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Unusual ventriculoperitoneal (vp) shunt tube extrusion through anus in a child: Case report and review of literature

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ABSTRACT

Background: The diversion of cerebrospinal fluid (CSF) for hydrocephalus is an established surgical practice. Ventriculo-peritoneal shunting is the most commonly performed diversion procedure. However, the procedure is associated with wide variety of complications, neurological, and non-neurological, which can occur in immediate perioperative period or during follow-up. Anal extrusion of a peritoneal catheter is a rare complication ranging from 0.1 to 0.7% of all shunt surgeries.

Case description: We present a rare case of anal extrusion of ventriculoperitoneal shunt in A 1 year and 7 months old male child who presented with extruding distal peritoneal tip of shunt tube per anus of 48 h duration and five episode of vomiting of ingested matter. The physical examination did not reveal any signs of peritonitis or meningitis. There was palpable VP shunt valve which was functional and Peritoneal end of the catheter was protruding through the anus.After proper investigation and family councelling,child was taken to the Operation theater and proximal catheter exteriorized and distal end removed via the anus.After three weeks of IV antibiotics,VPS revised and patient discharged.

Conclusion: Though *trans*-anal VPS extrusion is rare complication,awareness of this unusual complication among general Neurosurgeons and physicians is very important for early recognition, management, and timely intervention to save the life of the patient.

1. Introduction

The diversion of cerebrospinal fluid (CSF) for hydrocephalus is an established surgical practice.Ventriculo-peritoneal shunting is the most commonly performed diversion procedure.Various valve assemblies have been devised and we use valve-regulated ventriculoperitoneal (VP) shunt with a slit at the lower end. However, the procedure is associated with wide variety of complications, neurological, and non-neurological, which can occur in immediate perioperative period or during follow-up [1,2].

Many abdominal complications have been described, which include fibrous encasement of the peritoneal tip, blocking or kinking of the distal tube, slipping out through the surgical wound, or migration of the shunt or its components into the various abdominal cavities. Other complications are infection, CSF fistula, paralytic ileus in the immediate postoperative period, failure of peritoneal absorption of the diverted CSF, perforation of the bowel by the abdominal tube, development of hydrocele, appearance of a peritoneal cyst, and spontaneous extrusion of the tube through the umbilicus. Bowel perforation caused by a peritoneal catheter is a rare complication which has been reported with virtually every possible hollow viscera in the abdomen [2].

We report a rare case of anal extrusion of a migrated ventriculoperitoneal shunt catheter in a 1-year and 7 months old male child with myelomeningocele and associated hydrocephalus in resource

Abbreviations: CSF, Cerebrospinal fluid; VPS, Ventriculoperitoneal shunt; RUQ, Right upper Quadrant; MMC, Myelomeningocele; IV, Intravenous; CT, Computed Tomography.

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Fig. 1. Clinical photographs of a child showing *trans*-anal extrusion of the distal tip of VP shunt.



Fig. 2. Radiological photograph of a child showing trans-anal extrusion of distal VPS and catheter continuity.it also shows no air under the diaphragm.

limited setup.

2. Case report

A 1 year and 7 months old male child for whom surgical repair of cervical meningomyelocele was done at the age of 11 days developed severe post MMC closure hydrocephalous after three weeks for which he underwent right side keens point VPS insertion. Following the VPS insertion he was clinically improving and was on regular follow up. Currently he presented after 1 year and 6 months of the VPS insertion with extruding shunt tube per anus of 48 h duration and had associated history of five episodes of vomiting of ingested matter. However,he was passing faces and flatus and had no history of adnominal distension, rectal bleeding,loss of appetite or fever.

Clinical examination did not reveal any signs of peritonitis or meningitis. There was palpable VPS valve which was functional at right post auricular area. Peritoneal end of the VP shunt was protruding through the anus [Fig. 1] with continuous drops of cerebrospinal fluid. The child was investigated with shunt series radiograph which revealed no fracture of shunt but distal peritoneal end of the shunt tube passed well beyond the pubic symphysis [Fig. 2].

Ultrasonography of the abdomen and pelvis didn't reveal any abnormality and the absence of ascites further supported the diagnosis.

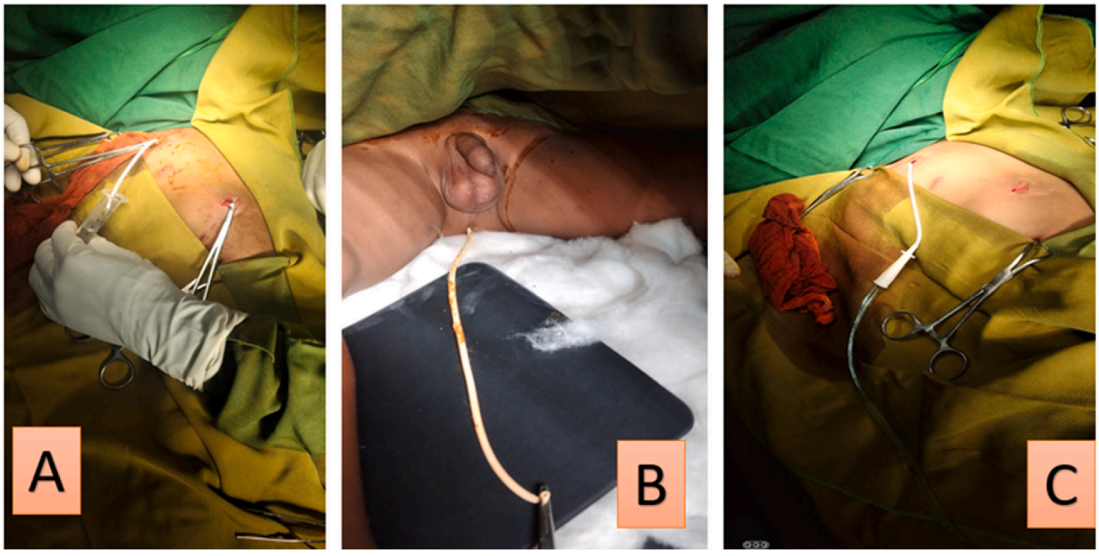


Fig. 3. photographs A) shunt exteriorization and CSF sample taken for culture, B) distal peritoneal tip of shunt removal C) Exteriorized end of tube connected to urine bag.

After preoperative evaluation and counselling, he was taken to major Operating theater. Under general anaesthesia and *endo*-tracheal intubation,patient positioned supie with left lateral tilt. Under possible aseptic technique, 2 cm skin incision performed at right upper chest and right upper quadrant area.

Proximal end of the catether exteriorized and connected with collecting bag,distal catether removed [Fig. 3] via the anus and CSF sample taken for culture and analysis.

Postoperatively he did not have any features of raised intracranial pressure and CSF culture turned out to be sterile with normal CSF parameters. Patient took braod spectrum IV antibiotics for three weeks and shunt was revised on the contralateral side. Patient discharged improved and he is on regular follow up.

3. Discussion

Ventriculoperitoneal shunt (VPS) implantation is well-accepted and one of the preferred surgical procedures for the management of hydrocephalus and carried out worldwide and across all age groups [3 –8]. VPS implantation is associated with a wide variety of complications and many of them require shunt revisions [3,5,9].

Common complications of VPS insertion include infection, obstruction, disconnection, CSF pseudocyst formation and migration [16]. Bowel perforation by distal VPS catheter and subsequent extrusion via the anus is also a known but rare complication of VPS insertion which may occur few weeks to several years after the insertion of the device in 0.01–1% of patients. This complication may involve any segment of the GI trat but the most commonly reported site is the colon(70%). Other organs reported include small intestine(14%), stomach(16%),urinary bladder,fallopian tubes,liver and jugulat veins and it is commonly encountered in children [3,10,11,12,13,16].

The main contributing factors for bowel persforation and subsequent anal extrusion of a peritoneal catheter are thin bowel wall and sharp&stiff end of the catether [12]. Foreign body reaction, pressure necrosis of intestinal wall, and silicon tube allergy are among the various mechanisms suggested for its pathogenesis. The catheter, most commonly associated with this complication is the Raimondi spring coiled catheter [14].

Clinical presentation ranges from being asymptomatic(50%) to the extent of developing serious infectious complications like peritonitis, meningitis,encephalitis, brain abscess and sepsis. It has mortality rate of around 15% [10].

The diagnosis of bowel perforation is considered when the catheter protrudes through the anus or mouth. Plain X-ray(to reveal pneumoperitoneum) and CT scan of the abdomen(to show thickened bowel-&peritoneal collections) are among the diagnostic modalities of choice. Other signs suggestive of bowel perforation include ventriculomegaly, air in the ventricles and intracranial suppuration on CT scan of the brain. If CSF culture from shunt valve or lumbar puncture reveals E.coli, Klebsiella or anaerobic bacteria bowel perforation is strongly suscpected [11].

Management of anal shunt extrusion involves prompt removal of shunt and intravenous antibiotics followed by shunt replacement on opposite side. In a patient with simple bowel perforation and no other complications formal laparotomy is not required while in patients with intraabdominal complications urgent laparotomy should be undertaken [10,13,15].

4. Conclusion

Although bowel perforation following VPS insertion is rare, it carries high mortality up to 15%. Awareness of this unusual complication among general Neurosurgeons and physicians is key in reducing VPS related morbidity and mortality by early detection and appropriate management.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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