SHORT REPORT

Pseudotumour cerebri syndrome due to cryptococcal meningitis

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Abstract

Three cases are reported of the pseudotumour cerebri syndrome—that is, intracranial hypertension without mass lesion or enlarged ventricles, due to cryptococcal meningitis. In these patients the papilloedema was successfully treated with optic nerve sheath decompression, and the intracranial hypertension with lumboperitoneal CSF shunting. These cases support the concept that pseudotumour cerebri is a syndrome of intracranial hypertension that can be due to any disorder producing obstruction of the CSF pathways at the level of the arachnoid villi. This concept is important because it directs therapy to normalise the intracranial pressure and preserve vision.

(*J Neurol Neurosurg Psychiatry* 1997;62:96-98)

Keywords: pseudotumour cerebri; intracranial hypertension; cryptococcus; meningitis

Case reports

Pseudotumour cerebri is a syndrome of intracranial hypertension, without a mass lesion or enlarged ventricles. In fat young women it is usually idiopathic. Several conditions known to interfere with CSF absorption pathways can produce the pseudotumour syndrome.¹ It is important to distinguish whether intracranial hypertension is due to pseudotumour syndrome or hydrocephalus, as the usual treatments of pseudotumour syndrome—optic nerve sheath decompression or lumboperitoneal shunting—are contraindicated in hydrocephalus. We report three patients with cryptococcal meningitis who developed severe intracranial hypertension due not to hydrocephalus but to pseudotumour syndrome.

PATIENT 1

A previously healthy 24 year old woman presented with four months of severe headache associated with nausea, vomiting, and transient visual obscurations in the left eye. There was bilateral advanced papilloedema, enlarged blind spots, and normal visual acuity. Brain MRI showed meningeal enhancement with gadolinium contrast (fig 1A and B) but normal

sized ventricles. Lumbar puncture disclosed a CSF pressure > 35 mm Hg, 56 lymphocytes/mm³, and a protein concentration of 1.38 g/l (normal < 0.45 g/l). The venous sinuses were patent on cerebral arteriography. *Cryptococci* were present on indian ink preparation of the CSF, and the serum cryptococcal antigen titre was 1:1024. She was treated with intravenous amphotericin B and 5-flucytosine. After one week of treatment she experienced sudden bilateral visual loss down to the perception of light in each eye, and a partial left abducens nerve palsy. Both optic nerve sheaths were then decompressed.

Within 48 hours of the operation vision began to improve in her left eye. However, the decompression failed to control the intracranial hypertension: ventricular CSF pressure studies showed that after infusion of 9 ml saline, the intracranial pressure rose to 47 mm Hg (normal < 20 mm Hg). A lumboperitoneal shunt was inserted, and the repeat pressure study was normal. Visual acuity in the left eye eventually improved to 6/12, but remained at counting fingers in the right, and she developed bilateral optic atrophy.

PATIENT 2

A previously healthy 35 year old man presented with headache and vomiting for one month, and was found to have bilateral advanced papilloedema, enlarged blind spots, and normal visual acuity. Brain CT was normal, with normal sized ventricles. Lumbar puncture disclosed a CSF pressure > 40 mm Hg, 59 lymphocytes/mm³, and a protein concentration of 0.63 g/l. *Cryptococci* were present on indian ink preparation of the CSF, and the serum cryptococcal antigen titre was 1:512. Despite treatment with amphotericin B and 5-flucytosine for 10 weeks the papilloedema persisted and the CSF pressure remained raised at 36 mm Hg. The CT remained normal throughout. The venous sinuses were patent on cerebral arteriography. An isotopic CSF study showed that the CSF pathways were patent, with no basal block. A lumboperitoneal shunt was inserted, the intracranial hypertension was relieved, and the papilloedema resolved.

PATIENT 3

A 45 year old man with advanced AIDS com-

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Received 5 January 1996
and in revised form
7 May 1996
Accepted 13 May 1996

A

B

Axial (1A) and sagittal (1B) T1 weighted MRI of patient 1 (after gadolinium contrast). There is prominent meningeal enhancement within cortical sulci (black arrows), and around the pons and cerebellum (white arrow). The ventricles are of normal size.

plained of severe headache and vomiting and was found to have bilateral papilloedema, more advanced on the right, with enlarged blind spots and normal visual acuity and colour vision. He also had a partial left

abducens nerve palsy. Brain CT was normal, with normal sized ventricles. Brain MRI showed slight swelling of the optic nerve sheaths, but was otherwise normal. Lumbar puncture disclosed a pressure of 35 mm Hg, no white cells, and a protein concentration of 0.83 g/l. Numerous *Cryptococci* were seen on indian ink preparation of the CSF, and the cryptococcal antigen titre exceeded 1:4096 in both serum and CSF. The patient was treated with amphotericin B and acetazolamide. A second lumbar puncture showed persistently raised pressure, so the right optic nerve sheath was decompressed, and the papilloedema began to resolve in both eyes within three days of surgery. However, intracranial pressure remained high and a lumbar CSF infusion study showed a baseline pressure of 19 mm Hg, with a rise to > 60 mm Hg after infusion of normal saline at 30 ml/h.

Over the next four weeks, the papilloedema resolved and eventually the patient developed bilateral optic atrophy. After three months, the visual acuity remained normal and the visual fields remained unchanged. The patient did not have any headaches, and he was generally well. However, after four months he presented with sudden bilateral visual loss due to herpes simplex retinitis, and he then developed bilateral retinal detachment. His visual acuity 12 months after the original cryptococcal meningitis was reduced to the perception of light in the right eye and counting fingers in the left.

Discussion

Findings on these three patients show conclusively that a syndrome of intracranial hypertension without ventricular enlargement—that is, the pseudotumour syndrome—can occur in cryptococcal meningitis. The mechanism is presumably defective CSF absorption at the level of the arachnoid villi, due to direct inflammation. It is also possible in some cases that raised CSF protein contributes to the failure of CSF absorption; however, the protein concentrations were only slightly raised in our patients.

The strictest definition of pseudotumour cerebri includes only those patients with intracranial hypertension, normal cerebral imaging (in particular no ventriculomegaly or mass lesion), and normal CSF constituents. The typical patient is a fat young woman, with an idiopathic form of the condition. However, there is increasing recognition that this clinical picture could arise from different causes, including cranial venous outflow impairment, drugs (for example, tetracyclines and vitamin A), and chronic idiopathic meningitis.¹ More recently there have been two studies in which direct cerebral venography and manometry have demonstrated cerebral venous hypertension to be the cause in patients who had previously been labelled “idiopathic”.^{2,3} We argue that the term *pseudotumour syndrome*¹ should be used to encompass these disorders for two reasons: firstly, the term implies that the clinical pattern of intracranial hypertension without ventriculomegaly could have various causes.

Secondly, it emphasises the importance of recognising and treating the raised pressure in its own right, even in the absence of ventricular enlargement, to preserve vision. In the context of cryptococcal meningitis, the fact that blinding intracranial hypertension can occur without ventricular enlargement is not widely recognised. Indeed some groups advocate CSF shunting in cryptococcal meningitis only if the ventricles are enlarged.⁴ Review of published cases of cryptococcal meningitis complicated by intracranial hypertension shows that 30%–70% of these patients have normal sized ventricles,^{5–8} which makes pseudotumour syndrome the rule rather than the exception.

In a patient with papilloedema it is important to determine whether the intracranial hypertension is due to pseudotumour syndrome or to hydrocephalus, to offer appropriate treatment. The treatment options for pseudotumour syndrome include lumboperitoneal CSF shunting and optic nerve sheath decompression, which are not suitable for patients with hydrocephalus. The presence of hydrocephalus implies that there is some degree of obstruction of CSF flow at the level of the basal cisterns or within the ventricular system, requiring direct drainage of the ventricles (for example, with a ventriculoperitoneal shunt). Lumboperitoneal shunting may actually increase the pressure gradient between the cranial cavity and the spinal canal, causing downward herniation of the medulla and cerebellar tonsils through the foramen magnum.

The first case confirms that sudden bilateral blindness can occur in cryptococcal meningitis,^{5–9} due either to raised intracranial pressure⁹ or to direct invasion of the optic nerves by the fungus.¹⁰ Rigorous control of intracranial hypertension, including CSF shunting, improves vision in most patients with intracranial hypertension due to cryptococcal meningitis.⁹ In theory the timing of CSF diversion could be important, both because placing a foreign body into an infected space is hazardous, and because the shunt might block. These considerations led us to treat patient 1 with an optic nerve sheath fenestration at first. In practice, however, the timing of shunt insertion might not be so critical: Tang⁴ reported his experience of seven shunts which were inserted before starting antifungal therapy; there were no adverse effects.

The optic nerve sheath was decompressed in two of our patients. It reduced optic disc swelling in both patients and improved visual acuity in the patient with reduced acuity, despite failing to reduce intracranial pressure in either. Optic nerve sheath decompression has been used to treat visual loss in idiopathic

pseudotumour cerebri, and the outcome depends on early intervention.¹¹ Vision has improved despite persistent intracranial hypertension, presumably by protecting the optic nerves from the effects of the raised CSF pressure.¹¹ Optic nerve sheath decompression has been used successfully in patients with AIDS with cryptococcal meningitis and visual loss due to intracranial hypertension.¹²

Cryptococcal meningitis is becoming increasingly common in patients with AIDS, yet it still occurs in patients who are immunocompetent¹³ (as in two of our patients). Its presence could reflect the virulence of the organism, or an obscure underlying immune defect. We favour the first explanation for our patients because they were previously healthy, and neither have developed other unusual infections after a follow up period of two years for the first patient and 16 years for the second.

The concept of pseudotumour syndrome due to chronic meningitis has important therapeutic implications for the preservation of vision. Our results emphasise the need to consider intracranial hypertension as the cause of optic disc swelling and visual loss in patients with chronic meningitis, even if the ventricular size is normal.

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