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Case Report

Anal extrusion of silent migrated ventriculoperitoneal shunt: Case report and literature review ☆

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ABSTRACT

The standard surgical treatment for hydrocephalus is ventriculo-perioneal shunting with shunt failure being the most common complication. A rare and serious consequence is intestinal perforation. A malnourished 9-month-old boy presented with anal protrusion of the distal migrated ventriculoperitoneal (VP) shunt after 2 months of shunt placement. An abdominal X-ray and a brain CT scan were performed. Following the correction of malnourishment and electrolyte imbalance, the patient underwent surgical management, with uneventful discharge on the third day of the procedure. To avoid potentially fatal complications such as sepsis and meningitis, prompt diagnosis and treatment are crucial in these cases.

Introduction

The ventriculoperitoneal (VP) shunt is the most common surgical procedure used in hydrocephalus management. However, like other surgical procedures, it can have corresponding serious complications [1]. Bowel perforation incidence is rare, occurring at 0.1%-0.7%, although Rajendra et al. reported a higher incidence of 2.51% [2]. In this case, we reported that a malnourished child presented with VP shunt extrusion through the anus.

Case report

A 9 months old boy with hydrocephalus who underwent VP shunt treatments 2 months ago, is presented in the

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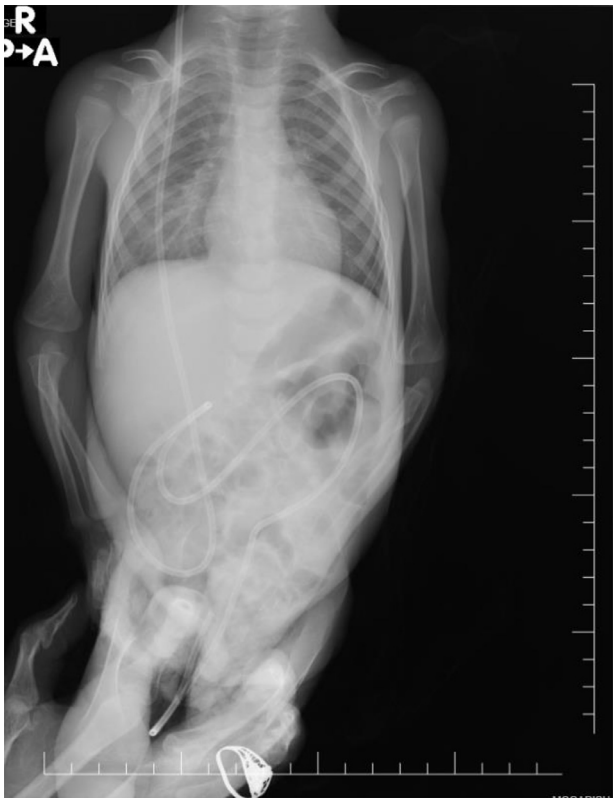

Fig. 1 – An abdominal X-ray revealed peritoneal end of the VP shunt tube going beyond the pubic symphysis.

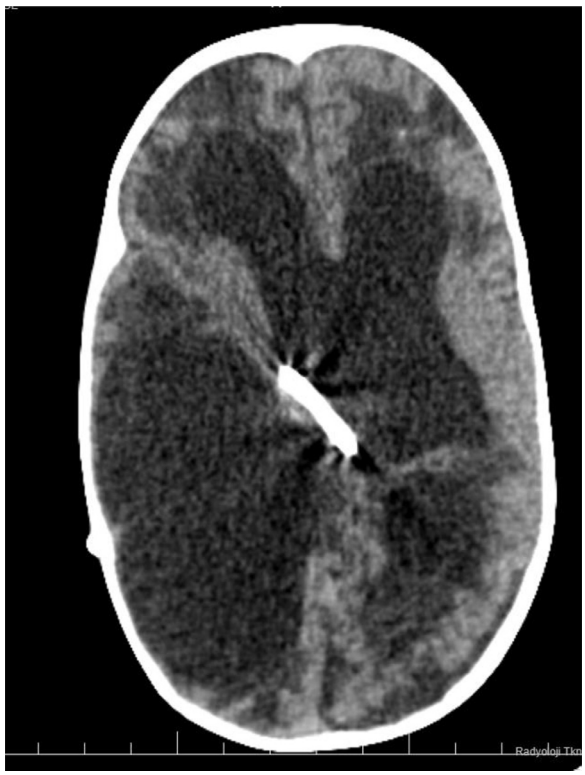

Fig. 2 – Brain CT demonstrated a right parietal VP shunt with its apex in the left lateral ventricle.

neurosurgery department after his parents noticed a tube protruding through the anus. The child has no history of abdominal pain, fever, and vomiting. In physical examination did not reveal signs of meningitis and peritonitis. The distal end of VPS was extruding through the anus.

His vital signs were within normal limits. He was cachexia with a z-score of less than -1 (severe acute malnutrition). His laboratory investigations revealed a low level of hemoglobin and WBC, 7.8 mg, and 1.4 x 10^3 mm^3 respectively. Total protein and albumin were low. Sodium potassium and calcium were low.

The child was investigated with a plain X-ray abdomen and ultrasonography of the abdomen. An abdominal X-ray revealed the peritoneal end of the shunt tube going beyond the pubic symphysis (Fig. 1). The abdominal ultrasound was normal since it could not detect the distal end of the shunt tube. The absence of ascites further supported the diagnosis. Brain computed tomography was performed to confirm the intraventricular position of the shunt (Fig. 2), while Gram stain and culture investigations of CSF were negative.

The case was admitted, and proud spectrum antibiotics were initiated to control and prevent shunt infection. F-75 and f-100 therapeutic milk were used to correct the nutritional status of the child. Furthermore, the electrolyte disturbance was balanced and the child has processed shunt correction surgery.

With the help of the pediatric surgeons, an exploratory laparotomy was done and the shunt tube was traced entering the ileocecal junction and extruding the external orifice of the anus with CFS leakage. There was no peritonitis since omentum sealed the entrance area. The catheter was chopped off and removed by the pediatric surgeons. Meantime total shunt replacement was made since there were no signs of infections and the operation was uneventful.

The patient was discharged on third day of the operation and was followed up as an outpatient.

Discussion

Generally, hydrocephalus is defined as increased cerebrospinal fluid leading to ventricular dilation and head enlargement requiring surgical management [3]. This disorder can be classified into many types, including congenital and acquired hydrocephalus. It causes disturbance of cerebrospinal fluid secretion and absorption or obstruction of its paths, resulting in fluid CSF accumulation and enlargement of the ventricles [2,3].

The VP shunt is the most common and globally accepted procedure intended for the management of hydrocephalus. It bypasses obstructed ventricular vessels and redirects the CSF into the peritoneal cavity. However, VP shunt complications remain high [4]. Shunt failure is the most common complication of VP shunts, and 70%-80% of cases need revision and proceed by shunt infection [5] and [6]. Ghritlaharey et al. [2] reported that 5%-10% of VP shunts are complicated with infec-

tions, which are serious and lethal sequela, and 70% of them occurred within the first 2 months of shunt placement.

The abdominal complications of this procedure comprise 10%-30%. Although bowel perforation is a rare consequence accounting for 0.1%-0.7%, penetration of the catheter tip into the bowel resulting in protrusion of the distal end of the catheter in the external orifice of the anus was well documented in the literature [7], with a mortality rate as high as 15% [8]. Among other delayed intra-abdominal complications are perforations of the urinary bladder, stomach, fallopian tubes, intestinal obstruction, and pseudocyst formation [5,9]. The reported rate of hollow viscus perforation depends on its mobility. Since the colon is the most rigid hollow organ, the colon is the most frequently perforated (70%) proceeded by the stomach and the small intestine,16%, and 14% respectively [9].

It is very crucial to keep in mind this rare complication as it may cause fatal sequelae, namely meningitis, encephalitis, and brain abscess [10]. Although the exact mechanism for bowel perforation and VP catheter migration is not completely understood, studies have postulated that inappropriate catheter length, fixation failure, foreign body reaction, local pressure injury, weak bowel wall muscles, and the presence of bacteria on the catheter tip during the procedure may contribute to intestinal perforation [8,11].

Low et al. [9] chronic inflammation from local foreign body reaction and allergy leads to late bowel perforation, while direct injury during procedure results in early perforation. It was suggested that malnutrition, prior abdominal surgery, and adhesions can increase the rate of shunt migration [8]. Studies found that young age, male gender, and prior abdominal operations and infections were possible predisposing factors associated with bowel perforation [9,12]. Like most cases in the literature, ours was asymptomatic, and the perforated site was sealed by a long fibrous tract, preventing contamination of feces into the peritoneal cavity. The major predisposing factor that makes our case unique is the presence of severe malnutrition and a long catheter, with the addition of a weak bowel wall in children; this might further weaken the bowel wall muscles, resulting in perforation.

It was postulated that, in children, their weaker intestinal musculature and stronger intestinal peristaltic activity result in a higher incidence of bowel perforation [9]. Thereafter, once the shunt enters the lumen of the intestine, the strong peristaltic activity pushes the catheter towards the anus [10]. There is no rational treatment option for these patients, and the management is individualized according to case-specific factors such as meningitis, the presence of shunt infections, and dependence on shunts [13].

In all cases, intravenous broad-spectrum antibiotics were started; however, surgery is the final step in these cases. For scenarios with peritonitis and sepsis, laparotomy is done and the distal end of the catheter is pulled out from the anus, while simple perforations are done with laparoscopy management [14]. Once the shunt is removed and the CSF culture is negative, another peritoneal shunt is inserted at a suitable time [10].

Since our case was asymptomatic and the entrance of the catheter was sealed by the peritoneum, laparotomy to close the perforated site and total shunt exteriorization and reinsertion of a new VP shunt on the contralateral site were done simultaneously.

Conclusion

Although intestine perforation of the distal end of the VP is an unusual complication, it can be lethal if sepsis and meningitis occur. Many risk factors were postulated in the literature, but the exact pathogenesis is unclear. Since most cases are asymptomatic, early diagnosis is important to mitigate the severity of complications. The approaches to management are individualized; however, antibiotics, removal, and replacement of the shunt are common.

Ethics approval and consent to participate

Ethical approval for this study was waived by ethical committee of Mogadishu Somali Turkey, Recep Tayyip Erdogan Training and Research Hospital. The Patient was invited to participate and written informed consent was obtained.

Patient consent

The Patient's parents were invited and written informed consent was obtained for his anonymized information to be published in this study.

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