Anti-siphon device

- Fixed versus Adjustable differential pressure valves in case of idiopathic normal pressure hydrocephalus treated with ventriculoperitoneal shunt. A systematic review and meta-analysis of proportion
- Solving a complex, rare, and challenging scenario in a normal pressure hydrocephalus with recurrent shunt dysfunction and multiple revisions - The opposing role of evolving low-pressure hydrocephalus and idiopathic raised intra-abdominal pressure
- Management of Chiari 1 Malformation and Hydrocephalus in Syndromic Craniosynostosis: A Review
- The collagen matrix dural substitute graft prevents postoperative cerebrospinal fluid leakage after ventriculoperitoneal shunt surgery in patients aged <1 year
- Dural sac shrinkage signs on spinal magnetic resonance imaging indicate overdrainage after lumboperitoneal shunt for idiopathic normal pressure hydrocephalus
- Slit ventricle syndrome: Historical considerations, diagnosis, pathophysiology, and treatment review
- Advances in CSF shunt devices and their assessment for the treatment of hydrocephalus
- Shunt performance in 349 patients with hydrocephalus after aneurysmal subarachnoid hemorrhage

Most available Cerebrospinal fluid shunt systems utilize differential pressure valves that often allow overshunting, resulting in complications due to the siphoning of fluid from the ventricular system. [1)].

Indications

Slit ventricle treatment:

Antisiphon devices (ASDs) of various working principles were developed to overcome overdrainage-related complications associated with ventriculoperitoneal shunting.

Though rare, complication associated with overdrainage is certainly a problem in children.

Patients who received shunts with antisiphon device do not show any overdrainage [2)].

Devices

Anti-siphon devices

Case series

The effects of an anti-siphon device (ASD) on shunt flow and intracranial pressure (ICP) in 16 children with hypertensive hydrocephalus were examined using quantitative radionuclide shuntography (99mTc) with the children in supine and sitting positions. The average age of these patients was 9.5 years. Results were compared with those recorded in 36 patients with adult normal-pressure

hydrocephalus (NPH). The closing pressure levels of shunt valve used were low in 8 cases, medium in 7 and high in 1. Half the children (8) had shunt systems with, and the other 8 without, ASD. In the children who had the shunt system without ASD, sitting shunt flow was significantly greater than supine shunt flow, which indicated overdrainage. Conversely, in children who had the shunt system with ASD, supine shunt flow was greater than sitting shunt flow. Because ASD prevented overdrainage, ICP was higher with the shunt system with ASD than with the shunt system without ASD. Without ASD, sitting shunt flow of children was lower than that of adult patients with NPH because of the lower hydrostatic pressure, which correlated with their height. Conversely, in the presence of a shunt system with ASD, sitting shunt flow of children was greater than that of adults, because of the higher ICP and lower hydrostatic pressure. The effect of ASD was smaller in children than in adults, because positive pressure over the ASD was greater (hypertension vs normal pressure) and negative pressure under the ASD was less (short vs tall) in children than in adults. Thus, in children the ASD was effective in preventing overdrainage [3].

1)
Horton D.D., Williams G., Pollay M. (1991) The Effectiveness of a Siphon Control Device in Preventing the Complications of Overshunting. In: Matsumoto S., Tamaki N. (eds) Hydrocephalus. Springer, Tokyo
2)
Khan RA, Narasimhan KL, Tewari MK, Saxena AK. Role of shunts with antisiphon device in treatment of pediatric hydrocephalus. Clin Neurol Neurosurg. 2010 Oct;112(8):687-90. doi: 10.1016/j.clineuro.2010.05.008. Epub 2010 Jun 19. PubMed PMID: 20646829.
3)
Tokoro K, Chiba Y, Abe H, Tanaka N, Yamataki A, Kanno H. Importance of anti-siphon devices in the treatment of pediatric hydrocephalus. Childs Nerv Syst. 1994 May;10(4):236-8. PubMed PMID: 7923233.