Subarachnoid Hemorrhage and Intracerebral Hematoma Following Lumboperitoneal Shunt for Pseudotumor Cerebri: A Rare Complication

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Summary

Placement of lumboperitoneal (LP) shunt as a surgical treatment for benign intracranial hypertension (BIH) is generally a safe procedure, with complications like mechanical failure, overdrainage and infections. Subarachnoid hemorrhage and intracerebral hematoma were seen after lumboperitoneal shunt in a patient having BIH. These complications were the cause of the patient’s deterioration. After removal of the hematoma and performing a decompressive procedure, patient’s neurological condition improved. The clinical features, investigations and clinical course are described and the literature reviewed.

Key words: Pseudotumor cerebri, Lumboperitoneal shunt, Subarachnoid hemorrhage, Intracerebral hematoma, Benign intracranial hypertension.

Introduction

Pseudotumor cerebri (PTC) or benign intracranial hypertension (BIH) is a clinical entity characterized by elevated intracranial pressure unrelated to hydrocephalus, tumor, brain edema or any other structural entity.1 Typical symptoms include headache, transient or permanent obscuration of vision, diplopia, and typically has a protracted course.2 Management of this disorder is both medical and surgical. The two main surgical procedures performed are lumboperitoneal (LP) shunt and optic nerve sheath fenestration (ONSF).2-4 LP shunt has been shown to be an effective and relatively safe method of treatment of BIH.2 We here described a rare complication of LP shunt done for BIH not mentioned earlier in the medical literature.

Case Report

A 42 year old, obese female (body weight=73kg.) presented with history of headache and progressive visual deterioration of 8 years duration. She was not on steroids, oral contraceptive or any other drugs like
tetracycline or nitrofurantoin. There was no history suggestive of deficiency or excess of vitamin A, or associated endocrinological disorders. Clinical examination revealed visual acuity of 6/9 in both eyes, and bilateral papilledema; visual field examination was within normal limits. The examination of the motor and sensory systems was normal. Ophthalmological referral ruled out other causes of ‘disc edema’ like drusen. Cerebrospinal fluid (CSF) was under moderately high pressure and its examination was within normal limits. CT scan and MRI of the brain were normal (Fig. 1a and b). Since the imaging studies were non-contributory and no other causative lesion for increased intracranial pressure could be found, a diagnosis of BIH was made after exclusion of all other causative factors. Patient was on medical therapy for seven years consisting of acetazolamide and furosemide, but for the last one year, had increasing headache and visual blurring.

A lumboperitoneal shunt with a distal slit valve was inserted. Clear CSF under moderately high pressure emanated. CSF cytology and biochemistry were normal and culture was sterile. Intraoperative and immediate postoperative periods were uneventful. Eight hours after surgery, she had three episodes of left focal motor seizures. CT scan revealed evidence of subarachnoid hemorrhage and a small hematoma in right parietal region. Platelet counts and coagulation profile were normal (bleeding time-3min.15sec., clotting time - 4min. 20sec., platelet count - 2,75,000/cu.mm., prothrombin time index - 100%) cerebral digital subtraction angiogram was normal - there was no evidence of aneurysm, arteriovenous malformation or venous sinus thrombosis. Forty hours after the surgery, she deteriorated and was found to be unresponsive to commands. She had rapidly worsened to decerebrating posture with bilateral pupils dilated and sluggishly reacting to light. CT scan revealed diffuse subarachnoid hemorrhage and a large hematoma in right frontal lobe causing mass effect and midline shift (Fig. 2a and b). The lumboperitoneal shunt was removed. Bilateral osteoplastic frontotemporal flap craniotomy was performed; the right frontal hematoma was evacuated and a wide duraplasty was done. Bone flaps were replaced but not secured, with the intention to decompress the cranial cavity. She had a stormy postoperative course consisting of chest infection, prolonged intubation and tracheostomy. At the time of discharge from the hospital, she was alert, oriented, and continent with no motor or sensory deficits; visual acuity was the same as before surgery, bone flaps on both sides were full and headache had subsided.

Histopathological analysis of the blood clot revealed a few cells resembling foam cells, which were not considered to be significant. No other explanation for the subarachnoid hemorrhage and intracerebral hematoma could be found and it was attributed to the placement of the lumboperitoneal shunt. Plain and contrast CT scans of the head after four weeks revealed thin bilateral frontotemporal subdural effusions with normal ventricles and cisterns. CSF examination was normal and there was no evidence of abnormal cells. Follow-up examination would aim at regular neurological and ophthalmological examination to prevent recurrence of symptoms.

**Discussion**

BIH is a condition with a wide variety of treatment options, both surgical and non-surgical. Initial medical treatment is with drugs such as acetazolamide, as was done in this case. The presence of visual deterioration or intractable headache is an indication for surgery. Two main surgical procedures for BIH are LP shunt and ONSF. A number of studies have confirmed both efficacy and complication rates of LP shunt. Placement of LP shunt has been regarded a safe
procedure.\(^6\) The most common cause of revision of LP shunt in most large reviews of medical literature is shunt obstruction followed by secondary intracranial hypotension resulting in low-pressure headache due to excessive CSF drainage.\(^3,7-10\) Duthier et al in 1996, in a study of LP shunts in 195 patients noted 47 complications (chronic subdural effusion - 8, meningitis - 10, mechanical failure - 28 and Chiari malformation - 1).\(^7\) Eggenberger et al\(^3\) studied the efficacy and safety of LP shunts in BIH in 27 procedures and showed no major complications apart from shunt obstruction. Several other series have been associated with sporadic incidence of minor complications like lumbar radiculopathy\(^3,6,8,9\), shunt infection,\(^8,9\) shunt migration\(^3,6,9,10\) and acquired Chiari malformation (tonsillar herniation) and syringomyelia\(^11,12\). Another study by Burgett et al did not reveal any major complications after LP shunt in BIH.\(^2\) Muthukumar et al\(^13\) reported one case of tension pneumocephalus complicating LP shunt placement. Miller et al reported one case of bilateral visual loss and simultagnosia after LP shunt for BIH.\(^14\) Murtagh and Lehman\(^15\) and Jones,\(^16\) reported acute subdural hematoma after LP shunting. Four cases of acute subdural hematoma after minor head trauma in patients with pre-existing LP shunts have been reported.\(^17-19\)

Development of subarachnoid hemorrhage and intracerebral hematoma following LP shunt has not been previously reported in literature. The potential pathogenesis is of overdrainage, but lack of any subdural effusion or blood is a pointer against this possibility. This points towards altered CSF dynamics leading to SAH and intracerebral hematoma due to variation in the differential pressures in various intracranial compartments.

References


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