

Transanal protrusion ventriculoperitoneal shunt migration in hydrocephalus patients

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ABSTRACT

Perforation of the abdominal viscera and protrusion of the distal end of the ventriculoperitoneal shunt are uncommon but serious complications of pediatric surgery. We report a case of distal ventriculoperitoneal shunt protrusion into the appendix by transanal access in a patient who did not exhibit typical appendicitis symptoms. We report the case of a 2-year-old male with anal extrusion and assess his condition.

Keywords: Transanal protrusion, pediatric, ventriculoperitoneal shunt, hydrocephalus

INTRODUCTION

The cerebrospinal fluid (CSF) hemodynamic disorder known as hydrocephalus is caused by an imbalance in the production, circulation, and absorption of cerebrospinal fluid. This results in increased intracranial pressure, ventricular dilatation, and crowding of the brain tissue in the surrounding area. Hydrocephalus can affect people of any age, but it most frequently affects young children and newborns. Because the fontanel is still open in newborns, the accumulation of cerebrospinal fluid can be compensated for by broadening the bones of the skull. As a result, the clinical signs of hydrocephalus in infants are more obvious than in older children and adults.¹⁻³

There are a significant number of people living with hydrocephalus across the globe. The incidence of hydrocephalus in Japan is approximately 0.2 per 1000 births, which is significantly lower than the incidence of hydrocephalus in the United States, which is approximately 0.5-4 per 1000 live births. Just in Indonesia, there are roughly 2 occurrences of hydrocephalus for every 1000 babies that are born. Approximately 46% of infantile hydrocephalus can be attributed to defects in brain development, 50% can be attributed to subarachnoid hemorrhage and meningitis, and fewer than 4% can be attributed to tumors in the posterior fossa.⁴

The ventriculoperitoneal shunt is one of the most frequently performed surgical therapies by 30% because it has a major impact on the management of hydrocephalus patients, the shunt consists of two valves connected to a catheter from the intraventricular to the peritoneal cavity, and it is one of the most common surgical treatments for hydrocephalus.⁵ This therapy,

on the other hand, might result in a number of consequences, such as infection, blockage, the creation of a pseudocyst, perforation, and migration of the ventriculoperitoneal shunt.⁶ Migration from the ventriculoperitoneal shunt is the most difficult complication because it can enter other organs such as the mouth, thorax, diaphragm, heart, pulmonary artery, breast, abdomen, bile, liver, umbilicus, colon, inguinal, urinary bladder, vagina, anus, and scrotum, which adds to the complexity of the management. This is the most difficult complication because it can enter other organs.^{7,8} We present a case report of ventriculoperitoneal shunt migration; hence, research on ventriculoperitoneal shunt migration in patients with hydrocephalus is required.

CASE

A 2-year-old boy came to the RSSA Malang emergency room with complaints of a ventriculoperitoneal shunt tube coming out of the anus in the last 1 day of before hospital admission. The tube comes out when the patient is defecating but the tube also goes in by itself. When he was taken to the hospital, the tube did not appear to come out of the anus. There was no previous history of bowel obstruction. In the local area of the anus, a shunt tube can be seen coming out through the anus in a tied position. Patients underwent a total of 4 operations in 2020 namely; ventriculoperitoneal shunt kocher D shunt surgery in June, meningocele surgery in September, wound descence surgery in October. Then the following year Debridement surgery + abscess drainage + reinsertion of VP Kocher D shunt in November 2021.

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Physical examination in September 2022 showed no abdominal dilatation or free intra-abdominal air. The ventriculoperitoneal shunt tube with an intraperitoneal impression tip and intestinal air distribution to the pelvic cavity with visible fecal material is seen. The patient was diagnosed with Transanal Protrusion of ventriculoperitoneal shunt.

The treatment plan for this patient is: Head up 30°, IVFD C1:2 1,000 cc/24 hours, Inj. Omeprazole 1×10mg and Inj. Metamizole 3×100mg for pain. The action plan that will be carried out is “Urgent Aff Shunt D + Analysis + Culture of LCS and Consulting Pediatric Surgeon for evaluation of acute abdomen and evaluation of durante surgery. Monitoring is carried out on the parameters of vital signs (general impression), heart rate (HR), Respiration rate (RR), Tax, Neurological status, signs of increased intracranial pressure, signs of acute abdomen, B1-B6 function and response to therapy.

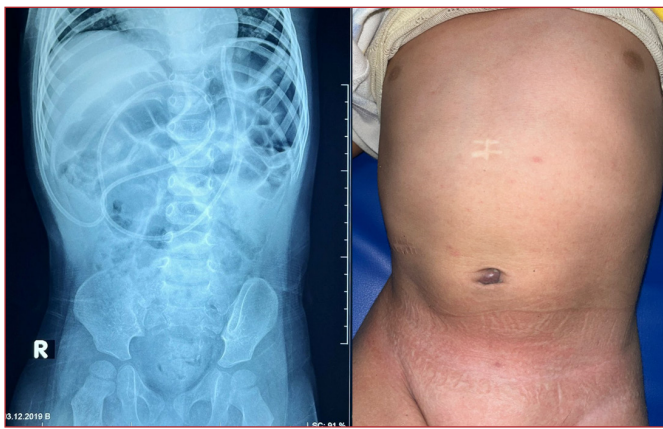


Figure 1. X-ray imaging on distal peritoneal catheter coiled at lower

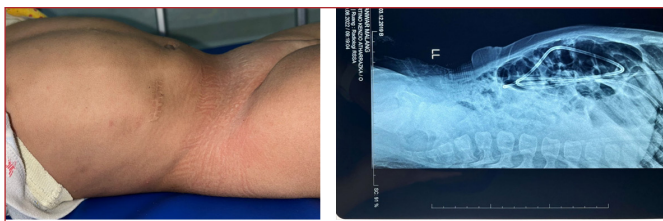


Figure 2. Side X-ray abdomen shunt tubing

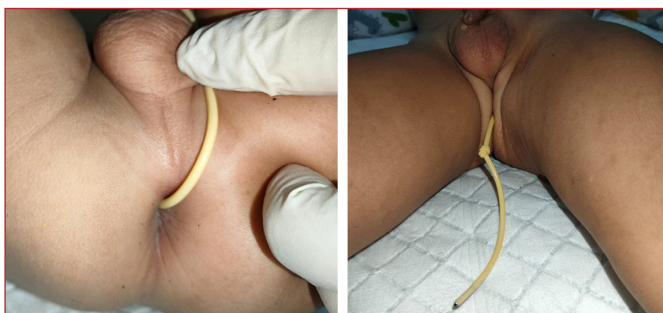


Figure 3. Images of protruding the distal catheter end.

DISCUSSION

The ventriculoperitoneal shunt is the most prevalent and globally acknowledged surgical treatment for hydrocephalus in children. Wilson and Bertan reported the first case of distal ventriculoperitoneal shunt anal extrusion in 1966.⁹ The period between shunt surgery and intestinal perforation in babies was shown to be brief and age-related. The longevity was greater in the older group. The time

between shunt placement and catheter protrusion from the anus ranged from 2 to 20 months, with an average of 6.1 months.¹¹ In pediatric patients, foreign body reaction, rigid shunt tip, and thin gut wall are factors related with intestinal perforation,^{11,12} abdominal infection, silicone allergy,¹³ use of trocar for peritoneal tip insertion.¹⁴ Patients with an extruding anal shunt may exhibit abdominal peritonitis. The fibrous tracts that grow at the site of the perforation typically close the perforation and prevent feces from spilling into the peritoneum and causing peritonitis in the majority of cases.¹⁵

Therefore, the diagnosis is incomplete until the gram-negative organism has been investigated. The process of shunt extrusion is poorly understood, but the most plausible explanation is that the shunt tube is expelled by consecutive intestinal peristalsis once bowel perforation is identified. Early diagnosis, thorough clinical, radiographic, and biochemical exams, and rapid treatment are essential for treatment success. Standard treatment involves removing the extruded shunt system, managing infection, and improving the patient's health, followed by CSF diversion surgery. Laparotomy with revision of the peritoneal shunt tip, conventional exploratory laparotomy and repair of bowel perforation, endoscopic localization of the enterotomy site and removal of the shunt, removal of the shunt, external CSF diversion and use of antibiotics, and subsequent ventriculoperitoneal shunt replacement when there are no signs of infection are the various treatment options, which is accessible. In situations of uncomplicated shunt extrusion, the shunt tube can be drawn through the extrusion orifice, and bowel perforation can be treated conservatively; nevertheless, laparotomy is necessary for shunt removal in difficult cases. Appendicitis following a ventriculoperitoneal shunt is a known complication; however, shunt extrusion through an appendicular perforation has not been recorded in the medical literature to the best of our knowledge. In these kinds of circumstances, extracting the shunt through the extrusion orifice can prove to be a difficult task. The presence of appendicitis, in conjunction with the removal of the shunt through the orifice that has been extruded, has the potential to result in the formation of peritonitis or an appendicular abscess. In these kinds of situations, management needs to be resolute in order to reach a sensible conclusion. As a result, patients who have difficulties coping with other patients, regardless of whether or not they can, should be placed in a different group, and the shunt should be removed via laparotomy, followed by prophylactic appendectomy.

CONCLUSION

Suspicious complications of bowel perforation in ventriculoperitoneal shunt should be considered as a malfunctioning shunt with various signs and symptoms. These signs and symptoms include cellulitis of the shunt tract or infection of the shunt, meningitis or cerebral abscess, and abdominal symptoms. A thin bowel wall in children, a sharp and stiff end of ventriculoperitoneal shunt, distal tip of ventricularperitoneal catheter placement with trocar, long peritoneal catheters, chronic irritation caused by shunt, previous surgery, infection, and silicone allergy are some of the contributing factors that affect the complications in the anal extrusion of the peritoneal catheter.

ETHICAL DECLARATIONS

Informed Consent: All patients signed the free and informed consent form.

Referee Evaluation Process: Externally peer-reviewed.

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