Late dissemination of ependymoma: case report

G. Bademci; K. Tun*; E. Erden**; C. Evliyaoglu and A. Unlu***


Summary

Spinal cord dissemination over 10 years after surgical removal of the fourth ventricle ependymoma without local recurrence is extremely rare. A 49-year-old male underwent a macroscopically gross total removal of the fourth ventricle ependymoma and postoperative radiotherapy to the posterior fossa. Twelve years after the initial operation, the patient complained from uncontrolled fever attacks, low back pain and numbness of the legs. Spinal Magnetic Resonance Imaging revealed intradural extramedullary mass lesions located at the thoracic 2-3 and lumbar 5 vertebrae levels. Cerebrospinal fluid examination showed no tumour cells. He underwent total excision of these spinal lesions. Although the majority of the recurrences take place within a few years after surgery, we experienced a case with multiple spinal disseminations 12 years after the resection of the fourth ventricle ependymoma and administration of the radiation therapy to the posterior fossa. Up to our knowledge, this case represents the second unusual late recurrence reported in the literature. We conclude that low grade ependymomas should be followed neurologically and radiologically for more than 10 years after the initial treatment.

KEY WORDS: Ependymoma. Dissemination. Spinal cord.

La resonancia magnética mostraba lesiones localizadas a la altura de la 2-3ª vértebra dorsal y de la L5. El líquido ceñalorraquídeo no mostraba células tumorales. Fue operado de ambos tumores raquideos, con resección total.

Aunque la mayoría de las recurrencias tienen lugar en los primeros años después de la operación, hemos observado un caso con diseminación raquídea múltiple, después de la resección de un ependimoma del IV ventrículo y radioterapia de la fosa posterior. Que sepamos, este caso es el segundo de recurrencia tardía, publicado en la literatura. En conclusión, los ependimomas de bajo grado deben ser vigilados neurológicamente y radiológicamente durante más de diez años después del tratamiento inicial.


Introduction

Intracranial ependymomas constitute approximately 3-5% of all intracranial tumours6,7. Prognostic factors such as the extent of tumour resection, age of the patient, tumour location, histological composition and the role of the adjuvant therapies still remain controversial4,10,16. Intracranial ependymomas may spread by local infiltration in the surrounding brain or by dissemination through the cerebrospinal fluid (CSF). The true incidence of cerebrospinal dissemination of ependymomas is still unknown. It is commonly known that especially high grade ependymomas tend to disseminate few years after the initial diagnosis13. Late recurrence of low grade ependymomas is not unknown, but unusual2,8,11,12. We experienced a case with multiple spinal cord disseminations, 12 years after total removal of the fourth ventricle low grade ependymoma without a local failure. This case report emphasizes that prolonged neurological and imaging review is reasonable. Furthermore, as a matter of fact that long dormant period may be considered as one of ependymoma’s
behavioural dynamics.

Case report

A 49-year-old male was admitted to the department of neurosurgery, Ankara University, School of Medicine in 1988 with a mass lesion located in the posterior fossa. A gross total removal of the 4th ventricle ependymoma via median suboccipital craniotomy had been performed. CSF cytology was negative on the onset of the disease. The tumour was diagnosed as Grade II ependymoma (Fig 1). The patient was discharged with minimal truncal ataxia and lateral gaze nistagmus. He underwent 45 Gy of radiation therapy (RT) to the posterior fossa 3 months after the surgical intervention. Cranial tomography (CT) and/or magnetic resonance imaging (MRI) had been repeated every 6 months for the first two years and then yearly. Radiologic findings revealed no residue or recurrence in primary tumour site (Fig 2). The history of the patient was unremarkable except an excisional biopsy for the basal cell carcinoma of the anus six years ago. The patient had a normal life for the following years, till he complained from uncontrolled fever attacks started in June 2000. At that time he complained back and low back pain and numbness of the legs. While the patient was examined in infectious disease clinic for the etiology of unidentified fever and high sedimentation degrees, he was consultated to the neurosurgery department. CSF cytology was negative. Spinal MRI showed intradural extramedullary mass lesions located at the levels of thoracic 2-3 (Fig 3a) and lumbar 5 (Fig 4a). Total laminectomy for thoracic 2-3-4 and lumbar 5 vertebrae and total excision of the intradural extramedullary tumours were performed (Fig 3b and Fig 4b). Pathological diagnosis of the spinal tumours revealed Grade II ependymoma (Fig 5).

Discussion

Proliferation and dissemination kinetics of ependymomas still remain unpredictable. Previously reported extremely rare events emphasized that ependymomas should be followed for a long-term period2,8. But the frequency and extent of radiologic follow-up is still controversial. Celli et al reported a late recurrence of filum terminale ependymoma as long as 42 years after the total removal5. Nakasu et al reported a case of fourth ventricle ependymoma disseminated 13 years after the resection without a local failure8. Plans et al reported an intracranial retrograde dissemination in filum terminale myxopapillary ependymoma three years after the initial diagnosis11. Rehman et al reported an intracranial ependymoma case recurred 10 years after completing chemotherapy12. Present case is the second delayed dissemination of intracranial ependymoma without local recurrence 12 years after the initial therapy. In fact, the true incidence may be higher, because spinal radiological follow-up is commonly neglected after local control of the primary tumor.

As ependymomas are derived from the ependymal and subependymal cells lining the cerebral ventricles and the central canal of the spinal cord, potential dissemination
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of the cranial ependymoma through CSF or leptomeningeal pathways should be considered carefully. The true frequency of this spreading is unknown. The incidence of seeding is accepted 8.7% for high grade compared to 5% for low grade. Exfoliated tumour cells are carried by the flow of CSF to other parts of the neuroaxis, especially to the basal cisterns and cauda equina, where tumour cells tend to settle as a result of gravity and slow CSF flow. The dissemination of malignant tumour cells depends on their replication and ability to adhere to the matrix of a biological barrier, such as basement membrane, to degrade the matrix, and to migrate through this more permeable barrier. Although most cases of dissemination become symptomatic within five years concomitantly with local recurrences, a few cases disseminated later. Possible reasons for delayed dissemination may be related to ependymoma dynamics itself or postoperative radiotherapy administration. Ependymomas still keep their behavioural mystery. Present case indicated that there may be a so-called “sleeping period” in ependymoma dissemination or metastasis. Another possibility may be addressed that the patients with ependymoma may have an intrinsic (perhaps genetic) predisposition to develop ependymomas and that this late recurrence is in fact a second tumour rather than a dissemination.

RT is considered as a part of whole ependymoma treatment. The goal of RT is to eradicate clonogenic tumour cells within the CSF thereby preventing subarachnoid metastases and possible re-seeding of tumour loci. Vanuytsel et al. indicated that there is no statistical difference in survival in low grade tumours when patients are irradiated indicated to whole brain or local field, with or without spinal irradiation while it was important for the high grade tumors. Paulino et al. suggested local field RT regardless of grade or location, with the exception of patients

Figure 3. a: Gadolinium-enhanced T1-weighted sagittal image showing thoracic 2-3 well-defined mass lesion in the spinal canal; b: Gadolinium-enhanced T1-weighted postoperative image indicating total excision of the mass lesion in the spinal canal.

Figure 4. a: Gadolinium-enhanced T1-weighted sagittal image showing lumbar 5 well-defined mass lesion in the spinal canal; b: Gadolinium-enhanced T1-weighted postoperative image indicating total excision of the mass lesion in the spinal canal.

Figure 5: Moderately cellular glioma with elongated tumour cells radially arranged around vessels, H-Ex200.
who present with neuroaxis spread at initial diagnosis. On
the present evidence spinal metastases are not prevented
by prophylactic spinal irradiation, regardless of tumor grade
and site. Kawabata et al. suggested that postoperative
radiation should be focused on local control, especially
for Grade II ependymomas instead of prophylactic spinal
radiation. The pooled data show that the use of spinal
irradiation does not seem to improve treatment results and
eliminate the risk of recurrence.

Delayed metastasis or late second tumour development
may be accepted as one of the main characteristics of
ependymoma if the reported cases increase. There is still
not much data about ependymoma kinetics and the fac-
tors affecting and triggering the dissemination even local
control is achieved. But it is certain that early detection
of dissemination during the asymptomatic stage may pro-
long survival and the patients with benign ependymoma
of dissemination during the asymptomatic stage may pro-

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