C S F pseudocysts peritoneal cavity following V P Shunt surgery: Report of three cases in children and review of literature

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ABSTRACT

Abdominal cerebrospinal fluid (CSF) pseudocyst is an uncommon complication following ventriculo-peritoneal (VP) shunt. The following report’s our experience with three cases of CSF pseudocyst in children. VP shunt was done earlier for communicating hydrocephalus following tubercular meningitis (TBM) in all cases. Clinical presentation was with progressive abdominal distension and features of intestinal obstruction. Clinically we were able to diagnose all cases as CSF pseudocyst peritoneal cavity. Ultrasound examination confirmed the clinical findings in all. CT scan of abdomen and pelvis showed a large unilocular CSF pseudocyst with shunt catheter within it on one patient (case 3). Ultrasound guided aspiration of cyst was done in case 1 alone, but failed to resolve the symptoms. All patients needed formal exploration. Near total cyst excision, adhesiolysis and relocation of peritoneal end of VP shunt catheter in right supra hepatic space was done in all. Two patients who developed shunt tract infection needed shunt removal. The follow up period is 6–8 months.

KEY WORDS: CSF pseudocyst peritoneal cavity, V P shunt complication

The use of peritoneal cavity for CSF absorption in VP shunting was introduced in 1905, since than VP shunting are among the most frequently performed operations in the management of hydrocephalus. Abdominal complications are reported to occur in 5-47% cases following VP shunt operations.[1] Abdominal CSF pseudocyst is an uncommon but well described complication and reported to occur in <1% to 4.5% of VP shunt surgery.[2,5] In 1954, Harsh first described a periumbilical pseudocyst, since than 130 cases of CSF pseudocyst in children have been reported in literature, to which few more cases have been added.[4-8] Herein we are reporting our experience with 3 cases of CSF pseudocyst peritoneal cavity following VP shunt operation in children.

CASE REPORT

Case 1
Eight years old male child was admitted on Nov 16, 2004 with progressive abdominal distension for one month and features of incomplete intestinal obstruction for one week. VP shunt was done for communicating hydrocephalus following TBM on June 24, 1997. General and systemic examination was normal including central nervous system. Abdominal examination revealed distended abdomen, 15 cms x 12 cms tense cystic lump at periumbilical region. Visible loops of intestine were also seen. Bowel sounds were hyper-dynamic. Shunt function was normal. Ultrasound examination of abdomen showed a large anechoic loculated collection with septations in periumbilical area with peritoneal end of shunt catheter within the cyst. CSF pseudocyst of peritoneal cavity was aspirated twice under ultrasound guidance under local anaesthesia and about 1000 ml of clear fluid was aspirated. Ultrasound guided aspiration failed to resolve the symptoms completely, and cyst refilled again within 5-6 days. On exploration, there was 15 cms x 12 cms CSF pseudocyst with few septations, containing 1200 ml of clear fluid. There were adhesions of terminal ileum and sigmoid colon with cyst wall. The peritoneal end of VP shunt catheter was also seen within the cyst. Adhesiolysis and near total cyst excision was done. The shunt functioning was checked, which was normal. The peritoneal end of shunt was repositioned at right sub-diaphragmatic space. CSF obtained from cyst and shunt was sterile. Postoperative period was uneventful. He is doing well, till date with a follow up period of 8 months.
Case 2
A 6 years old male child was admitted on Nov 25, 2004 with complaints of abdominal distension and non-bilious vomiting for one week. VP shunt was done on April 10, 2004 for moderate communicating hydrocephalus following TBM. General, CNS and other systemic examination were normal. Abdominal examination revealed moderate distension, visible bowel loops and fluid thrill. Abdominal skiagram showed few air-fluid levels with gross ascites. Ultrasound examination of abdomen revealed gross amount of encysted fluid with internal septations and tip of shunt catheter within it. Exploratory laparotomy was done for intestinal obstruction, as conservative management failed. There was a large cyst with internal septations, adherent to sigmoid colon and terminal ileum with proximal intestinal dilatation. The tip of shunt catheter was within the cyst cavity and shunt was functioning well. Near total cyst excision, adhesiolysis and repositioning of tip of shunt in right sub diaphragmatic space were done. CSF obtained from cyst and shunt was sterile. Postoperative period was uneventful. He was admitted again on Jan 12, 2005 with shunt tract infection and needed shunt removal. Follow up CT scan of head showed mild hydrocephalus, with no features of raised intracranial pressure. On last follow up on July 2005, he is doing well.

Case 3
A 10 years old male child was admitted on Dec 23, 2004 with complaints of progressive abdominal distension and pain in abdomen for one month. He was a diagnosed case of tubercular meningitis with communicating hydrocephalus for which VP shunt was done on July 27, 2004. He was taking anti-tubercular treatment irregularly. General, systemic and CNS examination was normal. There was gross abdominal distension with ascites and visible bowel loops. CT scan of abdomen and pelvis showed [Figure 1] a large CSF cyst of 25 cms x 15 cms occupying most of the abdominal cavity without septations with shunt tip within the cyst. Exploratory laparotomy was done on Dec 29, 2004 as conservative management failed to resolve intestinal obstruction. A large, thick walled, pseudocyst was found adherent to bowel loops and omentum. Cyst had no internal septations; contain 2500 ml of clear fluid and tip of shunt [Figure 2]. Multiple tubercles were also seen over intestinal serosa and omentum [Figure 3]. Adhesiolysis, near total cyst excision and relocation of tip of shunt into right supra hepatic space was done. Biopsy from omentum was positive for tuberculosis. Patient developed shunt track infection on 5th postoperative day and required removal of shunt. Re-shunt was done after a month.
left side. Regular follow up for last 6 months is uneventful.

DISCUSSION

Abdominal CSF pseudocyst is an uncommon albeit well-described complication of V P shunt malfunction in children.[2] The exact cause of abdominal CSF pseudocyst formation is still debated. Predisposing factors for CSF pseudocyst formation are; low grade shunt infection, chronic inflammation, multiple shunt revisions, increased CSF protein content, peritoneal adhesions, mal-absorption of CSF secondary to sub clinical peritonitis, silicon allergy, etc.[3,4]

In our series all patients had undergone VP shunt operation for hydrocephalus following TBM. Formation of CSF pseudocyst in our cases was probably due to sub clinical infection.

Abdominal CSF pseudocyst may present with features of shunt obstruction, progressive abdominal distension, features of intestinal obstruction, with or without features of raised intracranial tension. The differential diagnosis includes cysts of the mesentry and omentum, abdominal abscesses, ascites, etc.[4]

All patients we are reporting here had also presented with abdominal distension and features of intestinal obstruction. Diagnosis of CSF pseudocyst can be confirmed by ultrasound examination of abdomen and pelvis. A small amount of peritoneal fluid can be found with a normally functioning VP shunt. Ultrasonographic evidence of a large localized, or loculated collection of peritoneal CSF is abnormal and suggests CSF pseudocyst.[5]

Clinically we were able to diagnose CSF pseudocyst and was confirmed on ultrasound examination of abdomen in all cases. CT scan was done in one patient (case 3), which does not provided any significant additional information. So we also feel Ultrasonography remains an excellent imaging modality for CSF pseudocyst of the abdomen.

Traditional staged treatment consists of exploratory laparotomy, removal of shunt / shunt externalization, with or without cyst excision and placement of shunt catheter in different quadrant or conversion of VP shunt to VA shunt. Gaskill et al found that the cyst reabsorbed spontaneously without excision or aspiration once the CSF was diverted. The peritoneal cavity could then be used for re-shunting once the cyst had reabsorbed.[5] In 1995, Kim et al first described the laparoscopic management of a CSF pseudocyst, which involved excision of a portion of the cyst and repositioning the catheter within the peritoneal cavity. Thus a conventional laparotomy along with its various associated postoperative complications is avoided without compromising the quality of surgery.[5] Another way of treating CSF pseudocyst peritoneal cavity is simply conversion of VP shunt to ventriculo – pleural shunt or most frequently to VA shunt.[5-7]

Recently therapeutic ultrasound guided aspiration of CSF pseudocyst in children and adolescents have been advocated in selected patients. In 2004 Coley et al, described this technique and they are of opinion that this is an effective technique, allowing exclusion or confirmation of infection and providing relief of abdominal symptoms in patients with sterile collections, thus staged surgical revision with shunt externalisation can be avoided.[8]

We aspirated the cyst twice in case 1, who failed to respond and cyst refilled again within short period of time. Management of CSF pseudocyst must be individualised. We feel cyto-biochemical examination and culture of aspirated fluid must be done if clinical condition of patient permits, so that infection can be ruled out. As we failed to do so and decided on operation table to reposition the shunt in all 3 cases, two of them developed shunt track infection and needed its removal. Once we know the nature of CSF preoperatively, we may opt for repositioning of shunt or shunt exteriorisation rather than deciding on operation table.

REFERENCES