Case Report

Pediatric Neurosurgery

Pediatr Neurosurg 977
DOI: 10.1159/0000XXXXX

Received: January 13, 2006
Accepted after revision: July 19, 2006

Unusual Ventriculoperitoneal Shunt Extrusion: Experience with 5 Cases and Review of the Literature

Ravi Kanojia Shandip K. Sinha Jiledar Rawat Ashish Wakhlu
Shivnarain Kureel Rajkumar Tandon

Department of Pediatric Surgery, King George Medical University, Lucknow, India

Key Words
Ventriculoperitoneal shunt · Hydrocephalus · Distal catheter migration

Abstract
Distal migration of ventriculoperitoneal shunt is rare. We present this unusual complication in 5 patients. The lower end of the shunt was extruded from right lumbar region, cervical area, umbilicus and rectum. The cause of such extrusion is not known. The patients were managed by shunt removal followed by shunt replacement on the opposite side.

Introduction

Ventriculoperitoneal (VP) shunt is an established method of diverting CSF for the management of hydrocephalus. The procedure is associated with various complications. Shunt infection, malfunction, peritoneal complications, pseudocyst and extrusion are common. The reported incidence of abdominal complications is 10–30% [1]. Migration of the lower end of the shunt catheter is an infrequent problem, which occurs without any recognizable cause. The reported incidence of distal shunt migration is 10% [2]. Approximately 30–35 patients undergo VP shunt insertion at our institute annually. The incidence rate of all sorts of complications in these patients is around 22%. Unusual distal catheter migration with extrusion was seen in 5 patients. As would have been expected, not all but 1 patient had associated features of meningitis. No specific cause of the abnormal migration could be identified.

Case Summary

Five patients with spina bifida with lumbosacral defects underwent VP shunt placement due to associated hydrocephalus. The age at shunt placement ranged from 1 to 3 months. The age at time of shunt extrusion ranged from 3 to 6 months with the average time interval of 3 months.

The patients presented with the distal end of the shunt catheter tip coming out from the right lumbar region in 1 patient (fig. 1), cervical region in 2, umbilicus in 1 (fig. 2) and rectum in 1 (fig. 3). In all patients, the catheter tip was draining CSF well, as observed after pressing the shunt reservoir. The 1st patient with the extrusion from the right lumbar region had an associated lumbar hernia due to neurological deficit. He presented with meningitis and severe septicemia to which he succumbed later on. This was the only mortality in the presented series. In the remaining 4 patients, there were no features of meningitis. Cerebrospinal fluid taken through aspiration of shunt reservoir showed growth of coliforms in the 1st patient with lumbar extrusion. The remaining 4 patients had negative CSF growth.

KARGER

Fax +41 61 306 12 34
E-Mail karger@karger.ch
www.karger.com

1016–2291/06/0000–0000$23.50/0

Accessible online at:
www.karger.com/pne

Dr. Ravi Kanojia, Senior Resident
Department of Pediatric Surgery
King George Medical University (KGMU)
Lucknow (UP) (India), Zip 226003
Tel. +91 983 901 9309, +91 522 225 7825, E-Mail doctor.ravi@yahoo.com

Fig. 1. Shunt catheter coming out through the right lumbar region.

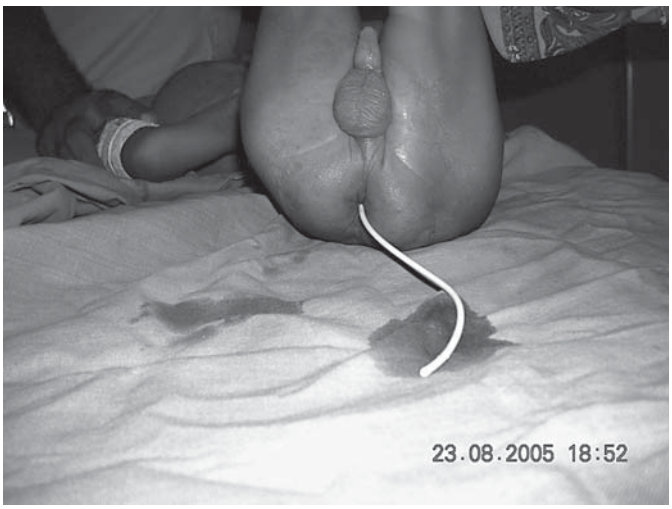

Fig. 3. Rectal extrusion of shunt.

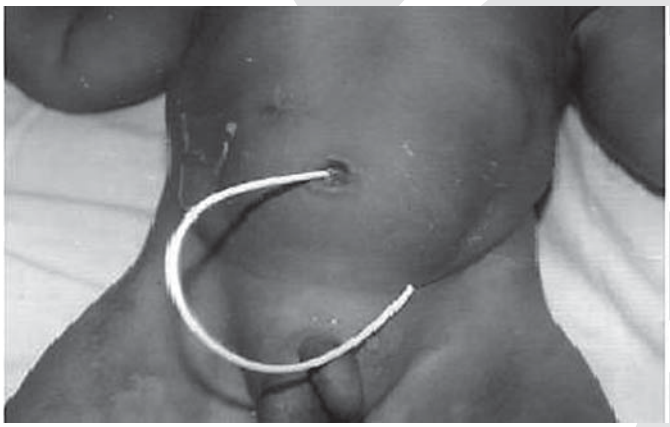

Fig. 2. Shunt catheter coming out through umbilicus.

All the 5 patients were initially managed by shunt removal through a small incision below the ipsilateral parietal eminence. In 4, the entire shunt was removed through this incision, whereas in the patient with rectal extrusion the distal end of the catheter was pulled out through the rectum after division of the shunt just below the reservoir. This was done to avoid catheter track contamination. This was followed by intravenous antibiotics in meningitic doses.

Replacement of VP shunt was done after an interval of 3–6 weeks during which negative CSF examination and cultures were ensured. Due to nursing difficulty and problems with home management, exteriorization of the shunt is not practiced at our hospital. Patients were kept on oral acetazolamide and glycerin in adequate dosages to limit the increasing hydrocephalus.

Discussion

We use medium-pressure spring valve-based Chabra VP shunt in all patients. It is made from silastic rubber, which is the most supple, flexible and soft of all the catheters used in medical practice. The reported incidence of distal catheter migration is less than 10% [1]. The occurrence of such a complication is fatal due to ascending bacterial meningitis.

Several reports regarding the abnormal migration of the lower end are available in the literature. The commonest type reported is the migration within the peritoneum. The favored sites are within the bowel lumen [3] (perforation), rectum [4] and out through the umbilicus [5]. Isolated reports are available of shunt catheter coming out through the mouth [6]. Migration into the scrotum through an inguinal hernia is also reported [7]. The other common extraperitoneal sites are the thorax through the diaphragm resulting in CSF hydrothorax [8]. None of the authors in the literature have been able to identify a specific cause of these complications. Akyuz et al. [8] hypothesized that the catheter tip adheres to the visceral wall, a local inflammatory process weakens the bowel wall and the tip then erodes into the lumen over a period of time. A constant pressure abutting the tip of the catheter with the viscera or the extruding surface usually co-occurs in this kind of setting. This favors the tip migration through the abnormal site. Similar etiopathogenesis was given by Shetty et al. [9]. Previously, with the use of stiffer catheters the occurrence of abdominal compli-

cations was high, but now with the introduction of more soft and supple catheters this has been reduced.

The basic principles in the management of these patients are [3] prompt removal of shunt, intravenous antibiotics and an adequate recovery gap so that CSF culture is sterile on two successive occasions. This is followed by shunt replacement on the opposite side. During the interval which is around 3–4 weeks, the patient can be kept on cerebral dehydrants to limit the increasing hydrocephalus.

In summary, unusual distal catheter tip migration of VP shunt is a rare but serious problem. We were not able to point out any specific cause of this; shunt behavior is unpredictable. The complication occurs even after all precautions with the technique of placement have been taken; however, in view of the potential for meningitis prompt and aggressive management is essential to avoid morbidity and mortality.

References

1 Bryant MS, Bremer AM: Abdominal complications of ventriculoperitoneal shunts. Case reports and review of the literature. Am Surg 1988;54:50–55.
2 Kast J, Doung D, et al: Time related patterns of ventricular shunt failure. Childs Nerv Syst 1996;10:524–528.
3 Yousfi MM, et al: Bowel perforation complicating ventriculoperitoneal shunt: case report and review. Gastrointest Endosc 2003; 58:144–148.
4 Digray NC, et al: Silent bowel perforation and transanal prolapse of a ventriculoperitoneal shunt. Pediatr Surg Int 2000;16:94.
5 Silav G, et al: The spontaneous umbilical perforation of the distal end of ventriculoperitoneal shunt. Neurochirurgie 2002;48: 128–130.
6 Park CK, Wang KC, Seo JK: Transoral protrusion of peritoneal catheter: a case report and literature review. Childs Nerv Syst 2000; 16:184–189.
7 Henriques JG, Pinho AS, Pianetti G: Complication of ventriculoperitoneal shunting: inguinal hernia with scrotal migration of catheter. Case report. Arq Neuropsiquiatr 2003;61:486–489.
8 Akyuz M, Ucar T, Goksu E: A thoracic complication of ventriculoperitoneal shunt: symptomatic hydrothorax from intrathoracic migration of a ventriculo-peritoneal shunt catheter. Br J Neurosurg 2004;18:171–173.
9 Shetty PG, Fatterpekar GM, Sahani DV, Shroff MM: Pneumocephalus secondary to colonic perforation by ventriculoperitoneal shunt catheter. Br J Radiol 1999;72:704–705.