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Case report of migration of 2 ventriculoperitoneal shunt catheters to the scrotum: Use of an inguinal incision for retrieval, diagnostic laparoscopy and hernia repair

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ABSTRACT

BACKGROUD: Ventriculoperitoneal shunts are commonly used in the treatment of hydrocephalus, and catheter migration to various body sites has been reported. Pediatric and general surgeons are asked on occasion to assist with intraabdominal access for these shunts, particularly when there may be extensive adhesions or other complicating factors.
METHODS: We describe a case in which an old shunt catheter was never removed from the abdomen, and it migrated through an inguinal hernia into the scrotum. The catheter became entangled and fibrosed to the testicle. A second and more recent shunt catheter was also in the scrotum. A single incision in the inguinal region was used to remove both shunt catheters, repair the inguinal hernia and perform diagnostic laparoscopy to assist in placing a new ventriculoperitoneal shunt.
RESULTS: Prompt surgical removal is recommended for catheters remaining in the abdomen after ventriculoperitoneal shunt malfunction. These catheters may cause injury to the testicle, or possibly other intraabdominal organs. General or pediatric surgical consultation should be obtained for lost catheters or inguinal hernias.
CONCLUSION: In the case of an inguinal hernia containing a fractured shunt catheter, the hernia sac can be used to remove the catheter, repair the hernia and gain laparoscopic access to the abdomen to assist with shunt placement.

1. Background

Ventriculoperitoneal (VP) shunt placement is the most common treatment for hydrocephalus. Traditionally, the distal catheter is placed into the abdominal cavity through an open incision or via a laparoscopic assisted technique. The catheter allows drainage of excess cerebrospinal fluid (CSF) into the peritoneal cavity, where it can be absorbed, thus relieving the intraventricular pressure. For laparoscopic assistance or for hostile abdominal conditions, often a general or pediatric surgeon is called upon to assist the neurosurgeon with abdominal access. Laparoscopic assistance has been shown to be associated with a lower rate of malposition, distal obstruction and distal shunt failure. [1]

Shunt migration is a rare complication, but due to the frequent incidence of shunt placement, there are many case reports of shunt migration. A handful of case reports have reported migration to the scrotum. [2–14] Other complications of shunt migration have included: colonic perforation [15], shunt abandoned in the pelvis [16], fistulization to the umbilicus [17], intracardiac migration and knotting [18], peroral extrusion [19], gastric perforation [20], bladder perforation [21], CSF leakage in the neck [22], pulmonary vasculature migration [23], breast migration with CSF galactorrhea [24], intestinal perforation [25], pneumonia caused by transdiaphragmatic erosion [26] and liver perforation [27].

Although scrotal migration has previously been reported, we report a case in which 2 catheters were found in the scrotum, and 1 catheter was extremely fibrosed and tangled around the testicle. We also report a novel technique of using 1 small inguinal incision to remove the catheters, gain laparoscopic access to the abdomen and repair the inguinal hernia.

2. Presentation of case

Informed consent was obtained, and this report was written within the guidelines of the SCARE criteria [28]. A 10-year-old male with a history of hydrocephalus and 3 prior VP shunt placements, presented to El Paso Children's Hospital emergency room (an academic, tertiary care hospital) with several days of wors-

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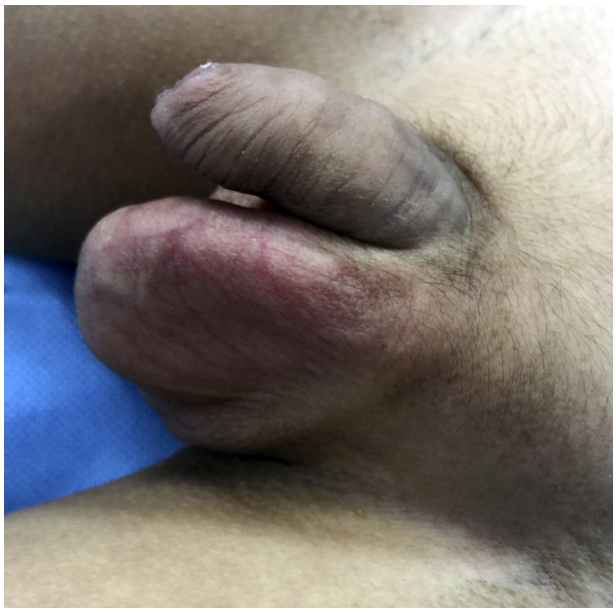

Fig. 1. Left inguinal hernia containing the fractured VP shunt catheter.

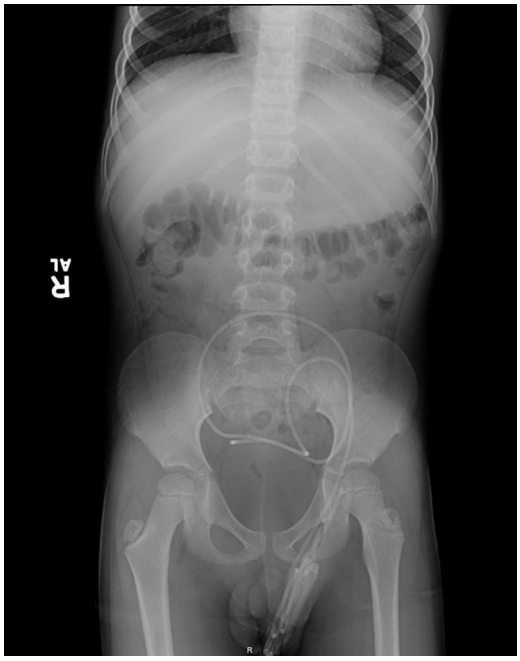

Fig. 2. Abdominal radiograph showing the fractured shunt catheter herniating into the left scrotum.

ening headache, fatigue, nausea and vomiting. Hydrocephalus had been diagnosed in the neonatal period and his initial VP shunt was placed at two years of age. At four years of age the shunt malfunctioned and was removed and replaced. He subsequently underwent a third shunt revision. He was living in Mexico and intermittently travelling to the United States. He had last seen a neurosurgeon in the United States two years ago. Two years prior to presentation the mother had noticed a left scrotal bulge, but as it was asymptomatic, she did not seek further medical attention. While in Mexico he became ill with several days of worsening headache, fatigue, nausea, and vomiting and was treated by a pediatrician in Mexico. After failure to improve, he was brought to our children's hospital in El Paso, on the Texas-Mexico border.

On presentation he was lethargic but oriented with reactive pupils. The VP shunt catheter was palpable under the skin of his neck. His abdomen was soft, non-tender, and he had a palpable bulge in the left hemi-scrotum that was felt to contain a loop of catheter (Fig. 1). His vital signs and initial labs studies including complete blood count and metabolic panel were normal. A CT scan of the head demonstrated a fractured VP shunt at the level of the upper neck with resultant hydrocephalus. A shunt series showed fracture of the VP shunt with the catheter coiled and extending into the left inguinal-scrotal region (Fig. 2).

He was seen in the emergency room and emergently taken to the operating room for shunt externalization. 3 days later he was returned to the operating room for VP shunt replacement with laparoscopic assistance, removal of the scrotal catheter and left inguinal hernia repair. A small left inguinal incision as was made and a Mitchell-Banks hernia repair was performed. The hernia sac was dissected away from the spermatic cord. Upon opening the hernia sac, the fractured VP shunt catheter was found and easily removed (Fig. 3A). At this point a 3 mm laparoscopic port was placed through the hernia sac and the abdomen was insufflated with carbon dioxide. Using the laparoscope, the peritoneal cavity was visualized. The right upper quadrant was free of intestinal adhesions, and this area was chosen for peritoneal placement of the new VP shunt catheter. After removal of the camera, abdominal desufflation and removal of the port, high ligation of the hernia sac

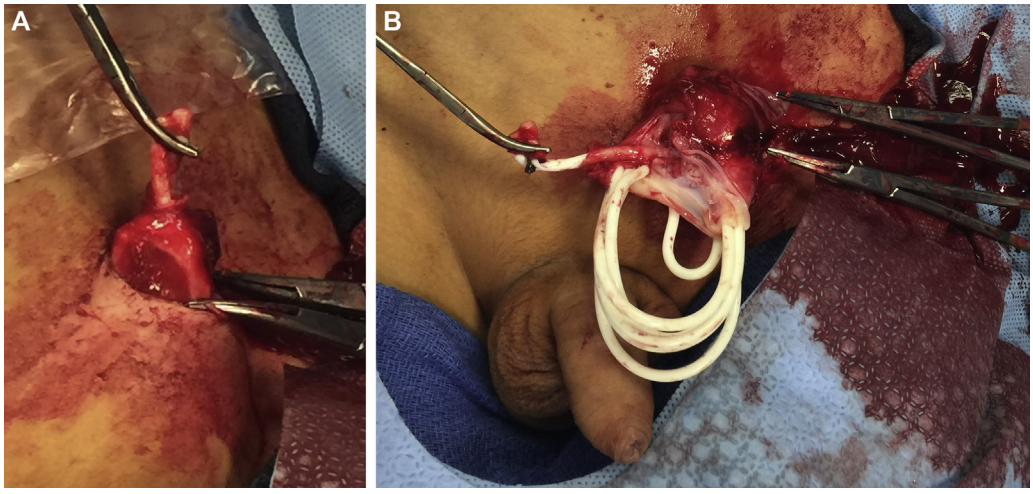

Fig. 3. A) The first fractured VP shunt catheter was removed easily from the hernia sac. B) The second shunt catheter was adherent to the left testicle.