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CASE REPORT

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CT guided shunt positioning - case report of difficult shunt placement

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ABSTRACT

Cystoperitoneal or ventriculoperitoneal shunt placement is generally a blind procedure where both the, cranial and peritoneal, ends are inserted into their respective cavities guided by anatomical landmarks. The subsequent final placement of the ends after insertion is still blind. The cranial end can be placed by the aid of intraoperative ultrasound. However, its use is not widespread. We report an interesting case report of a female who had repeated shunt failure despite being in peritoneal cavity.

Keywords: Cystoperitoneal Shunt, Ventriculoperitoneal Shunt, Abdominal Pseudocyst, Difficult abdomen

1. INTRODUCTION

Placement of peritoneal end of shunt inside the peritoneal cavity is generally achieved by small incision on the abdomen and opening peritoneal cavity. Alternatively, shunt can be placed via a trocar placed blindly in the peritoneal cavity and shunt end introduced through it. The site and side of shunt placement in the peritoneal cavity depends upon the location of cranial pathology and local factors at the anterior abdominal wall or peritoneal cavity.

2. CASE REPORT

35-year-old female presented with complaints of episodic moderate to severe headache on the right side of hemi cranium of 3 months' duration that resolved partially with oral analgesics. She had undergone a laparoscopic converted open cholecystectomy 15 years ago. General physical and neurological examination was normal. Radiological workup revealed a well-defined, solitary, extra axial, uniformly hypodense lesion in the right frontal lobe without significant perilesional edema but with compression of the underlying brain parenchyma. She was diagnosed to be a case of right frontal arachnoid cyst and planned for operative intervention due to her inadequate relief of pain on conservative management.

She was planned for right sided cystoperitoneal shunt under general anaesthesia with endotracheal intubation. Abdominal incision was made 4 cm above and right paramedian to umbilicus and peritoneum was reached. Shunt tunnel was created and shunt introduced along the tract. Cranial incision was made over right frontal region nearing the underlying arachnoid cyst. Burr Hole was made and cranial end of low pressure Chhabra VP shunt was introduced after coagulating the duramater and durostomy inside the cyst cavity. Cranial and peritoneal ends were connected. Peritoneum was identified and opened and the peritoneal end was introduced which went smoothly. Abdominal and cranial incisions were closed in layers. Postoperative course was uneventful till the 5th postoperative day when straw coloured collection could be seen coming out of abdominal wound. The patient was posted for surgery for repositioning of peritoneal end. Intraoperatively, the peritoneal end was seen coiled up in the subcutaneous plane. It was reintroduced in the peritoneal cavity and purse string suture was applied at the peritoneal entry of the shunt. The patient redeveloped leak from the abdominal suture site 3rd day after repositioning the shunt. The patient underwent abdominal X Ray and ultrasound followed by Non Contrast Computed Tomography of abdomen. Radiology revealed the peritoneal end intra abdominally with the distal end coiled inside a cystic cavity attached to the under surface of anterior abdominal wall (Fig 1). No other abnormality was detected. The case was reposted for the third time. Abdominal incision was made on the left paramedian area 4 cm above umbilicus and previous incision was opened at the same time. Peritoneal end was extracted and was passed to the left side in subcutaneous plane. Peritoneum was identified on the left side and opened and shunt end placed in the peritoneal cavity. Both the incisions were closed in layers (Fig 2).

Cystoperitoneal Shunt:
It is a diversion procedure in which fluid from the cyst in the brain is diverted to drain into peritoneal cavity.

Peritoneal Pseudocyst:
Type of cyst-like structure that appears in relation to the peritoneum and results from a non-neoplastic reactive mesothelial proliferation.

Arachnoid Cyst:
Arachnoid cysts are cerebrospinal fluid covered by arachnoidal cells and collagen that may develop between the surface of the brain and the cranial base or on the arachnoid membrane, one of the 3 meningeal layers that cover the brain and the spinal cord.

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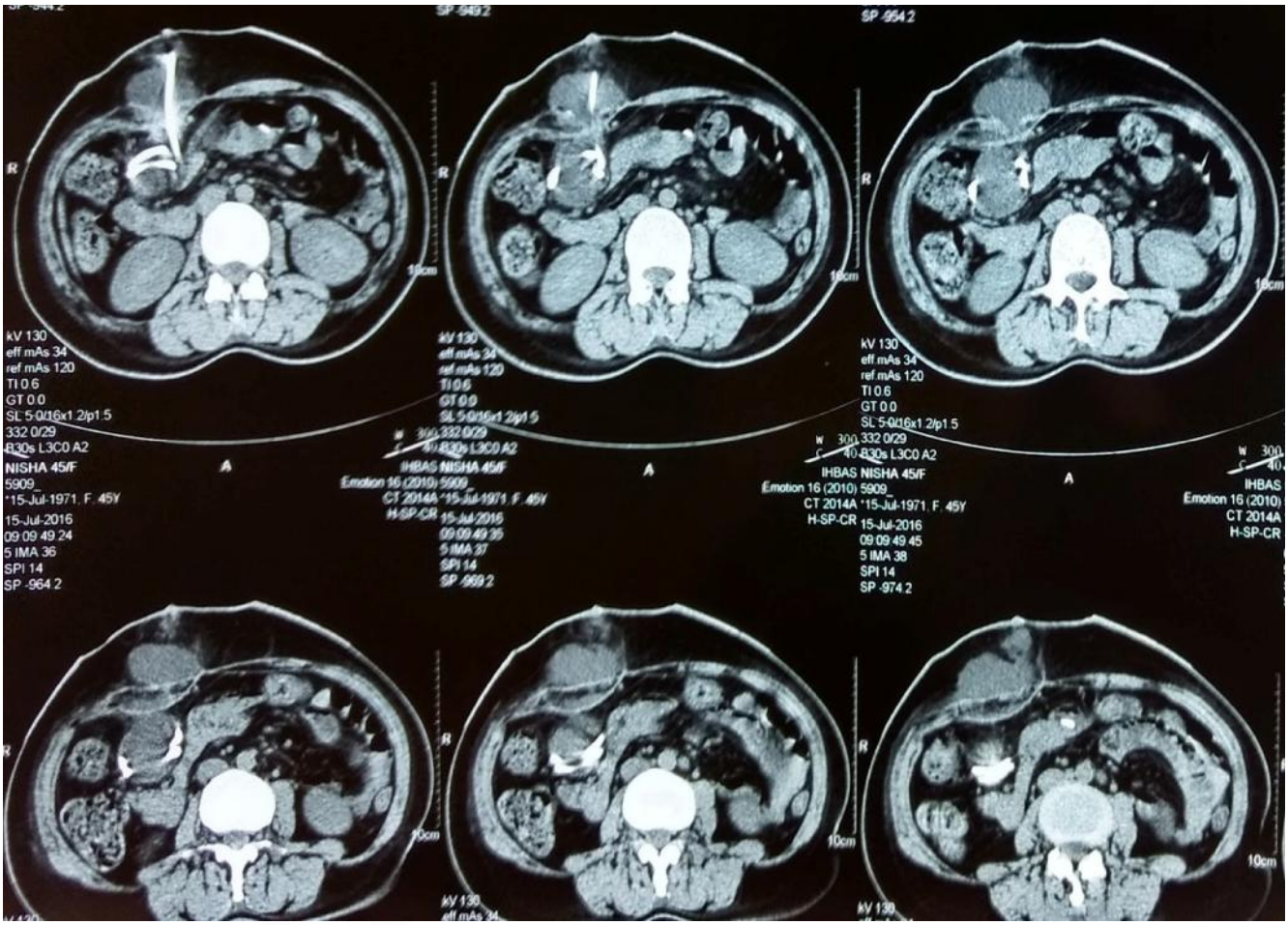

Figure 1 NCCT Abdomen showing coiled shunt tip

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Figure 2 Repositioned Peritoneal End from Left paramedian incision

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3. DISCUSSION

Shunt surgery is one of the most common neurosurgical procedures performed worldwide (Crofford MJ, 1983). Placement of both ventricular and peritoneal end is a blind procedure. Lately cranial ultrasound has been used to guide ventricular end insertion (Whitehead WE, 2007). Most common shunt related complications occur especially with abdominal end and they include infection, CSF loculation, and cyst formation, bowel perforation, migration of the tube into pleural cavity, liver, heart, and scrotum, anus, abdominal wall, migration, and subcutaneous coiling of the peritoneal catheter, vagina, oral cavities (Teegala R, 2012).

Ventriculo-Peritoneal Shunt:
A medical device that relieves pressure on the brain caused by fluid accumulation.

Both catheter and patient related factors have been proposed to play role in shunt malfunction due to peritoneal end of catheter. These factors include catheter greater length, lesser diameter, and highly elastic material (Chopra I, 2004), increased abdominal volume, crowding of abdominal contents, intra-abdominal adhesion, and vigorous peristalsis (Mohindra, 2012).

Radiology of the abdomen is not routinely performed. Peritoneum is identified by inspection and a stoma is created for shunt insertion. Alternatively, a trocar may be placed blindly inside the peritoneal cavity and peritoneal end inserted through it. Final placement of the shunt tip inside the peritoneal cavity is a blind procedure. Insertion of peritoneal end may be complicated in cases where the patient may have had abdominal procedures previously or intra-abdominal pathology that renders a particular site difficult to assess and access. Our case had an intra-abdominal adhesion forming a cyst just underneath the anterior abdominal wall, leading to repeated placement of the shunt tip in the cyst rather than free in the peritoneal cavity. Probable cause of the intra-abdominal adhesion or cyst could be laparoscopic converted open cholecystectomy that the patient underwent previously or a past infection.

4. RESULTS

Postoperative course after the third operation (following left side shunt reinsertion) was uneventful and the stitches were removed on the 10th postoperative day. No leaks were noted from the abdominal wound. Patient reported near total resolution of headache at the time of discharge on 12thpost-operative day and complete resolution of headache at the time of first follow up 15 days' post discharge.

5. CONCLUSION

Placement of abdominal end of shunt is usually a straightforward procedure. In certain cases, the placement may fail requiring reoperation, adding to the morbidity and increased hospital stay. To minimise the failure rate it might be prudent to image the abdomen with ultrasonography or a non-contrast computed tomography scan specially in cases where there is history of an abdominal procedure or intra-abdominal infection.

DISCLOSURE STATEMENT

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