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Case Report

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Anal Extrusion of Distal V-P Shunt Catheter after Double Perforation of Large Intestine

We describe the extrusion of a ventriculoperitoneal shunt catheter from the anus after double perforation of the large bowel in a 3-year-old girl with hydrocephalus. She was admitted because the tip of the peritoneal catheter protruded 10 cm from the anus and clear cerebrospinal fluid dripped from the tip. Emergency laparotomy was performed. The distal peritoneal catheter perforated and penetrated the sigmoid colon and re-perforated into the rectal cavity. The distal peritoneal catheter was removed, the proximal catheter was exposed for external drainage, and intravenous broad-spectrum antibiotics were administered for 2 weeks. After control of infection, the shunt system was completely removed. Bowel perforation by a peritoneal catheter is a rare complication. Diagnosis is often difficult, delayed, and its incidence is likely underestimated. Most bowel perforation is the result of infection as opposed to technical errors.

KEY WORDS : Hydrocephalus · Ventriculoperitoneal shunt · Intestinal perforation.

INTRODUCTION

Ventriculoperitoneal (V-P) shunting is a universally accepted procedure in the management of hydrocephalus. Complications associated with V-P shunts are numerous and can be serious. There have been a number of reports of complications relating to the abdominal catheter : vaginal perforation[17], hepatic perforation[18], intrapleural migration[12], extrusion through the umbilicus[1], abdominal wall[19], anus[2], or intestine[4,21]. Bowel perforation caused by a peritoneal catheter is a rare complication, but has been reported in several clinical reports detailing the perforation of virtually every possible hollow viscera in the abdomen[10,12,15-18].

We describe the protrusion of a ventriculoperitoneal shunt catheter from the anus after double perforation of the colon that occurred in a 3-year-old child with hydrocephalus.

CASE REPORT

A 3-year-old, V-P shunted girl with hydrocephalus secondary to bacterial meningitis was admitted in March, 2006 because the tip of the peritoneal catheter protruded 10 cm from the anus and clear cerebrospinal fluid dripped from the tip (Fig. 1, 2). There were no abdominal signs or symptoms or other associated complications. She had been operated on for hydrocephalus at the age of 21 months in October, 2004. Six months later, right posterior parietal scalp swelling was developed. Lateral skull radiography showed the separation, with fracture, of proximal and distal catheter connector. Wound revision was done and connector was changed. Neurological examination revealed no change following operation. In June, 2005, the patient was treated for bacterial peritonitis

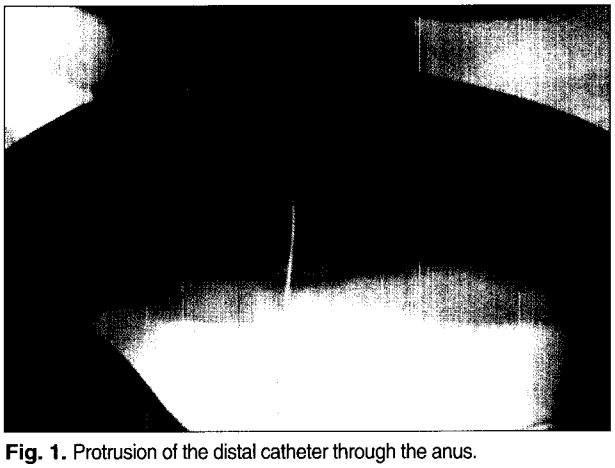

Fig. 1. Protrusion of the distal catheter through the anus.

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with intravenous antibiotics.

An emergency laparotomy was performed after the patient's admission in 2006. The peritoneal catheter had perforated and penetrated the sigmoid colon and re-perforated into the rectal cavity (Fig. 3). The peritoneal catheter was cut and the distal segment removed. The proximal segment was exposed for external drainage. Cerebrospinal fluid culture showed pleocytosis and anaerobic bacteria. After surgery, intravenous broad spectrum antibiotics were administered for two weeks. After the control of infection, the shunt system was completely removed.

DISCUSSION

Ventriculoperitoneal shunting is a popular method for surgical treatment of hydrocephalus. However, the complication rate is relatively high, mostly due to infection (in skin, subcutaneous tissue, the ventricular system, and the peritoneal cavity), mechanical obstruction, and failure of CSF flow. The catheter may fracture in its long trajectory through the subcutaneous tissue[3,5,9,11].

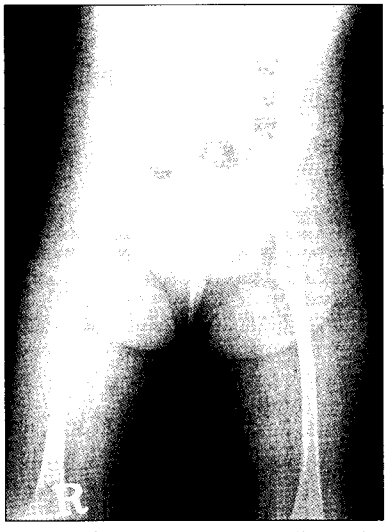

Fig. 2. Simple abdominal radiography showing the peritoneal shunt catheter extruding from the anus.

There are a few reports of complications that include the perforation of visceral organs. One even reported a case of intracardiac migration of a distal V-P shunt catheter[13]. Lee et al.[14] reported a 68-year-old man with a V-P shunt in whom subclinical peritoneal infection presented with ascites. The patient was treated successfully with antibiotics after removal of the shunt system.

Fig. 3. Intra-operative finding : the distal peritoneal catheter is perforating and penetrating the sigmoid colon and re-perforating into the rectal cavity.

Bowel perforation and anal extrusion of a peritoneal catheter is an unusual complication. The first case of anal protrusion were reported by Wilson and Bertrand in 1966[20], who described two cases of bowel perforation after insertion of lumboperitoneal shunts.

Most cases of bowel perforation caused by a peritoneal shunt catheter occurred well after surgery, suggesting that they resulted from a chronic inflammatory process rather than a traumatic event. One paper reported a case of colonic perforation by ventriculoperitoneal shunt with the tube protruding from the anus and CSF culture revealing Escherichia coli[7]. Bowel erosion results from inflammation was caused by pre-existing shunt infection[8].

De Aquino et al.[6] analyzed all reports related to these complications published between 1966 and 2003. There were 84 articles, and it has been suggested that catheter length and the presence of fibrosis around the distal catheter are important factors. Interaction between the silicone tubes of the VP shunt system, CSF contents (especially glucose and proteins), and well-known immunomediators involved in the inflammatory response to infection in the peritoneum have also been published.

The exact pathogenesis of V-P shunt-related organ perforation is unclear, and various mechanisms have been suggested, including foreign body reaction, pressure necrosis, and poor general patient condition with weakening of the intestinal wall and the stiff end of the shunt tube causing perforation. Because of weak bowel musculature, children are more susceptible to intestinal perforation. Previous inflammations and irritations to the bowel wall may contribute to perforation in this case.

In view of the high mortality rate associated with this complication, early diagnosis of bowel perforation is essential. Radiographs following injection of a contrast medium into the shunt system, with or without fluoroscopic guidance, can be readily used to diagnose visceral perforation. If the catheter is left inside the gastrointestinal lumen for a long time, severe ventriculitis and, finally, sepsis may develop due to ascending infection from gastrointestinal flora migrating through the catheter and its sheath.

The treatment for this complication is removal of the catheter from the lumen of the gastrointestinal tract. Transient external drainage and complete replacement after a vigorous course of antibiotics is needed to resolve infection of the ventriculoperitoneal shunt system.

This case showed a peritoneal shunt catheter that perforated and penetrated the sigmoid colon and re-perforated into the rectal cavity. Such 'double perforation' of the bowel has not been previously reported in the literature.

CONCLUSION

The diagnosis of bowel perforation is often difficult and delayed because anal extrusion of the distal catheter is present in only a minority of cases, and abdominal symptoms are easily overlooked, especially in severely disabled and nonverbal patients. Most bowel perforation is the result of inflammation rather than technical errors. We describe the extrusion of a ventriculoperitoneal shunt catheter from the anus after double perforation of the large bowel in a 3-year-old girl with hydrocephalus.

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