Large Abdominal Cysts: A Complication of Peritoneal Shunts

Report of Three Cases

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Cerebrospinal fluid shunts into the peritoneal cavity are frequently used at Children's Hospital Medical Center, despite their limitations. Considerations leading to a ventriculo-peritoneal shunt include operative scarring of neck veins, cardiac disease, and blood stream or other infection. Similarly, lumbar-peritoneal shunts have been utilized for small or infection-scared ventricular systems, to avoid unnecessary instrumentation of intact brain and because revision to accommodate body growth seems to be required less often with the shunt tubing lying transverse to the body axis.

It is well known that peritoneal shunts often become obstructed by omentum or peritoneal adhesions. This report presents three instances of large, intra-abdominal, cerebrospinal fluid cysts as an unusual, and occasionally dramatic, sequel to peritoneal shunts. Jackson and Snodgrass made brief allusion to one of their 62 patients who formed a "huge omental cyst around the tip of a peritoneal catheter." Harsh, in his series of 12 patients with fallopian tube peritoneal shunts, reported one in whom two abdominal procedures for shunt were followed by the formation of a "large thin-walled cyst about the fimbria." Unnecessary and extensive evaluation of an abdominal mass may be avoided by awareness and suspicion of this complication of shunting; moreover, its presence may influence future management.

Case Reports

Case 1. This 3-year-old girl had had a ventriculo-atrial shunt inserted in Peru at 5 weeks of age for aqueductal stenosis. Between 2 and 6 months of age she had had a series of fevers of undetermined etiology with hepatosplenomegaly, leading to a bone marrow aspiration and liver biopsy, both of which were normal.

First admission. The patient was transferred to Children's Hospital Medical Center at 6 months of age because of continuing fever. Staphylococcus aureus, coagulase negative, was cultured from blood as well as from the shunt when it was removed. One month later, while she was still on antibiotics, a ventriculo-peritoneal shunt was inserted, placing the Holter silicone tubing in the suprahepatic space.

Second admission. The patient did well until 2 years and 3 months of age when she returned with intermittent vomiting, lethargy, and deterioration of her gait. The Holter valve pumped well, but she had a cracked pot percussion sound and a head circumference above the 97th percentile. The liver could be felt three fingers' breadth below the right costal margin. In addition there was a firm, midline, upper abdominal mass. An intra- or suprahepatic neoplasm was strongly suspected. The AU hepatic scan showed an anterior indentation of the liver with decreased uptake in the left lobe and adjacent right lobe. Celiac arteriogram suggested a suprahepatic mass. Liver function tests were normal. Plain abdominal x-rays (Fig. 1) showed marked displacement of abdominal contents and located the shunt tubing anterior to the liver. Aqueductal stenosis and markedly dilated ventricles were seen in the ventriculogram.

Operation. Several hundred cubic centimeters of clear fluid were found in the suprahepatic space, the liver appearing normal. After an unsuccessful attempt to perform a ventriculo-atrial shunt, a lumbar-peritoneal shunt was inserted, placing the tubing in the right lower quadrant of the abdomen.
The child did well for approximately 3 months, when signs of obstruction recurred. A successful ventriculo-atrial shunt was performed in Peru, without removal of the peritoneal shunt. This has functioned well for 10 months.

**Case 2.** At 2 years and 9 months of age, this boy had had a silicone tube lumbar-peritoneal shunt inserted for communicating hydrocephalus. Postoperatively, marked tube tract swelling occurred. At reoperation 2 months later, the tube was found to lie outside the peritoneum and was reinserted. When he was ½ years old, an inguinal herniorrhaphy was performed.

**Examination.** At 5 years (6 months later) he was readmitted. For 2 weeks he had had flank pain and inability to eat normal amounts of food; for 4 days he had shown massive enlargement of the abdomen; for 36 hours he had had a headache. Electrolytes and liver chemistries were normal. X-ray studies showed displacement of all intestinal gas to the right lower quadrant.

**Operation.** The shunt tubing was found entering a red thick-walled cyst (Fig. 2) containing approximately 1500 cc of clear fluid. The tubing was placed in another part of the peritoneum. He did well for 4 weeks, when all his symptoms recurred. The shunt was then removed from the peritoneal cavity and placed in the ureter, after nephrectomy. The patient has had no further difficulty in the 7 months since that procedure.

**Case 3.** This 15-year-old boy was born with hydrocephalus. A ventriculogram performed when he was 2½ months old demonstrated non-filling of the third and fourth ventricles and was followed by an exploration that revealed a large venous lake covering the cerebellum and both occipital lobes. A series of six shunt or shunt-revision operations (left ventriculo-cisternal, lumbar-ureteral, and ventriculo-atrial) ensued; there was one episode of Staphylococcus aureus ventriculitis. The child subsequently showed mental retardation but adequate control of the hydrocephalus.

When the patient was 14 years old he underwent abdominal exploration for ob-