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Case Report

Trans-anal Protrusion of the Distal End of a Ventriculoperitoneal Shunt Without Peritonitis in a Neonate: An Unusual Complication

Protrusion Trans anale de la Partie Distale d'Un Cathéter de Dérivation Ventriculo-Péritonéale Sans Péritonite chez un Nouveau-né : Une Complication Rare

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ABSTRACT

Ventriculoperitoneal shunting is the standard of care for hydrocephalus, yet carries a risk of complications throughout a patient's lifetime. Here we describe the case of a 4-week-old child who presented with the distal end of her shunt protruding through the anus without signs of peritonitis. She was neurologically intact on examination without signs of meningitis, and cerebrospinal fluid examination were negative for infection. She underwent surgical removal of the distal shunt followed by replacement after a course of prophylactic antibiotics. The neonate later died from meningitis two weeks after shunt replacement despite the initially negative CSF tests. Despite its rarity, bowel perforation is a potentially fatal complication of shunt placement and should be treated in an urgent manner with surgical repair and prophylactic antibiotics until ventriculitis is ruled out.

RÉSUMÉ

La dérivation ventriculo-péritonéale est le traitement standard pour la prise en charge des hydrocéphalies. Cette modalité thérapeutique peut-être source de complications diverses. Nous rapportons le cas d'une fillette de 4 semaines qui a présenté une protrusion de la partie distale du cathéter de dérivation ventriculo-péritonéale à travers l'anus, sans signe de péritonite. L'examen neurologique était dans les limites de la normale sans signe d'irritation méningé. L'analyse cytobactériologique du liquide cérébro-spinal n'a pas montré de signe d'infection. Nous avons procédé au changement du dispositif de dérivation ventriculo-péritonéale après une antibiothérapie prophylactique. La fillette est décédée deux semaines après le changement du dispositif de dérivation ventriculo-péritonéale, dans un contexte de méningite malgré les analyses initiales négatives du liquide cérébro-spinal. Bien que rare, la perforation intestinale est une complication des dérivations ventriculo-péritonéales. Elle peut être cause de décès et doit de ce fait être pris en charge de façon urgente avant la survenue de ventriculite.

INTRODUCTION

Hydrocephalus is the most frequent neurosurgical problem encountered in children world-wide and the commonest pediatric neurological disorder in Africa [1, 2]. Although Endoscopic Third Ventriculostomy (ETV) is resurging as a treatment option [3], ventriculoperitoneal shunting (VPS) is the commonest neurosurgical procedure used, and the prognosis is excellent in many hydrocephalic patients [2]. VPS for hydrocephalus can lead to an amelioration in the quality of life. However, the latter have been subdued by the occurrence of complications like shunt infection and malfunction [2]. Distal shunt protrusion through the mouth or anus are uncommon phenomena. A case of trans-Oral protrusion of the distal end of a VPS [4] post-hydrocephalus surgery was reported. Herein, we report an unusual case of Intestinal perforation accompanied by distal shunt

protrusion through the anus. The probable mechanisms of migration are discussed and management outlined.

CASE PRESENTATION

A 4-week-old preterm, underweight, female neonate underwent uncomplicated VP shunt placement as an infant for congenital hydrocephalus. At 10 weeks post-surgery she presented with shunt tubing visibly protruding from the anus. (Fig. 1). On physical examination, there was a trans-anal protrusion of the distal shunt, which was freely mobile in the rectum. There was clear, sterile cerebrospinal fluid draining from the shunt, without signs of meningeal irritation, abdominal fluid collection, or peritonitis.

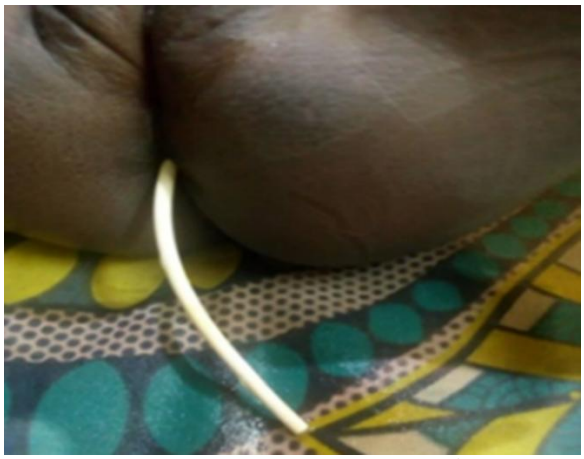

Figure 1: Photograph showing anal protrusion of distal shunt end

The patient could not afford for a scan so an x-ray of the head was done which showed the proximal end of the shunt tube still successfully implanted in the right lateral ventricle (Fig. 2).

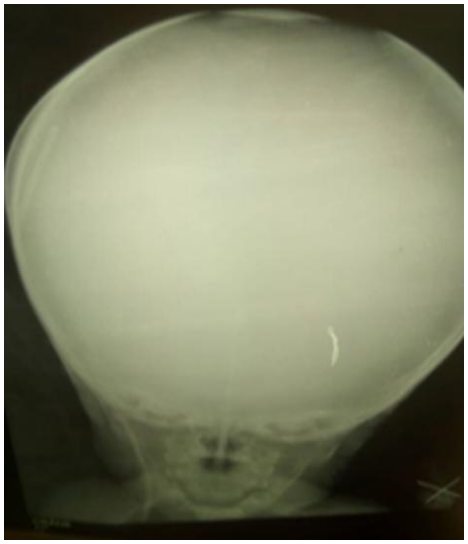

Figure 2. Cranial radiography showing proper implantation of the tube into the left lateral ventricle

An abdominal radiograph demonstrated the distal shunt end had migrated, perforating the small intestine and crossing the ileocecal valve as well as the ascending, transverse, descending, and sigmoid colons (Fig. 3).

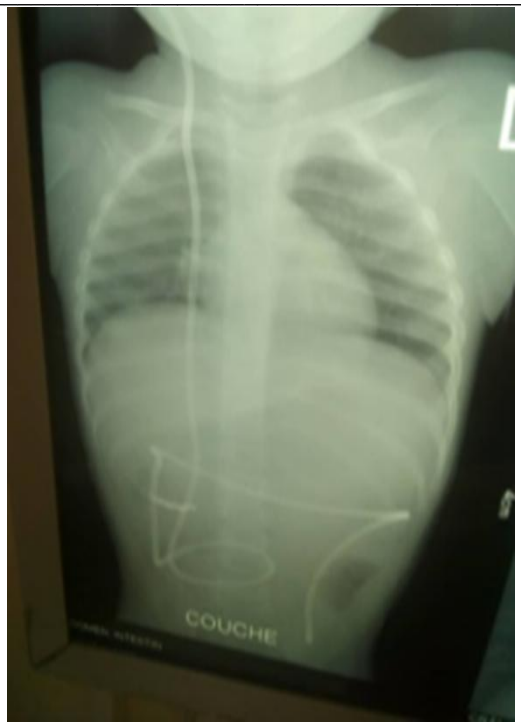

Figure 3: An abdominal radiograph showing small intestine perforation and migration through the colon

Parenteral feeding was promptly initiated. The shunt system was urgently explanted, the bowel perforation repaired and a new ventriculoperitoneal shunt system was placed without complications. Two weeks after the second operation, the baby developed signs of meningeal irritation and later died.

DISCUSSION

Bowel perforations are an uncommon but dangerous side effect of the ventriculoperitoneal shunt [5-7].

Although the exact pathogenesis of intestinal perforation is unclear, the most likely reason for its occurrence is thought to be the shunt catheter adhering to the intestinal wall and subsequently eroding, creating a localized inflammatory response [8]. To accommodate the infant's rapid growth, surgeons frequently leave a lengthy tube in the peritoneal space. This, together with infants' weak gut muscles and increased peristalsis, makes distal end migration easier than in adult patients [8]. This was a plausible mechanism of perforation in our case.

Other possible hypotheses for perforation include: the type of catheter used, such as silicon catheters, local inflammation and fibrosis at the contact site with silicon in the shunt tube and CSF pulsations causing a continuous water hammering effect that can perforate the bowel wall. Moreover, a silicon-based tube may interact with CSF particles and immunomodulators, increasing the likelihood of intestinal penetration through an inflammatory reaction [6, 9]. The lack of pneumoperitoneum may be explained by the presence of local inflammation and fibrosis at the site of the perforation with silicon in the shunt tube, which seals the entry and prevents air from filling the abdominopelvic cavity [8].

Teegala and Kota [10] point to poor nutritional status as a precipitating cause in two similar cases as was with our

case which was underweight and malnourished. Nonetheless, malnutrition is not a known risk factor for intestinal perforation from a ventriculoperitoneal shunt.

The distal tube end entering the anus can be seen, which makes the diagnosis rather simple. Infectious complications must be thoroughly assessed to rule out ventriculitis and meningitis. Although a CT scan is superior for seeing the migration, in our case, restricted resource conditions constrained the radiologic study of the shunt migration to routine radiography.

Despite being uncommon, the frequency of ventriculoperitoneal shunt complications can be decreased by excellent surgical technique [5, 11] and implementation of evidence-based protocols aimed at curbing ventriculoperitoneal shunt complications[1].

CONCLUSION

Ventriculoperitoneal shunt remains the mainstay for treating infants with hydrocephalus due to its simplicity and low cost. Regardless of its suitability, complications may occur, including rare instances of bowel perforation and even rarer anal transgressions. The authors advise surgeons to be aware of this risk and to perform postoperative radiologic studies to ensure the catheter remains in the peritoneal cavity if there are any signs of bowel discomfort, feeding difficulties, or migration. This is not routinely performed, but it may aid in the early diagnosis and management of this complication. When perforation with or without protrusion is diagnosed, aggressive management with a prophylactic antibiotic course and shunt removal should be performed. Ventriculoperitoneal shunt reinsertion is only advised after CSF biology has returned to normal.

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