Left out ventriculoperitoneal shunt tubings causing a catastrophe.

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Abstract

Ventriculoperitoneal (VP) shunting is a time-tested modality for the treatment of hydrocephalus. Every treatment modality has certain disadvantages, so does VP shunting. Abdominal complications including CSF pseudocyst, knotting, dis-connection or per rectal expulsion are well accounted but small intestinal fistulization and obstruction are extremely rare. We are reporting this case of small intestinal obstruction (volvulus with shunt knotting and small bowel erosion by shunt tubings) in an 8-year-old male child, who underwent shunt revision and previous shunt tubing was left behind in abdomen.

Keywords: Ventriculoperitoneal shunt, Shunt tubings, Shunt malfunction, Gut fistulisation, Intestinal obstruction.

Introduction

Ventriculoperitoneal (VP) shunt procedure is a common surgery done in field of pediatric and neuro-surgery, with limelight advantages of easy to perform, short learning curve and life saving surgery. VP shunt malfunction is the most common complication seen after surgery, needing shunt revision in most cases. VP shunt tubing may be left behind in body owing to its inert property. When a new shunt tubing is inserted, it can cause problems by mobility of two tubings, along with peristaltic activity of bowel. More than one tubings are likely to cause more complications as happened in presented case. Bowel obstruction and fistulization are relatively rare but life-threatening complications of ventriculoperitoneal shunts, necessitating laparotomy.

Case Report

The 8-year-old male patient underwent lumbosacral myelomeningocele excision and repair at day 8 of life followed by VP shunting for post-operative hydrocephalus. The patient had shunt malfunction, for which shunt revision was done but previous peritoneal shunt tubing was left behind. He now presented in acute intestinal obstruction viz bilious vomiting, central abdominal distension and obstipation. He underwent emergency exploratory laparotomy which revealed twisted small intestine around shunt tubings and fistulization of shunt into jejunum (Figure 1). The patient was managed by resection of part of jejunum having fistulous connection with the shunt tubing and end to end anastomosis, followed by removal of abdominal part of shunt and exteriorization of shunt.

Discussion

VP shunting is time tested procedure for hydrocephalus having a short learning curve. On literature review, event-free survival after ventriculo-peritoneal shunt surgery at 1-year ranged from 62% to 80% [1,2] and at 10 years from 35% to 48% [1,3]. The most common shunt complications are malfunction and infection [4,5].

Shunt malfunction is a partial or complete blockage of the shunt. A shunt blockage from blood cells, tissue or bacteria can occur in any part of the shunt.

Shunt infection

It is usually caused by a person’s own skin organisms and the most common infection is Staphylococcus Epidermidis [6], followed by Methicillin resistant Staphylococcus aureus [MRSA] [7].

Over drainage

It causes the ventricles to decrease in size creating slit-like ventricles as a result of the brain and its meninges pulling away from the skull. Slit ventricles is commonly a problem in young adults who have been shunted since childhood. A particular symptom is severe intermittent headache, often relieved when lying down. Imaging studies reveal smaller than normal ventricles.

Under drainage

Under drainage fails to relieve the symptoms of hydrocephalus. Surgical treatments include shunt revision (with more accurate pressure valve), ventricular catheters with multiple perforations or openings, craniotomy and fenestration of the intraventricular loculations.

Figure 1: Intra-operative images showing twisted small intestine around shunt tubings and fistulization of shunt into jejunum.
Abdominal complications

Abdominal complications of VP shunting include abdominal CSF pseudocyst formation, perforation of GI tract, erosion of solid organs or abdominal wall, disconnection and infection.

Bowel perforation is a rare complication of VP shunt placement, with an incidence rate of 0.1% to 1% [8]. Bowel perforation may manifest with non-specific signs and symptoms like fever, leukocytosis, diarrhea or intracranial manifestations like E. coli meningitis [9]. Erosion of VP shunts most commonly seen in stomach and large colon. Small bowel erosion is extremely rare [10].

Abdominal complications of VP shunting include abdominal CSF pseudocyst formation, perforation of GI tract, erosion of solid organs or abdominal wall, disconnection and infection. Spontaneous bacterial peritonitis (SBP) is an infection of the peritoneal fluid in the absence of an obvious intra-abdominal process. It is commonly seen in patients with shunts and is characterized by ascites and abdominal pain. The most specific finding for VP shunt erosion seen on VP shunt patency scan includes radiotracer opacification of the bowel orifices. Infection control is crucial in managing this scenario of presence of two tubings.

Conclusion

Small intestinal obstruction and fistulization are relatively rare but life-threatening complications of ventriculoperitoneal shunts. Isolation of microorganisms from CSF, which mainly reside in gastrointestinal tract, should immediately raise a concern of gut fistulization by the shunt. One should bear in mind the possibility of bowel penetration/fistulization if a patient develops abnormal abdominal conditions, especially in scenario of presence of two tubings.

References

10. Odebode TO. Jejunal perforation and peroral extrusion of a ambulatory peritoneal dialysis. Two cases of SEP in VP shunting have been described in literature [17]. In each case, the bowel was "cocooned" in a fibrous sheath with a notable absence of parietal adhesions. Both children were managed by meticulous adhesiolysis accompanied by shunt exteriorization.

Volvulus has been cited as the most common cause of VP shunt-related obstruction [18] and mechanical obstruction due to twisting of the catheter the second most common [19]. Our case had multiple reasons, which may be assigned to acute abdomen presentation. He had twisting of bowel loops around shunt tubings, fistulization into small bowel and entanglement of two shunt tubings. Treatment in most cases is laparotomy.


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