionato in base agli specifici criteri riportati in letteratura. L’analisi delle caratteristiche cliniche del nostro paziente e di quelli riportati in letteratura ha permesso di confermare che il trauma cranico potrebbe essere un fattore predisponente all’evoluzione di un meningioma intracranico.

References

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