Mature Spinal Teratoma Associated With Thickened Filum Terminale

—Case Report—

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Abstract

A 30-year-old man presented with an intradural spinal teratoma with thickened filum terminale manifesting as urinary and sexual disturbances, and low back pain persisting for 4 years. Spinal magnetic resonance imaging revealed thickened filum terminale containing a heterogeneously enhanced intradural lesion extending from the L-3 to L-4 levels and in contact with the conus medullaris. The filum terminale was incised and the tumor was totally resected. The histological diagnosis was mature teratoma consisting of three germ cell layers. The patient’s complaints had completely resolved 6 months later.

Key words: intradural teratoma, thickened filum terminale, tethered cord, spinal cord tumor, filum terminale teratoma

Introduction

Intraspinal teratoma was first described in 1863 and then in 1888. Teratoma is generally believed to originate from three germ cell layers. The age at occurrence varies widely from newborn to 57 years. Intramedullary teratomas may occur along the whole spinal cord with predominance in the thoracolumbar region. The clinical symptoms and findings are related to the location of the tumor as for other intramedullary tumors.

The conventional view of the pathogenesis of teratoma is that primordial germ cells failed to migrate properly during early embryonic development. A clinicopathological study based on seven cases of spinal cord teratoma suggested that teratomas could originate from misplacement of a multipotential germ cell. Pluripotential embryonic caudal mesenchymal cells could give rise to teratomas due to dysfunction of several factors that probably involve gene functions and cellular inductive interactions, suggesting that development of spinal teratoma is not neoplastic but the result of multiple dysembryogenic mechanisms. Teratomas are well known to associate with dysraphic congenital malformations. The co-occurrence of spinal dysraphism and intramedullary teratoma indicates a developmental fault in the same period as suggested by dysembryogenic theory.

Here we describe a unique case of filum terminale teratoma associated with thickened filum terminale.

Case Report

A 30-year-old man was admitted to our department on December 3, 2001. The patient’s complaints were low back pain, sensation of incomplete voiding, constipation, and problems with erection and ejaculation. These complaints had started 4 years ago and the severity had increased.

Physical examination revealed bladder distension up to the pubic symphysis, normal external genitalia, and normal prostate gland function. Flow cystometry study revealed residual urine volume of 400 ml. Motor, reflex, and sensory examinations, and routine urine, hematological, and serum tests found no abnormalities. Somatosensory evoked potential (SEP) study revealed prolonged latency and decreased amplitude.
Computed tomography demonstrated an intradural space-occupying lesion and widening of the spinal canal at the L3–4 levels. Sagittal T2-weighted magnetic resonance (MR) imaging showed thickened filum terminale containing a heterogeneously enhanced mass lesion extending from the L-3 to L-4 levels and in contact with the conus medullaris (Fig. 1A). Axial T1-weighted MR imaging showed a thickened fatty filum terminale passing through cross-sectional images at the L5–S1 levels.

Histological examination found a large number of glandular formations covered by prism and flattened cubic epithelial cells and embedded in fibrovascular tissue and mature fat tissue which contain some cystic formations. HE stain, ×100. B: Photomicrograph of a cystic formation covered by multiple levels of keratinous squamous epithelial cells containing keratin lamellae. HE stain, ×100.

Total laminectomy was performed at the L-3 and L-4 levels. The dura mater was opened with a midline incision to expose the enlarged medulla. The yellowish tumor found located adjacent to the conus medullaris in the filum terminale. Fatty substance was present outside the tumor, and mucous substance, bony fragments, and hair were found inside the tumor. Dissection and total removal of the tumor were easy, but fibro-adipose tissue was adherent adjacent to the conus medullaris in some places. The adherent tissue was dissected carefully and totally removed. The thickened filum terminale was then released.

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Neurol Med Chir (Tokyo) 45, July, 2005

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Fig. 3 Postoperative sagittal T2-weighted magnetic resonance image showing total resection of the mass and the conus medullaris at the L2-3 disc space.

glandular formations covered by mature prism and flattened cubic epithelial cells (Fig. 2). These structures were embedded between fibrovascular tissue and mature fat tissue, which included some cystic formations. Three germ cell layers including ectodermal, mesodermal, and endodermal elements were observed. The histological diagnosis was mature teratoma.

One week after the operation, the patient's low back pain improved but his urinary and sexual complaints continued. Six months after the operation, neurological findings and urinary functions were exactly normal. Problems with erection and ejaculation were also improved. SEP study revealed normal latency amplitude. Postoperative T2-weighted MR imaging revealed total resection of the mass and the conus medullaris at the L2-3 disc space without evidence of residual or recurrent tumor (Fig. 3).

Discussion

Thickened filum terminale is a different pathological entity from other dysraphic congenital malformations, such as spina bifida, split cord malformation, meningomyelocele, and lipomyelocele, so originates at a different stage of embryogenesis. Almost all neural tube defects other than thickened filum terminale occur as a result of faults in the primary neurulation period. The filum terminale is considered the caudal part of medulla. Thickened filum terminale is an abnormality that arises in the canalization period of the embryogenesis. In our case, the teratoma originated from the filum terminale and grew adjacent to the conus medullaris. The localization of the tumor in the filum terminale indicates the occurrence of a secondary neurulation period developmental anomaly. We suggest that misplacement of pluripotent embryonic caudal mesenchymal cells during the secondary neurulation period before closure of neural tube could result in teratoma formation. It is not clear whether the thickened filum terminale in our case formed due to the teratoma or was an independent anomaly that coincidentally occurred during the secondary neurulation period.

This case involved the unique association of teratoma and thickened filum terminale without other dysraphic malformation originating in the primary neurulation period. This case supports the dysembryogenic theory for the pathogenesis of teratomas. Total surgical resection is the best choice of treatment for spinal intradural teratoma. However, total resection should not be attempted in cases with tight adherence to the neural tissue. Recurrence has been observed in incomplete resections. In our case, the tumor was totally resected and the thickened filum terminale was incised. Postoperative MR imaging observed no residual tumor.

References


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