CASE REPORT

Giant Abdominal Pseudocyst Causes Hydronephrosis: A Complication of Ventriculoperitoneal Shunting

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ABSTRACT

Hydrocephalus is treated with a ventriculoperitoneal shunt that is commonly placed in children and adults. In rare cases, a giant abdominal pseudocyst can form and cause shunt malfunction and hydronephrosis. A 7-year-old female presented with progressive abdominal distention, vomiting, pain, and convulsions. A shunt had been placed due to her hydrocephalus. Her head CT scan revealed ventriculomegaly. Moreover, the abdominal CT scan showed a mass with a shunt catheter inside and right kidney pelvicalyceal system was widening. External ventricular drainage was performed. The pseudocyst was removed by laparotomy. About 2,7 liters of fluid was drainage from the pseudocyst. The formation of giant pseudocysts in the abdomen causing hydronephrosis is a rare complication of VP-shunt placement. This possibility should be a concern for neurosurgeons, pediatricians, and physicians, and consider it as a differential diagnosis.

Keywords: Ventriculoperitoneal Shunt, Abdominal Pseudocyst, Hydronephrosis

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INTRODUCTION

Ventriculoperitoneal shunt (VP-shunt) is a procedure that often used in the treatment for hydrocephalus.(1). Various complications of VP-shunt may be seen, such as infection, mechanical failure and malfunctional. The incidence of shunt malfunctions in the first year after insertion is approximately 25-35% (2).

The abdominal pseudocyst is one of the uncommon complications of VP-shunt, characterized by the collection of cerebrospinal fluid in the peritoneal cavity, which contains the distal tip of the shunt catheter (1.3). The incidence of abdominal pseudocyst is ranging from less than 0.33% to 6.8% since it was first reported in 1954 (1-4). Large pseudocysts may as well present as giant abdominal masses with compressive symptoms. It is yet extremely rare to found giant abdominal pseudocyst causing hydronephrosis as the complication of VP-shunt (5).

The most common presentations of abdominal pseudocyst are acute abdomen such as abdominal pain, distension, nausea, vomiting, anorexia, and fever. It could also find as signs of shunt malfunction such as lethargy, headache, and seizure (3). Here, we present the case of a 7-year-old female patient, admitted to our hospital with progressive abdomen distention, vomiting, and convulsions and was subsequently found to have a hydronephrosis and giant abdominal pseudocyst attributed to shunt malfunction.

CASE REPORT

A 7-year-old girl was admitted to our hospital presented with progressive abdomen distention, vomiting, pain, and convulsions. She previously had been installed the VP-shunt due to hydrocephalus at two years old VP-shunt had been performed due to her hydrocephalus condition at two years old. It is known that she has already done 3 times of revisions surgery due to shunt malfunction, with the last revision happened 18 months ago, and hasn't done any other abdominal surgery afterward.

Through neurological examination, we discovered the patient has deteriorated of consciousness (GCS score of E3M5V4) Pupil sizes 4 mm in both eyes with reduction of responsivity to the light. Abdominal examination found a large palpable elastic masses. Her vital sign was unstable (heart rate 120 bpm, temperature 38.7 oC). Laboratory tests revealed leukocytosis (23800/μL) and hyponatremia (2.69 mmol/L).

Head CT scan shows bilateral ventriculomegaly and

an infarction in the frontal cortical-subcortical (Fig. 1). Moreover, a contrasted abdomen CT revealed homogeneous low-density fluid collection in the right hemiabdomen measuring about 20.6 cm X 17.9 cm x 11.9 cm, with a distal tip of shunt catheter was inside to the fluid collection (Fig. 2). The giant pseudocyst was compression of the surrounding organs, the right kidney pelvicalyceal system to be widening, resulting in grade 1 hydronephrosis (Fig. 3).

Thus, the patient diagnosed acute of hydrocephalus due to shunt malfunction caused by the formation of abdominal pseudocyst. Following the result above, we performed EVD to decrease intracranial pressure (ICP).

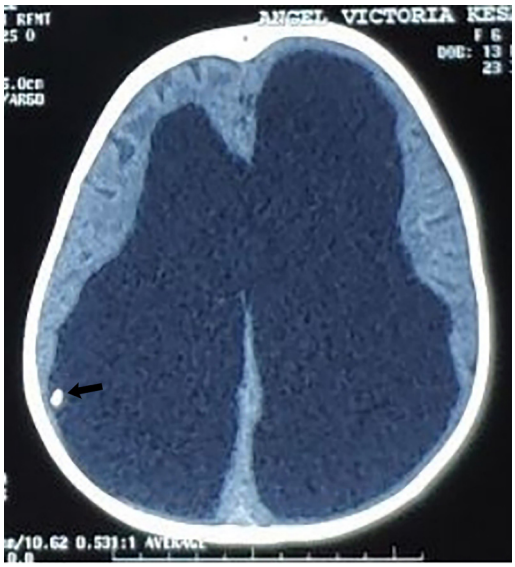

Figure 1: Head CT demonstrated bilateral ventriculomegaly and a proximal tip of the VP-shunt catheter in the right lateral ventricle

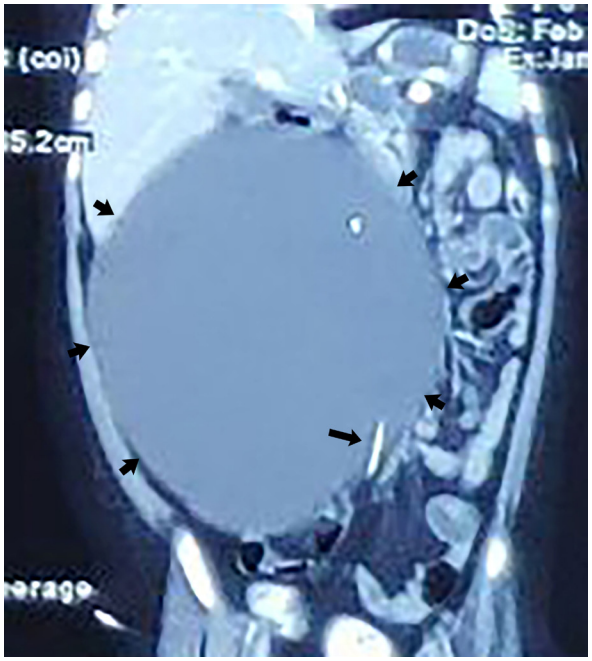

Figure 2: Contrasted abdominal CT (coronal) demonstrated homogeneous low-density fluid collection in the right hemiabdomen adjacent to the VP-Shunt catheter

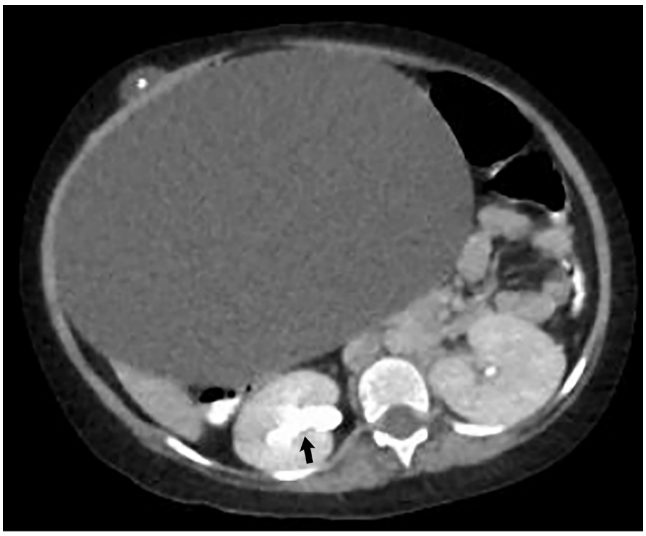

Figure 3: Contrasted abdominal CT (axial) demonstrated widening of right kidney pelvicalyceal system

Subsequently, laparotomy exploration was performed due to remove the pseudocyst. Some parts of the pseudocysts have adhesions to surrounding organs, the pseudocyst was opened and drained of 2700 ml of clear fluid. Then we verify the distal tip of the shunt is still functioning and reinserting it at a different place in the abdominal cavity.

Histopathological examination shows fibrous tissue without an epithelial lining. The findings of CSF analysis were absence of microbial flora and negative culture. The EVD was removed after obtaining three times negative CSF culture, following the placement of new VP-shunt in the left lateral ventricle. Ultrasonography abdomen was performed 6 months after surgery, with result of no abdominal pseudocysts found and the pelvicalyceal system of the right kidney is not widening (Fig. 4).

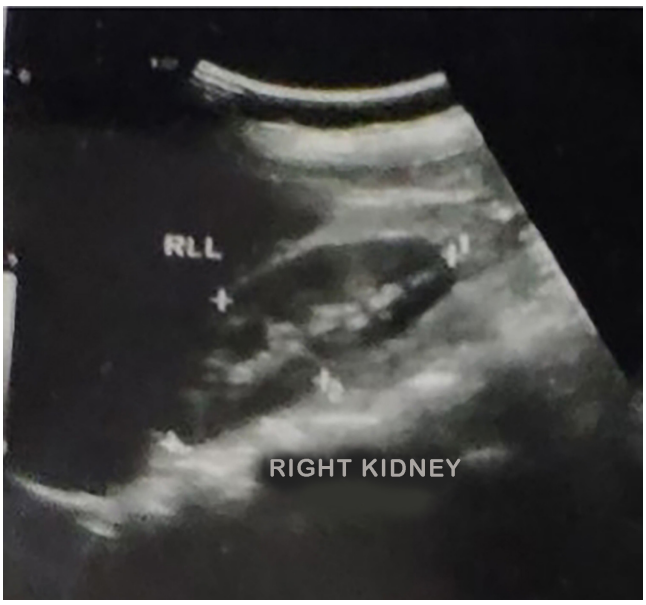

Figure 4: Abdominal USG demonstrated a normal pelvicalyceal system in the right kidney

DISCUSSION

VP-shunt placement is one of the most commonly performed procedures for the treatment of hydrocephalus of various etiologist in children and adults (1.2). Various complications of VP-shunt may be seen, such as infection, mechanical failure and malfunctional. Among these complications, abdominal pseudocyst is rare complication with characterized by the accumulation of cerebrospinal fluid in the peritoneal cavity with subsequent pseudocyst formation. The term pseudocyst implies that the cyst is surrounded by a wall of nonepithelial tissue (1).

The presence of a shunt malfunction causes an increase ICP with clinical manifestations such as headache, nausea, vomiting, and decreased level of consciousness (2). Abdominal pain often as a chief complaint in most patients with abdominal pseudocyst (1). Head CT scan in a patient with increase ICP may show ventriculomegaly and periventricular edema. The placement of EVD is one of the management procedures to decrease ICP immediately (1.2).

CT scan abdomen is often more practical in distinguishing those presenting with severe abdominal pain because it can help identify other etiologist such as appendicitis, diverticulitis, abdominal abscess, or bowel obstruction. The diagnosis of pseudocysts is most accurately made by a contrast CT scan, whilst ultrasound also recommended by some costly-effective and less radiation exposure (1.2).

The cause of the formation of pseudocysts in the abdominal cavity is still unknown, but several conditions such as chronic infection, implant rejection reactions due to allergies to the material used, and repeated shunt revisions are predisposing factors that can be found (1-4).

This hypothesis explains the process of abdominal pseudocyst formation in our case. The culture results are negative and the absence of microbial flora. The possibility of pseudocyst formation in this case, is the result of adhesions surround in distal tip of shunt catheter that occur due to a history of repeated shunt revision (3). Abdominal pseudocyst can be treated with laparotomy or with minimally invasive procedures such as paracentesis and aspiration of the cystic fluid(3). In the present case, exploratory laparotomy and fluid drainage was performed. During the surgery, we found some parts of the pseudocyst had adhesions with the mesentery. We also obtain the total drainage fluid of 2700cc from the pseudocyst. Adhesions of pseudocyst with mesentery could indicate the present of chronic inflammatory surround distal tip of shunt catheter.(1-3)
As the shunt drains from the ventricles, abdominal pseudocysts may enlarge and cause upper urinary tract obstruction. The patient in this case had a giant pseudocyst. It is likely that the obstruction of his right ureter was the result of the direct pressure effect of the pseudocyst being severe enough to compress.(5) In addition, the pelvicalyceal system of the right kidney was dilated, resulting in grade 1 hydronephrosis.
Ultrasonography abdomen was performed 6 months after the surgery, with results of no abdominal cysts found and the pelvicalyceal system of the right kidney is not widening. Therefore, hydronephrosis associated with giant pseudocyst abdominal was highly suspected.

CONCLUSION

The formation of giant pseudocysts in the abdomen causing hydronephrosis is a rare complication of VP-shunt placement. This possibility must be a concern for neurosurgeons, pediatricians, and physicians, to consider it as a differential diagnosis in those with a history of VP-shunt placement presenting with acute abdomen. The earlier diagnosis and prompt treatment delivered could lead to a better clinical improvement.

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