Case Report

Anal Extrusion of Ventriculoperitoneal Shunt in a 14-month-old: A Rare Complication and Management

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ABSTRACT

Background: Medulloblastoma of the cerebellum treatment often involves ventriculoperitoneal (VP) shunt placement for associated hydrocephalus. In this study, we report a rare but successfully managed case of VP shunt extrusion through the anus, treated with a single incision technique without requiring a laparotomy or endoscopic intervention.

Case Presentation: In this study, the case was a 14-month-old infant who had undergone cerebellar medulloblastoma surgery at five months of age. The VP shunt was displaced in the Keen's point region, displayed unusual compressibility and distally extruded through the anus. The patient was then hospitalized and underwent surgery. Under general anesthesia, a small incision was made behind the right ear, allowing for the removal of the reservoir and proximal cerebral shunt. The protruding part of the shunt was gently pulled out through the anus. A three-week follow-up revealed no complications, supporting the efficacy of this minimally invasive approach.

Conclusions: In this case report, we described a unique and successful treatment approach involving only a single incision behind the right ear and extrusion of the catheter through the anus. Although no complications were observed in our patient, further research into the prevalence, risk factors, and long-term outcomes of similar cases is warranted to refine clinical management strategies.

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Introduction

In the pursuit of effective therapeutic interventions, the deployment of ventriculoperitoneal (VP) shunts for hydrocephalus following cerebellar medulloblastoma surgery has become a common strategy. However, within this routine clinical context, unusual complications can emerge, presenting clinicians with unexpected scenarios that demand meticulous investigation and tailored management. Perforation of the bowel and extrusion of the distal shunt tube are uncommon and atypical complications associated with a VP shunt, which can lead to life-threatening infections such as meningitis. In this study, we report a rare but successfully managed case of VP shunt extrusion through the anus, treated with a single incision technique without requiring a laparotomy or endoscopic intervention.

Case Presentation

The case was a 14-month-old female infant who had undergone cerebellar medulloblastoma surgery at five months of age. Subsequently, the infant developed hydrocephalus and underwent VP shunt placement in the Keen's point region. However, the shunt exhibited an extraordinary phenomenon: It was compressible and failed to return to its original state after compression (Figure 1). During a journey, a remarkable event occurred where the distal end of the shunt protruded approximately 20 cm from the anal region. Despite this unprecedented complication, physical exams were normal. The infant remained conscious, without fever, neck stiffness, or bleeding. The parents reported no known allergic reactions. The most extraordinary finding was the partial erythema observed in the anal region, coinciding with the distal extrusion of the ventriculoperitoneal shunt. The x-ray imaging confirmed the presence of the tube extending through the rectum and perineum. Ultrasonography reported a small amount of fluid in the subhepatic and right paracolic regions (Figure 2).

The patient was hospitalized, and after the prescription of 50 mg/kg cefazolin intravenously as prophylaxis, she was transported to the operating room. Under general anesthesia, a small incision was made behind the right ear, allowing for the removal of the reservoir and proximal cerebral shunt. The protruding part of the shunt was gently pulled out through the anus. After 24 hours, she was discharged on a regular diet and a prophylactic antibiotic regimen for one week. A three-week follow-up revealed no complications, supporting the efficacy of this minimally invasive approach.

Discussion

Migration of distal catheters of VP shunt has been reported with great variability, from perforation of hollow viscus to exteriorization from the mouth, urethra, vagina, and anus, or perforating the abdominal wall [1]. Pan et al. in a study stated that the most common types of abdominal complications are abdominal pseudocysts and shunt migrations, in which the distal shunt catheter can migrate from the peritoneal cavity to other places and perforate the abdominal wall or hollow viscus [2]. Although abdominal complications related to VP shunt have been considered rare with heterogeneous presentation, the incidence has varied over the last decades, ranging from 5% to 50% of cases [3], while bowel perforation by peritoneal catheters remains rare, occurring in only 0.07% of cases with a mortality rate of 15% [4]. Ghritlaharey et al. stated that these complications occurred in more than two-thirds of the cases within one year after the VP Shunt placement [5]. In our case, catheter dislodgment also occurred 9 months after surgery. It seems that a close follow-up is necessary during this period and requires ongoing vigilance in postoperative care.

Although the exact mechanism of penetration is not fully understood, several potential mechanisms have been proposed, including pressure necrosis, foreign body reaction, prior inflammation of the bowel wall, and atrophied bowel musculature [6]. On the other hand, A thin bowel wall in children, a sharp and stiff end of VP shunt, distal tip of VP catheter placement with trocar, long peritoneal catheters, chronic irritation caused by shunt, previous surgery, and silicone allergy are some of the contributing factors that affect the complications in the anal extrusion of the peritoneal catheter [7, 8]. The worst-case scenario appears to be perforation of the colon, which can result in retrograde translocation of bacteria and meningitis [9, 10].

Our case report delved into an extraordinary occurrence in a 14-month-old female infant who had undergone surgical intervention for cerebellar medulloblastoma. She subsequently faced the development of hydrocephalus necessitating VP shunt placement in the Keen's point region. While traditional placements are common, the Keen's point approach introduces nuances that require careful consideration [11].

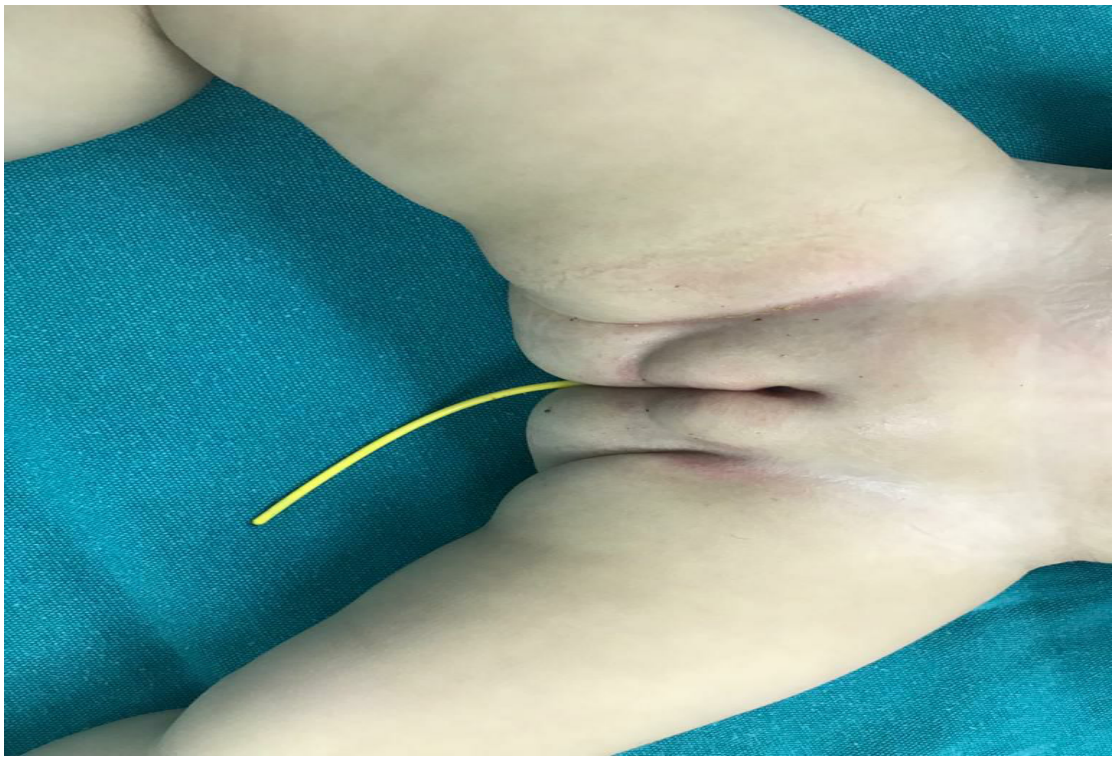

Figure 1. Distal end of the shunt protruded approximately 20 cm from the anal region

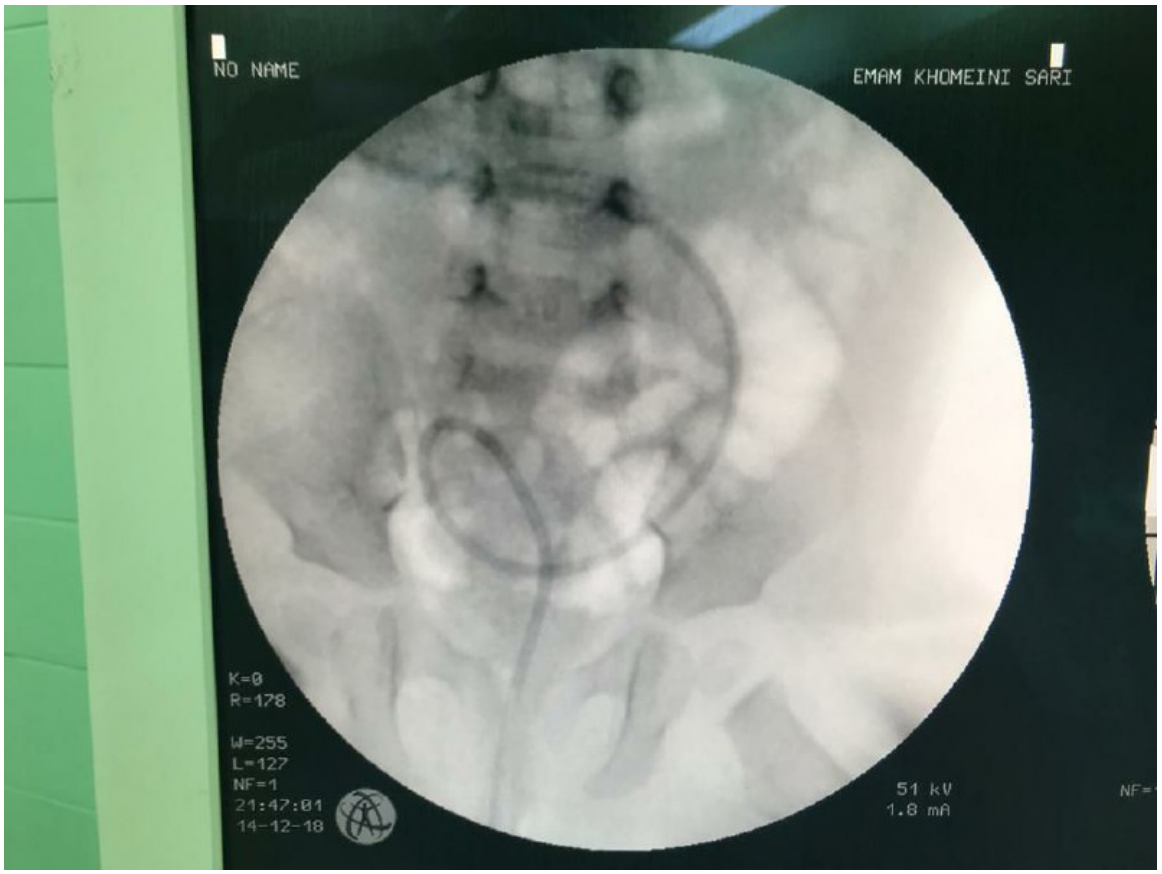

Figure 2. The tube was entering to the rectum and perineum

The comprehensive analytical review by Allouh et al. focused on the anatomical aspect and categorized distal VP catheter migration into three patterns: Internal, external, and compound. Internal migration involved invasion of any viscus inside the thoracic, abdominal, or pelvic cavity. External migration penetrated through the body wall (either subcutaneously or completely outside the body). Compound migration involved penetration of a hollow viscus with protrusion through a pre-existing anatomical orifice. They noted that external migration occurred more in infants, while internal migration occurred more in adults. Shunt duration was identified as a critical factor influencing migration patterns, with newly-replaced shunts tending to migrate externally [12].

Chugh et al. focused on abnormal migration and extrusion of the abdominal end of VP shunt and presented findings from eight cases. They described cases where the distal end was extruded from the anus, vagina, and anterior abdominal wall. Patients with extrusion through the abdominal wall experienced infections along the shunt tract, leading to abscess formation. Meningitis, with the growth of *Streptococcus* species from cerebrospinal fluid, was observed in these cases. They recommend a prompt and aggressive management protocol for cases with distal tip migration of VP shunts, suggesting further cerebrospinal fluid diversion procedures such as endoscopic third ventriculostomy or the placement of a new VP shunt [13]. In our study, we did not do any aggressive management. Bakshi et al., in a similar case, conducted the resection of the distal part of the tube over the abdomen and pulled it out gently through the anus. The proximal catheter part along with the reservoir was removed through a separate incision in the neck [14]. Amouei et al. operated on it by three incisions on the head and abdomen [15]. While in the study by Bal'afif et al. [16] and in our study, we use only a single incision behind the right ear.

Conclusion

In this case report, we described a unique and successful treatment approach involving only a single incision behind the right ear and extrusion of the catheter through the anus. Although no complications were observed in our patient, further research into the prevalence, risk factors, and long-term outcomes of similar cases is warranted to refine clinical management strategies.

Ethical Considerations

Compliance with ethical guidelines

Written informed consent was obtained from the patient's parents for publication of this case and accompanying images.

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Authors contributions

Supervision and surgery: Seyed Abdollah Mousavi; Clinical data collection and investigation: Saiead Ehteshami; Writing: Ali Pahnabi; Final approval: All authors.

Conflicts of interest

The authors declared no conflict of interest.

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