Slit ventricle syndrome after cyst-peritoneal shunting for the treatment of intracranial arachnoid cyst

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Abstract. Serious complications following installation of a cyst-peritoneal shunt in an 8-year-old boy with asymptomatic arachnoid cyst in the middle cranial fossa are reported. Highly elevated intracranial pressure without association of ventriculomegaly seen in this patient indicates slit ventricle syndrome caused by malfunction of the cyst-peritoneal shunt. This phenomenon is worth recognizing as a possible consequence of cyst-peritoneal shunting for the treatment of intracranial arachnoid cyst.

Key words: Intracranial arachnoid cyst - Cyst-peritoneal shunt - Elevated intracranial pressure - Slit ventricle syndrome

Different surgical approaches including an excision of the cyst walls [1–3, 5, 8, 11] and cyst-peritoneal shunting [6, 7, 9, 10, 12, 14] have been advocated for the treatment of arachnoid cysts in the middle cranial fossa. Controversy exists over the advantages and drawbacks of each approach [5, 11, 12], however, without definitive conclusions.

Recently the authors encountered an infant with this lesion which had been treated by cyst-peritoneal shunting at another hospital, with the resultant occurrence of slit ventricle syndrome [4, 13]. This phenomenon, only rarely documented in previous literature [16], is serious enough to be kept in mind by neurosurgeons treating this lesion by cyst-peritoneal shunting.

Case report

An 8-year-old boy with no significant family history or past history visited a nearby hospital after suffering minor head trauma in February, 1985. At that time, he was unremarkable on neurological examination, but computed tomography (CT) scans revealed a huge cystic mass in the right middle cranial fossa (Fig. 1). In March, 1985, he underwent craniotomy, through which an excision of the outer wall of the arachnoid cyst and simultaneous installation of a cyst-peritoneal shunt were performed. His postoperative course was uneventful, and follow-up CT scans showed a small residual arachnoid cyst on the base of the middle cranial fossa. He remained well until October 1987, when he began to complain of headache with vomiting, prompting presentation to the Department of Neurosurgery, Tokyo Metropolitan Fuchu Hospital. On arrival, neurological examination failed to reveal any objective abnormalities. CT scans, however, revealed slit-like ventricles (Fig. 2). In addition, refilling of the flushing device was found to be delayed. Based on these conditions, he was considered to have slit ventricle syndrome. His further clinical course was observed, with the administration of acetazolamide and analgesics on an outpatient basis, during which time he suffered intermittent headaches and vomiting. On January 27, 1988, his headache became intolerable in severity, necessitating admission to our hospital.

Examination

On admission, he was alert and well oriented, but complaining of severe headache. Neurological examination disclosed prominent papilledema (Fig. 3), abducens paresis on both sides, and facial paresis on the left side. Skull X-ray series showed diastasis of the coronal sutures; this finding was not seen on the previous films. Lateral ventricles remained slit-like on CT scans. The arachnoid cyst disappeared, and the catheter tip of the cyst-peritoneal shunt seemed to be embedded in the temporal lobe. The flushing device of the shunt was nonfunctioning.

Clinical course after admission

The patient was treated with intravenous administration of glycerol for slit ventricle syndrome manifested as intracranial hypertension. However, no relief of symptoms was obtained, and he continued complaining of persistent headache. CT scans performed on February 8 disclosed slight dilatation of lateral ventricles, suggesting the possibility of ventricular cannulation. On the following day, he underwent ventriculoperitoneal (VP) shunting with a high pressure slit valve. At ventricular tapping through the left frontal region, clear cerebrospinal fluid gushed out under extremely high pressure. Postoperatively, the patient presented complete resolution of headache, and was discharged from this hospital 8 days later with minor abducens paresis on the left side. Follow-up CT scans revealed a reappearance of slit-like ventricles.
what type of operation is indicated. Particularly regarding the latter, two different approaches, including an excision of the cyst walls [1–3, 5, 8, 11] and cyst-peritoneal shunting [6, 7, 9, 10, 12, 14], have been discussed without definitive conclusions. Some neurosurgeons argue against the treatment with membranectomy of arachnoid cysts as not only requiring craniotomy but also because of the relatively frequent occurrence of reaccumulation of cerebrospinal fluid [7, 12]. On the other hand, the presumed disadvantages of cyst-peritoneal shunting are listed as follows [5]: the possibility of shunt malfunction, the difficulty in approaching compromised bridging veins, and the necessity of inserting foreign bodies. However, these factors do not appear to validate the reevaluation of cyst-peritoneal shunting.

The present patient had undergone cyst-peritoneal shunting associated with excision of the outer wall for asymptomatic arachnoid cyst, which had been incidentally detected after minor head trauma. About 3 years later, however, shunt malfunction caused intracranial hypertension without association of reappearance of the arachnoid cyst or ventriculomegaly. These clinical features were interpreted as indicating a shunt-dependent condition, followed by slit ventricle syndrome after shunt malfunction. Intracranial arachnoid cysts are known to occasionally be associated with hydrocephalus [14]; however, in our patient no evidence of hydrocephalus was present on the preoperative CT scans.

Although cyst-peritoneal shunting may be superior to membranectomy, in that it is less invasive and achieves a high rate of resolution [7, 12], detailed evaluation of its complications have not appeared in the literature [5]. In particular, slit ventricle syndrome as seen in this patient, to our knowledge, has been documented in only a few reports to date [16]. This phenomenon seems to occur in patients treated with combined removal of the cyst wall [16].

Finally, as emphasized in recent articles [2, 15], it must be borne in mind that cerebrospinal fluid shunting may be complicated by acute subdural hematoma even after minor head trauma.

References