

Dural Astrocytoma: A Case Report

Dural Astrositoma: Olgu Sunumu

TANSU MERTOL, MERAL KOYUNCUOĞLU, FERİDUN ACAR, SAİT NADERİ

Departments of Neurosurgery (TM, FA, SN) and Pathology (MK),
Dokuz Eylül University School of Medicine, İzmir

Received : 3.1.2000 ⇔ Accepted : 2.10.2000

Abstract: This report describes a case of 9-month-old boy with dural astrocytoma. The patient presented with monoparesis on the side contralateral to the cranial tumor. Computerized tomography revealed a cystic mass in the frontal lobe, and this was treated with surgery alone. We review the clinical, radiological, and pathological aspects of dural astrocytoma, and emphasize the histopathological aspects of this tumor. We also discuss neoplasms that should be included in the differential diagnosis. In conclusion surgery alone is an adequate treatment in these cases.

Key Words: Astrocytoma, dural astrocytoma, infancy, superficial astrocytoma

Özet: Bu çalışma dural astrositomalı 9 aylık bir olguyu tanımlamaktadır. Olgu, intrakraniyal tümöre kontralateral gelişen monoparezi ile kliniğimize başvurdu. Bilgisayarlı tomografide frontal lobda kistik bir kitle saptandı ve hastaya sadece cerrahi uygulandı. Bu çalışmada dural astrositomanın klinik, radyolojik ve patolojik özelliklerini gözden geçirip, histopatolojik özelliğini vurguluyoruz. Aynı zamanda ayırıcı tanıda düşünülmesi gereken neoplazmları tartışıyoruz. Sonuç olarak, bu olgularda cerrahi tedavi yeterlidir.

Anahtar kelimeler: Astrositoma, dural astrositoma, enfansi, superfisiyal astrositoma

INTRODUCTION

Dural astrocytoma is a rare neoplasm that was first described by Taratuto et al. in 1984 (6). Comprised of neoplastic stromal cells that stain positive for glial fibrillary acidic protein (GFAP), dural astrocytomas are found in superficial locations in the cerebral cortex, and are densely adhered to the meninges and the surface of the brain. Published reports describe these neoplasms as supratentorial in location and cystic in structure (1,6). They almost always occur in infancy, and the prognosis is excellent if the tumor can be completely excised. In this report, we describe a case of dural astrocytoma, highlight

the histopathological and immunohistological aspects of this rare tumor, and review the relevant literature.

CASE REPORT

A 9-month-old boy was admitted to our hospital with a history of left arm weakness of 15 days duration. His physical was normal, and monoparesis of the left arm (muscle strength 2/5) was the only abnormal finding in the neurological examination. Cranial computerized tomography (CT) revealed a large 5x5x5 cm cystic mass lesion in the right frontal lobe (Figure 1A).

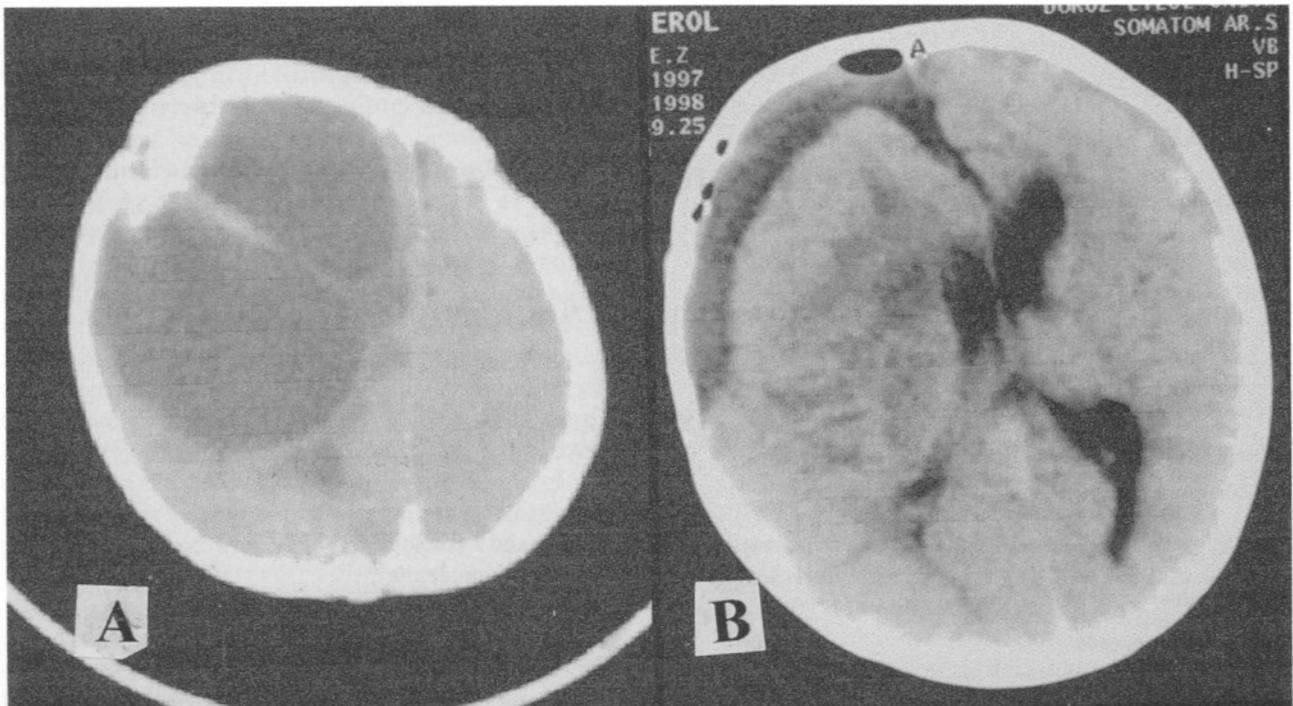


Figure 1: A: Preoperative CT shows a large cystic mass in the right frontal lobe. B: Postoperative CT of the same patient confirms complete tumor removal and reveals a subdural collection at the surgery site.

We performed a right central frontal craniotomy and exposed a superficially located solid mass with a cystic portion. The tumor was adherent to the dura and cerebral cortex of the frontal lobe. We drained the cyst material, and totally excised the mass without difficulty.

The early postoperative course was uneventful. A CT scan performed 48 hours after surgery confirmed total excision of the tumor and revealed a 1 cm thick subdural collection at the surgical site. A repeat CT examination performed 6 months postsurgery showed no residual tumor tissue or recurrence (Figure 1B). The patient did not undergo radiation or chemotherapy

Histological findings:

Histological examination of the specimen revealed that the mass was a dural astrocytoma. The solid portion of the tumor was gray-white, 6x5x2 cm in dimension, and had a smooth surface. The composition of the tumor mimicked that of a mesenchymal tumor, with fascicles of spindle-shaped cells containing scant cytoplasm. We observed no pleomorphism, no mitotic figures, and no neural elements (Figure 2).

Immunocytochemical findings:

The tumor cells stained positive for GFAP (Glial Fibrillary Acidic Protein), vimentin, actin, S-100 protein, NSE (Neuron Specific Enolase), and chromogranin, but were negative for synaptophysine (Figure 3).

DISCUSSION

Paulus et al. (5) described two patients with desmoplastic supratentorial neuroepithelial tumors,

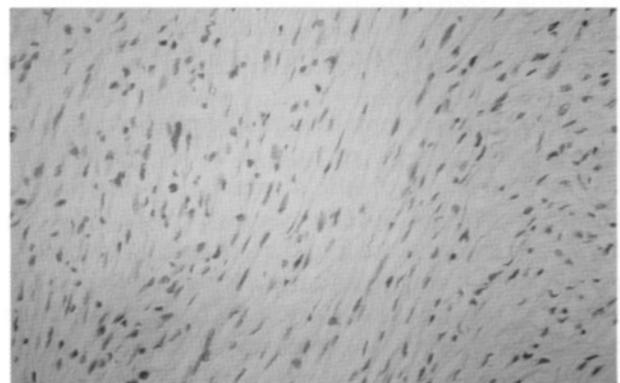


Figure 2: A stained section of tumor tissue shows the characteristic spindle-shaped cells (Hematoxylin and Eosin, x200)

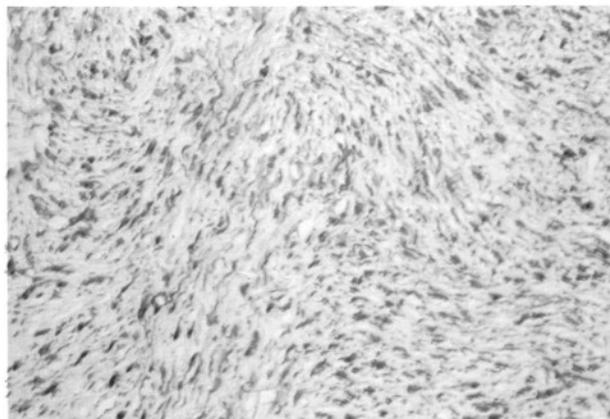


Figure 3: The tumor cells exhibit GFAP immunoreactivity (x200)

and suggested that dural astrocytomas and desmoplastic infantile gangliogliomas should be classified together under the title of "desmoplastic supratentorial neuroepithelial tumors of infancy" but this classification has not been accepted yet and controversy continues regarding the categorisation of dural astrocytomas.

The histological pattern, radiological features, and pattern of antigen expression we observed in our case are consistent with Taratuto and colleagues' original description of dural astrocytoma (6). In defining this tumor type, these authors listed the histological features of six cases of superficially located cystic tumors of the brain (6). However, in 1987, Vandenberg et al. (7) disputed this classification, suggesting that dural astrocytoma was a variant of the tumor they called a "desmoplastic supratentorial neuroepithelial tumor of infancy with divergent differentiation potential." This tumor type and dural astrocytoma do share many histological and biological similarities, but the main differentiating feature of dural astrocytomas is that they do not have a neuronal component (7).

The initial report on dural astrocytoma did not include a thorough description of the tumor's ultrastructure. In 1990, de Chadarevian et al. (1) published a detailed ultrastructural study of a tumor with a similar histological pattern to that of dural astrocytoma. They labeled their case a "desmoplastic cerebral astrocytoma of infancy." Like the dural astrocytoma, the tumor they described had no

neuronal component. Their report listed the two main histological features of dural astrocytoma as the absence of neuronal elements, and the presence of large amounts of external lamina material and collagen fibers between neoplastic astrocytic elements. This material and fibers under the electron microscope correspond to the reticulin fibers visualized between the S-100 protein and GFAP-positive cells under light microscopy in dural astrocytomas. Although Taratuto et al. (6) reported that typical dural astrocytomas show mild pleomorphism, there was none in our case, nor did we observe any neuronal component.

With regard to differential diagnosis, pleomorphic xanthoastrocytoma, fibrous histiocytoma, meningioma, fibrosarcoma, epithelioid hemangioendothelioma, and pericytoma should all be considered (2-4). These tumors may arise in the same location as dural astrocytomas and none of them have a neuronal component, but they all show GFAP positivity.

Dural astrocytomas are usually seen in patients less than 1 year of age. Total excision is associated with excellent outcome, and neither radiation therapy nor chemotherapy is required because the tumor very rarely recurs. Neuroradiological follow-up of our patient revealed no recurrence by 6 months postsurgery.

In summary, dural astrocytomas are rare tumors that carry a good prognosis. The histopathological diagnosis is straightforward, and surgical treatment alone is adequate. The case presented here is significant in that, this is the first published case of dural astrocytoma in our country.

Acknowledgement: The authors wish to thank Lucy B. Rorke, M.D., for her consultation.

Correspondence: Sait Naderi
Dokuz Eylül Üniversitesi Hastanesi
Nöroşirürji ABD,
İzmir, Turkey
Fax: 90-232-2788802

REFERENCES

1. De Chadarevian JP, Pattisapu JV, Faerber EN: Desmoplastic cerebral astrocytoma of infancy. Light microscopy, immunocytochemistry, and ultrastructure. *Cancer* 66: 173-179, 1990

2. Kepes JJ, Rubinstein LJ, Eng LF: Pleomorphic xanthoastrocytoma: a distinctive meningocerebral glioma of young subjects with relatively favorable prognosis. A study of 12 cases. *Cancer* 44: 1839-1852, 1979
3. Kordek R, Biernat W, Awasiak J, Liberski PP: Pleomorphic xanthoastrocytoma and desmoplastic infantile ganglioma - have these neoplasms a common origin? *Folia-Neuropath* 32:237-9, 1994
4. Lipper H, Eberhard DA, Phillips CD, Vezina LG, Cail WG: Pleomorphic xanthoastrocytoma, a distinctive astroglial tumor: neuroradiologic and pathologic features. *AJNR* 14: 1397-1404, 1993
5. Paulus W, Schlote W, Perentz E, Jacobi G, Warmuth-Metz M, Roggendorf W: Desmoplastic supratentorial neuroepithelial tumors of infancy. *Histopathology* 21:43-9, 1992
6. Taraturo AL, Monges J, Lyluk P, Leiguarda R: Superficial cerebral astrocytoma attached to dura. Report of six cases in infants. *Cancer* 54: 2502-2512, 1984
7. Vandenberg SR, May EE, Rubinstein LJ, Herman NM, Perentes E, Vinore SA, Collins P, Park TS: Desmoplastic supratentorial neuroepithelial tumor of infancy with divergent differentiation potential ("desmoplastic infantile gangliogliomas"). *J Neurosurg* 66: 58-71, 1987

Meningeal sarcomas are rare tumors of the leptomeninges which are reported to occur after external beam radiation therapy for medulloblastoma, ependymoma, astrocytoma, and pituitary adenomas. Most meningeal sarcomas are supratentorial in location, and most have a dural attachment, although entirely parenchymal lesions have been described.