

THE MASQUERADERS- ABDOMINOPELVIC SEPSIS MASKING NEUROSURGICAL EMERGENCIES

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INTRODUCTION

Patients with hydrocephalus present frequently to the emergency department with headache and altered mental status. A ventriculoperitoneal shunt (VPS) may already have been placed for draining extra CSF. Most of the time, complications related to VPS placement are common.^[1] The most common of them is shunt obstruction which most often occurs in the proximal part of the catheter. Other complications like shunt infection, pseudocyst formation and bowel perforation infrequently cause shunt malfunction. The infectious complications are mostly noticed in infants and premature neonates. We present two cases of diagnostic dilemmas of shunt malfunction in adult patients with confusing symptoms and signs.

CASE REPORTS

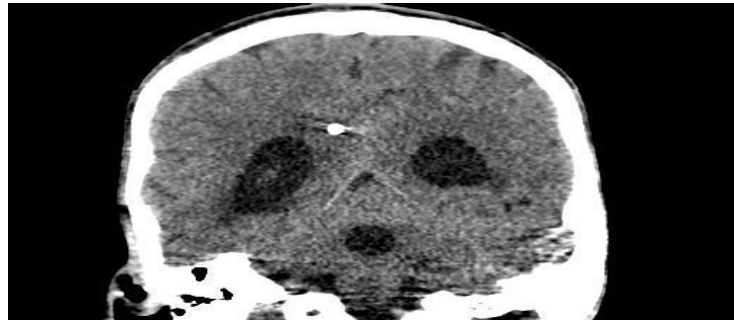
Case 1- A 22 years old male presented to ED in an unresponsive state. He was lethargic for 2 days and from the last 3 hours, he had stopped responding. He had undergone VPS 3 weeks back for tuberculous meningitis. He was on an antitubercular regime and was following with his neuro physician regularly since his discharge a week back. On presentation, he was making gurgling sounds for which an appropriate nasopharyngeal airway was inserted and oral suction done. On general examination, he looked visibly jaundiced with a heart rate of 120, blood pressures were 110/70 and SpO2 was 98%. On application of painful stimuli, the patient was opening eyes and moving all four limbs. He was keeping his right leg in a flexed position. He was aphasic and his GRBS was 182 mg/dl. His lungs were clear on auscultation and heart sounds were normal with no added murmurs. He was catheterized and catheter tubing showed obvious pus. There was no history of headache, nausea and vomiting. Septic encephalopathy, shunt malfunction or metabolic or drug (ATT) related encephalopathy were our differentials. Blood was withdrawn for basic and metabolic profile including liver function tests. Patient was sent for a non-contrast scan of the brain. The CT scan was suggestive of dilated lateral ventricles with communicating hydrocephalus and shunt

in place (Figure 1). ABG was suggestive of uncompensated metabolic acidosis with lactates at 2.69mmoles/l and bilirubin of 4.2 mg/dl. WBC count (POC test) was 17000 cells per cubic mm. Serum electrolytes and BUN were within normal limits. The biochemistry reports were more suggestive of septic encephalopathy as a cause of depressed sensorium. A neurosurgical consult ruled out the possibility of proximal shunt obstruction. They performed a shunt tap which had inconclusive results. Abdominal palpation revealed fullness in the right flank and bowel sounds were sluggish. Urgent contrast enhanced scan for abdomen and pelvis was obtained. It showed a big loculated hypodensity at the level of the right kidney. The provisional report from the radiologist was suggestive of psoas abscess with multiple loculated extensions intra abdominally, one of them pressing over the distal end of shunt catheter (Figure2). Piperacillin tazobactam with metronidazole was started and a pig tail was inserted under fluoroscopic guidance for drainage of the pus. As the abscess cavity drained, the patient improved and was discharged from the hospital on day 8 with follow up in neurosurgery and general medicine departments.

Case 2- A 17 year old boy presented to the emergency department with abdominal pain, constipation and

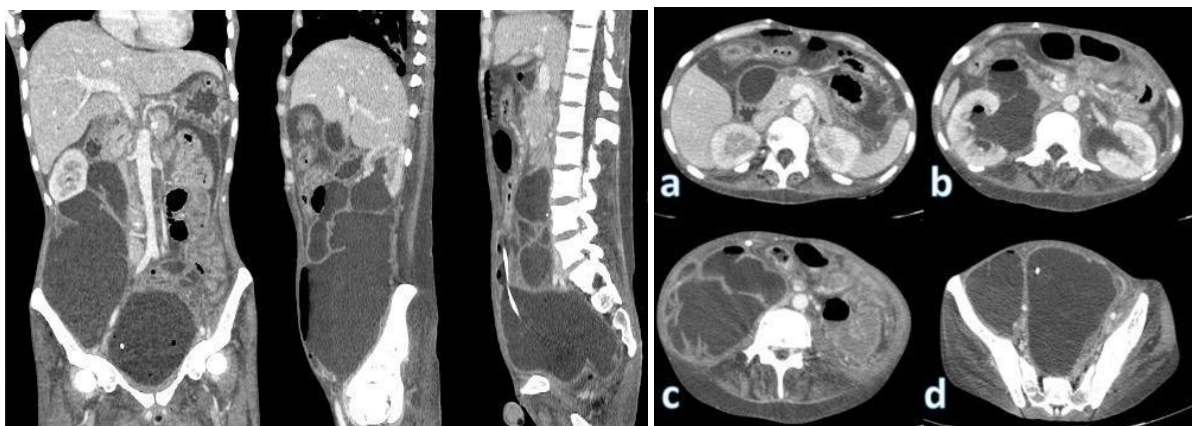
multiple episodes of bilious vomitings from 2 days. He had no recent history of fever, headache, and trauma or food allergy. He was non-alcoholic. His past history was suggestive for a VPS procedure done for congenital hydrocephalus at the age of 2. He had been doing well as for his neurological issue and did not require any shunt revision so far. On examination, he was conscious, coherent, had a distended abdomen with tachycardia at 110 per min and BP was 110/74 mm of Hg. He was maintaining saturations of 96% on room air. There was no icterus and pedal edema. On per abdominal examination there was no periumbilical or flank ecchymosis He had a diffusely tender abdomen but there was no guarding, rigidity or rebound tenderness or organomegaly. With suspicion of intestinal obstruction we have sent him for a radiograph and ultrasound abdomen. Moderate hydronephrosis of the right kidney with massive ascites was reported. No calculi were visualized in the right kidney. The liver and kidney functions were normal. The bowel gas was obscuring a good view of the pelvis. The abdominal radiograph

showed dilated bowel loops. Contrast enhanced CT of abdomen was performed which revealed a large well defined abdomino-pelvic thick walled intraperitoneal collection measuring 21x16x12 cm - extending up to pelvis inferiorly, displacing the bowel to periphery and left kidney superiorly (Figure 3). VP shunt was noted in situ with its tip within the collection. Few of the small bowel loops within the encapsulation collection appear dilated and fluid filled, with maximum diameter 3.6 cm with transition zone in mid-jejunal loops which was suggestive of small bowel obstruction. There was right mild hydronephrosis due to compression of the right renal pelvis by the collection. Patient was shifted to OR and an exploratory laparotomy was done. The jejunal loops within encapsulated collections were dilated (Figure 3). Resection anastomosis and Pseudocyst drainage was done and distal end of the VP shunt catheter was placed in the right paracolic gutter. The patient had an uneventful recovery and discharged in healthy condition on the 11th day of admission.



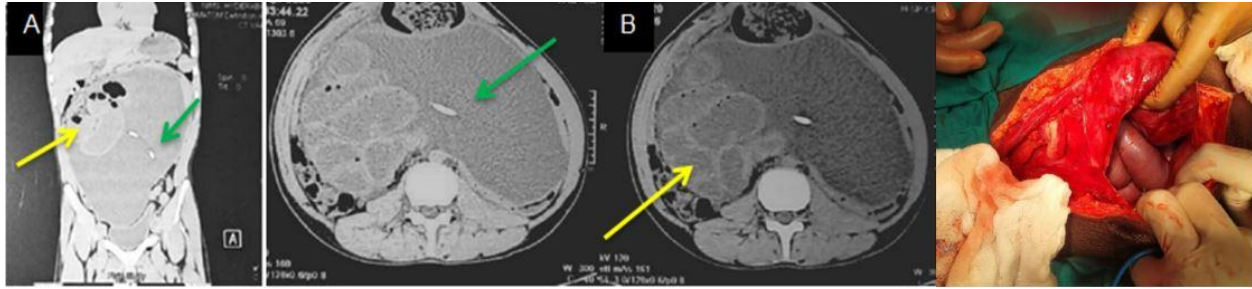
CAPTION- Figure 1.

Legend- NCCT Brain in axial and coronal sections showing dilatation of lateral and fourth ventricle suggestive of Communicating Hydrocephalus



CAPTION- Figure 2.

Legend- Contrast enhanced CT axial images craniocaudal (a-d) showing a large collection in the retroperitoneum extending from the level of head of pancreas, traversing through the perinephric space into the pelvis displacing the right external iliac vessels medially. Fluid is seen in the greater sac and pelvis with draining catheter in situ.



CAPTION- Figure 3.

Legend- (a-c) are axial and coronal contrast enhanced images of abdominopelvic pus filled sac with distal end of catheter visible as hyperdense. Intestines are also visualized pushed to one side with enhanced peripheries.

DISCUSSION

Both of the cases show a problem which was external to VPS but had a major impact on functionality of the shunt. It is hence important to understand the workup plan for patients presenting with previous shunt surgery to the emergency department. The two most common problems with shunt are failure or infection.^[2] The patient can also present without classical signs of elevated ICP which makes the early recognition difficult. The emergency physician should therefore evaluate each patient for shunt related problems.

The emergency doctor should enquire about the cause for initial insertion of shunt and any hospitalizations as regards to it. If done at a younger age, shunt revisions are needed during the course of life. the patient should undergo urgent neuroimaging mostly a non contrast CT Brain. the biochemistry investigations to be sent are hemogram, ESR, CRP and pancultures. The shunt can be tapped for CSF studies. it may also help to reduce an acutely elevated ICP. ultrasound abdomen followed by a contrast enhanced CT abdomen shall be necessary to look for distal obstruction. Serum white blood cell count can be normal in 25% of these patients. ESR tends to be elevated. Blood cultures will be positive in < 1/3rd of cases. CSF studies show the following characteristics- WBC count which is usually not > 100 cells/mm³, Gram stain can be positive 50% of the time elevated protein, decreased or normal glucose. 40% of patients will have a negative culture report.

Few neurosurgeons would like to visualize the entire course of shunt radiologically by multiple x rays. This modality is useful for visualizing fractures of the tubing as well as disconnection or migration of the shunt tip. However, abnormal findings do not always equate to CSF shunt malfunction. Disconnected shunts may continue to function by CSF flow through the fibrous tract.

Pseudocysts are inflammatory collections of fluid that accumulate around the tip of the distal catheter and are surrounded by a wall of fibrous tissue lacking an epithelium. Predisposing conditions are abdominal surgeries and multiple episodes of intestinal infections.^[3] In the majority of cases, CSF cultures are negative at the

time of diagnosis.^[4] Abdominal pseudocyst is a rare complication of VPS with a reported frequency among patients ranging from 1 to 4.5%^[5]. These develop mostly a year after shunt placement or revision.^[4] The symptoms on presentation are abdominal pain and distention associated with a palpable mass with altered sensorium.^[6] The site of pseudocyst can be liver if the distal tip of the catheter migrates over it. In that scenario, the pain is felt in the right upper quadrant with elevated liver enzymes and postprandial worsening of pain. The cyst can be drained by a pig tailed catheter with help of an ultrasonologist.^[6] Surgical excision of cyst along with shunt revision can be performed in the same sitting. Dabdoub et al.^[4] found pseudocyst recurrence to happen in 19.8% of children and 24.2% of adults, with the lowest odds of recurrence in children in whom the distal catheter was repositioned into a non-peritoneal space. Alternative sites for repositioning of the distal end of the catheter like pleural cavity or right atrium can be considered during surgical intervention. One group has found that placement of the catheter in a retro-hepatic position effectively avoids pseudocyst recurrence.^[7]

CONCLUSION

Broadly speaking, shunt failure or shunt infection is a neurosurgical emergency. Early referral to neurosurgery and rapidly making the diagnosis is utmost important for decreasing patient morbidity. Shunt failure needs urgent ICP reduction which can happen by emergency reservoir puncture in consultation with neurosurgeon and early initiation of drug therapy like dexamethasone and acetazolamide. Shunt infection, on the other hand requires early initiation of meningeal doses of antibiotics. Tapping a shunt or performing a lumbar puncture should be discussed with the neurosurgeon. All patients with complications secondary to CSF shunts need to be admitted in hospital for further management. Written consent of patients is present.

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