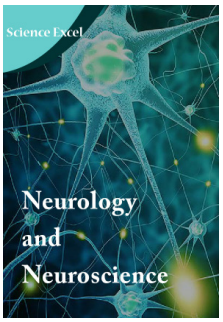
Neurology & Neuroscience

Case Report



Large Abdominal Cerebrospinal Fluid Pseudocyst Complicating Ventriculoperitoneal Shunt: About a Case and Review of the Literature

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Abstract

Background: *Ventriculoperitoneal shunting is a simple neurosurgical technique used to treat hydrocephalus, but it is not without complications. One of these is abdominal cerebrospinal fluid (CSF) pseudocysts, which can occur in all age groups, with a highly variable onset time, ranging from a few weeks to several years after drainage. In this article, we report a rare case of abdominal CSF pseudocyst.*

Case presentation: *9-year-old girl admitted 2 months after ventriculoperitoneal shunt for permanent abdominal pain associated with vomiting and loss of appetite. Clinical examination of the abdomen revealed a voluminous swelling of liquid consistency, not painful to palpation. Abdominal and pelvic CT scans revealed a cystic formation encapsulating the tip of the drain. Surgery consisted of excision of the pseudocyst, evacuation of the fluid and replacement of the bypass drain. The patient made a full recovery.*

Conclusion: *Peritoneal pseudocyst, although rare, is a significant complication of ventriculoperitoneal shunting. Cerebrospinal fluid infection has been identified as its most frequent cause. A multidisciplinary approach is recommended for optimal patient management.*

Introduction

Ventriculoperitoneal Shunt (VPS) is a neurosurgical procedure frequently performed to treat hydrocephalus [1]. Extracranial complications of VPS are extensive and include valve disconnection, infection, blockage of the distal end of the valve, visceral perforation and abdominal obstruction [2]. Abdominal CSF pseudocyst is rarely observed, with a prevalence rate of less than 1% in all VPS patients [3]. Most of these complications are reported in children [4]. The walls of this cyst consist of a peritoneal serous membrane thickened by a chronic inflammatory process, hence the name pseudocyst [5]. Our study focuses on the case of a 9-year-old child who developed a pseudocyst a few months after the placement of a ventriculoperitoneal shunt (VPS) for tumoral hydrocephalus..

Case presentation

IThis is a 9-year-old young patient, of Senegalese nationality, with normal psychomotor development, who was admitted for an examination of permanent abdominal pain, which occurred 3 days ago, associated with vomiting and a progressive and persistent loss of appetite. It should be noted that no headaches were reported and there was no disturbance of consciousness. It should also be noted that she had a VPS two months ago due to a tumor hydrocephalus. The tumour was not operated on as the child needed to be consulted during the onset of COVID, where neurosurgical activities were reduced. Physical examination showed normal consciousness, normal-sized pupils, no neurological deficits and flexibility of the neck. Abdominal examination revealed large left mediolateral swelling, ranging from hypogastric to left hypochondria, fluid consistency, not painful to feel and preventing walking. Patient's fever was 38°C. Biochemical and blood tests showed normal renal and hepatic function. The blood count showed slight leukocytosis, while the C-reactive protein was 26 mg/l. Urine tests and chest x-ray were normal. Abdominal ultrasound revealed a large collection of enkysted and homogeneous fluid encapsulating the distal end of the VPS drain.. The radiographic examination of the material revealed the presence of a drain positioned along the craniocervicothoracic-abdominal path. The abdomenic pelvic CT scan revealed a left medial-lateral cystic formation occupying two thirds of the epigastric region, extending

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to the dorsal cavity of the omentum and the hypogastric region. This formation was characterized by homogeneity, good wall delineation and encapsulation of the distal end of the drain. [Figure 1]. A discussion took place with pediatric surgeons, and a diagnosis of abdominal pseudocyst without VPS valve dysfunction was made. The surgical procedure was performed, and the approach to the abdomen revealed a ruptured cystic mass, resulting in the drainage of 1000 ml of CSF. Inside, we found the distal end of the valve, which continued to produce clear cerebrospinal fluid (see Figure 2). The shell was excised and the distal end of the drain reinserted in the contralateral direction as shown in Figure 3. Examination of the drained intracystic fluid revealed no microorganisms. Analysis of the CSF at the distal end revealed the following values: a clear CSF with proteinorrhea at 0.48 g/l, glucorachia at 0.66 g/l, and the presence of 5 lymphocytes on the cytology.

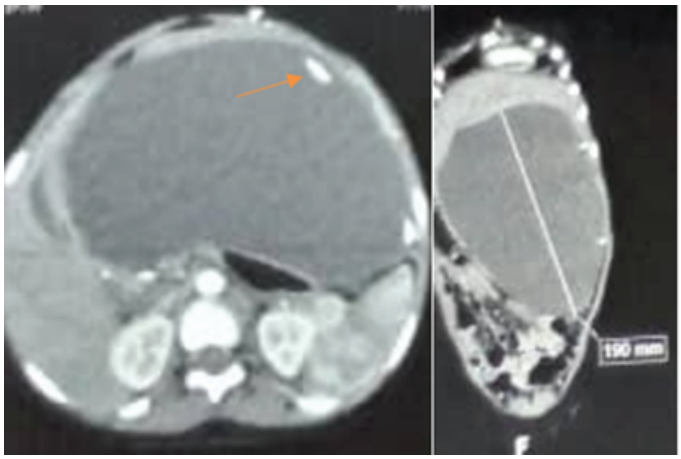

Figure 1. *Aabdominal CT scan axial cut on the right and sagittal reconstruction on the left: showing a large pseudocystevabdominal CSF with a drain in place (arrow)*

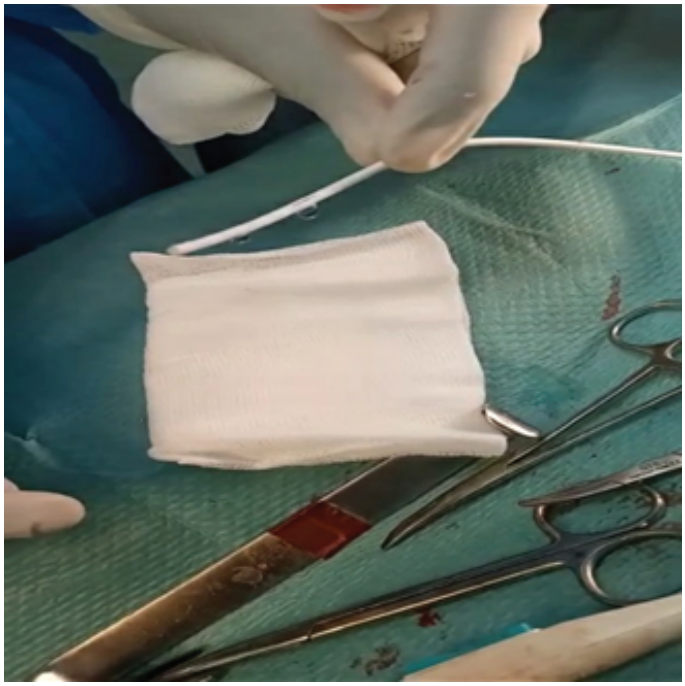

Figure 2. *Distal end of drain with flow, y of CSF*

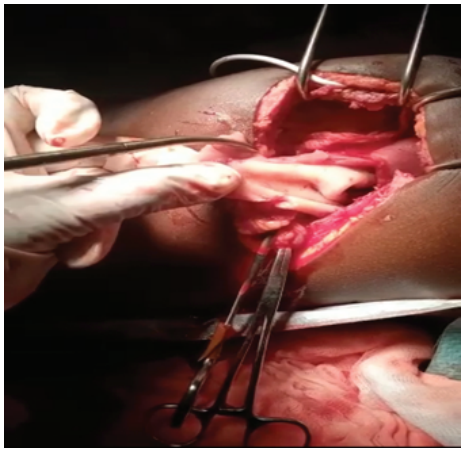

Figure 3. *Intraoperative image showing the cock and the distal end of the drain*

Discussion

HHydrocephalus is defined as active ventricular dilation secondary to a disorder of CSL hemodynamics (6). VPS is a neurosurgical procedure for treating hydrocephalus. The first VPS was performed in 1908 by Kansh [7]. Other methods of shunting CSF include atrial ventricular shunt (AVS), lumboperineal shunt and ventriculocisternostomy [8]. The peritoneal cavity is preferred for its ease of insertion of the drain and reintegration in case of revision [9]. However, this practice is not without complications. Incidence ranges from 5% to 47% according to Chung et al. The most common causes of VPS dysfunction are blockage and catheter infection. For the distal drain, there are a multitude of complications including infections, spontaneous CSF collections, intestinal volvulus, intestinal perforation, catheter migration and a peritoneal pseudocyst [10]. Among these, the pseudocyst of the peritoneal CSF is an unusual complication, first described in 1954 by Harsh. Chung et al [10] report an incidence of 1 to 4.5%. It occurs at all ages in children as well as in adults who have had a VPS. Our patient was 09 years old, VPS was indicated for tumor hydrocephalus. The wall of the peritoneal pseudocyst is made up of inflammatory fibrous or serous tissue without epithelium and is filled with CSF and debris. The pathogeny is not yet well elucidated, the most common cause is infection as reported by Hahn et al. [11] and suggests that all pseudocysts should be considered infectious until proof to the contrary. This is due to the response of the distal catheter to inflammation which results in the formation of a sheath around the drain, with CSF flowing into this sheath thus forming the pseudocyst [10]. The germs most involved are staphylococcus epidermidis, staphylococcus perpetrators, propiobacterium acnes [12].

Other contributing factors are described as a history of abdominal surgery, liver dysfunction or an allergic reaction to silicone or ethylene oxide [13]. The clinical presentation is different according to age, in children, intracranial hypertension associated with abdominal pain are found while in adults there are local abdominal signs such as abdominal pain, abdominal distension, nausea, vomiting, loss of appetite, fever or an acute abdominal picture [10]. In our case, the child presented with abdominal pain, vomiting and loss of appetite without signs of intracranial hypertension. An infectious etiology was evoked despite the sterile CSF, he presented a fever at 38 ° C, a hyperleukocytosis at 11000 IU / ml and a CRP at 26 mg / l. The

liver function tests were normal. The time to onset between the installation of VPS and the appearance of the first clinical signs is between 3 weeks and up to 21 years [14]. Our patient had had VPS for two months ago. Abdominal ultrasound is the preferred examination of diagnosing peritoneal pseudocyst. It can be supplemented by an abdominal CT which makes the diagnosis of peritoneal pseudocyst by demonstrating a well limited intraperitoneal collection of liquid, without internal partition, a demonstration of the intra or extra cystic peritoneal drain. It also makes it possible to establish a differential diagnosis with other etiologies of abdominal pain syndrome such as appendicitis, diverticulum, abdominal abscesses, intestinal obstruction. The cerebral CT makes it possible to find a dilation of the ventricles, the position of the proximal drain, an effacement of the grooves in the event of HIC [10]. In the present case, abdominal ultrasound found a large collection of encysted, homogeneous fluid encapsulating the distal end of the VPS drain. These lesions were confirmed and better defined on abdominal CT. The therapeutic principle in case of peritoneal pseudocyst consists of evacuation of the pseudocyst with resection of the shell. If infection is present, the catheter is removed. The catheter tip is cultured and antibiotic therapy initiated. Revision of VPS is not done until the infection has healed [14]. If there is no infection there is no indication to remove the distal drain. In our case, we have to replace the end of the drain in a contralateral position after evacuation of the fluid content of the peritoneal pseudocyst and excision of the shell.

Conclusion

Peritoneal pseudocyst is an unusual complication of ventriculoperitoneal leads. It is one of multiple complications resulting from VPS, the risk of which varies depending on the antibiotic prophylaxis, the size, the clinical condition of the patient and the experience of the surgeon. The taking into account of these factors by the neurosurgeon preoperatively makes it possible to prevent complications in general and the peritoneal pseudocyst in particular.

Declarations

Ethics approval and consent to participate : Not applicable

Consent for publication : Written informed consent was obtained from the patient for publication of this case report and accompanying images.

Availability of data and material : All data generated or analysed during this study are included in this published article [and its supplementary information files].

Competing interests : The authors declare that they have no competing interests

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Authors' contributions

All the authors contributed to this work

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