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CASE REPORT

Abdominal Pseudocyst, a Rare Complication of Shunting Procedure: A Case Report

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Abstract

The use of the peritoneal cavity for cerebrospinal fluid (CSF) absorption was introduced in 1905. Since then, the ventriculoperitoneal shunt has been one of the most commonly performed surgeries to treat hydrocephalus. Abdominal pseudocysts are relatively rare abdominal complications due to the insertion of a ventriculoperitoneal shunt. Their incidence varied between 0.33 and 6.8%. We report a young boy with a history of hydrocephalus treated by ventriculoperitoneal shunt he admitted to our department presenting with abdominal pseudocyst revealed by abdominal pain and headache. He underwent surgery, where shunt was externalized and the pseudocyst was excision. The shunt was reinserted after the infection was eradicated, a ventriculo-atrial shunt was placed.

Keywords: shunt complication, ventriculoperitoneal shunt, shunt complications, abdominal pseudocyst

INTRODUCTION

Ventriculoperitoneal (VP) shunt procedure is the most common surgery performed to manage hydrocephalus in neurosurgery. Distal complications of this procedure include abdominal wall perforation, peritonitis, and ascites [1]. Abdominal pseudocyst (APC) formation is a rare complication secondary of VP shunt [2,3]. Herein, we presented an unusual case of a patient with a chronic right abdominal pain at the right hypochondrium region and was subsequently, after the examination procedure, found to have a massive CSF pseudocyst attributed to VP shunt malfunction.

CASE REPORT

An 11-year-old child who underwent shunting at the age of 3 years because of congenital hydrocephalus (Dandy-Walker variant), was admitted to our emergency department with abdominal pain and vomiting for one month, physical examination shows vital signs were stable within normal limits, no fever. On abdominal examination, there was no abdominal distension, but occurred to be rebound tenderness in the right upper abdominal region and decreased bowel sounds. A CT abdominal scan revealed an intraperitoneal cyst at the tip of the abdominal catheter (figure 1). Inflammatory assessments were

negative; white blood cell count of 9000/µL (4000–10000 /mm^3) and a C-reactive protein level of 3 mg/L (< 4. 5 mg/L). Liver and kidney functions were normal with normal serum electrolytes. The child was admitted to surgery room for an exploratory laparotomy of intraperitoneal CSF cysts, where the pseudocyst was punctured through the abdominal wall followed by excision of the pseudocyst and the distal side of the peritoneal shunt was repositioned in the left upper quadrant of the abdomen cavity (Figure 2). The postoperative evolution showed persistent abdominal pain, images showed no pseudocysts (Figure 3) and the CSF culture was positive for E. coli. Antibiotherapy was initiated (C3G 100 mg/kg/day for 21 days) and the shunt was externalized. After CSF sterilization, the child underwent surgery to place a ventriculo-atrial shunt. The postoperative evolution was favorable, no abdominal pain, no intracranial hypertension syndrome, he was apyretic. One year later, the child fully recovered with no further complications.

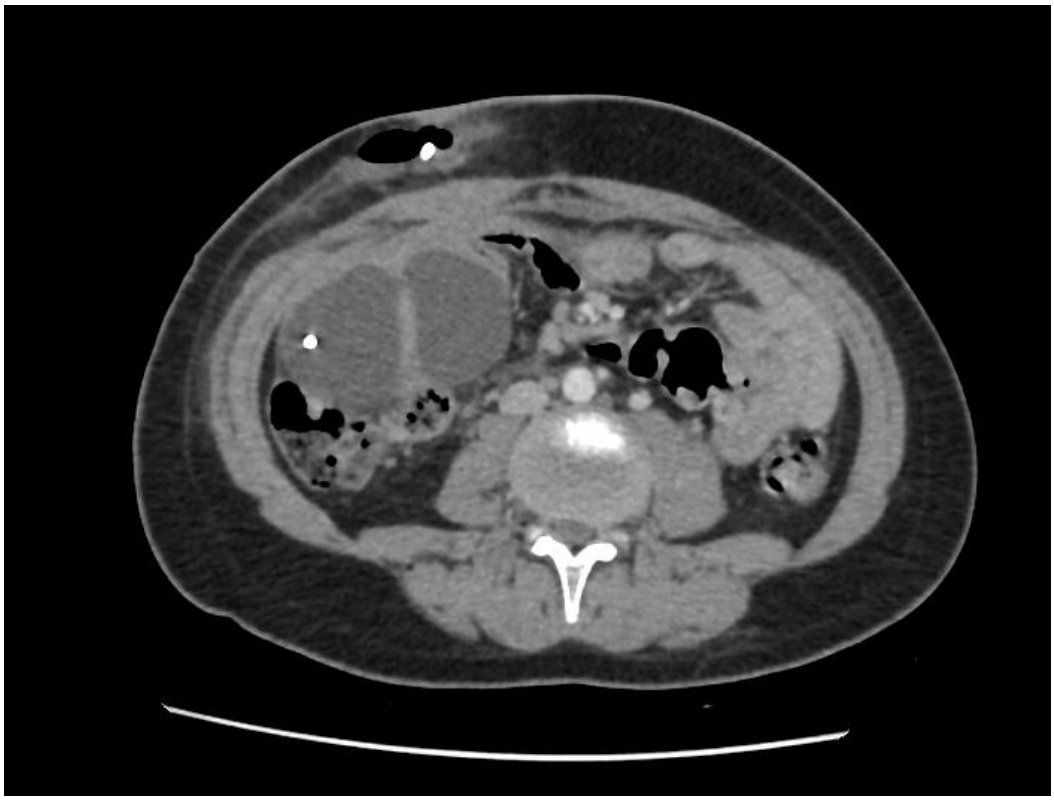

Figure 1 Abdominal CT scan showed pseudocyst abdominal within the tip of abdominal catheter

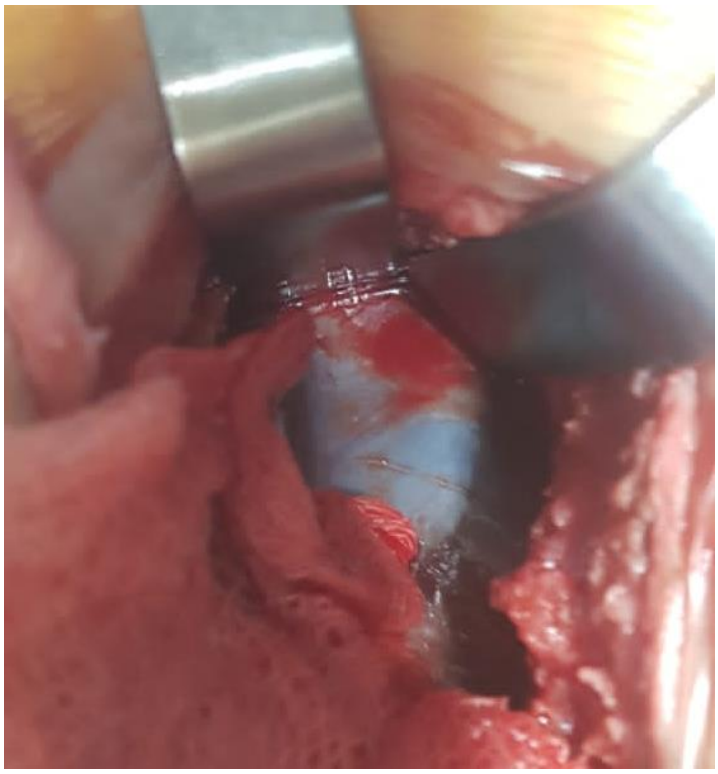

Figure 2 perioperative image shows the cyst wall

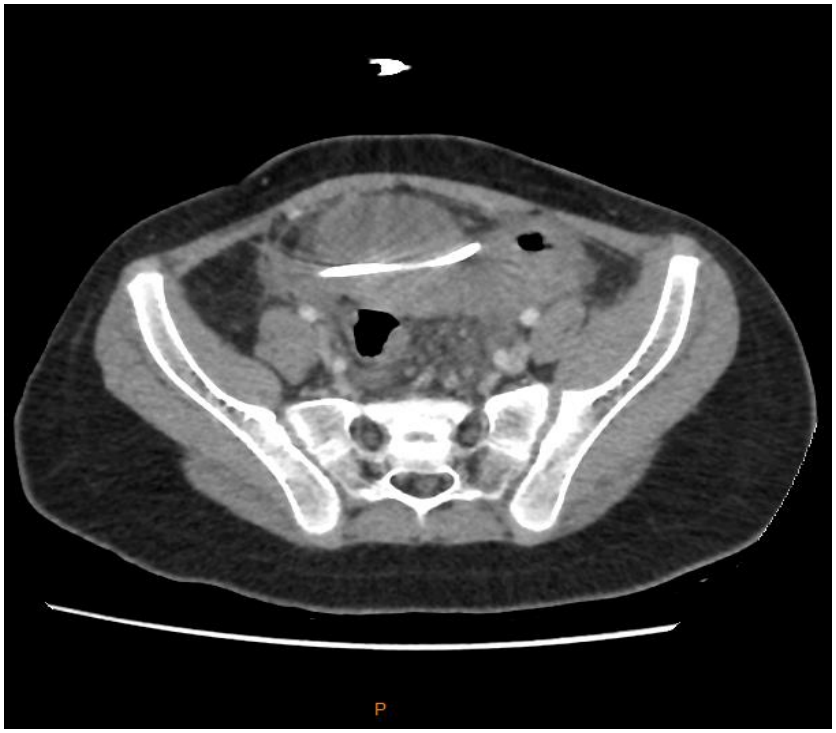

Figure 3 Abdominal CT scan after excision the pseudocyst and reinsertion the catheter into the left superior quadrant

DISCUSSION

Abdominal pseudocyst is a rare complication of ventriculoperitoneal shunt, its incidence ranging from less than 1 to 4.5% [4,5]. VP Shunt-related complications are reported in the literature with a frequency from 1 to 59% [6,7]. The formation of pseudocysts due to shunt placement is mainly observed in the abdominal cavity, as most ventricular drains are placed in the abdominal cavity. In 1954, APC was described for the first time by Harsch [8]. Jackson and Snodgrass mentioned a similar complication after one year [3]. The definition of abdominal pseudocyst is an accumulation of CSF at the distal end tip of the VP shunt within the abdominal cavity, or if the VP shunt has migrated, CSF accumulation occurs within the adjacent abdominal wall [1]. The term “pseudocyst” refers to encapsulation by a fibrous peritoneal membrane, which does not contain an epithelium [9]. They are more common than ascites [10]. Three different mechanisms have been proposed, however, the pathogenesis exact remains unknown: chronic infection, foreign body reaction, and particle like protein in CSF [11,12]. The time for an abdominal pseudocyst to develop from the last shunting procedure ranges anywhere from three weeks to five years. Depending on the size of the pseudocyst, symptoms of bowel obstruction may arise. Abdominal complaints is the classical presentation of APC and signs of shunt dysfunction [5,12–14], such as nausea and/or vomiting were the most frequent symptoms, followed by decreased appetite, constipation and diarrhea. Although the absence or a low incidence of shunt dysfunction has been reported [5,15], there are reports of a higher rate of intracranial hypertension that can even prevail over the abdominal signs, including headache, lethargy and irritability. CT scan of the abdomen is the gold standard diagnostic imaging modality, although ultrasound could be used as initial management for it is fast, reliable and cost-effective [16,17]. CT scan is often more useful to identify other etiologies in distinguishing those presenting with severe abdominal pain, such as appendicitis, diverticulitis, abdominal abscess, or bowel obstruction [18]. Pseudocysts can be identified on CT abdomen as large fluid-filled collections delimited by a thin wall adjacent to the catheter tip [11,19]. Histological examination of the pseudocyst shows fibrous tissue with acute inflammation [12].

Treatment of pseudocysts varies and no recommendations have been established, treatment strategies should be adjusted according to the patient's clinical condition[20]. If infection was eliminated and the patient is asymptomatic, no treatment is indicated. In the other hand, if the cyst was symptomatic and there is no infection, some authors suggest paracentesis and aspiration of the cyst fluid, others had been treated by laparotomy and wide excision of the cystic walls, and recently laparoscopic-assisted lysis of the pseudocyst has been proposed. For shunt treatment; replacement of the distal catheter in the peritoneum, in the cases of pseudocyst recurrence replacement of the distal catheter in the atrium or pleural cavity. If shunt infection is confirmed, the shunt should be externalized and anti-biotherapy until the germ is eradicated. In the literature, Staphylococcus aureus is the most common cultured germ [12]. Ricardo et al. reported four cases with abdominal pseudocyst treated by endoscopic third ventriculostomy, which have failed in two cases [21].

CONCLUSION

Abdominal pseudocyst is an uncommon complication of VP shunt placement. It should be suspected in any patient with VP shunt complaint of abdominal pain. Infection of the shunt is always should be suspected. For selected patients, endoscopic third ventriculostomy could be an excellent strategy after shunt externalization.

Declaration of interest

The authors declare that there is no conflict of interest that could be perceived as prejudicing the impartiality of this review.

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Consent for publication

All authors consent to publication

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الكيس الكاذب البطني، أحد المضاعفات النادرة لعملية التحويلة الدماغية

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الملخص

الخلفية والأهداف: تعد عمليات التحويلة الدماغية لمعالجة استسقاء الرأس من اكثر العمليات شيوعا حيث يتم استخدام الصفاق (الغشاء البيرتوني) لامتصاص سائل الدماغ الشوكي. الأكياس الكاذبة في البطن هي من المضاعفات البطنية النادرة نسبيًا بسبب إدخال تحويلة بطينية صفاقية. تتراوح نسبة حدوثها بين 0.33 و 6.8٪.

المنهجية: في هذا المقال نوضح حالة طفل صغير يعاني من استسقاء الرأس عولج بواسطة التحويلة البطينية الصفاق وتم إدخاله إلى قسمنا بسبب الإصابة بكيس كاذب في البطن كشفت عن طريق ألم في البطن وصداع في الرأس. خضع لعملية جراحية حيث تم تحويل التحويلة الي تحويلة خارجية وتم استئصال الكيس الكاذب.

النتائج: تم معالجة العدوى وإعادة إدخال التحويلة في الأذين.

الكلمات الدالة: استسقاء الرأس، التحويلة الدماغية، الكيس الكاذب البطني، السائل الدماغ الشوكي، مضاعفات التحويلة الدماغية.