

## CLINICAL IMAGE

# A Case of Intracranial Subependymoma: Histopathological Confirmation of Ring-shaped Lateral Ventricular Nodule

Keita Kuya<sup>1\*</sup>, Yuki Shinohara<sup>1</sup>, Hiroki Yoshioka<sup>2</sup>, Satoshi Kuwamoto<sup>3</sup>,  
Masamichi Kurosaki<sup>2</sup>, and Toshihide Ogawa<sup>1</sup>

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## Case Report

Ring-shaped lateral ventricular nodules (RSLVNs) were first described by Shimono et al. in 2009.<sup>1</sup> They reported the MRI features of these incidentally discovered lesions and reported a prevalence of only about 0.023%. Subsequently, Nakajima et al. reported a 0.45% prevalence of RSLVNs.<sup>2</sup> Although they noted RSLVNs might be benign lesions without rapid growth, histopathological confirmation has not been described. We report a case of RSLVN with histopathological examination of surgical specimens.

A 68-year-old man with obstructive hydrocephalus caused by a metastatic lesion in the pineal region secondary to renal cell carcinoma was referred to our institution for endoscopic third ventriculostomy. On preoperative brain MRI, a ring-shaped nodule of 5 mm in diameter was incidentally found to be projecting in the frontal horn of the right lateral ventricle. The nodule showed isointensity relative to the white matter, and the core portion demonstrated isointensity relative to the cerebrospinal fluid (CSF) on T<sub>2</sub>-weighted and T<sub>1</sub>-weighted images. It showed no contrast enhancement on gadolinium-enhanced T<sub>1</sub>-weighted images (Fig. 1). Neither the size nor the signal intensity of this nodule had changed in comparison with MRI findings from 32 months prior (not shown). These findings corresponded well with the MRI features of RSLVNs. During ventriculoscopy, a well-defined, solid, white mass protruded into the right lateral ventricle, and tumorectomy was performed to exclude disseminated

carcinoma. Histopathologically, clusters of oval-shaped cells lacking atypia were embedded in the fine fibrillary background accompanied by microcystic formations, and the specimen was diagnosed as subependymoma (Fig. 2).

Shimono et al. described that RSLVNs are similar in nature to subependymoma.<sup>1</sup> Subependymoma is often incidentally found in the lateral ventricle as a well-defined, nonenhancing tumor on MRI, especially in middle-aged and elderly adults.<sup>3</sup> Nakajima et al. also proposed that RSLVN may be a precursor to or variant of subependymoma because of the similar radiological and clinical findings.<sup>2</sup> Multiple RSLVNs also will not be inconsistent with subependymoma, because a case of multiple subependymoma was reported previously.<sup>3</sup> However, a definitive conclusion has been difficult because subependymoma has not been described as having a ring-shaped appearance. In our case, the CSF signal in the core portion of the ring-shaped nodule on MRI might have been caused by microcystic formations, in comparison with the histopathological findings. On microscopic evaluation of histopathological specimen sections, microcystic formations were prominent centrally, and the marginal region was occupied by fibrillary stroma and lacked microcystic formations. These histopathological findings might give a thick-walled, ring shape on MRI. It has been suggested that the main component of subependymoma is fibrous stroma when it is small. Then microcystic formations expand from the center to the marginal regions as the tumor increases in size. Therefore, the MRI appearance of subependymoma is ring-shaped when it is small, but not when it is large enough to be resected.

This report demonstrates the surgical and histopathological findings of RSLVN. In our case, RSLVN was subependymoma with centrally predominant microcystic change. RSLVNs are considered to be small subependymomas, and follow-up observation is sufficient management, as has been described previously.

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<sup>1</sup>Division of Radiology, Department of Pathophysiological Therapeutic Science, Tottori University, 36-1 Nishi-cho, Yonago, Tottori 683-8504, Japan

<sup>2</sup>Division of Neurosurgery, Department of Brain and Neurosciences, Tottori University, Tottori, Japan

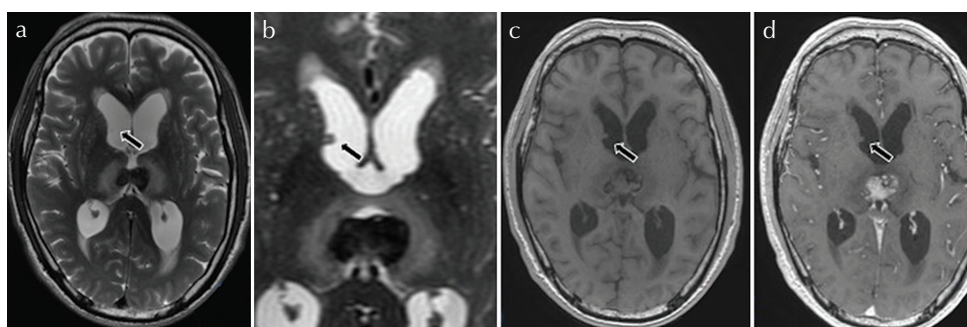
<sup>3</sup>Division of Molecular Pathology, Department of Pathology, Faculty of Medicine, Tottori University, Tottori, Japan

\*Corresponding author, Phone: +81-859-38-6637, Fax: +81-859-38-6639, E-mail: keita98\_1\_7@hotmail.co.jp

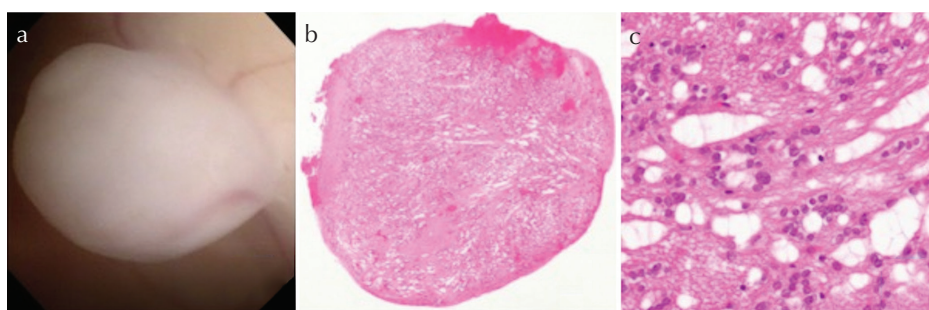
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**Fig. 1** Preoperative magnetic resonance imaging findings. A 5-mm ring-shaped nodule projecting in the frontal horn of the right lateral ventricle (arrow) shows isointensity relative to the white matter on fast spin echo T<sub>2</sub>-weighted imaging (a), three-dimensional variable refocusing flip angle fast spin echo T<sub>2</sub>-weighted imaging (b) and three-dimensional fast spoiled gradient recalled acquisition in the steady state (FSPGR) T<sub>1</sub>-weighted imaging (c). It shows no contrast enhancement on gadolinium-enhanced three-dimensional FSPGR T<sub>1</sub>-weighted imaging (d). A metastatic lesion causing obstructive hydrocephalus with hemorrhage is also observed in the pineal region.



**Fig. 2** Surgical findings during endoscopic third ventriculostomy and histopathological findings. A well-defined, solid, white mass protrudes into the lateral ventricle on endoscopic image (a). Haematoxylin & Eosin (HE; loupe, b), HE (×400, c). Clusters of oval-shaped cells lacking atypia are embedded in a fine fibrillary background. Microcystic formations are prominent in the central part.

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### Conflicts of Interest

The authors declare that they have no conflicts of interest.

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