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Case Report

Imaging findings of right-sided trigone intraventricular meningioma: A case report ☆

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ABSTRACT

Intraventricular meningioma is a case with an incidence about 0.5%-2% of all cases of meningioma. About 80% of all intraventricular meningiomas occur in the trigone of lateral ventricle and more common on the left side. In this case, we present a 43-year-old woman with Right-sided Trigone Intraventricular Meningioma. The diagnosis and assessment of intraventricular meningiomas remains a challenge. Radiological examination has a major role in cases of intraventricular meningioma. Presurgical diagnostic imaging may be useful in corroborating the diagnosis. In this article, we describe the patients with intraventricular meningiomas in CT and MR imaging that revealed useful data for diagnosis.

Introduction

Intraventricular meningioma is a well described tumor, most often located in the trigone. It constitutes approximately 0.5% to 2% of all intracranial meningioma. The majority present in the fourth to the sixth decades of life and show a predominance in women of approximately 2:1. About 80% of all intraventricular meningiomas occur in the trigone of lateral ventricle and more common on the left side, the posterior of the 3rd ventricle accounts for 15% of cases, and 5% in the fourth ventricle [2].

Brain magnetic resonance imaging (MRI) is the gold standard diagnostic imaging for meningioma. On MRI, Meningiomas are iso or hypointense on T1-weighted MR images, and iso or hyperintense on T2-weighted images, with strong contrast enhancement and heterogenous both in CT and MR.

Meningioma might have been suspected from the radiologic characteristics by CT and MRI, and MR spectroscopy may provide additional information in cases in which the differential diagnosis of tumors by neuroimaging is difficult. Common proton MR resonances, an increase in Cho, and the presence of lactate and lipid resonances in different proportions [3–6]. The NAA appears to be present in high levels only in neuronal tissue. It is considered a neuronal marker that should not be found in extramedullary tumors unless there has been contamination of nontumoral neuronal tissue surrounding the tumor or there are normal neurons within the tumor [4,5,7]. Total Cr content is reduced in almost all brain tumors, but it tends to be higher in neuroectodermal than in nonneuroecto-

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dermal tumors [7]. Cho reflects membrane turnover, correlates with malignancy in astrocytic tumors, and forms high peaks in meningioma and pituitary adenoma. The presence of lactate in tumors is thought to be due to high anaerobic glycolysis or, alternatively, to hypoxic conditions. The most common proton spectrum found in meningiomas is a high Cho peak with low or absent NAA and Cr and variable amounts of lactate [4,6,9].

Case presentation

A 43-year-old female had 2 months history of reccurent episodes of progressive frontal headache and unsteadiness. Complaints of headaches are also felt by the patient to arise slowly since 2 months ago. Physical examination showed mild left-sided hemiparesis, with negative neck stiffness, negative pathological reflexes, normal physiological reflex, isochore round pupils with a diameter of 3 mm/3 mm, positive light reflex, and eye movement in normal limits. The patient's MMSE result was 32.

Head CT with contrast showed an intense enhancement tumor localized in the right trigone with extension to lateral ventricle, to posterior body of the lateral ventricle, temporal and occipital horn with vasogenic edema and causing midline shift to the left (Fig. 1).

The MRI showed a tumor localized in the right trigone with extension to the posterior body of the lateral ventricle and temporal and occipital horn (4.19 mm wide, 6.42 mm in length, 6.54 mm in height) with midline shift 0.98 cm to left. On T-weighted images, the mass enhanced homogeneously with loculated enlargement of the occipital horn. The mass gives changes signal intensity with inhomogenous hypointense on T1WI, inhomogenous isointense on T2W1, inhomogenous hyperintense on T2-FLAIR and showed peritumoral edema (Fig. 2).

It shows restricted area on DWI-ADC with ADC value 0.8 × 10-3 mm^2/s, showing blooming artefact on SWI (Fig. 3). The mass enhanced intensely after administration of contrast material (Fig. 4).

The head MR Spectroscopy shows a shows a decreased in NAA with peak 2.1 ppm (normal value 169,4; intra lesion 29,15), a decreased in creatine with peak 3.0 ppm (normal value 86,91; intra lesion 47,23), and an increased in Choline with peak 3.3 ppm (normal value 76,36; intra lesion 141,59) which support the diagnosis of a trigonal intraventricular meningioma. The pathological examination revealed a meningioma with fibroblastic components (Fig. 5).

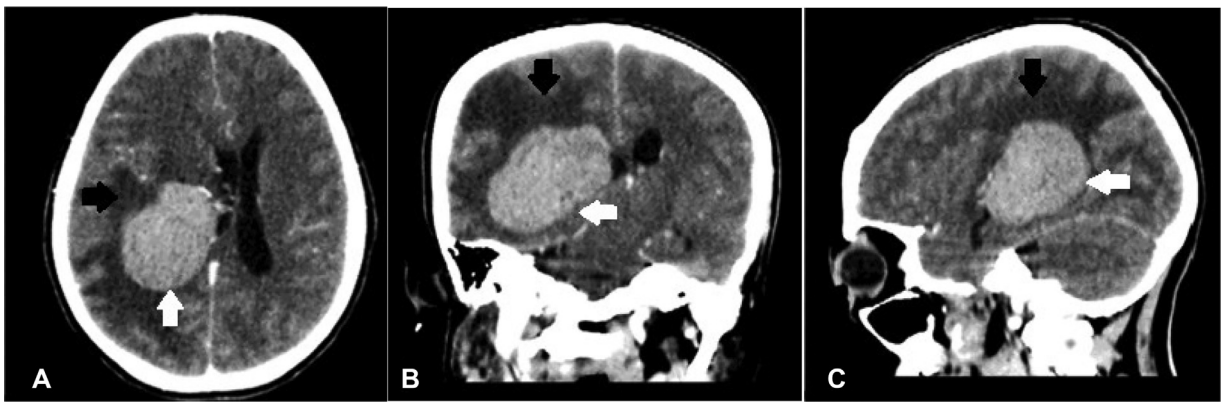

Fig. 1 – (A) CT contrast axial, (B) CT contrast coronal, and (C) CT contrast sagittal showed intense enhancement mass (white arrow) with vasogenic edema (black arrow).

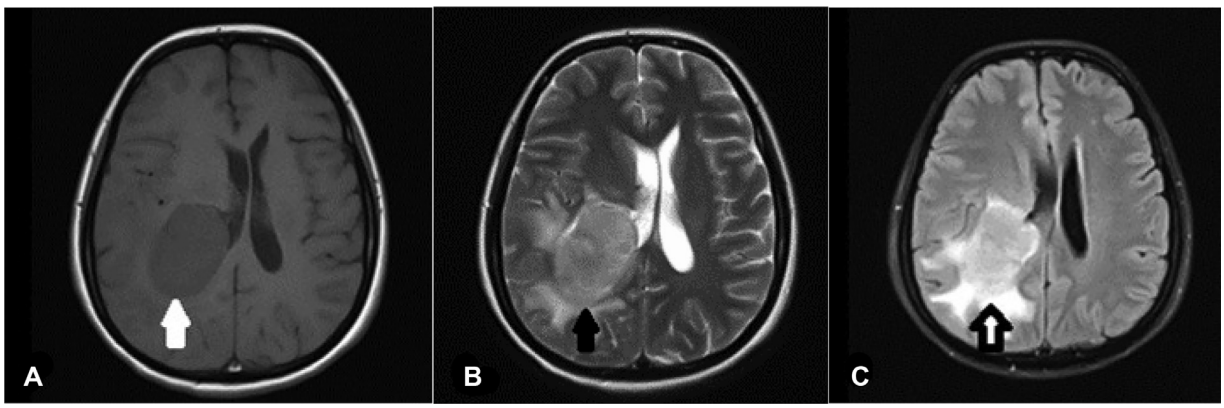

Fig. 2 – (A) T1WI axial showed inhomogenous hypointense mass (white arrow), (B) T2W1 showed inhomogenous isointense (black arrow), (C) T2 Flair showed inhomogenous hyperintense (black arrow).

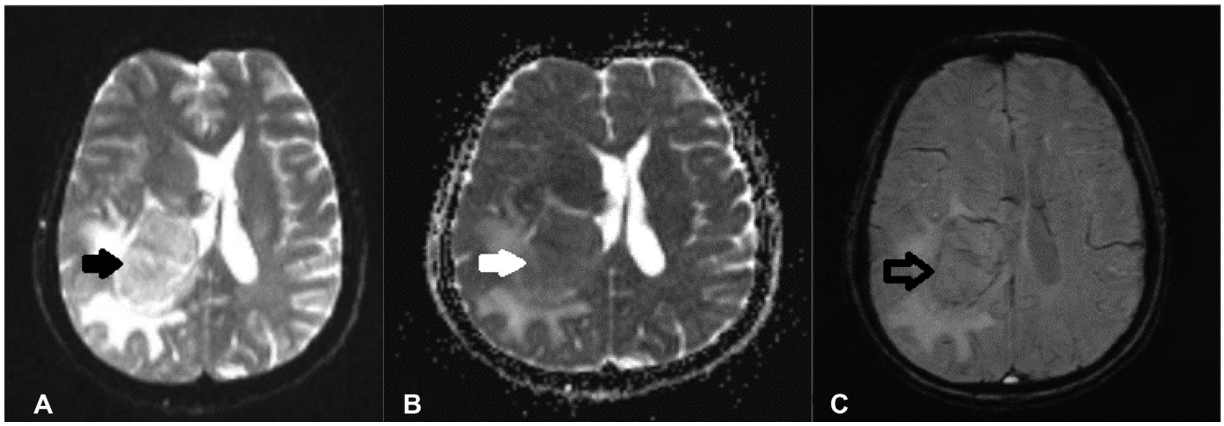

Fig. 3 – (A) ADC (black arrow) and (B) DWI showed isointense signals with slightly inhomogeneous hyperintense mass, with a few restricted area (white arrow), and (C) SWI forming a "blooming artifacts" (blank arrow).

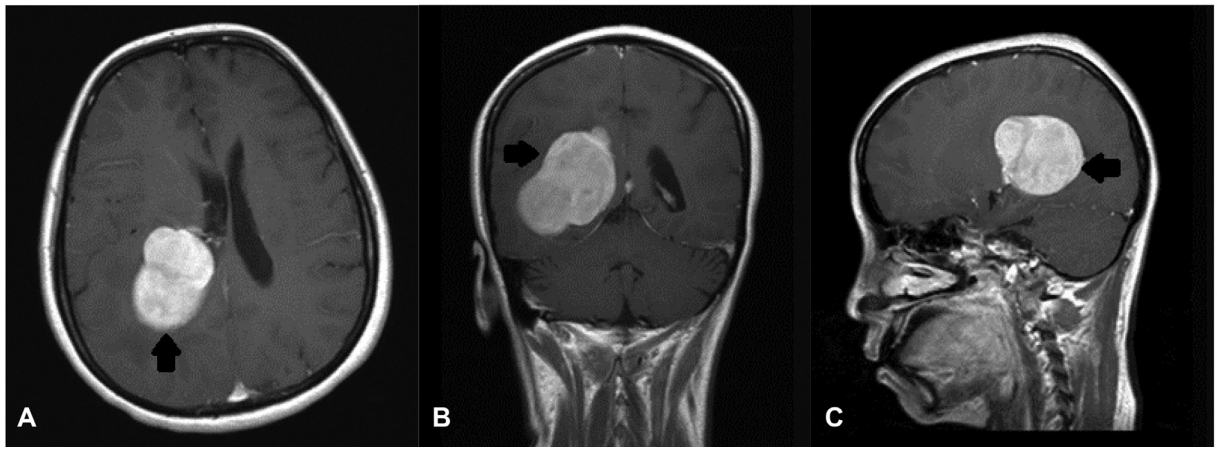

Fig. 4 – (A) Postcontrast axial, (B) postcontrast coronal, and (C) (postcontrast sagittal) showed intense enhancement mass (black arrow).

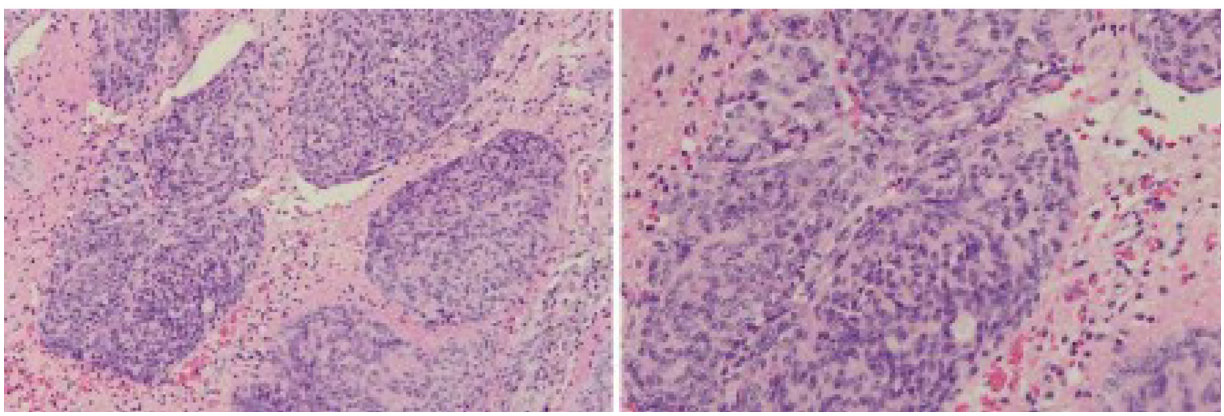

Fig. 5 – A pathological photomicrograph shows benign-looking fibroblastic meningioma with monomorphic elongated cells and spindly nuclei.

Discussion

Meningioma is a mostly benign tumor in the brain and comprises 13 – 26% of intracranial tumors. The most common site of intraventricular meningioma was the trigone of lateral ventricular, accounting for 88.4% of all IVM cases with the incidence of left-sided IVM is more common than right-sided [5] and more common in women with a ratio of 1.47:1 of all IVM cases [2].

Intraventricular meningiomas are mostly asymptomatic. There is no pathognomonic constellation of signs or symptoms for intraventricular meningiomas. Non specific headache is the most common symptom and present inapproximately 80% of patients. Other symptoms include vision, gait disturbances, memory problems, and cognitive changes [8,9]. Seizures are presents in 27% of cases [7]. In this case, the patient presented reccurent episodes of progressive headache and unsteadiness with mild left-sided hemiparesis.

The intracranial mass may resemble meningiomas based on their radiological findings.The mass that located in the trigone of lateral ventricle have differential diagnosis such as choroid plexus papilloma (age <10 years), low-grade glioma (age 10-40 years), metastases, lymphoma, or meningioma [4]. When they occur at the base of the skull, meningiomas must be distinguished from neoplastic meningitis or vestibular schwannomas. Meanwhile, if it is in the ventricles, meningiomas need to be differentially diagnosed with ependymoma or metastases, papillomas/choroid plexus carcinomas, and solitary fibrous tumors/hemangiopericytomas [1].

A head computer tomography (CT) is performed to look for calcifications in the intracranial mass. CT has a higher sensitivity for calcifications than MRI. In atypical meningiomas or suspected malignancy, CT provides the best picture of osseous destruction, hyperostosis shows the mass invasion to the bone [11].

Magnetic resonance imaging of the brain (MRI) is the gold standard imaging for suspected brain lession [3]. Existing findings from the examination of intraventricular meningiomas on T1-weighted images are solid masses that are well demarcated, iso or hypointense. While the T2-weighted image shows an iso or hypertense image. In certain cases where neuroimaging is difficult to diagnose the tumor, MR spectroscopy is helpful to obtain additional information. In extramedullary tumors, NAA was not found. High NAA is a neural marker. If there is contamination of the neural tissue around the tumor, NAA can be found. In all cases of brain tumors, the total creatine reduction with non-neuroectodermal tumors tends to be lower. High choline values occur in cases of meningiomas and pituitary adenomas. High choline with decreased NAA and creatine are the most common findings on MR spectroscopy of meningiomas. The amount of lactate may vary, its presence as a result of anaerobic glycolysis or hypoxia [4,10]. In this case, the findings of a decreased in NAA, a decreased in creatine and an increased in choline with are additional informations to rule out the differential diagnosis of meningioma.

Conclusion

Radiological examination such as CT and MR imaging revealed useful data for diagnosis of meningioma, and MR spectroscopy may provide additional information for support the diagnosis. Proton MR spectroscopy in our case showed a high peak from Cho with very low Cr and NAA. These result correlate well with meningioma and support the diagnosis of right-sided trigone intraventricular meningioma.

Patient consent

Written informed consent for publication of their case was obtained from our patient.

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