J Ped Surg Case Reports 2 (2014) 1–3

Contents lists available at ScienceDirect

Journal of Pediatric Surgery CASE REPORTS

journal homepage: www.jpscasereports.com

Migration of the distal catheter of a ventriculoperitoneal shunt into the colon: Case report and clinical analysis

Migration of the catheter of colon from VPS

Ruijun Wang [a,b], Yuming Wang [c], Ruijian Zhang [d], Lin Huang [e], Yinan Luo [a,*]

[a] Department of Neurosurgery, The First Hospital of Jilin University, 71 Xinmin Avenue, Changchun 130021, PR China
[b] Department of Neurosurgery, The First Affiliated Hospital of Inner Mongolia Medical University, 1 Tong Dao Bei Jie, Huimin District, Hohhot 010050, PR China
[c] Department of Clinical Laboratory, The First Affiliated Hospital of Inner Mongolia Medical University, 1 Tong Dao Bei Jie, Huimin District, Hohhot 010050, PR China
[d] Department of Neurosurgery, People's Hospital of Inner Mongolia Autonomous Region, 20 Zhao Wu Da Lu, Hohhot 010041, PR China
[e] Tumor Department of Hematology, The 208th Hospital of PLA, Changchun, 130062, PR China

ARTICLE INFO

Article history:
Received 30 July 2013
Received in revised form
11 November 2013
Accepted 14 November 2013
Available online 4 December 2013

Key words:
Hydrocephalus
Ventriculoperitoneal shunt
Colonic perforation

ABSTRACT

Colonic perforation is an extremely rare complication following ventriculoperitoneal (VP) shunting. The common treatment is to remove the perforating catheter and replace it with a new one. Here we report a case of colonic perforation from VP shunting in a 2-year, 8-month-old boy who presented with the distal end of the shunt catheter protruding out of his anus. The distal catheter was removed via the anus and the perforation repaired transanally. The patient's postoperative course was uneventful. This case reminds us that we should not make another rush to perform a new shunt operation unless there are some manifestations of hydrocephalus. Potential mechanisms of migration and its management strategy are discussed.

Ventriculoperitoneal shunt (VPS) is the most common treatment for hydrocephalus, but it can have serious complications. The migration of the distal catheter within the bowel so that it protrudes through the anus is a relatively rare complication, but it can result in a potentially serious infectious complication, sepsis, or even death. In this study, we report a case of a peritoneal shunt catheter migrating into the colon and protruding through the anus. We discuss the successful treatment and potential mechanisms of migration.

1. Case report

A 2-year, 8-month-old boy had received a VP shunt for idiopathic hydrocephalus at the age of 15 months. Seventeen months after shunt placement, his mother noticed a catheter protruding from his anus after he defecation. The catheter then spontaneously retracted into the rectum a moment later. The boy was quickly taken to the emergency department of a local hospital, and upon his arrival, the catheter was not visible outside the anus. His mother did not notice any symptoms such as nausea, vomiting, melena, or sepsis. He was afebrile, and there were no signs of intracranial or abdominal infection. Plain-film radiographs of the abdomen showed the distal catheter within the colonic lumen and traversing the descending and sigmoid colon and rectum (Fig. 1).

There was no free air in abdominal cavity. Sigmoidoscopy revealed a catheter tip approximately 4 cm long penetrating the bowel wall 13 cm above the anal verge, as well as local inflammation. Abundant chronic fibrous tissue could be seen around the point of perforation. The distal catheter was grasped with the forceps of the sigmoidoscope, and the proximal catheter was removed through the previous head incision. Afterward, the abdominal cavity and the back closed-ventage of the drainage tube should respectively be irrigated with an amount of normal saline and the abdominal cavity should be irrigated again with antibiotics saline. The distal catheter was then removed from the anus without any resistance under

* Corresponding author. Tel.: +86 431 88782331.
E-mail address: luoyinan1767@gmail.com (Y. Luo).

2213-5766
http://dx.doi.org/10.1016/j.epsc.2013.11.006

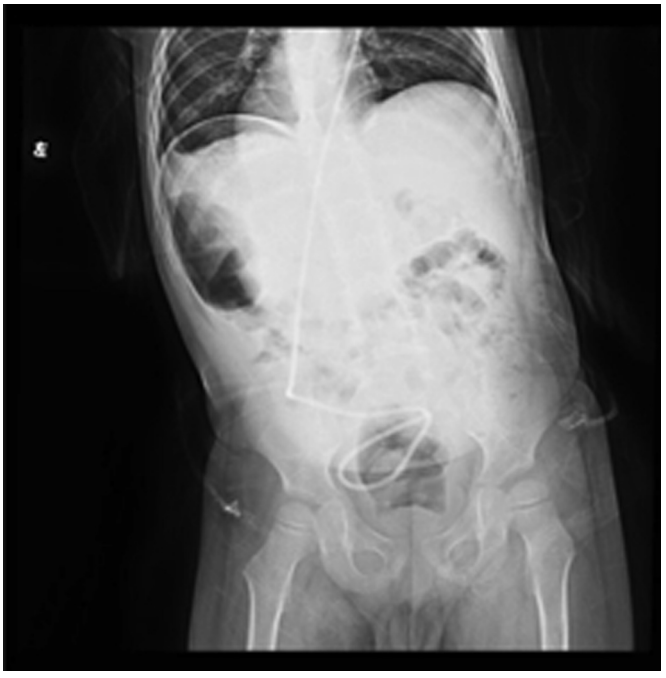

Fig. 1. X-ray film of standing abdominal.

sigmoidoscopic guidance. The boy received intravenous antibiotics during the whole perioperative period and broad-spectrum antibiotics after the operation for 1–2 weeks. No reoperation was required after removing the penetrating catheter. Two-year follow-up was unremarkable, such as normal body function and physiological indicators, with the computed tomography (CT) scan that analog signal was received by the detector when X ray scanning human body and converted into digital signals, and image was reconstructed after computer calculating the attenuation coefficient of each pixel showing a slight amount of retraction of the brain ventricle (Fig. 2).

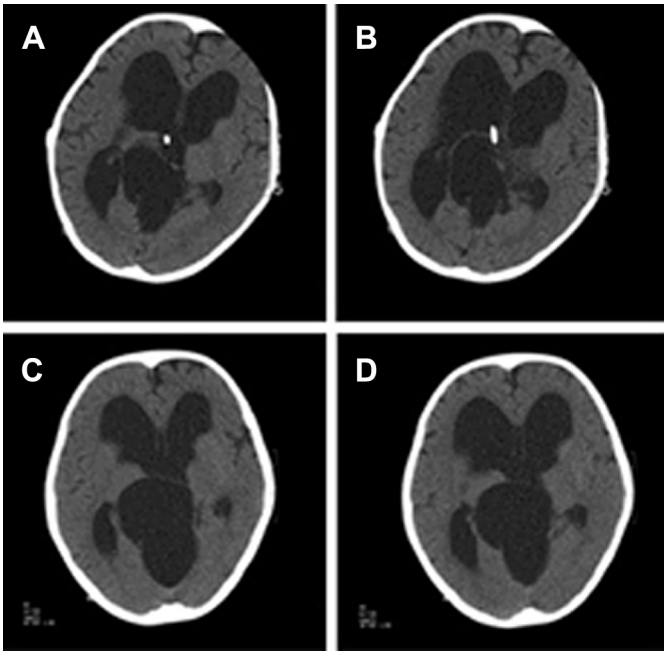

Fig. 2. Detection of brain ventricle retraction by computed tomography (CT) scan.

2. Discussion

VP shunting is a procedure commonly used to treat obstructive or normal-pressure hydrocephalus in neurosurgery. VP shunt placement is often accompanied by various complications such as ventriculitis, meningitis, and sepsis and may cause several rare abdominal complications, including intestinal volvulus, pseudocyst, and extrusion through the scrotum, colon, anus, umbilicus, vagina, bladder, or heart. Spontaneous bowel perforation is a rare complication of VP shunt surgery, occurring in only 0.01%–0.07% of cases; however, the mortality rate, which is due to intracranial or intra-abdominal infections, is considerably high at about 15% of all such reported cases [1–3].

The etiology of the migration of the distal VP shunt catheter into the gastrointestinal tract remains unknown. Most scholars believe that it is caused by fibrous adhesions [4]. The formation of a local inflammatory reaction or fibrosis around the distal catheter is thought to have an anchoring effect on the tube, resulting in pressure on an area of the bowel that finally causes perforation of the wall. The type of catheter or the length of the abdominal part of the catheter may also be implicated in bowel perforation; finally, silicon allergy may result in a foreign body-like reaction [3]. It has been noted that among the reasons for migration, the length of the abdominal catheter, trauma during the operation, age, fibrous adhesion, and infection must be taken into consideration [4]. In our case, the patient was an infant, so the migration may be have been caused by a trait specific to our patient, such as weak gastrointestinal function or the thin intestinal wall or postoperative intestinal chaos. And the problems of the basic disease existing among children are concerned, which may be the malnutrition, intestinal tracts and intestinal walls being thin, intestinal peristalsis being enhanced, and localized greater omentum being wrapped, and may also be the result that the shunt tube, placed on the stump of abdominal cavity, remains too long, according to the requirement of growth and development in children. Moreover, there is a certain relationship between shunt placement and complication [5]. Therefore, drainage tube is so overlong that there is a long-term friction between the peritoneum and the intestinal wall, which results in peritonitis and complications. At the same time, taking into consideration the growth of the child's body, the long length of the catheter remaining in the peritoneal cavity may be influenced his future life.

Gastrointestinal perforation is an extremely rare complication following VP shunting, and optimal treatment of such a patient is decided by the presence of features of sepsis, perforation peritonitis, or intraperitoneal abscess [6]. These complications are usually treated by removing the failed portion of the shunt and replacing it with a new shunt. Protrusion of a VP shunt catheter per rectum can occur without producing peritonitis [7]. There is no need to perform a laparotomy unless the patient has peritonitis. Our patient had no peritoneal cavity infection, so we pulled the distal catheter out of the anus. After removing the distal catheter via the anus, the bowel perforation site was successfully repaired transanally without subsequent peritonitis.

The patient's abdomen must be monitored intensively postoperatively. Laparotomy is usually required when peritonitis is suspected. One report suggests cutting off the distal end of the catheter at the point where it entered the colon, pulling the protruding distal end out of the anus, and leaving the remaining distal end in the peritoneal cavity to maintain the function of the catheter [8]. We think this method is dangerous, as the sharp tip of the peritoneal catheter may have been a factor in the occurrence of the complication initially, and the sharp cut edge of the catheter could cause a re-perforation.

Vigilance and early recognition and diagnosis of complications of bowel perforation by VP shunt are the key factors in reducing

mortality and improving prognosis. Pediatric surgeons and neurosurgeons should be aware of the possibility of bowel perforation to allow for early treatment when patients present with the aforementioned symptoms. We suggest that transanal repair of bowel perforation be considered as an alternative choice of treatment for patients with distal bowel perforation due to VP shunt, especially for those patients presenting with mild abdominal symptoms [9]. In our case, after removing the peritoneal catheter, we did not hastily repeat VP shunting. Instead, we carefully observed the patient during the 2-year follow-up period, which was uneventful. The reason is unknown, but the retraction of ventricle seen on follow-up CT scan suggests that the cerebrospinal fluid get in a beneficial cycle.

This case reminds us that we should wait and observe a patient after the first catheter is removed. This approach may be better than creating more operative stress or trauma for the patient and can benefit many of these patients.

3. Conclusion

We herein reported that a case of a 32-month-old boy received a VP shunt through a distal catheter protruding out of the anus. After paying close attention to the changes of patient's condition, the treatment of removing the distal catheter via anus was adopted.

Conflicts of interest

None.

Sources of funding

None.

Acknowledgment

The author thanks Yinan Luo for revising this manuscript, and Yuming Wang for collecting references, Ruijian Zhang and Lin Huang for analyzing figures and providing clinical supports. And all contributors approve this manuscript to be submitted.

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