

## Editorial

## Cystic Meningiomas

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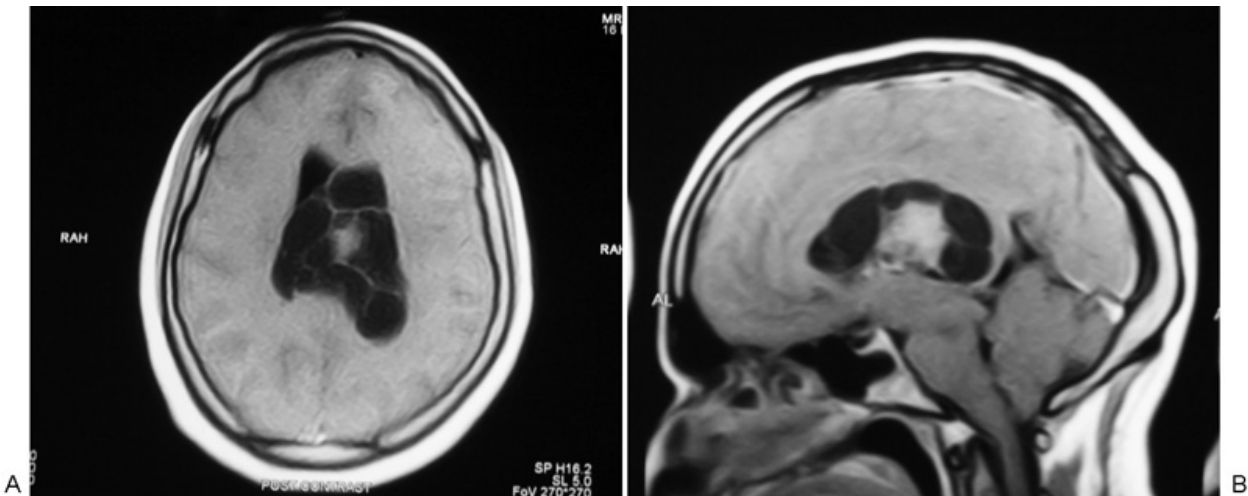
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Meningiomas originate from the arachnoid cap cells of leptomeninges and can occur in any region of meninges where these cells can be found. Generally arising from and seen attached to the dura, these tumors can occur without dural attachment as in Sylvian fissure and intraventricular locations. The tumor was first discovered in an autopsy study by Felix Plater in 1614,<sup>1</sup> and the terminology underwent several changes till Cushing coined the term “meningioma” to describe these solid, vascular dural-based tumors. Operative and imaging appearances of these tumors are well described, as being extra-axial with a cerebrospinal fluid (CSF) cleft, solid, vascular, uniformly enhancing, discrete, arising from dura, falx, or tentorium, and having a dural tail. Atypical features are observed in atypical meningiomas, such as invasion of cortex, varying degrees of cerebral edema, and cystic changes in these tumors.

Cystic changes in meningiomas are uncommon, and the occurrence rate has recently been reported at approximately 3.5% of intracranial meningiomas.<sup>2</sup> The overall occurrence has

been reported to be between 2 and 4%.<sup>3</sup> Cystic meningioma denotes a meningioma with macroscopical cysts, which may be peritumoral or intratumoral. Intratumoral cysts are caused by cystic degeneration, ischemic necrosis, intratumoral hemorrhage, or active secretion.<sup>4</sup> Peritumoral cysts are caused by loculated CSF space around the tumor and cavitation after hemorrhage, together with peritumoral demyelination and edema of the adjoining brain.<sup>5</sup>

Clinical presentation of cystic meningiomas is no way different from other meningiomas. However, the radiological appearances need careful interpretation and application of magnetic resonance imaging (MRI) protocols so that distinction from other cystic tumors can be made preoperatively. Prior to MRI, these tumors were considered as meningiomas with atypical radiological appearances and were often confused with gliomas.<sup>6</sup> Other differential diagnosis included hemangioblastomas and secondaries. The solid portion may appear hypointense or isointense on T1-weighted images. In FLAIR, the solid portion of the tumor



**Fig. 1** (A) Axial magnetic resonance imaging (MRI; T1-weighted contrast) showing cystic intraventricular meningioma. (B) Sagittal MRI (T1-weighted contrast) showing cystic intraventricular meningioma.

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shows up as hyperintense lesion in majority of the cases. Most of the tumors have multicystic component, although solitary cysts too occur frequently.<sup>2</sup> Septa may be seen within the cysts, and vasogenic edema is seen in almost half the patients. Diffusion-weighted imaging shows the solid meningiomas to be hyperintense due to their high cellularity.<sup>2</sup> Cystic meningiomas occur in the same location as solid meningiomas and are seen in unusual locations as well (pineal region, lateral ventricles, etc.) (–Fig. 1A, B).

Surgery for cystic meningiomas is planned in the usual manner for meningiomas. Cyst wall should be removed as far as possible since the wall may contain viable tumor cells leading to recurrence.<sup>7</sup> Presence of tumor cells has been disputed.<sup>8</sup> Boukobza et al found tumor cells in cyst wall in nearly 60% cases. Intraoperative 5-aminolevulinic acid fluorescence has shown promise in deciding excision of cyst wall and extent of bone infiltration, especially in atypical meningiomas.<sup>9</sup>

Cystic meningiomas are unusual tumors, and it is now possible to have a fair idea of their nature by neuroimaging. Excision follows usual principles of meningioma surgery, and the cyst wall should be removed as far as possible to minimize possible recurrences. Histopathology of these tumors is no different from the solid meningiomas.

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