CASE REPORT

'Trapped temporal horn' of lateral ventricle in tuberculous meningitis

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SUMMARY

A young girl presented with a 1-month history of constitutional symptoms, headache and vomiting and 7-day history of left hemiparesis. Neuroimaging showed the 'trapped temporal horn' sign, suggestive of focal obstructive hydrocephalus at the foramen of Monro. Analysis of the cerebrospinal fluid and other investigations revealed a tubercular aetiology. The patient was managed with a ventriculoperitoneal shunt and antitubercular medications.

BACKGROUND

Obstructive hydrocephalus in tuberculous meningitis usually leads to symmetric dilation of the cerebral ventricles. However, obstruction at the foramen of Monro of the lateral ventricle in tuberculous meningitis may seal off the temporal horn from the rest of the ventricular system. Continued secretion of cerebrospinal fluid (CSF) by the choroid plexus within the temporal horn can lead it to expand into a cyst and behave as a mass lesion. This entity, termed 'entrapment of the temporal horn', is a form of focal hydrocephalus which has scarce mention in the literature.

CASE PRESENTATION

A 22-year-old woman presented with a 1-month history of low-grade fever, malaise, anorexia and persistent headache, with intermittent vomiting. Since past 7 days, she presented with weakness in the left upper limb. There was no history of visual blurring or seizures, nor chronic cough or haemoptysis. On examination, her vitals were normal except for skin temperature of 37.7°C. She was conscious and alert but irritable. Cranial nerve examination revealed bilateral sixth cranial nerve palsy; pupils were equal and reacting to light in both eyes. Fundus examination revealed hyperaemic discs with blurred superior disc margins. Other cranial nerves were normal on examination. Motor system examination revealed left hemiparesis (more marked weakness in the arm than the leg) with positive Babinski's sign on the left. Neck stiffness and Kernig's sign were present. Other systemic examination was normal. Hence, a provisional diagnosis of subacute meningitis was considered.

INVESTIGATIONS

Non-contrast CT of the brain showed asymmetric dilation of the temporal horn of the right lateral ventricle with hypodensity of the surrounding white matter, described in the literature as the 'trapped temporal horn' sign (figure 1), signifying focal

obstructive hydrocephalus at the foramen of Monro. MRI of the brain showed marked periventricular ooze, mass effect on the adjacent brain parenchyma, minimal contralateral midline shift and mild communicating hydrocephalus (figure 2). Gadolinium-enhanced MRI of the brain showed additional evidence of thin enhancement of the lining of the right temporal horn (figure 3), suggestive of focal ventriculitis.¹ The opening CSF pressure was elevated (230 mm H₂O). The CSF was turbid with raised cell count (230 cells/mm³), differential count of 85% lymphocytes, raised proteins (258 mg/dL) and decreased glucose (40 mg/dL). The corresponding blood sugar was 104 mg/dL and the CSF/serum glucose ratio was decreased. Further, CSF ADA (adenosine deaminase) levels were 24 IU/L, well above the upper laboratory limit of 10 IU/L. Real time qualitative PCR for tuberculous bacilli in the CSF was positive. Erythrocyte sedimentation rate was 105 mm/first hour and HIV was negative. Other haematology and biochemical blood investigations including chest X-ray were normal.

DIFFERENTIAL DIAGNOSIS

Thus, a diagnosis of tuberculous meningitis with ventriculitis of the right temporal horn of lateral ventricles causing focal obstructive hydrocephalus at the foramen of Monro was considered.

Figure 1 Non-contrast CT of the brain axial image: 'trapped temporal horn' sign (arrow)—asymmetric dilation of the temporal horn of the lateral ventricle.

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Figure 2 MRI of the brain T2-weighted axial/coronal image showing periventricular ooze, mass effect on the adjacent brain parenchyma and mild communicating hydrocephalus.

TREATMENT AND OUTCOME

The patient was managed with five-drug antituberculous treatment (ATT), which included daily oral therapy with rifampicin (10 mg/kg), isoniazid (5 mg/kg), pyrazinamide (30 mg/kg), ethambutol (15 mg/kg) and intramuscular streptomycin (15 mg/kg). Oral steroids such as dexamethasone (0.75 mg/kg) and tapered over 6 weeks were started. Also, surgical drainage of the trapped temporal ventricle was performed with a ventriculoperitoneal shunt connecting the right temporal horn of lateral ventricle to the peritoneal cavity. The postoperative CT scan is shown in [figure 4](#). Subsequently the patient improved symptomatically and was continued on ATT, with streptomycin and ethambutol being withdrawn after 3 months. Currently, the patient is on three-drug ATT (rifampicin/isoniazid/pyrazinamide) and the plan is to continue ATT for a minimum of 12 months.

DISCUSSION

Hydrocephalus results when the flow of cerebrospinal fluid is impeded. The frequency of hydrocephalus in tubercular meningitis (TBM) is high, occurring in almost two-third of the patients and portending an unfavourable impact on the prognosis.² Further, hydrocephalus can be communicating, non-communicating or complex in patients with TBM. Tubercular hydrocephalus is usually communicating, accounting for 80% of cases.

‘Obstructive hydrocephalus’ usually results from compression of, or a block within the fourth ventricle, the aqueduct of Sylvius, or the third ventricle, leading to symmetrical dilation of the lateral ventricles. However, if a part of the ventricular

Figure 3 Gadolinium-enhanced MRI of the brain T1-weighted axial/coronal image showing thin enhancement of the lining of the right temporal horn, suggestive of focal ventriculitis (white arrow); plain arrows denote the area of focal obstruction at foramen of Monro.

Figure 4 Non-contrast CT of the brain axial image (postoperative) showing the ventriculoperitoneal shunt in situ (white arrow) in the right temporal horn, with resolution of the periventricular cerebrospinal fluid ooze.

system is sealed off from the rest, and if the sealed off part contains choroid plexus, then continued secretion of CSF by the choroid plexus may result in a partial or focal hydrocephalus. The term ‘entrapment of temporal horn’ was first used by Maurice Williams *et al*,³ to describe focal ventricular dilation of the temporal horn caused by occlusion of the CSF pathway at the foramen of Monro of the lateral ventricle. It is a form of non-communicating hydrocephalus.

In normal individuals, the cerebral ventricles are narrow slit-like cavities and the opposing wall of the ventricles often adhere; further the foramen of Monro of the lateral ventricle is anatomically narrowed by the bulk of the choroid plexus, making it more susceptible to obstruction under the following circumstances: (1) meningeal inflammation leading to raised CSF protein content in tuberculous meningitis renders the CSF more viscous and compromises the CSF flow at the already narrowed junction of foramen of Monro and lateral ventricle; (2) focal ventriculitis of the temporal horn may yet be another factor enforcing the pathogenesis of the ‘trapped temporal horn’.

Causes leading to entrapped temporal horn include previous meningitis with choroid plexitis and ventriculitis, intracranial neoplasms (colloid cysts of the third ventricle, tumours of the septum pellucidum and thalamus), intraventricular cysts,⁴ (hydatid cysts or cysticercosis) or after a surgical procedure within or in proximity of the foramen of Monro.

Clinical manifestations of trapped temporal horn⁵ include features of increased intracranial pressure due to mass effect. The characteristic clinical triad of hemiparesis, homonymous hemianopsia and memory disturbance may be seen due to compression over the internal capsule, Meyer’s loop and hippocampus, respectively. Of these, hemiparesis and features of raised intracranial pressure were noted in our patient.

Management includes ATT and drainage of the trapped CSF via shunting. However, multiple internal septations and loculations may occur within the ventricles in tuberculosis. Thus, ventriculoperitoneal shunts by themselves may fail and open ventriculostomy may be required to divide the septa. By principle, the brain shunt tube should be able to drain the CSF. Hence, in the current case, a ventriculoperitoneal shunt between the temporal horn of lateral ventricle and peritoneal cavity was performed. Other options are: (1) endoscopic removal of the adhesions at the blocked foramen of Monro followed by shunt in

either frontal or occipital horn of the lateral ventricle; generally in TBM there is a block in CSF drainage at the arachnoid granulation level leading to generalised communicating hydrocephalus, thus this option is preferred by some neurosurgeons; (2) frontal-to-temporal shunt has also been used to relieve the trapped temporal horn, though usually in cases with malignancy/tumour as the aetiology.

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Competing interests None.

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Learning points

- ▶ Focal obstructive hydrocephalus is seen in central nervous system's tuberculosis, secondary to—tuberculomas, ventriculitis as well as meningitis.
- ▶ The 'trapped temporal horn' sign is the radiological correlate of this pathology and is detected on brain imaging studies.
- ▶ Ventriculoperitoneal shunts (between the temporal horn of lateral ventricle and the peritoneal cavity or other surgical variations mentioned above) are usually required along with antitubercular medications.

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