Ventriculoperitoneal shunt procedure complicated by ureter obstruction

Case report


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The authors present the case history of a patient in whom the peritoneal catheter of a ventriculoperitoneal shunt system caused ureter obstruction. This is a rare complication of such a shunt procedure, and the patient's symptoms were relieved by shortening the peritoneal catheter.

Key Words • hydrocephalus • meningeal tuberculosis • ventriculoperitoneal shunt • ureter obstruction • hydronephrosis

The insertion of a ventriculoatrial (VA) or a ventriculoperitoneal (VP) shunt system is a procedure commonly used in the management of patients with hydrocephalus. Both types of shunt are associated with potential complications, the most common of which are obstruction or infection. The literature documenting unusual complications is extensive, but as far as we are aware ureter obstruction caused by the intraperitoneal catheter of a VP shunt system has not been described before. We present the case history of a patient with such a complication.

Case Report

This 36-year-old woman had received intraventricular streptomycin for the treatment of tuberculous meningitis when she was 3 years of age. Despite an otherwise excellent clinical recovery, she was left with bilateral neurosensory deafness.

She presented to us at the age of 26 years, complaining of intermittent bifrontal headaches and deteriorating vision. Examination revealed bilateral optic atrophy with bilateral central field defects and lower limb spasticity. A Myodil ventriculogram demonstrated a block at the outlet of the fourth ventricle, and a diagnosis of communicating hydrocephalus secondary to tuberculous meningitis was made. A Spitz-Holter VA shunt was inserted with subsequent clinical improvement.

Ten years later the patient returned, complaining of severe early-morning headaches. On examination, there was tenderness over the shunt tubing but she had no abnormal neurological signs. Computerized axial tomography revealed hydrocephalus, and the shunt system was removed. No evidence of infection was found, and a VP shunt was inserted. The peritoneal catheter, the low-pressure Raimondi variety,* was passed into the right hypochondrium via a midline epigastric skin incision; approximately 40 cm of tubing was inserted into the abdomen. The patient obtained early relief of her headaches and was discharged home.

Four months later, she complained of generalized abdominal pain, urinary frequency, and dysuria. On examination, she was aphyreal but tender in the loins and iliac fossae bilaterally. The urine was microscopically clear. A plain abdominal radiograph (Fig. 1 left) showed the tip of the peritoneal catheter lying opposite the lower border of the L-4 vertebra, but a considerable length of catheter tubing rested within the pelvis. Pelvic examination revealed some tenderness in the lateral vaginal fornices, but an ultrasound scan failed to reveal any abnormal pathology. There was no evidence that the shunt was malfunctioning.

In view of the persistence of symptoms and, in particular, the presence of loin pain, an intravenous urogram was performed. This demonstrated partial obstruction of the right ureter at the upper border of the

* Raimondi peritoneal catheter manufactured by Heyer-Schulte del Caribe, Inc., Puerto Rico.
Ureteral obstruction by shunt tube

FIG. 1. Left: Plain abdominal radiograph taken before shortening the peritoneal catheter. Closed arrow shows the point at which the catheter crosses the right ureter. Open arrow indicates the catheter tip. Right: Intravenous urogram before shortening the peritoneal catheter. Note that the site of obstruction of the right ureter corresponds to the point at which the catheter crosses it (closed arrow). The open arrow indicates the catheter tip.

sacrum, with unilateral hydronephrosis. The shunt tubing was noted to overlie the right ureter at the level of the obstruction (Fig. 1 right). There was no evidence of a ureteral calculus. Drainage of the right kidney improved when the patient was prone, suggesting extrinsic mechanical compression of the ureter.

The peritoneal catheter was shortened by 20 cm, resulting in resolution of symptoms. A repeat intravenous urogram (Fig. 2) 5 days later showed free flow of contrast material down the right ureter, with resolution of the hydronephrosis. At no time did the patient void a renal calculus.

Discussion

Many complications that may follow insertion of a VP shunt system have been described previously. Obstruction or infection are responsible for the majority of these complications, but a number of rare problems have been encountered associated with the use of peritoneal catheters. Several cases of genitourinary complications have been reported. Viets, et al., described hydronephrosis secondary to ureter obstruction caused by a cerebrospinal pseudocyst associated with a peritoneal catheter. Ureter compression by the peritoneal catheter of a lumbar subarachnoid-peritoneal shunt was observed by Sullivan, et al. In their patient, the site of obstruction was where the catheter crossed the ureter, and resolution of the hydronephrosis followed shortening of the peritoneal tubing.

However, as far as we are aware, ureter obstruction caused by the peritoneal catheter of a ventriculoperitoneal shunt system has not been described previously. Opinion varies as to the ideal length of peritoneal catheter which should be inserted into the abdomen.
Usually, 25 to 30 cm is advised to avoid extrusion via the abdominal wound.\textsuperscript{7,9,15} Alexander\textsuperscript{2} reported the case of a patient in whom perforation of the small bowel was attributed to the insertion of too great a length of peritoneal catheter into the abdomen; he recommended that the length of catheter buried be no greater than the distance from the abdominal incision to the symphysis pubis. Clearly, in the case we report, too great a length of catheter may well have been the cause of ureter obstruction. It is possible that the spiral wire used to reinforce the peritoneal catheter increased the catheter's rigidity and caused it to compress the ureter from within the peritoneum.

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References


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