Intraperitoneal Cerebrospinal Fluid Pseudocyst: a case report

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Intraperitoneal cerebrospinal fluid pseudocyst (CSF pseudocyst) is a rare but important complication in patients with ventriculoperitoneal shunts (VP shunts). It is often precipitated by inflammatory process or recent abdominal surgery and should be considered in VP-shunted patients presenting with abdominal complaints. This report presents a 74-year-old male with VP shunt insertion for 4 years without complication. However, the patient developed CSF pseudocyst soon after recent laparotomy.

Key words: Cerebrospinal fluid; Shunts, Ventriculoperitoneal

Cerebrospinal fluid pseudocyst (CSF pseudocyst) is so rare a complication of ventriculoperitoneal shunts (VP shunts) that it may be overlooked in VP-shunted patients presenting with abdominal complaints. Since the management of CSF pseudocyst is different from that of other cystic lesions, it is important for radiologist to be aware of this rare complication. A case of CSF pseudocyst formation with characteristic image findings was presented here.

CASE REPORT

A 74-year-old male with history of old CVA complicated with hydrocephalus received placement of VP shunt about 4 years ago. The VP shunt had been functioning well without complication after its insertion. The patient suffered from CBD stone complicated with cholecystitis and received laparocholecystectomy 4 years after the procedure of VP shunt placement.

The patient suffered from abdominal distension after the laparocholecystectomy. CT scan performed 4 months later revealed a huge oval cystic lesion within the peritoneal cavity (Fig. 1). It measured about 28 × 12 × 15 cm in size. The wall of the cystic lesion was regular and smooth without enhancement. The catheter of the VP shunt was curling within the cystic lesion (Fig. 2a, 2b).

Under the impression of intraperitoneal CSF pseudocyst formation, CT guided drainage was performed. Large amount of yellowish clear fluid was drained out after insertion of an 8-French pigtail catheter by Trocar method. Follow up CT scan 2 weeks later showed nearly complete collapse of the cystic cavity.

One month later, follow up abdominal CT revealed minimal amount of fluid collection around the VP shunt tip. CSF pseudocyst recurrence was considered but the patient did not receive further management due to unapparent symptoms.
DISCUSSION

The incidence of intraperitoneal CSF pseudocysts in patients with VP shunts ranges from 0.7% to 4.5% [1]. The CSF pseudocyst consists of fibrous tissue without epithelial lining under microscope, and is thought to arise as a result of the reaction of intraperitoneal structures to either the catheter itself or to the CSF [2, 3].

The most common presentation of CSF pseudocyst in adults is abdominal distension or pain rather than shunt malfunction. It may take 3 weeks to 5 years for the CSF pseudocyst to develop after last shunting procedure [4]. However, CSF pseudocyst tends to occur within 6 months of the last intra-abdominal surgical intervention [5].

Predisposing factors for CSF pseudocyst formation include acute infection, recent abdominal surgery, central nervous system (CNS) tumor and multiple shunt revisions [3, 6]. In our case, the VP shunt had been placed for 4 years without complication. But soon after the laparocholecystectomy, the CSF pseudocyst developed. It was reasonable to assume the correlation between the pseudocyst formation and the abdominal surgery.

According to the two known major predisposing factors of inflammation and recent surgery, a mechanism of pseudocyst formation is suggested. Loculated compartment between mesentery and peritoneum as a result of adhesion bands may provide a space for CSF to accumulate. Concurrent inflammation destroys the normal epithelial lining which would absorb the CSF. Maybe some normal epithelium do exists, but the CSF production rate is over the absorption capability of the loculated surface epithelium. Thus, CSF pseudocyst develops within a compartment.

CT can offer imaging diagnosis of CSF pseudocysts. CSF pseudocysts appear as a thin-walled cystic mass around the shunt tip. Measurement of attenuation values characterizes the content as water attenuation. CT may demonstrate the relationship between the shunt catheter and the pseudocyst. Rim enhancement of the wall of the pseudocyst and debris within the cavity are suggestive of infection.

Based on the imaging features in our case, the favored differential diagnoses were abdominal

Figure 1. Axial enhanced abdominal CT revealed a huge oval cystic lesion about 28x12x15 cm with smooth wall in the peritoneal cavity. The V-P shunt catheter was noted as a high density nodular structure at the periphery of the cystic lesion.

Figure 2. a. Axial enhanced abdominal CT revealed an oval cystic lesion with smooth wall. The catheter of the ventriculoperitoneal shunt was curling within the cyst cavity. b. Coronal reconstruction image also demonstrate the ventriculoperitoneal shunt catheter as a nodular high density within the cavity. Image findings characteristics for intraperitoneal cerebrospinal fluid pseudocyst.
abscess, CSF pseudocyst and metastatic tumor from CNS through the VP shunt. Since the wall of the cystic lesion was quite smooth and regular without nodularity or enhancement, CSF pseudocyst was much favored than abscess or metastatic tumor.

Clinical management of the CSF pseudocyst is guided by whether the CSF pseudocyst is complicated with infectious process. Percutaneous aspiration of the CSF pseudocyst not only helps clinicians to determine the presence of infection, but also provides relief of abdominal symptoms [7]. If the CSF pseudocyst is infected, shunt externalization with later reposition of the catheter intraperitoneally in a different quadrant is usually performed. But in the setting of sterile pseudocyst, shunt externalization can be avoided and single shunt revision is adequate [7]. Repositioning of the shunt tip with minimally invasive laparoscopic techniques is safe and effective in non-infected pseudocysts [8]. Recurrence is rare, especially under appropriate medical treatment of infection [5].

In conclusion, management of CSF pseudocyst is different from that of other cystic lesions in VP-shunted patients presenting with abdominal complaints. Proper imaging diagnosis of CSF pseudocyst can lead to optimal treatment for these patients. 

REFERENCES

腹腔內腦脊髓液偽性囊腫：病例報告

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腹腔內腦脊髓液偽性囊腫對於裝設有腦室至腹膜腔引流管的病人而言，是一罕見但重要
的併發症。它通常由於炎性反應或是近期腹部手術所促發，於裝設有腦室至腹膜腔引流管
的病人而呈現腹部症狀時應列入鑑別診斷。本篇病例報告描述了一位七十四歲男性裝設
腦室至腹膜腔引流管四年之後，而在最近一次開腹手術後形成腹腔內腦脊髓液偽性囊腫。

關鍵詞：腦脊髓液；腦室至腹膜腔引流管