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Original Research Paper

Neurosurgery

CAUDAL MIGRATION AND TRANS-ANAL EXTRUSION OF VENTRICULO-PERITONEAL SHUNT IN A CHILD : A CASE REPORT

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ABSTRACT We present an unusual case of anal extrusion of the peritoneal end of a ventriculo-peritoneal shunt (VP shunt) in a 5 year old male child. The patient was suffering from aqueductal stenosis for which the shunt was placed 2 years ago. Pertinent literature is reviewed regarding this rare complication in such a common surgery.

KEYWORDS : hydrocephalus, VP shunt , complication, caudal migration, trans-anal extrusion

INTRODUCTION :

Ventriculo-peritoneal shunts are one of the commonest surgical procedures performed in neurosurgery for diversion of cerebrospinal fluid for hydrocephalus. Excess amount of cerebrospinal fluid is drained unidirectionally from obstructed ventricular cavities into the peritoneum in the management of hydrocephalus. VP shunt sometimes causes complications. Complications can be mechanical (obstruction, disconnection and migration) or non mechanical (infection and distal compartment related like pseudocyst formation , ascites and pleural effusion). [1,2] Migration can be defined as translocation of the part/ whole of the shunt system (proximal/ distal catheter / reservoir/ valves) from the compartment where it was intended to be to a new compartment which may be associated with/ without shunt dysfunction. In general, a caudal migration is more common than a cranial migration.[3] Bowel perforation caused by the ventriculo-peritoneal shunt is a rare occurrence with an estimated incidence rate of 0.1% to 1.0% among all cases of VP shunt displacement. Perforation of the bowel wall by VP shunt is a surgical emergency. Awareness and early recognition of this complication are essential because of the high mortality rate in such patients. [4] In this present case report, a 5 year olds male child presented with anal protrusion of VP shunt with fever and signs of shunt malfunction. Early diagnosis and treatment of this complication is essential to minimize or prevent infectious and neurological consequences.

Case Presentation :

A 5 year old male child was diagnosed with aqueductal stenosis and resulting hydrocephalus 2 years ago. He was admitted in our hospital and underwent Chhabra type silicone VP shunt placement surgery on the right side. Now he presented with fever , vomiting and headache without any abdominal distension. Clinically no ascites could be demonstrated. Non contrast-enhanced computed tomography scan (NCCT) revealed a proximal catheter in the lateral ventricle of the brain. Colonoscopy revealed perforated and prolapsed VP shunt stent. The patient was given broad spectrum antibiotics and was prepared for surgery. Patient was operated- previous abdominal incision opened, shunt catheter was cut at the abdominal wound level and gently pulled out by the extruded anal portion. Rest of the shunt assembly including the ventricular end was removed by an incision at the head end. CT scan head was done 48 hours later. It revealed hydrocephalus. After the infection resolved , a VP shunt was placed on the left side. The patient is currently on regular follow-up, and was well at last follow-up four months after shunt placement.

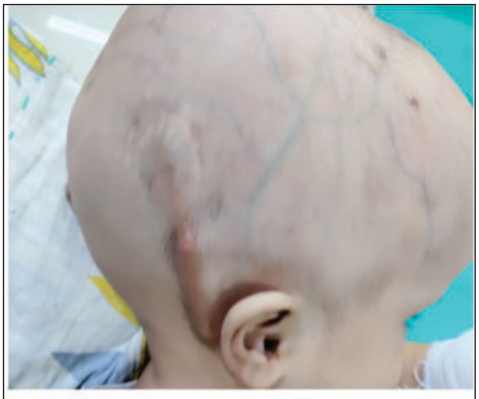


Fig 2. Previous surgery scar- cranial end of VP shunt catheter

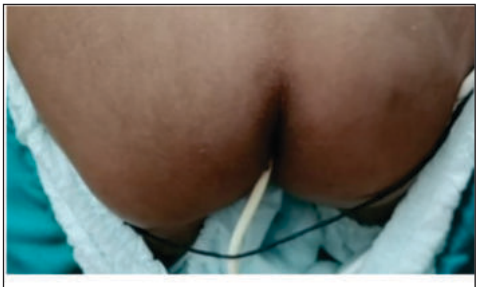


Fig 1. Trans-anal extrusion of caudally migrated VP shunt catheter

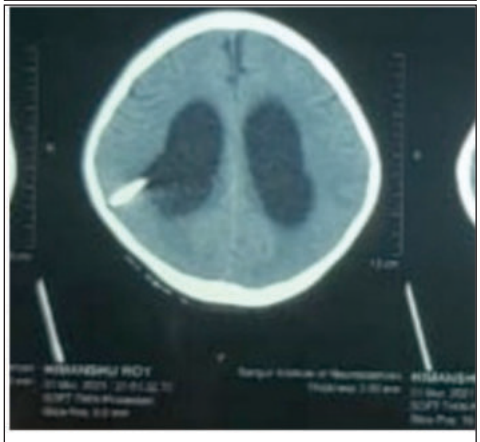
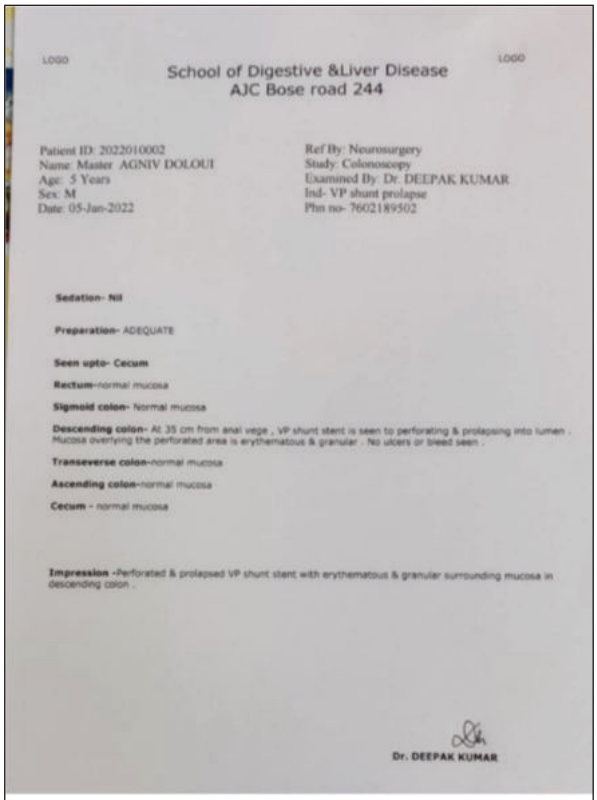


Fig 3. Ventricular tip of catheter


LOGO

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School of Digestive &Liver Disease
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Patient ID: 2022010002
Name: Master AGNIV DOLOUI
Age: 5 Years
Sex: M
Date: 05-Jan-2022

Ref By: Neurosurgery
Study: Colonoscopy
Examined By: Dr. DEEPAK KUMAR
Ind- VP shunt prolapse
Phn no- 7602189502

Sedation- Nil

Preparation- ADEQUATE

Seen upto- Cecum

Rectum-normal mucosa

Sigmoid colon- Normal mucosa

Descending colon- At 35 cm from anal vege , VP shunt stent is seen to perforating & prolapsing into lumen . Mucosa overlying the perforated area is erythematous & granular . No ulcers or bleed seen .

Transeverse colon-normal mucosa

Ascending colon-normal mucosa

Cecum - normal mucosa

Impression -Perforated & prolapsed VP shunt stent with erythematous & granular surrounding mucosa in descending colon .

Dr. DEEPAK KUMAR

Fig 4c.

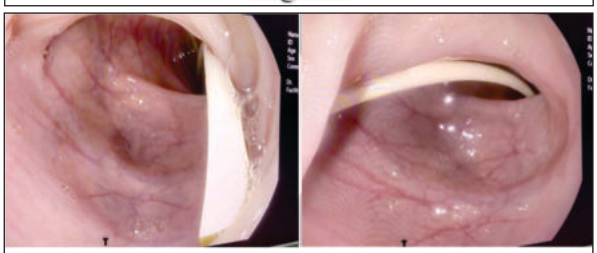

Fig 4a. Fig 4b.

The above pictures reveal bowel perforation and prolapsed VP shunt in colonoscopy.

DISCUSSION :

Bowel perforation and anal extrusion of a peritoneal catheter is an unusual complication which was first reported by Wilson and Bertrand in 1966 .[5] In a recently published review by Hai et al.[6], anal protrusions of distal shunt catheters were reported in 96 patients. The VP shunt consists of various valve assemblies and a slit at its lower end. The draining abdominal tip may also cause complications like paralytic ileus in the early postoperative period and intestinal obstruction secondary to adhesion formation in a later period. Some other abdominal complications may occur like blockade due to fibrous encasement or kinking, expulsion through the abdominal wound, migration (both cranial or caudal) into various abdominal organs, development of hydrocele in male, formation of peritoneal cyst and extrusion through the umbilicus. Perforation of the gall bladder, gut, rectal wall, urinary bladder, uterus, the vagina has also been reported in the literature. [7] The catheter tip adheres to the wall of viscera and a constant pressure of the abutting tip along with local inflammatory reaction leads to erosion of the visceral wall and entrance of tip in the lumen. The peristaltic activity of gut carries it all the way down to the anus. Since the inflammation is usually a localized phenomenon, rarely there are any obvious signs of peritonitis. Coexisting thin intestinal musculature in myelomeningocele, placement of hard peritoneal catheters, and local infective adhesions may predispose gut perforation . Use of modern soft supple catheters made up of silicone, which may incite a lesser foreign body reaction, has been said to have decreased the incidence of such complications.[8] The trocar used for placement of abdominal catheter is a blind procedure and may result in perforation of bowel.[9] Techniques to investigate bowel perforation include abdominal x-ray and CT. X-rays, CT scans, and CSF cultures are positive in nearly 50% of cases. Bowel perforation may be implied if pneumocephalus is visible on CT head. Cerebral abscess must be ruled out from a CECT head that may develop due to retrograde migration of infection into the cranial cavity. E.coli meningitis is also an indicator of intestinal perforation by a VP shunt tube. The management includes removal of the shunt and administration of broad spectrum antibiotics. [10] Antibiotics that have been used include linezolid, meropenem and metronidazole. The use of a sequential combination of intravenous antibiotics and intraventricular antimicrobial therapy has been reported. [11]For very acute cases, an emergency surgery is required to suture the perforation through laparotomy , thorough peritoneal lavage and primary repair of the intestinal wall while in chronic cases, shunt removal will be adequate like in this case. Sometimes, knotting of long shunt catheter itself or twisting of the tube with the bowel loops makes laparotomy mandatory even in the absence of peritonitis. Laparoscopic visualization and disengagement of the shunt tube may be tried. Simultaneous laparoscopic management of intra- abdominal complications along with endoscopic management of anal extrusion of ventriculo-peritoneal shunt has also been reported in the literature. [12] If the patient develops hydrocephalus after removal of the shunt, a new VP shunt should be placed on the contralateral side after repeated CSF cultures are negative and sterile.

CONCLUSION :

Bowel perforations are mostly due to local inflammatory process rather than technical error in shunt placement. Most migrations occur present in the first year following VP shunt placement. In any patient, who has undergone a shunt procedure and presents with non-neurological signs/ symptoms, shunt migration should be considered. Detection is often delayed and abdominal symptoms overlooked until the patient develops shunt malfunction, retrograde cranial infection, or the shunt protrudes through anus. All these conditions should be aggressively managed to decrease morbidity and mortality.

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Conflicts of interest:
None.

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