Neuroradiology (1998) 40: 45–47

R. Matsubayashi
A. Uchino
A. Kato
S. Kudo
S. Sakai
S. Murata

Cystic dilatation of ventriculus terminalis in adults: MRI

Received: 7 February 1997
Accepted: 2 May 1997

R. Matsubayashi (✉) · A. Uchino · A. Kato · S. Kudo
Department of Radiology,
Saga Medical School Nabeshima 5-1-1,
Saga, 849, Japan
Fax +81-952-32-0214

S. Sakai[1] · S. Murata
Department of Radiology,
Matsuyama Red Cross Hospital,
Matsuyama, Japan

Present address:
[1] Department of Radiology, Kitakyushu Municipal Medical Center, Kitakyushu, Japan

Abstract We report the MRI findings in two patients with cystic dilatation of the ventriculus terminalis. The latter is usually a tiny ependyma-lined cavity of the conus medullaris. In both cases the markedly dilated ventriculus terminalis was seen as a rounded cavity with regular margins, the content of which gave the same signal as cerebrospinal fluid with all MR pulse sequences. No contrast enhancement was seen.

Key words Ventriculus terminalis · Conus medullaris · Magnetic resonance imaging

Introduction

The ventriculus terminalis is a very small ependyma-lined cavity in the conus medullaris, first described by Stilling [1] in 1859; it forms during embryonic development as a result of canalisation and retrogressive differentiation. Cystic dilatation of this cavity is extremely rare in adults; only four cases have been reported previously. We describe the MRI findings in two patients with a cystic lesion in the conus medullaris whose postoperative diagnosis was cystic dilatation of the ventriculus terminalis.

Materials and methods

The images of two patients with cystic dilatation of the ventriculus terminalis were reviewed. Both patients were women, aged 49 and 58 years. They had nonspecific neurological symptoms including low back pain, sciatica, bladder dysfunction and weakness of the lower limbs. MRI was performed using 1.5-T and 1.0-T units. Sagittal and axial images were obtained with T1-weighted spin-echo (TR/TE 450/20, 400/25), T2-weighted (1800/70), and T2*-weighted (400/17, flip angle 27°) sequences. Contrast-enhanced T1-weighted images were also obtained.

Results

The images showed in each case a large cystic lesion in the lumbar enlargement of the spinal cord, measuring 50×20 mm and 40×20 mm. These lesions were rounded and elongated with smooth walls and with no internal septa. They contained fluid which gave the same signal as cerebrospinal fluid (CSF) on T1-, T2- and T2*-weighted images, and no contrast enhancement was seen. One patient had an intradural extramedullary lipoma adjacent to the cyst. In both patients, surgery was performed to relieve the symptoms and because of the

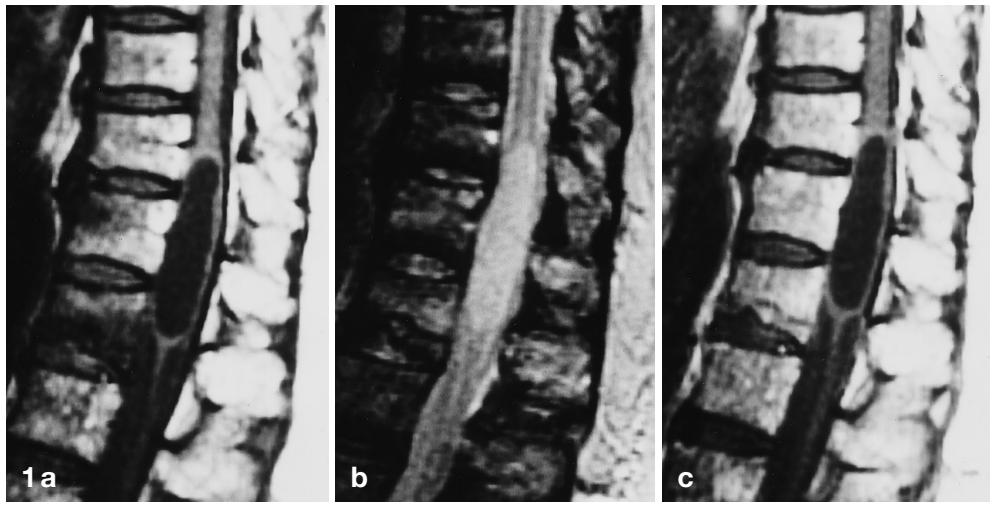

Fig. 1 a–c Case 1. Sagittal T1-weighted (**a**) T2-weighted (**b**) and contrast-enhanced T1-weighted (**c**) images. There is a cyst in the conus medullaris, whose contents show CSF intensity. The neural tissue adjacent to the lesion is reduced to a thin layer, and the cyst has no internal septa. There was no contrast enhancement

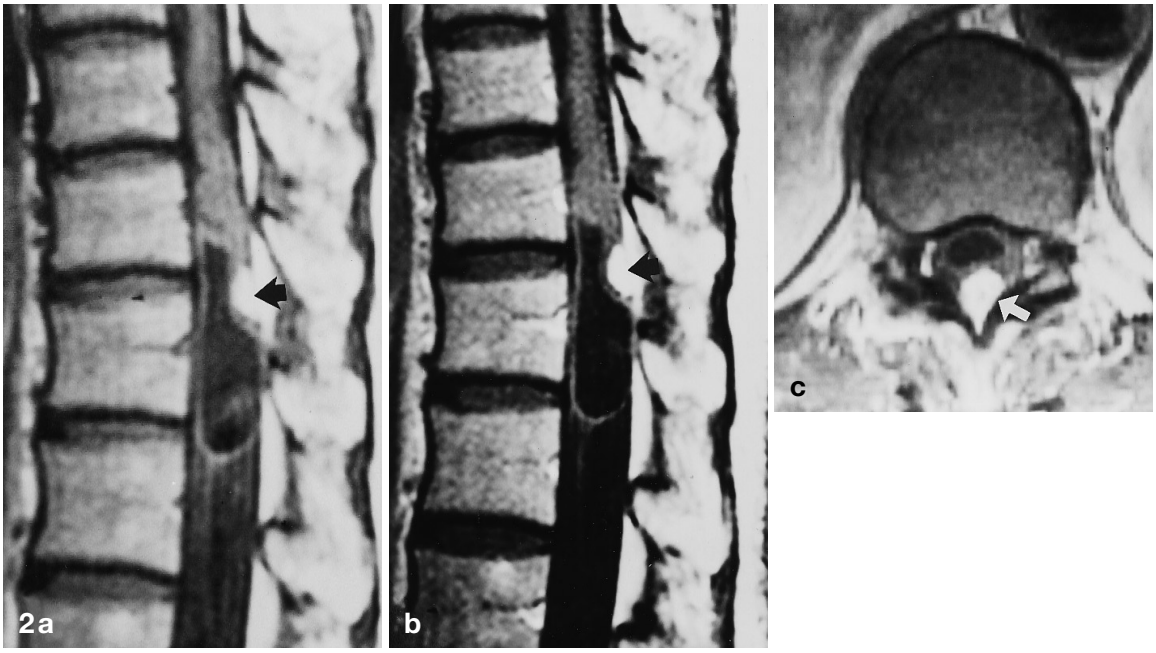

Fig. 2 a–c Case 2. **a, b** Sagittal T1-weighted images before and after contrast medium. **c** Contrast-enhanced axial T1-weighted image. There is a thin-walled cyst in the conus medullaris. No contrast enhancement is seen. There is an intradural extramedullary lipoma *(arrows)* posterosuperior to the lesion

remote possibility of a cystic neoplasm. In both cases, a large cyst containing CSF was found in the lower spinal cord and drained into the subarachnoid space. The cysts had no neoplastic component, so no biopsy of their walls was performed. After surgery, the symptoms of the patients resolved.

Discussion

The ventriculus terminalis is formed during fetal life. After Stilling's first description, Krause identified it as a true ventricle lined by ciliated ependymal cells and named it the "fifth ventricle" in 1875 [1]. The ventriculus terminalis can be observed at any age. A necropsy study has established that it is smallest in middle age and largest in early childhood and old age [1]. Coleman et al. [2] reported MRI of the ventriculus terminalis in children and stated that 2.6 % (11 of 418) of normal children had a visible cavity. All these children were less than 5 years old. The children had no symptoms and the cavities were smaller (the mean measurements were $22 \times 4.1 \times 4.2$ mm) than those in our cases. Sigal et al. [3] reported four adults, aged 35–65 years, who had neurological symptoms and signs similar to those of our cases. One patient had a Chiari I malformation. No contrast enhancement of the cyst wall was seen. The cysts were large ($25–40 \times 17–25$ mm) and compressed the adjacent neural tissue.

To our knowledge, no case of a lipoma adjacent to the cyst has been reported. Intradural lipoma is frequently found with various congenital disorders, and the presence of lipoma suggests a congenital origin of cystic dilatation of the ventriculus terminalis.

The mechanism of isolated dilatation of the ventriculus terminalis is not clear. Various theories have been proposed, including that a craniocervical obstruction (i.e. a Chiari malformation) causes it. However, Sigal et al. [3] reported that surgical decompression of a Chiari malformation did not reduce the size of the lesion. We believe that abnormal closure of the communication between the ventriculus terminalis and upper part of the central canal gives rise to dilatation.

The differential diagnosis of cystic lesions the conus medullaris includes neoplasms such as ependymoma, astrocytoma and haemangioblastoma, which would usually show contrast enhancement of a solid portion.

When a nonenhancing cyst at the lower end of the spinal cord is on MRI, cystic dilatation of the ventriculus terminalis should be considered and seen distinguished from cystic intramedullary neoplasms, to avoid excessive or unnecessary surgery.

References

1. Kernohan JW (1924) The ventriculus terminalis: its growth and development. J Comp Neurol 38: 107–125
2. Coleman LT, Zimmerman RA, Rorke LB (1995) Ventriculus terminalis of the conus medullaris: MR findings in children. AJNR 16: 1421–1426
3. Sigal R, Denys A, Halimi P et al (1991) Ventriculus terminalis of the conus medullaris: MR imaging in four patients with congenital dilatation. AJNR 12: 733–737

ANNOUNCEMENTS

Neuro Imaging 1998 – Head and Spine: Anatomy, Function and Pathology
February 22–27, 1998, Puerto Rico
Information: Marti Carter, CME, Inc., 11011 W. North Avenue, Milwaukee, WI 53226, USA, Phone & Fax: ++1 41 47 71 95 20, E-Mail: cmemilw@aol.com

7th Zurich Course on Interventional Neuroradiology
March 23–27, 1998, Zurich, Switzerland
Information: Prof. A. Valavanis, Institute of Neuroradiology, University Hospital of Zurich, CH-8091 Zurich, Switzerland, Phone: +41 12 55 56 20; Fax: +41 12 55 45 04

CAR '98 – Computer Assisted Radiology and Surgery, 12th International Symposium and Exhibition
June 24–27, 1998, Tokyo, Japan
Information: Prof. Heinz U. Lemke, Technische Universität Berlin, Institut für Technische Informatik, Sekr. Computer Graphics FR 3-3, Franklinstr. 28–29, D-10587 Berlin, Germany
Tel. +49 30 31 47 31 00; fax +49 30 31 42 35 96; e-mail hul@cars.tu-berlin.de; www:http://cars.tu-berlin.de

Third International Congress on Tropical Neurology
30 November–2 December, 1998, Fort de France, Martinique
Information: Prof. Dumas, Institute of Tropical Neurology, Faculty of Medicine, 2 rue du Docteur Marcland, F-87025 Limoges Cédex, France
Tel. +3 35 55 43 58 20; Fax +3 35 55 43 85 21
or Prof. Vernant, Department of Neurology, Meynard Hospital, P.O. Box 632, F-97200 Fort de France, Martinique
Tel. +3 35 96 55 22 61; Fax +3 35 96 75 45 90