Extramedullary tanycytic ependymoma of the lumbar spinal cord

Dong Ja Kim¹, Man-Hoon Han², SangHan Lee¹

¹Department of Forensic Medicine, School of Medicine, Kyungpook National University, Daegu, Korea
²Department of Pathology, Kyungpook National University Hospital, Daegu, Korea

Keywords: Ependymoma; Glial fibrillary acidic protein; Lumbar vertebrae; Spinal cord neoplasms

Introduction

Tanycytic ependymoma is a histologically distinct rare subtype of ependymoma and is recognized as a grade II tumor in the latest World Health Organization classification in 2016 [1]. This tumor is usually found in the cervical and thoracic spine as an intramedullary mass but can also rarely present as an extramedullary mass in the lower spine [2]. Diagnosis in this location is difficult because the pathologic features resemble the findings of schwannoma or pilocytic astrocytoma. We present a case of tanycytic ependymoma in the lumbar spine and a brief literature review.

Case

A 44-year-old woman with complaints of a 4-year history of progressively worsening low back pain and sensory loss in her lower extremities visited our neurosurgery clinic. Four years prior, she had visited another hospital during which magnetic resonance imaging (MRI) revealed a 6-mm-sized intradural extramedullary mass in her lumbar spinal cord at level 2-3. The tumor mass developed in an intradural extramedullary location. Histopathologically, tanycytic ependymoma can be misdiagnosed as schwannoma or pilocytic astrocytoma. Immunohistochemical findings such as strong positivity for glial fibrillary acidic protein, perinuclear dot-like positive patterns for epithelial membrane antigen, and focal positivity for S100 protein are helpful in diagnosing tanycytic ependymoma. It is important to be aware of this rare tumor to ensure appropriate patient management and accurate prognosis.

Received: September 24, 2019
Revised: October 29, 2019
Accepted: November 4, 2019

Corresponding author:
SangHan Lee
Department of Forensic Medicine, School of Medicine, Kyungpook National University, 130, Dongdeok-ro, Jung-gu, Daegu 41944, Korea
Tel: +82-53-420-4885
Fax: +82-53-422-4712
E-mail: sanghan1@knu.ac.kr

Copyright© 2020 Yeungnam University College of Medicine
This is an Open Access article distributed under the terms of the Creative Commons Attribution Non-Commercial License (http://creativecommons.org/licenses/by-nc/4.0/) which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.
including schwannoma, pilocytic astrocytoma, or other spindle cell neoplasm of the spinal cord. Immunohistochemical analyses, including those for glial fibrillary acidic protein (GFAP), vimentin, epithelial membrane antigen (EMA), S100 protein, CD34, and calretinin, showed tumor cells diffusely positive for GFAP and vimentin. S100 protein was focally positive, and EMA showed positive perinuclear dot-like or ring-like patterns consistent with ependymal differentiation (Fig. 4). The tumor cells were negative for CD34 and calretinin. Thus, a definitive diagnosis of tanycytic ependymoma was established. The postoperative results were uneventful, and the patient’s symptoms improved.

Discussion

Ependymomas of the spinal cord usually arise within the cervicothoracic segment and are the most common intramedullary neoplasms of adulthood. The typical histopathologic features include a dense meshwork of fibrillar cytoplasmic processes forming perivascular pseudorosettes. Tanycytic ependymoma exhibits distinctive histologic features and was initially described by Friede and Pollak [3] in 1978. The term “tanycytic” refers to the spindle elongated cell morphology and the origin of the tumor cells from tanycytes, which are special and unique ependymal cells. Tanycytes are most commonly located in the wall of the third ventricle, in the circumventricular organs, and in the spinal cord [4]. In the spinal cord, they surround the spinal canal and radiate toward the grey matter. They are considered to participate in the communication between the cerebrospinal fluid, brain parenchyma, and vasculature [5].

Tanycytic ependymomas are commonly found in the cervical
Fig. 3. Microscopic features. (A) Histopathologic analysis showing a moderately cellular neoplasm composed of short fascicles of elongated cells. The tumor cells have bland nuclei with no mitotic figures. The elongated cells are rich fibrillary processes (hematoxylin and eosin stain, x200). (B) Hyalinized blood vessels and pseudorosettes are seen (hematoxylin and eosin stain, x400).

Fig. 4. (A) The tumor cells show strong and uniform positivity for glial fibrillary acidic protein (immunohistochemical stain, x 200). (B) Focal positivity for S100 protein (immunohistochemical stain, x200). (C) Epithelial membrane antigen staining showing perinuclear dot-like or ring-like patterns (immunohistochemical stain, x200).
and thoracic spinal cord [2,6]. Tumors arising in the lumbar or thoracolumbar regions are very rare [2,4,7-9]. Extramedullary tanyctic ependymomas in the filum terminale are rarely reported [7-9]. According to the 40 cases of spinal cord tanyctic ependymoma reported by Tao et al. [2], only one and four cases were lumbar lesion and in extramedullary locations, respectively. Extramedullary tumors were found in the lower thoracic or lumbar spine. Tanyctic ependymoma accounted for approximately 1% of spinal cord tumors (40 of an estimated 4,000) and one patient had tumor recurrence after surgery. Thus, patients are usually expected to show long-term survival with a low rate of recurrence. Rare cases of tanyctic ependymoma associated with multiple endocrine neoplasia type 1 or neurofibromatosis type 2 have been also reported [7,10,11]. We found only one published case of tanyctic ependymoma in Korea in a Medline search of the English literature [10]. In that case, the patient had neurofibromatosis type 2 and was diagnosed with tanyctic ependymoma of the cervical spine.

The differential diagnosis on radiologic imaging features included schwannoma, neurofibroma, or myxopapillary ependymoma. In this case, the preoperative diagnosis was schwannoma. However, schwannoma may demonstrate more heterogeneous T2 signal hyperintensity. Most of the MRI features in previously reported cases of tanyctic ependymoma were T1-isointense and T2-hyperintense; however, the findings can be variable and non-specific. Therefore, the radiologic diagnosis of tanyctic ependymoma remains challenging. While tanyctic ependymoma is typically solid, cystic components were reported in half of the cases [12].

The histologic features show fascicles of spindle fibrillary tumor cells with low to moderate cellularity that can be misinterpreted as schwannoma, pilocytic astrocytoma, meningioma, or neurofibroma [2,6,12,13]. Myxopapillary ependymoma can be differentiated from tanyctic ependymoma because there are no pathological findings of a papillary arrangement of the tumor cells or deposition of basophilic mucinous materials. Immunohistochemical staining shows strong positivity for GFAP and focal reactivity for S100 protein in tanyctic ependymoma. The perinuclear dot-like or ring-like positive patterns of EMA are a peculiar feature in ependymoma. In contrast, schwannoma is negative for GFAP and EMA and uniformly positive for S100 protein. Moreover, schwannoma tends to be more cellular and has typical Antoni A and B patterns. Pilocytic astrocytoma can resemble tanyctic ependymoma. A pilocytic astrocytoma is strongly positive for GFAP but negative for vimentin. The findings of Rosenthal fibers and eosinophilic granular bodies are helpful in the diagnosis of pilocytic astrocytoma.

A case series of ependymoma reported that the Ki-67 labeling index appeared to be an important prognostic factor [14]. While Ki-67 labeling index values of less than 4.0 have been associated with long survival times, a predictive threshold has not been established [15]. In our case, the Ki-67 labeling index was estimated to be less than 2%. Radiotherapy can be considered for cases with incomplete resection and aggressive treatment such as chemotherapy is usually not indicated. There has been no evidence of tumor recurrence during the 1-year follow-up period after gross total resection (Fig. 1C).

The present case is a rare intradural extramedullary tanyctic ependymoma that developed in the L2-3 spine with slow tumor growth over 4 years. The histopathologic features were unique but accurate diagnosis was challenging and difficult due to unusual location and rarity. The precise diagnosis of tanyctic ependymoma is important because local recurrence is possible.

Acknowledgments

Conflicts of interest
No potential conflict of interest relevant to this article was reported.

ORCID
DongJa Kim, https://orcid.org/0000-0001-8462-3173
Man-Hoon Han, https://orcid.org/0000-0001-8856-553X
SangHan Lee, https://orcid.org/0000-0003-0390-3494

References


