Clinical Study

Diffuse primary leptomeningeal gliomatosis

G. Davila, C. Duyckaerts,* J.P. Lazareth, M. Poisson and J.Y. Delattre
Departments of Neurology (Pr. Brunet) and Neuropathology, * Hôpital de la Salpêtrière. 47 Bd. de l'Hôpital.
75651 Paris Cedex 13, France

Key words: leptomeningeal gliomatosis, meningeal metastases, glioma, astrocytoma

Abstract

A 38 year old patient developed multiple cranial nerve palsy, seizures and progressive alteration in consciousness. CSF examination revealed tumor cells and a tentative diagnosis of leptomeningeal carcinomatosis from an unknown primary tumor was made. Treatment with intrathecal methotrexate and cranial radiation therapy was started without effect. At autopsy widespread leptomeningeal gliomatosis originating from a previously unknown astrocytoma of the hippocampus was found.

Introduction

Metastatic seeding of the leptomeninges by gliomatous cells is a well known, generally delayed, complication of CNS gliomas [1–14]. The occurrence of a diffuse form of leptomeningeal gliomatosis (LMG) without known primary tumor is rare. Only 6 cases have been previously reported [15–20]. We evaluated an additional case.

Case report

A 38 year old man developed a right sided hearing loss with tinnitus and vertigo in December 1988. Two weeks later, he had a generalized seizure and was admitted to an outside hospital where a CT scan of the head and a lumbar puncture were normal. Over the following month, he complained of a left side hearing loss. He also experienced diffuse pain in the extremities and had a 10 kg loss of weight. He was admitted at the Salpêtrière hospital on February 1989. On examination, he had an unsteady and broad based gait. Multidirectional nystagmus, right facial palsy, and bilateral sensorineural deafness were found. CT scan and MRI revealed contrast enhancement in the cerebello-pontine angles and in the basal cisterns. CSF was sterile and contained 66 WBC/mm³, 79% of which were lymphocytes; protein was 3.4 g/l; CSF glucose was 16 mg/100 ml (blood glucose 92 mg 100/ml). Repeated lumbar punctures showed the presence of tumor cells. No primary tumor was found despite extensive investigations. A diagnosis of meningeal carcinomatosis from an unknown primary tumor was made. The patient received two intrathecal injections of methotrexate and a course of whole brain radiation therapy (RT) was started. He received 10 Gy in 2 fractions but RT had to be discontinued because of clinical deterioration. The patient developed left ophthalmoplegia, dysarthria, dysphagia and became stuporous. Repeated CT scan showed progression of the contrast enhancing lesions in the basal cisterns and over the cortical sulci. His condition deteriorated rapidly and he died 3 months after the first symptom.

Postmortem examination

Autopsy was performed 24 hours after death. A right bronchopneumonia was found. No others ab-
normalities were noticed outside the nervous system.

The leptomeninges of the cerebrum, cerebellum, and spinal cord were diffusely thickened. The third, seventh and eighth cranial nerves, as well as the roots of the cauda equina were irregularly swollen. On section, infiltration of the right hippocampus and fornix was noted.

Microscopically, the right Ammon’s horn was invaded by protoplasmic and fusiform astrocytes (Fig. 1B). There was no vascular proliferation, necrosis nor hemorrhage.

The cerebral and spinal subarachnoid spaces were diffusely infiltrated by the same tumor (Fig. 1A). Fusiform, GFAP positive, tumoral cells were also found along the Virchow-Robin spaces, sometimes invading the superficial cortical layers. The oculomotor nerves and the dorsal roots of the spinal cord were widely infiltrated. Occasionally, the glioma cells were large, with a high nuclear-cytoplasmic ratio, and a few monstrous nuclei.

Based on these findings, a final diagnosis of right hippocampus astrocytoma with diffuse meningeal dissemination was made.

Discussion

Leptomeningeal gliomatosis (LMG) occurs in three different settings. In 20 to 25% of patients suffering from extensive recurrence of intracerebral gliomas, meningeal dissemination is an accessory event during the terminal phase of the disease or an autopsy finding [6, 8, 21]. More rarely (less than 3% of the cases) fatal meningeal dissemination occurs in the absence of recurrence of a known primary glioma [14]. The rarest condition is primary LMG during which there is not known parenchymatous tumour [15]. The meningeal tumor may arise from early meningeal seed of an asymptomatic intraparenchymal glioma or from a heterotopic glioma [22]. Russel and Rubinstein [23] emphasized that the diagnosis of LMG from primary heterotopic glioma should be viewed with skepticism since it is difficult to sample the entire CNS to exclude the presence of a small intraparenchymatous glioma responsible for the subarach-