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Clinical Study

Endoscopic management of intraventricular neurocysticercosis

Rohit Kumar Goel, Faiz Uddin Ahmad, Ananth Kesav Vellimana, Ashish Suri *, P. Sarat Chandra, Rajinder Kumar, Bhawani Shankar Sharma, Ashok Kumar Mahapatra

Department of Neurosurgery, Neurosciences Centre, All India Institute of Medical Sciences, Ansari Nagar, New Delhi 110 029, India

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Abstract

Surgical management is the only option for patients presenting with acute hydrocephalus caused by intraventricular neurocysticercosis. Although various modalities have been described, endoscopic excision is becoming increasingly popular. The outcomes for 22 patients with intraventricular neurocysticercal cysts with hydrocephalus managed endoscopically are presented. Complete excision of cysts (fourth ventricle, 14; lateral ventricle, 4; third ventricle, 3; both lateral and third ventricles, 1) was performed in all patients. Internal procedures for cerebrospinal fluid diversion were performed in 20 patients. There were minimal perioperative complications, all patients were relieved of raised intracranial pressure and no patient has required shunting to date. Mean follow-up duration was 20.7 months. Follow-up imaging showed the absence of residual cysts and resolution of hydrocephalus in all patients.

Keywords: Cyst; Endoscopy; Hydrocephalus; Intraventricular; Neurocysticercosis; Third ventriculostomy

1. Introduction

Neurocysticercosis (NCC), caused by hematogenous dissemination of *Taenia solium* larvae into the brain parenchyma, is still endemic in many parts of Asia, Africa and Latin America.[1–5] About 7% to 30% of patients with NCC present with cysts in the cerebral ventricular system.[2,3,6–15] The occipital horn of the lateral ventricles and the fourth ventricle are the most common sites for intraventricular cysts.[16–18] These single or multiple cysts frequently coexist with parenchymal and subarachnoid cysts.[6,7,19] The prognosis of intraventricular neurocysticercosis (IVNCC) is worse than that of parenchymal NCC, making prompt diagnosis and treatment especially important.[7,20]

Obstruction of cerebrospinal fluid (CSF) flow as a result of subarachnoid and intraventricular cysts may result in non-communicating hydrocephalus in about 30% of patients with NCC.[21] These patients may also develop communicating hydrocephalus due to ependymitis.[22] For patients presenting with acute hydrocephalus, surgery is the only option. The surgical modalities include ventriculoperitoneal (VP) shunting, microneurosurgical excision and endoscopic management. Shunting tends to be fraught with problems such as infection, malfunction and migration of cysts.[23] Microneurosurgical procedures are time consuming, technically demanding and associated with the risk of complications.[24] However, endoscopic management of these lesions is relatively new, and has yielded promising results,[25–30] but the literature on this subject is limited.[29,31]

Various techniques for endoscopic excision of fourth ventricular NCC have been practiced by different surgeons. We present our experience of twenty-two patients with IVNCC who were managed endoscopically at a tertiary-care neurosurgical centre.

2. Materials and methods

We retrospectively analysed 22 patients with IVNCC who were managed endoscopically between June 2001

* Corresponding author. Tel.: + 91 11 26593291; fax: +91 11 26589650.
E-mail address: surineuro@hotmail.com (A. Suri).

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and December 2006. Data on demographic profile, clinical presentation, neuroimaging findings, endoscopic management instituted, immediate clinical outcome, post-operative hospital stay and outpatient follow-up was collected. There were seven males and 15 females and the mean age at presentation was 26.2 years (range 4–55 years). All patients presented with raised intracranial pressure. Headache was present in all patients. Vomiting was a presenting symptom in two-thirds ($n = 15$), while another one-third ($n = 7$) had visual deterioration. Four patients had a previous history of seizures. In three of these patients there were parenchymal cysts in addition to the intraventricular cysts. However, the fourth patient had only a lateral ventricular cyst with hydrocephalus. Other presenting symptoms included diplopia ($n = 4$), vertigo ($n = 2$), gait ataxia ($n = 1$) and hemiplegia ($n = 1$).

All patients had pre-operative CT scans (Fig. 1) and contrast-enhanced MRI brain scans. Out of the 22 patients, 14 had cysts in the fourth ventricle (Fig. 2). Four of these 14 patients also had associated parenchymal cysts and, in one patient, cysts were present at the foramen of Monro (FOM) as well as the fourth ventricle and parenchyma. Four patients had cysts in the lateral ventricle, and three had cysts in the third ventricle. One patient had cysts in both the lateral and third ventricles (Table 1). In all patients, the intraventricular cysts were associated with hydrocephalus. The prerequisite for endoscopic excision of a fourth ventricular NCC was a dilated aqueduct of Sylvius and third ventricle.

Endoscopic excision of the intraventricular cysts was performed in all 22 patients. Internal CSF diversion in the form of endoscopic third ventriculostomy (ETV) ($n = 16$), septostomy ($n = 5$) and foraminotomy of the FOM ($n = 2$) were also done in the same sitting. Twenty-one patients received albendazole (15 mg/kg per day, twice daily for 21 days) and steroids post-operatively. One female patient was not given albendazole because she was 24 weeks pregnant. The mean hospital stay following surgery was 4.0 days, although most patients were discharged on post-operative day 3. All the patients were subsequently followed up in the neurosurgical outpatient department.

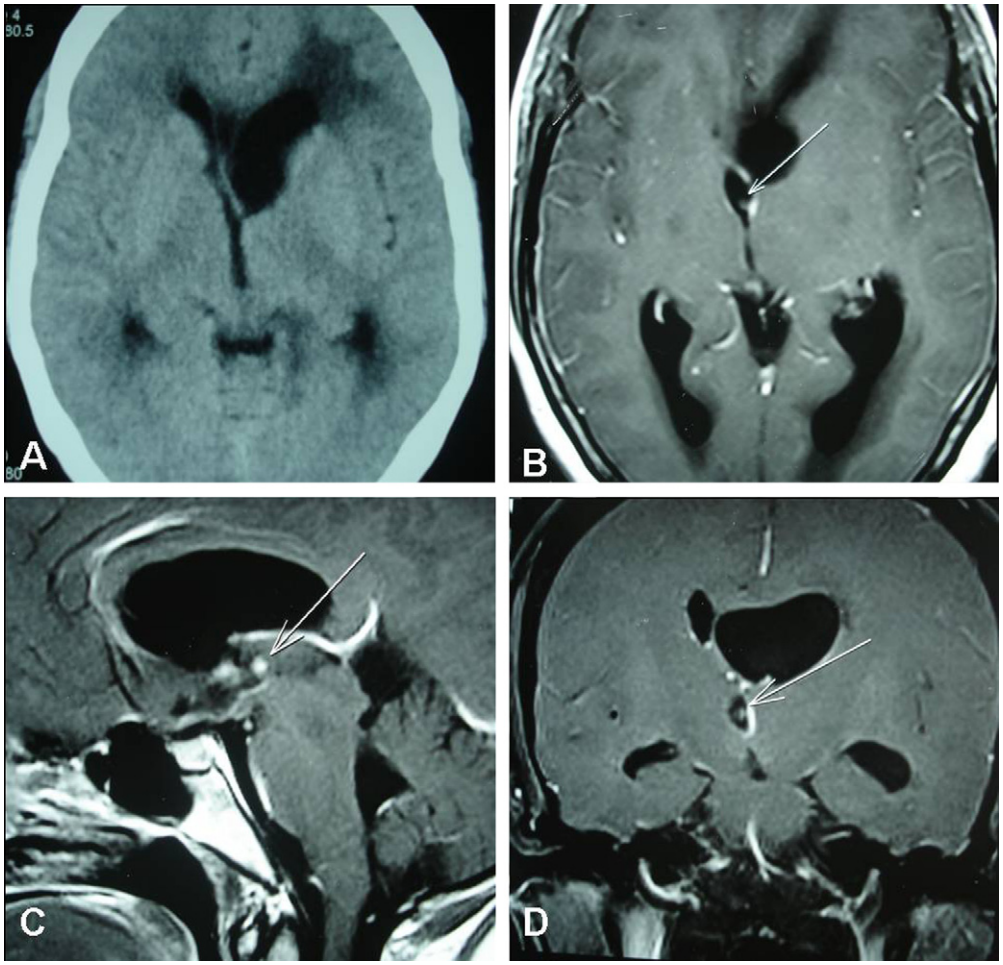

Fig. 1. Non-contrast axial CT scan of the head (A) showing asymmetric dilatation of the left lateral ventricle as a result of obstruction of the foramen of Monro by a third ventricular cyst. Axial (B), sagittal (C) and coronal (D) contrast-enhanced MRI sections of brain showing a third ventricular cyst with the scolex (white arrows) causing asymmetrical hydrocephalus.