

# Laparoscopic Management of Postventriculoperitoneal Shunt Abdominal Pseudocyst in 10 Years Old Girl

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## ABSTRACT

Ventriculoperitoneal shunt VPS well established procedure in the treatment of pediatric hydrocephalus can be encumbered with many complications of which is one of the rarest of the formation abdominal pseudocyst (AP).

The pseudocyst wall is covered with inflammatory fibrotic tissue, unlike true cysts whose wall is covered with mesothelium. Treatment of abdominal pseudocysts involves resection of the pseudocyst wall and shunt replacement. The above procedure can be done by open or minimal access to the surgical procedure. A 10-year-old girl to whom the VPS is placed comes from long-term abdominal colic and symptoms similar to an acute abdomen. We treated the girl with minimal access to the procedure, performed a resection from the abdominal pseudocyst, and did a VPS replacement. The patient's postoperative course was satisfactory.

**Keywords:** Hydrocephalus; Pseudocyst; Laparoscopy; Shunt; Pediatric.

## INTRODUCTION

Hydrocephalus in the pediatric age usually leads to increased intracranial pressure. A common surgical procedure presented by a neurosurgeon is placement of a ventriculoperitoneal shunt. Parietal peritoneum cavity is the most acceptable area for receiving ventricular fluid due to low complication rate. After the first ventriculoperitoneostomy, which was done in 1905, these operations became most applicable in the treatment of congenital hydrocephalus [1,2].

VPS problems related to the abdominal can result in infections, disconnection, perforation, penetration or obstruction of hollow viscera, catheter extrusion, volvulus, hernias and intrabdominal pseudocysts. The walls of pseudocysts are not composed of mesothelium, but of fibrous tissue or inflamed serosal surface. Pressure in the pseudocyst space may increase which may interfere with VPS function.

In case of complications, the clinical picture depends on the worsening of the condition in the neurological and gastrointestinal tract. Symptoms can include vomiting, bloating, obstruction, abdominal pain, fever, palpable mass, headache [3,4]. Treatment is usually pseudocyst excision and shunt replacement.

## CASE REPORT

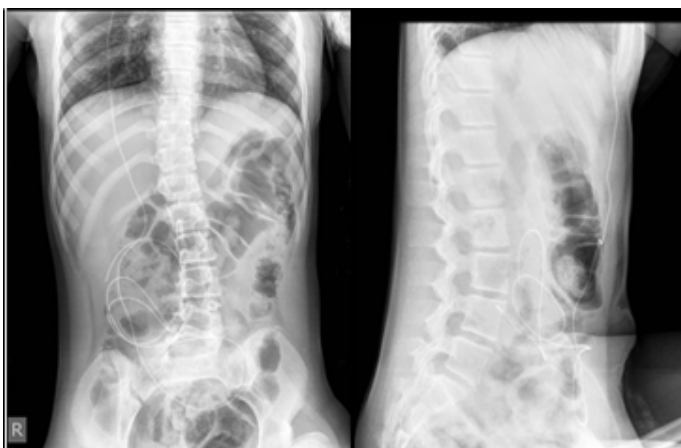
Patient was 10 years old girl, with VP shunt from birth. The girl had a third degree intraventricular hemorrhage by birth with consecutive development of hypertensive hydrocephalus. A ventriculoperitoneal shunt was immediately performed after diagnosis.

She has been having abdominal pain characterized by spasms for a month before admission to our Clinic.

The symptoms were intensified 15 days before coming to our Clinic when the girl was crying because of constant abdominal pain. She was hospitalized at a regional hospital for intense abdominal pain. She did not have fever, did not vomit, had no problems with urination. She had a stool every second or third day with the help of teas. Her mother gave her occasional analgesics due to intense abdominal pain. She refused the meals, abdominal pain intensifies during the night when crying become more intense. She had a fever to 38 °C. Radiological examinations were performed and a CT scan of the brain showed an enlarged ventricular system, initial development from hydrocephalus, with a VP shunt placed in the area of the right ventricle with the apex traced at the border of the ventricles and brain parenchyma.

Due to the intensification of the problems and the suspicion of an acute surgical condition, the patient is transferred from the regional center to our Pediatric Surgery Clinic.

On admission, patients with general poor condition, dormant, respond to painful stimuli, subcutaneous adipose tissue reduced, abdomen diffusely painful to palpation. A nasogastric probe is obtained, to which a brown liquid content is obtained. During the physical examination, the abdomen was diffusely painfully sensitive. Laboratory tests are performed CRP = 196, ECHO shows a lot of free thick fluid, an abdominal RTG is performed which shows top of ventriculoperitoneal catheter subhepatically (**Figure 1, 2**).

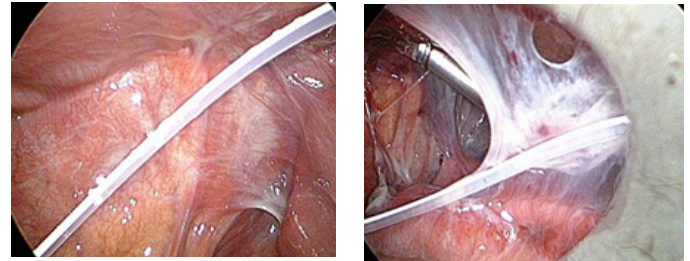


**Figure 1, 2:** RTG shows the end of the VP shunt subhepatically.

Ultrasound has shown changes in the appearance of intestinal curvatures that are edematous are observed irregularly, pockets of denser fluid content with some significant reaction of the surrounding mesentery, and significant mesenteric adenopathy in this region are occasionally observed.

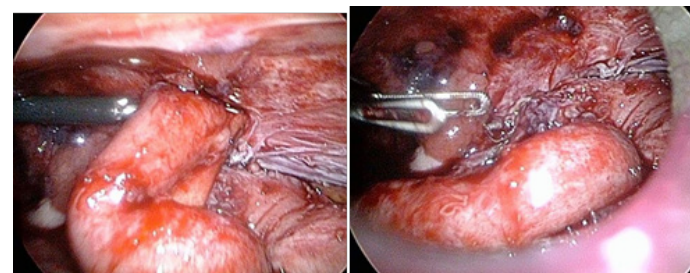
Due to suspected acute surgical disease, emergency surgery is

initiated after preoperative preparation. During laparoscopic surgery, pneumoperitoneum and placement of the first umbilical trocar is performed with an open Hasson procedure. It was difficult to insert other trocar because of the increments. Pseudocyst formations in the cavum recto-uterine Douglas and right pararectally are noticeable. All the while the VP shunt is attached to the small intestines by the tight attachments, (**Figure 3, 4**).



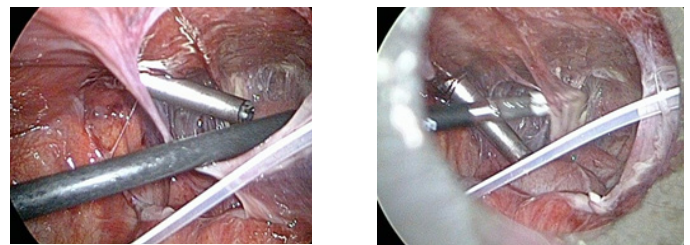
**Figure 3, 4:** VP shunt is attached to the small intestines by the tight attachments.

Removing the walls of the pseudocyst liberated the abdominal cavity and removes the adhesions between the intestinal loops (**Figure 5, 6, 7**).



**Figure 5, 6:** Removing the walls of the pseudocyst with blunt grasper and removes the adhesions between the intestinal loops between each other and between the intestinal loop and the anterior abdominal wall.

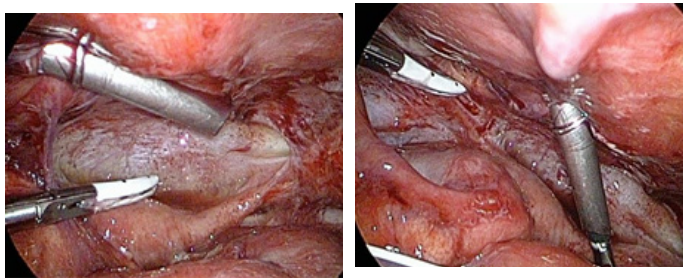
It was performed almost complete resection of the pseudocyst and complete liberalization and release of cavum recto-uterine Douglasi. (**Figure 7, 8, 9, 10**) There is a lot of blurry content between the adherents and the walls of the pseudocyst.



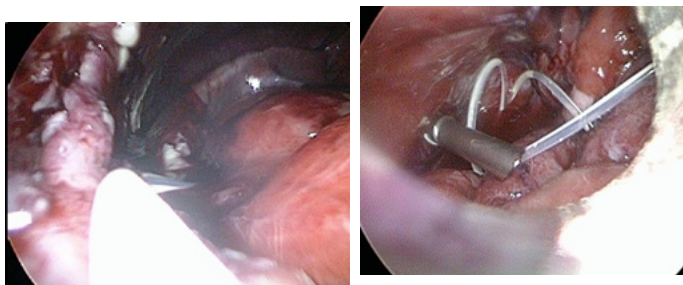
**Figure 7, 8:** Near total cyst excision and adhesiolysis.

The top of the ventriculoperitoneal catheter was in the subhepatic space between the margo inferior of liver, gallbladder, and intestinal loops. (**Figure 11**) The tip of VP shunt was released and noted to be functional and drain clear cerebrospinal fluid. The walls of the pseudocyst formation

located subhepatically are not liberalized because they are very firm and due to the possibility of injury to the gallbladder, liver parenchyma and small intestine. The tip of the VP shunt is replaced to the Douglasi recto uterine cavum (**Figure 12**). Drainage were performed.

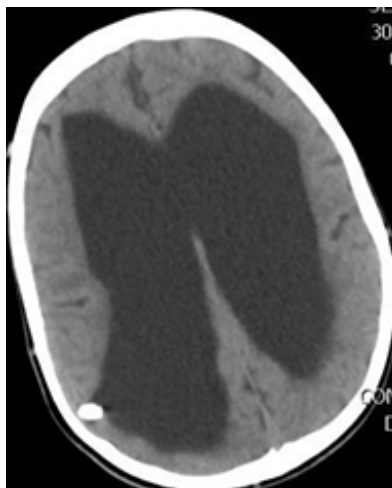


**Figure 9, 10:** Complete liberalization and release of cavum recto-uterine Douglasi.



**Figure 11, 12:** The tip of VP shunt placed in subhepatically pseudocyst formation and replaced in cavum recto-uterine Douglasi.

CT postoperatively was without changes in comparison with preoperative (enlarged ventricular system, initial development from hydrocephalus, with a VP shunt placed in the area of the right ventricle with the apex traced at the border of the ventricles and brain parenchyma) (**Figure 13**).



**Figure 13:** Control CT - enlarged ventricular system, initial development from hydrocephalus, with a VP shunt placed in the area of the right ventricle with the apex traced at the border of the ventricles and brain parenchyma.

Ophthalmologist fundus finding is normal. The neurosurgeon recommends the treatment of a competent neurosurgeon in regional hospital.

The postoperative course is satisfactory. The patient was placed in the Intensive Care Unit. Antibiotic therapy is administered postoperatively: Metronidasol, Meropenem and Vakomycin. She was controlled by a neurosurgeon and an ophthalmologist.

The general condition is satisfactory, the patient has no pain, the peristalsis is established, the patient does not fever, the threads are removed and the patient is transferred to a regional medical center for further outpatient treatment.



**Figure 14:** Appearance of anterior abdominal wall after laparoscopy treatment of abdominal pseudocyst patient.

## DISCUSSION

Harsch was the first to use an abdominal pseudocyst as a medical term in 1954 [5]. In 1955, Jackson and Snodgrass also described abdominal pseudocyst (APC) in their publications. The degree of this complication in the surgical procedure for placement of VPS in congenital hydrocephalus is about 4.5%. The most likely cause of this complication is a reaction from the parietal peritoneum to the foreign body and an increased amount of cerebrospinal fluid (20 ml/h) to be absorbed [7]. This all events can lead to the challenge of the epithelium of the peritoneum, creating adhesions and the creation of the collection of cerebrospinal fluid [7,8]. Also, infection can be the cause of this disease and it is always necessary to take a sample for microbiological analysis [9].

Symptomatology can be from the neurological tract as well as from the gastrointestinal tract. Neurological symptoms that are more pronounced in the pediatric age may be related to an increase in intracranial pressure: headache, vomiting, and disorder of consciousness. Gastrointestinal symptoms are more pronounced in adult patients and may be accompanied by abdominal pain, abdominal distension, tenderness, signs



of ileus, and mass in abdomen, like our patient, 10 years old girl. If there are signs of pseudocyst inflammation, the patient may have fever.

There are no clear guidelines to treating an abdominal pseudocyst today. Paracentesis has been described as one of the methods in the treatment of APV [7,8,9]. Recently lysis of adhesions and pseudocysts with laparoscopic-assisted surgery were used [10]. Recommended treatment of non-infected APC is minimal access surgery with excision of pseudocyst wall and replacement of the tip of the ventriculoperitoneal catheter. An open surgical approach with extensive resection of a pseudocyst wall may disrupt future resorption of cerebrospinal fluid and hinder future eventual placement of AV shunt. VP shunt complications were treated with the peritoneoscopy method for the first time by Morgan in 1979 [11,12,13]. The procedure we have presented in this case report was first published by Kim et al. in 1995, where they described their experience with a 12 year old boy [14]. They resected part of the APC, like in our case report, and moved the tip of the catheter to another part of the peritoneal space. Brunori et al. have published their experiences with patients with APC. They laparoscopically punctured APC space and evacuated cerebrospinal fluid [15]. Jain et al. presented 2 adult APC patients treated with minimal surgery access [16]. They were able to solve the pseudocyst and to keep VP shunt in peritoneal cavity. Esposito and the authors have recommended a minimal surgery approach to treatment of APC as safe and with a low complication rate [17]. APC treatment should be performed with 3 trocar 5 millimeter diameter with precision work, lysis of adhesion and pseudocyst wall removal. It is necessary to check the catheter tip and see if the catheter is functional and replace the catheter tip in place with maximum possibility of absorption, Douglas space [18,19]. The biggest advantage of minimal access surgery is the possibility of entering into all parts of the abdomen, lysis of adhesion and the possibility of replacing the tip of the catheter.

## CONCLUSION

The advantages of minimal access surgery in the treatment of the abdominal pseudocyst are a better approach to the abdominal cavity, the ability to remove all attachments, and the ability to better position the tip of the catheter.

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