

Strata NSC Lumboperitoneal Adjustable Pressure Shunt

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- Use of external lumbar cerebrospinal fluid drainage and lumboperitoneal shunts with Strata NSC valves in idiopathic normal pressure hydrocephalus: a single-center experience
 - Use of lumboperitoneal shunts with the Strata NSC valve: a single-center experience
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The PS Medical® **Strata®** NSC Lumboperitoneal Shunt is used to treat communicating hydrocephalus and may be used to treat idiopathic intracranial hypertension when shunting is an option. The Strata NSC LP shunt is designed to provide continued cerebrospinal fluid flow from the lumbar subarachnoid space into the peritoneal cavity. The Strata NSC lumboperitoneal valve allows the physician to noninvasively adjust the pressure/flow performance level settings pre- and post-implantation to address changing patient needs.

PS Medical Strata NSC LP valve is sized for subcutaneous placement.

PS Medical Strata NSC LP valve includes integral lumbar connector and strain relief for easy, non-kinking attachment of the proximal lumbar catheter.

Pressure/flow performance level setting can be adjusted or verified simply and non-invasively in the physician's office with a hand-held adjustment tool.

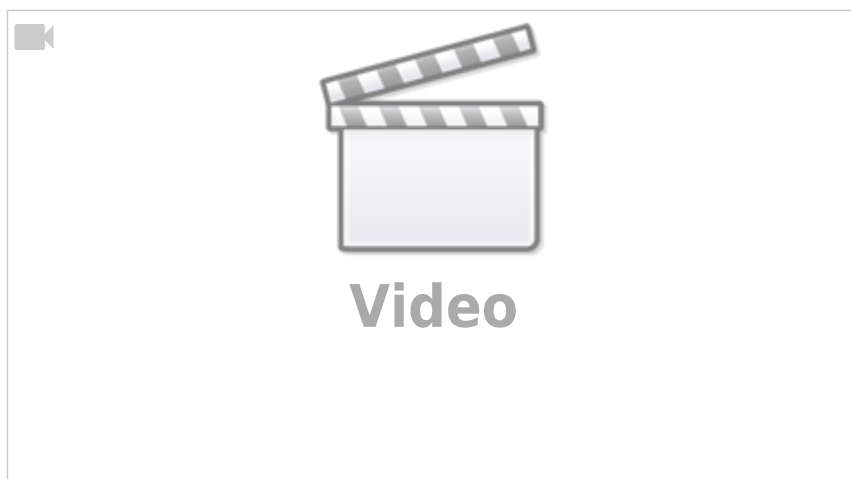
Injectable reservoir dome

Proximal and distal occluders for selective flushing

Latex free

LP shunts with programmable Strata valve systems are a potential alternative to conventional LP and programmable ventriculoperitoneal shunt systems as well as optic nerve sheath fenestration, due to their potential in avoiding brain injury, lower failure and complication rates, lower intracranial hypotension incidence, and flexibility in adjusting valve pressure settings post-operatively evading under- and overdrainage complications. They should be considered for the management of IIH instead of early design LP systems and VP shunts. A randomized multi-center trial should be conducted to compare the efficacy of these surgical techniques ¹⁾.

Implantation Technique



Case series

2015

Seven female patients with IIH underwent insertion of an LP shunt with a programmable Strata valve. The mean opening pressure was 35.8cm H₂O. The initial valve setting was 1.5, and four patients required post-operative valve pressure adjustment. All patients showed significant improvement in objective visual testing at follow-up as well as less frequent headaches. None of the patients developed intra- or post-operative complications. ²⁾

51 INPH patients (mean age, 75 years; males, 29), who underwent placement of Medtronic Strata NSC LP shunt systems were reviewed retrospectively as a cohort. LP shunting was evaluated with the modified Rankin Scale, the Japan Normal-Pressure Hydrocephalus Grading Scale, the Mini-Mental State Examination, the Frontal Assessment Battery, and the Trail-Making Test A as outcome measures.

Modified Rankin Scale scores improved from 3.2 to 2.2 ($P < 0.01$), indicating a 64% response rate 12 months after treatment. Total Japan Normal-Pressure Hydrocephalus Grading Scale scores decreased from 6.5 to 4.0 ($P < 0.01$), indicating a response rate of 81%. Mini-Mental State Examination scores improved from 22.2 to 25.4 ($P < 0.01$), Frontal Assessment Battery scores improved from 11.7 to 13.4 ($P < 0.05$), and Trail-Making Test A scores improved from 122.3 to 112.7 ($P = 0.60$). During the 12-month follow-up period, complications requiring surgery were observed in 6 cases (11.8%).

LP shunts showed effectiveness rates that were similar to those of ventriculoperitoneal shunts. Despite the relatively high complication rate, LP shunts can be recommended for the treatment of patients with INPH because of their minimal invasiveness and lack of lethal complications ³⁾.

2010

20 patients underwent placement of an LP shunt with an adjustable Strata NSC valve and small lumen peritoneal catheter. Their mean age was 40.3 years and the mean duration of follow-up was 12

months. Preoperatively, 18 patients had headache and 15 patients had visual signs and symptoms. Fourteen of the 18 patients with preoperative headache did not complain of headache postoperatively, and 4 had headache that was found not to be related to shunt function. Two of the patients with preoperative visual complaints had ongoing visual problems postoperatively. None of the patients had infection or subdural hematoma. The only overdrainage symptoms occurred in association with spontaneous readjustment of the valve and resolved when the valve was reset. Thirteen patients (65%) did not require shunt revision. Seven patients (35%) required 13 shunt exploration or revision procedures, mainly due to distal obstruction. Placement of an LP shunt failed to completely resolve the raised intracranial pressure problem in 2 patients.

The use of the Strata NSC valve and small lumen peritoneal catheter is effective in treating pseudotumor cerebri and is beneficial in terms of markedly reducing overdrainage complications compared with other reported series of cases in which an LP shunt has been placed. However, the use of the Strata NSC valve and small lumen peritoneal catheter did not have a marked impact on other causes of shunt failure, particularly distal obstruction ⁴⁾.

Case reports

A 64 year-old woman with a diagnosis of lung adenocarcinoma was admitted to our neurosurgical division in February, 2007, suffering from severe headache and dizziness. Systemic chemotherapy had been repeated for multiple metastases to the bone and cerebral cortex since 7 months before. Reexamination with MRI revealed mild hydrocephalus without cortical metastasis. Cytological analysis of the cerebrospinal fluid (CSF) provided the diagnosis of leptomeningeal metastasis. Removal of 8 ml of CSF dramatically alleviated the patient's symptoms. To improve the quality of her remaining life, she underwent lumboperitoneal (L-P) shunt using a Strata adjustable pressure valve. Severe headache disappeared and other symptoms gradually improved after the operation. She survived for 10 months after the shunt placement, participating in family life for 6 months. Pressure level of the Strata valve was changed twice according to the degree of hydrocephalus and functioned well while her life lasted. The present case showed that L-P shunt is one of the effective palliative procedures and an adjustable pressure valve is available for this kind of CSF shunt in patients with leptomeningeal metastasis ⁵⁾.

References

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