

# Lumboperitoneal Shunts

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## Abstract

**Background:** To assess lumboperitoneal shunting as a simple method of relieving communicating hydrocephalus, treating pseudotumor cerebri, and resolving cerebrospinal fluid fistulae.

**Method:** Three neurosurgeons at different hospitals report their combined experience over a 20-year period.

**Results:** Ease of insertion of the device and low rate of complications were reported in a combined series of 107 patients.

**Conclusions:** Lumboperitoneal shunting is a technically simple and highly effective surgical technique for diversion of cerebrospinal fluid. **Key Words:** Lumboperitoneal shunts, communicating hydrocephalus, cerebrospinal fluid fistula, pseudotumor cerebri.

IN 1975, SPETZLER AND CO-WORKERS (1) introduced a new silastic lumboperitoneal shunt which could be introduced percutaneously without the need for formal laminectomy or laparotomy. While the shunt's primary intended use was relief of communicating hydrocephalus, it can also be used in the treatment of rhinorrhea, bulging craniectomy sites, and postsurgical lumbar pseudomeningoceles (2). A combined series of 107 lumboperitoneal shunting procedures have been performed, including several for cases of otorrhea, spinal-subclavicular fistula, and pseudotumor cerebri, and the experience has been evaluated.

## Materials and Methods

### Patient Population

We tested 82 cases of communicating hydrocephalus; the diagnosis had been confirmed by computerized tomography and/or radionuclide scanning. Five patients were worked up for pseudotumor cerebri. The 20 spinal fluid fistulae included leakage from the nose in 17

patients: 11 posttraumatic cases, 5 cases following transphenoidal hypophysectomy, and one instance of spontaneous rhinorrhea. Two patients with otorrhea had basilar skull fractures. One spinal-subclavicular fistula developed after removal of a Pancoast tumor. All of the cases of cerebrospinal fluid leakage were observed for at least 10 days before undergoing the shunting procedure.

### Equipment

The Spetzler shunt is available from Heyer-Schulte Co. (Goleta, CA) as a one-piece model with perforations at the proximal end and slit valves at the distal end; no reservoir is included. A variety of devices are available to form a three-piece model with an in-line flushing reservoir that has a one-way valve. A separate miter valve may be attached with high, medium, or low pressure. Connectors and suture collars are also supplied.

### Surgical Technique

The patient is placed in the lateral decubitus position with the right side elevated and the operating table flexed. A 2-cm midline incision is made between the L4 and L5 spinous processes. A 14-gauge Tuohy needle is introduced into the

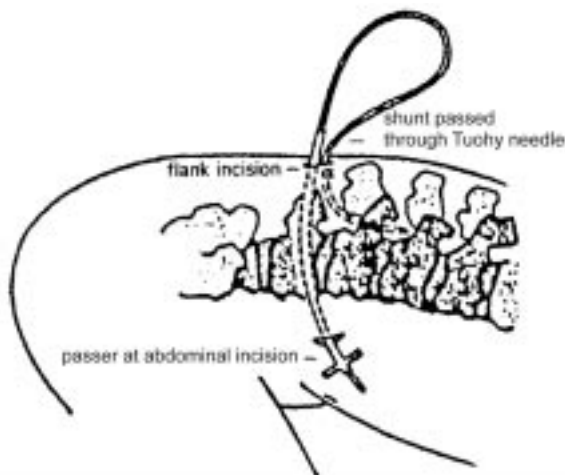
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subarachnoid space with the bevel pointed cephalad. The proximal end is advanced into the thecal sac for a distance of 8 cm. As soon as cerebrospinal fluid is observed to be coming out the distal end, the Tuohy needle is withdrawn. One suture collar is used to prevent displacement of the shunt from the spine. A 2-cm incision is made in the right flank, and a malleable passer is employed to deliver the distal end of the shunt. If a line-flushing reservoir is needed, the device is inserted and buried under the subcutaneous fascia. A 2-cm incision is made in the lower right quadrant of the abdomen, and the same passer delivers the tubing (Figure). Another suture collar prevents dislodging of the tubing. The fibers of the rectus abdominis are spread, and a blunt trocar is used to insert the distal end into the peritoneal cavity. In the cases of spinal fluid fistula, the slit valves are cut off prior to insertion in order to insure maximum flow. All the incisions are closed in two layers with 4-0 nonabsorbable sutures.

### Results

In the cases of normal pressure hydrocephalus, the symptoms of dementia, ataxia, and incontinence were noticeably improved in 80% of the patients. All the patients with pseudotumor were free of papilledema postoperatively. Every cerebrospinal fluid fistula resolved within 48 hours of shunt implantation. Two shunts had to be revised following displacement from the spinal subarachnoid space. One distal tubing was displaced from the peritoneum into the subcutaneous



**Figure.** Artist's drawing of surgical insertion of lumboperitoneal shunt.

tissue. There was one wound infection, which was treated with nafcillin, and one infection secondary to abdominal exploration.

### Discussion

Additional clinical application for cerebrospinal fluid leakage following removal of a leptomeningeal lipoma was reported by James and Tibbs (3) in 1981. In 1982, Katz et al. (4) published successful shunting of a spinal-subclavicular fistula following thoracotomy. Others have reported their experiences with the use of percutaneous lumboperitoneal shunting for rhinorrhea (5–7), chronic hydrocephalus (8), and pseudotumor cerebri (9, 10). Aoki (11) found that the incidence of infection (1%), obstruction (14%) and other malfunctions (2%) was significantly less with the percutaneous technique of lumboperitoneal shunting than that found with ventriculoperitoneal shunts.

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