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Intraperitoneal Cerebrospinal Pseudocyst: A case report of a complication in a child with Ventriculoperitoneal Shunt

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Abstract

Introduction

Ventriculoperitoneal (VP) shunting is used to manage hydrocephalus, and many complications have been reported with this intervention. Abdominal pseudocysts are relatively rare but do occur as a complication in patients with VP shunts.

Case report

We report of a case of a seven-year-old boy with congenital hydrocephalus and VP shunt in situ who presented with a two-week history of headaches and abdominal pain accompanied by partial constipation. Abdominal CT-scan revealed an intra-abdominal pseudocyst. The boy was operated, recovered well and was discharged with no complications.

Conclusion

Due to its low incidence and unspecific symptomatology, it is easy to overlook an intraperitoneal pseudocyst. As relatively cheap and non-invasive diagnostic modalities are available, it is worth to do an ultrasound in patients presenting with failure of VP shunts as well as abdominal complaints.

Keywords: *CSF Pseudocyst, Shunt complications, VP shunt.*

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Background

Hydrocephalus is a common condition characterized by increased cerebrospinal fluid (CSF), resulting in ventriculomegaly (1). VP-shunting is a standard modality to manage hydrocephalus surgically. The CSF is then absorbed from the peritoneal cavity. Other sites of diversion of CSF are the right atrium, ureter and pleural space (1). Abdominal pseudocysts are an uncommon complication of VP-shunts (2). They are termed as pseudocysts because they are surrounded by a wall of nonepithelial tissue (1,2).

Typical presentations are abdominal pain, abdominal distension, vomiting, shunt malfunction hence features of raised intracranial pressure, decreased appetite and fever. Larger cysts may even be palpable on abdominal examination (1). In this article, we describe a case of a seven-year-old boy with a VP shunt who presented with an intra-abdominal cyst and features of raised intracranial pressure clinically.

Case presentation

A seven-year-old boy presented to our centre with a two-week history of intermittent headaches and dull abdominal pain that was associated with partial constipation and decreased appetite. There was no history of vomiting, fevers, loss of consciousness, nor convulsions. The child was known to have congenital hydrocephalus. They had received a VP shunt at our institution soon after birth, and it was revised when the child was three years of age. Prior to the current presentation, child had normal developmental milestones, was reported to be normal cognitively when compared to his peers. Upon initial examination, the child was alert with stable vitals. His abdomen was moderately distended with generalized tenderness (not guarding), but no mass was palpable. His full blood count showed leucocytosis of 15.5 x 10^9/L, thrombocytosis of 670 x 10^9/L and moderate anaemia of 9.4 g/dl. He was transfused with one unit of whole blood and kept on Ceftriaxone, Metronidazole and Paracetamol. His liver enzymes were within normal range, and he had a creatinine level of 28 µmol/L.

An ultra-sound scan of the abdomen showed an intra-abdominal cystic mass but was unable to define its origins and thus recommended an abdominal CT. Abdominal CT-scan was done which showed a thick-walled peritoneal cyst measuring 8.4 x 9.3 x 13.8 cm in the right lower quadrant engulfing the peritoneal limb of the VP shunt. The cyst was exerting a mass effect on the surrounding small bowels and urinary bladder (Figure 1).

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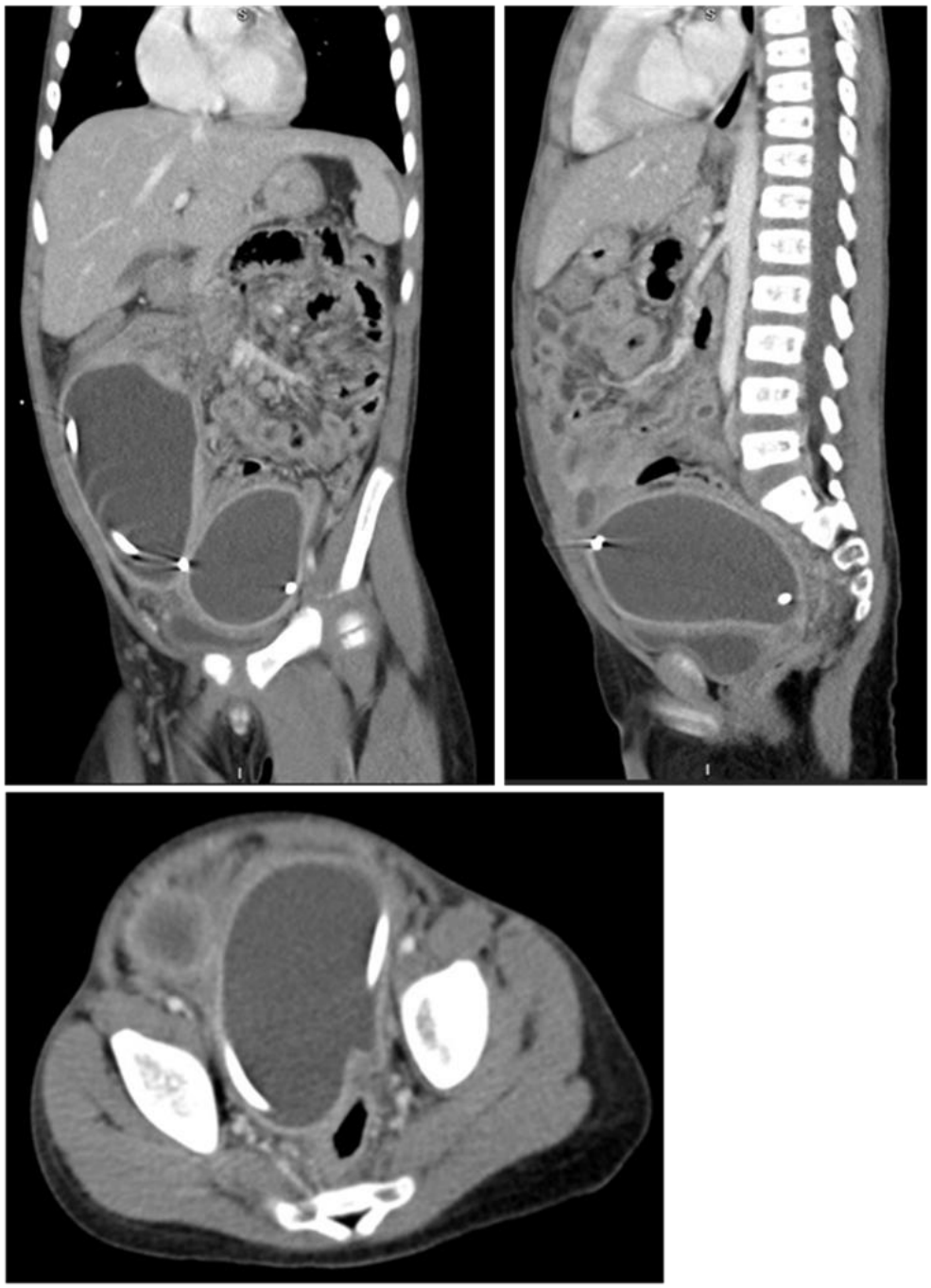

Figure 1: Contrasted CT abdomen and pelvis shows a thick-walled multi-loculated peritoneal cyst engulfing the ventriculoperitoneal shunt tubing in the right lower quadrant exerting mass effect to the surrounding small bowels and the urinary bladder measuring 8.4cm (AP) x 9.3cm (T) x 13.8cm (CC)

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A laparotomy was performed by the general surgeons who found extensive adhesions and a thick-walled cyst containing clear CSF and the peritoneal limb of the VP shunt (Figure 2). The adhesions were released, partial cystectomy was done, and the peritoneal limb of the shunt system was repositioned in the lower abdomen. The child post-operatively recovered well with no complications and was discharged on the 5th post-op day. Follow-up of the patient until 10 months post-surgery has not revealed any features suggestion of recurrence or complications.

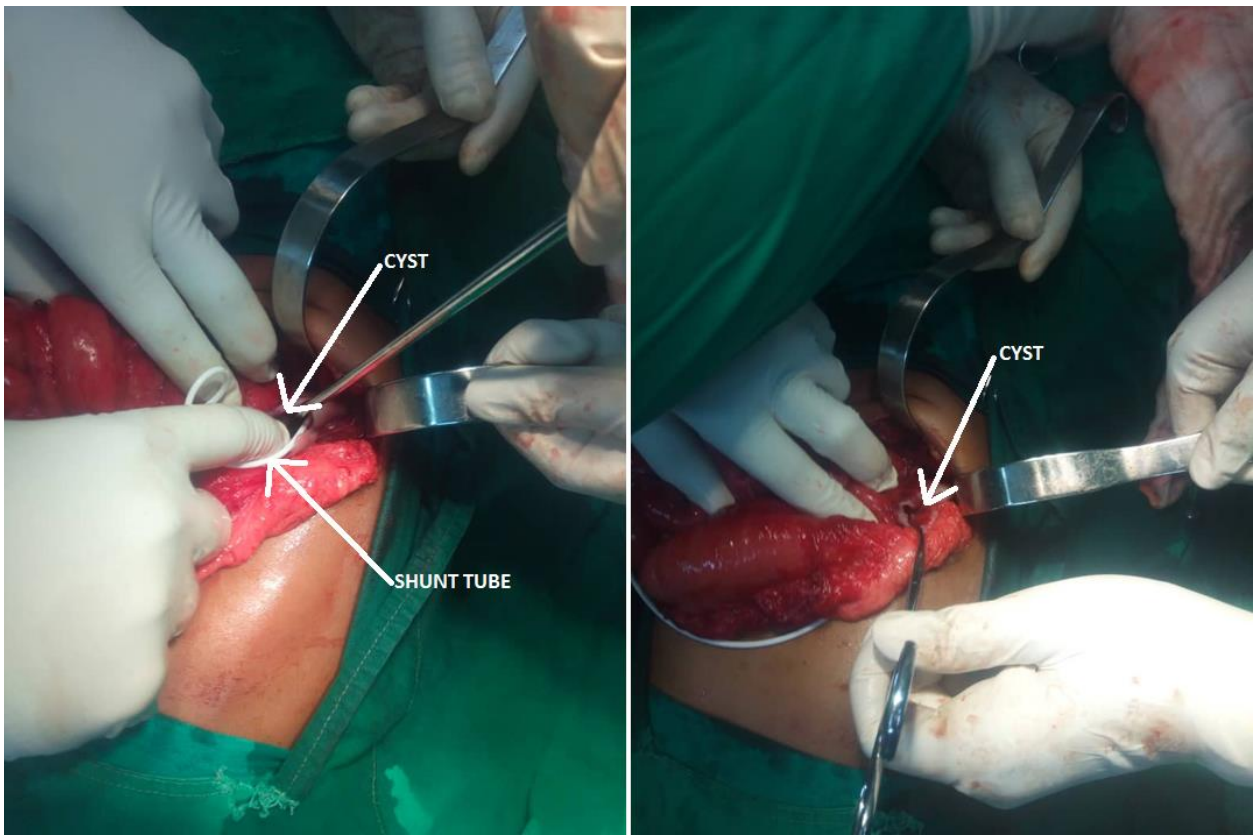

Figure 2: Photographs showing pseudocyst and VP shunt tube

Discussion

VP shunting remains the most common modality of treatment of hydrocephalus since it was initially described in 1908 (2). It has an 80% lifetime risk of developing complication (2). Some abdominal complications that have been mentioned in literature are infection, pseudocyst formation, bowel perforation, shunt migration, intestinal volvulus and mesenteric pseudo-tumor (2,3). The incidence of CSF pseudocysts is said to be between 0.33- 6.8% (4).

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Most patients present with abdominal pain, distension and features of raised intracranial pressure. As was in our case, the build-up of fluid resulting from reduced absorption in the cyst leads to shunt dysfunction (5). Though not present in our patient, other neurological symptoms resulting from shunt dysfunction include drowsiness and vomiting. Some pseudocysts can be benign or even asymptomatic (3,4). The pathogenesis of CSF pseudocyst remains unclear, but risk factors are shunt revision, previous intra-abdominal surgeries, adhesions, high protein content in CSF and allergic reactions to the shunt (2,3.6). The history of shunt revision in our case could be a probable trigger for the pseudocyst as there was no history of other surgeries or allergic reactions.

Ultrasonography is an ideal modality for diagnosis of CSF pseudocysts as it can be done rapidly with no risk of radiation; however, the catheter can be challenging to localize (4,6). CT-scan is more sensitive and specific and carries the advantage of being able to describe the nature of the cyst and localize the shunt, whether it is free-floating or adherent to the cyst (6). There are no fixed management guidelines established for CSF pseudocysts, but options include laparotomy and excision of the cyst with re-location of the shunt limb as was done in the index case (6). Other options include laparoscopic-assisted drainage of the cyst and re-location of the shunt, ultrasound- or CT-guided aspiration of the cyst (6).

Kashyapet al. reported that following treatment of a pseudocyst, the risk of recurrence ranges from 7.1 – 62.5% (4). With such recurrences, it is advised to convert the shunt system to ventriculopleural or ventriculoatrial. Converting is not always possible though, hence simple drainage and appropriate antibiotics are an option for simple cysts (5,6).

Kashyap et al. report that VP shunts are prone to complications, where infections within the first-month range from 3 – 20%. Patients with any underlying medical conditions that compromised their immune system are at increased risk of developing shunt infections. Third ventriculostomy (ETV) is thus advisable in the immunocompromised patient (4). A study by Gmeiner et al. reported that shunt infection occurred in 50% of the cases with abdominal pseudocysts but only in 3 out of 122 cases pseudocyst-fluid revealed infection. They also concluded that there was no association between pseudocyst formation and age at the first operation, cause of hydrocephalus or type of first surgical procedure (7).

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Conclusion

Without a high index of suspicion, it is easy to overlook an intra-abdominal pseudocyst. The presentation mimics a lot of other conditions, and its low incidence allows it to be forgotten easily. A simple abdominal ultrasound can, however, go far in guiding towards the diagnosis without too much cost or invasiveness. For patients with VP shunt who present with abdominal complaints or features suggesting of shunt blockage, it is beneficial to perform an abdominal ultrasound to rule out a CSF pseudocyst as part of the routine workup.

Consent

Written informed consent was obtained from the patient's mother for publication for this case report and accompanying images. A copy of the consent is available for review by the chief editor of this journal.

Competing interest

The authors declare they have no competing interests.

Authors' contributions

JL and RP conceptualized the manuscript and reviewed medical records. DM was the lead surgeon. AS read and reported the radiology films and all authors have read and approved the final manuscript.

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