Subduroperitoneal shunt

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Indications

Subduroperitoneal (SP) shunting is one of the definitive treatment modalities in the management of chronic subdural fluid collections.

Not always, although occasionally it may be needed in the treatment of infantile subdural hematomas (SDHs) [1) 2) 3)]

In most cases, the shunt can be removed a few months later, but there is the anxiety that removal could cause complications and some surgeons elect to leave the shunts permanently implanted, on the understanding that they are not causing problems

Procedure

The surgical procedure is not standardized and results achieved using this technique have not been well documented.

Vinchon et al. reviewed their cases of traumatic SDH treated with SDPD in infants (< 2 years of age). Their standard technique includes bilateral SDPD whenever the SDH is bilateral, placement of a free shunt, and systematic removal of the drainage unit after a few months [4)].

Subduro subgaleal drainage is an efficient treatment that could be proposed as an alternative to external subdural drainage or subduroperitoneal drainage [5)].

Case series

2007

161 children 2 years of age or younger with SDH who were treated using a unilateral valveless SDP shunt. The patient history, characteristics, and treatment methods including prior therapies, neuroimaging findings, and clinical outcomes were measures of evaluation. Thirty-six children (22.4%) suffered complications related to SDP shunts: obstruction in 27 (16.8%), infections in eight (5%), disconnection in four (2.5%), migration in three (1.9%), wound complications (leakage and skin ulceration) in two (1.2%), and symptomatic subdural rebleeding in one (0.6%) necessitating bur hole evacuation. Seventeen children (10.6%) underwent placement of a second SDP shunt because of ipsilateral or contralateral persistent fluid collections, or premature shunt removal. With the exception of 12 patients (7.4%), shunt removal was performed systematically and resulted in the following minor complications in 30 children (18.6%): an adherent proximal catheter in 16 (9.9%), transient symptoms of intracranial hypertension in six (3.7%), subcutaneous cerebrospinal fluid accumulation in

four (2.5%), local infections in three (1.9%), and hydrocephalus requiring placement of a ventriculoperitoneal shunt in one (0.6%). Status epilepticus at presentation and neuroimaging findings such as areas of hyperdensity on computed tomography (CT) scans representing fresh blood in the subdural fluid collections before shunt insertion and at follow up were predictors of shunt-related complications. Correlations were also discovered for the following CT findings: ischemic lesions before shunt treatment, cerebral atrophy and ventricular dilation during the last follow up, and residual medium to large collections before shunt removal. Children who attained a good outcome were less affected by shunt-related complications, unlike those who presented with focal deficits and/or visual impairment.

Subduroperitoneal shunt placement for the treatment of SDH in infants is–despite the complication rate–an effective and often inevitable treatment option, especially for most large and symptomatic SDHs; a certain number of complications could be reduced with careful and precise surgical techniques. Close observation for detection of risks is mandatory, and seizure control is essential to prevent further brain injury that may result in large subdural fluid collections that are difficult to treat [6)].

2005

A retrospective review was performed of patients who had their subdural shunts removed after CT evidence of resolution of the collections, with the intention of assessing the possible risks and benefits.

Of the 19 patients who had insertion of a subdural shunt for infantile subdural collections by a single surgeon between 1999 and 2003, 14 were eligible for removal of the shunt and 13 had the shunt removed, while in 1 patient the parents refused the option of removal. Mean age at shunt insertion was 9.1 months (range 1.5-25.4 months). The mean shunt implantation time was 5 months (range 0.5-11 months). The mean follow-up period was 30.3 months (range 1-59 months).

All shunts were removed successfully without complications. There was difficulty in removing the shunt in one case (implantation time 10 months) because of migration of the shunt, requiring extension of the incision and a small craniectomy. None of the patients required re-insertion of the shunt.

Subdural shunts can be removed safely, but it is advisable to perform such an operation during the first 6 months after insertion to avoid undue operative difficulties [7)].

2000

Ersahin et al. retrospectively reviewed the complications of SP shunting in 73 boys and 24 girls, who ranged in age from 1 to 180 months (median 7 months). Subdural fluid collection was bilateral in 75 and unilateral in 22 patients. The most common complication was shunt obstruction (13 patients). Shunt migration was seen in 8 patients. Migration occurred only with unishunts without a reservoir and with peritoneal catheters. However, the shunts with a reservoir or flushing valve led to skin necrosis in 4 patients (P=0.003). Unilateral drainage though bilateral collections were present, infection, bowel perforation, and ileus occurred in 5, 4, 1 and 1 patients respectively.

These SP shunt complications, some of which are avoidable, should be kept in mind [8)].

Case reports

2014

Basaran et al. reported an interesting case of subdural effusion developing following desmoplastic infantile ganglioglioma managed with gross total excision with good outcome in a 9-month-old boy. He underwent frontotemporal craniotomy with aspiration of the cyst, followed by gross total resection of the tumor. Authors stated postoperative period was uneventful; however, a subdural-peritoneal shunt insertion was carried out on the third postoperative day for management of subdural hygroma formation, revealed on computed tomography (CT) scan causing squeezing of brain tissue and producing mass effect [9].

2006

Park et al. present a case of Sotos syndrome with increasing severity of subdural hygroma from the age of 5 months, which was managed with a subduroperitoneal shunt at 10 months of age. The patient had been followed up until 30 months of age with continuing improvement of symptoms. The patient initially presented with dolichocephaly accompanied by macrocrania, early tooth development, repeated pneumonia infections and developmental retardation concerning crawling, sitting, walking and speaking at 5 months of age. Magnetic resonance imaging (MRI) demonstrated partial hypoplasia of the corpus callosum and bifrontal subdural hygroma. The patient underwent subduroperitoneal shunting at 10 months of age with partial improvement of symptoms. At 18 months of age, the patient showed increased irritability and sweating, and development of spinal kyphosis, which resulted from shunt malfunction as shown in the shuntogram. The appearance of cervical syringomyelia was also seen in the MRI. After shunt revision, the irritability, sweating and kyphosis improved along with disappearance of the syringomyelia. The authors describe a case of Sotos syndrome with subduroperitoneal shunt that showed syringomyelia which developed with shunt malfunction but disappeared after shunt revision. We emphasize the importance of active management such as subduroperitoneal shunting to drain the cerebrospinal fluid in the Sotos syndrome [10].

1995

An 82-year-old male with intractable bilateral chronic subdural hematomas was treated by emplacement of bilateral subduroperitoneal shunts on the left in 1990 and on the right in 1991. Chronic subdural hematoma recurred in 1992 due to an unusual migration of a shunt catheter into the subdural space. This migration was probably due to inadequate fixation of the shunt. Shunt replacement and fixation with an anchoring wing has resulted in no further complications for 2 years [11].

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