

## Image of the Month

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# Endoscopic total removal of lateral ventricular cysticercus cyst

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A patient presented with recurrent episodes of generalized seizures for last 1 year followed by progressive holocranial headache, vomiting and visual blurring at the peak of headache for last 2 months. On admission, the patient was neurologically intact with bilateral papilledema. Magnetic resonance imaging (MRI) of brain showed cystic lesion at the left lateral ventricle with hydrocephalus (Figs 1a and 1b). Endoscopic complete cyst removal was done under general anesthesia. The procedure was performed using a zero degree rigid lens endoscope (Karl Storz 2.7 mm Neuro-Endoscope System, COMPANY). The patient was placed supine, with no rotation of the head to maintain vertical orientation. Frontal precoronal burr-hole approach through left side was used. The endoscope was set in and secured to the accompanying endoscope holder that was attached to the operative table. Normal saline solution was used for gravity-fed irrigation. Once cyst was identified with the endoscope, an assessment was made whether the cyst could be removed safely. The cyst was blocking the left foramina of Monro and loosely adherent to the ependymal wall. With the help of saline irrigation and the mechanical pressure of endoscope,

we tried to separate the cyst from the ependymal wall. Once it was confirmed that the cyst was inseparable from ependyma or was adherent to an ependymal surface, the trans-endoscopic grasping instrument was advanced down the working channel of the endoscope. After grasping of the cyst wall, the grasping instrument was retracted to the point at which the cyst was approximately 5 mm from the distal tip of the endoscope. The anesthesiologist was asked to perform a gentle and sustained Valsalva maneuver (to approximately 30 mmHg airway pressure) while endoscope was backed out and withdrawn. The cyst remained just beyond the distal end of the endoscope and was delivered to the specimen cup. After complete removal of the cyst, the ventricular system was inspected for any additional cyst. The endoscope was negotiated through the foramina of Monro and third ventriculostomy was performed. The ventricular system was inspected a final time and irrigation was continued until all cloudiness of ventricular fluid cleared. The cyst was inspected; it was completely removed with intact wall (Fig. 2). The histopathological report revealed cysticercosis. A postoperative MRI showed no evidence of residual cyst with decompressed ventricles. The patient was put on albendazole (15 mg/kg) therapy for 28 days.

Neurocysticercosis is the most frequent cause of hydrocephalus in adults in regions where the disease is endemic, like India. The prognosis for intraventricular neurocysticercosis is worse than that for the intra-

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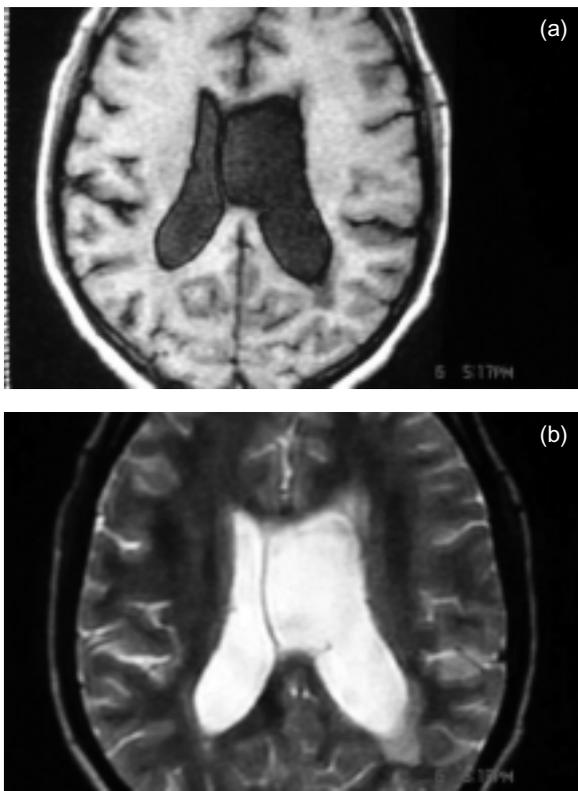


Fig. 1. Preoperative magnetic resonance imaging (1a, T1 contrast, 1b T2 weighted) showing left lateral ventricular cyst.



Fig. 2. Excised cyst with intact wall.

parenchymal form of the disease, making treatment especially important [1]. Before the advent of MRI, intraventricular cysts were difficult to diagnose noninvasively. Among the invasive procedures used were contrast ventriculography and computerized tomography ventriculography. MRI, with its multiplanar imaging capabilities, excellent depiction of tissue contrast, and versatile parameters, has made the diagnosis of intra-

ventricular cysticercosis cysts easy [2]. Various surgical approaches to treat intraventricular cysticercosis have been practiced over the years. Utilization of the endoscope is meant to provide a safe and minimally invasive procedure for the removal of symptomatic cysts, minimizing morbidity and mortality relating to the natural history of the disease, as well as possibly avoiding a more extensive standard open craniotomy [3]. The goals of the strategy were to i) remove ventricular cysts; ii) employ internal cerebrospinal fluid (CSF) diversion procedures for hydrocephalus to avoid shunting, and; iii) elude open surgical procedures [4].

Cysticercosis is a chronic inflammatory disease and there can be both communicating and noncommunicating hydrocephalus due to subclinical ependymitis or arachnoiditis [5,6]. The pathophysiological mechanism of raised intracranial pressure include: i) hypertension caused by space-occupying cysticerci (tumoral form); ii) hypertension caused by diffuse cerebral edema (pseudotumoral form); and iii) hypertension secondary to hydrocephalus caused by obstruction of CSF circulation. These mechanisms can be isolated or combined [5,6]. Therefore, CSF diversion procedure are required even after the obstructive component is alleviated [4,6]. In our case, we performed third ventriculostomy along with total removal of the cyst. The endoscopic removal of lateral ventricle cysticercal cysts, combined with a third ventriculostomy is an effective treatment in patients with hydrocephalus and should be considered the primary treatment for this condition [5].

Despite the intraoperative rupture of cysts, there are least chances of arachnoiditis or ventriculitis postoperatively. The ease of performing septostomies and third ventriculostomies in conjunction with cyst removal makes these procedures appealing and practical for most cases of ventricular cysticercosis [4,6].

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