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PERORAL EXTRUSION OF VENTRICULOPERITONEAL SHUNT: AN UNUSUAL COMPLICATION WITH LITERATURE REVIEW

Neurosurgery

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ABSTRACT

Background: VP shunt surgery is a commonly performed surgery. There have been various shunt-related complications among which peroral extrusion of a ventriculoperitoneal shunt is the rarest of all. Although its mechanism is unknown, prompt diagnosis and appropriate treatment of such instances may result in better outcomes and a reduction in morbidity and mortality. **Case description:** A 5-year-old girl presented with peroral extrusion of a VP shunt catheter. Four months back, the girl had been diagnosed with craniopharyngioma for which she was operated and the VP shunt system was inserted subsequently. A head CT was done and the girl underwent emergency surgery. **Conclusion:** Peroral extrusion of a VP shunt is a rare complication to be encountered. Hence, clinicians should be aware of such complications and should recognise subtle changes or neurological dysfunctions related to shunt malfunction and hydrocephalus. The likelihood of a successful recovery is extremely high with early diagnosis and appropriate treatment.

KEYWORDS

VP shunt, complication, hydrocephalus, surgery, CSF, peroral extrusion, neurosurgery, peritoneal end

INTRODUCTION

Hydrocephalus is characterized by excessive cerebrospinal fluid (CSF) accumulation within the brain's ventricles; it's a multifactorial neurological disorder, and a common neurosurgical condition, requiring treatment with a cerebrospinal fluid (CSF) shunt [1,2]. In the paediatric population, hydrocephalus has high morbidity and mortality[3]. CT scan, MRI and ultrasonography are the imaging studies that provide tools for diagnosis, treatment and prognosis[4]. The most often surgery done is VP (Ventriculoperitoneal) shunt, although other alternatives include ventriculo-atrial (VA), ventriculo-pleural (VPL), and lumbar-peritoneal (LP) shunts[5]. The reported rates of shunt malfunction are significantly high within the first year of initial implantation[6]. Shunt-related complications include obstructions, shunt infections, migration, CSF leaks, inappropriate drainage, revision surgeries and surgical site infection[7-9]. However, an extremely rare complication is the peroral expulsion of a ventriculoperitoneal shunt[6,10].

Figure1: Peroral Extrusion Of Peritoneal End Of A VP Shunt Catheter.

CASE REPORT

A 5-year-old girl presented with peroral extrusion of a VP shunt catheter (Figure1). Four months back, the girl had been diagnosed for craniopharyngioma for which she was operated on and VP shunt system was inserted subsequently. About a day before the admission to our hospital, her mother observed a tube like structure coming out of her daughters mouth. On examination, the girl was afebrile, fully conscious and hemodynamically stable. There were no signs of inflammation along the shunt tract and; abdomen was soft and bowel sounds were normal. Flow of cerebrospinal fluid (CSF) was observed from the end of the catheter which meant no obstruction. Laboratory tests showed no signs of infection or any other abnormality. Head CT showed ventricular catheter was in the right position (Figure2). The girl underwent emergency surgery. Surgeons made incisions in her scalp and abdomen along the previous scars. The ventricle end and the chamber were removed through the incision and peritoneal (distal) end was pulled through mouth (Figure3). A revision surgery was performed on the opposite side. Tests on the CSF showed no signs of infection. On fifth day she was discharged uneventfully and was kept on follow up with neurosurgery.

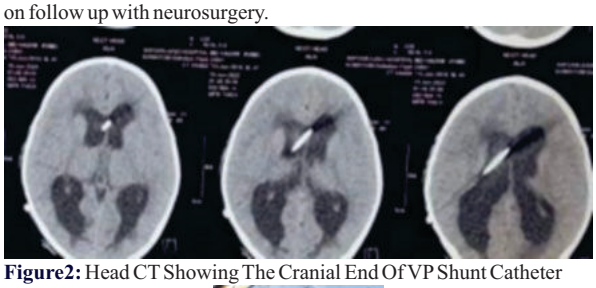

Figure2: Head CT Showing The Cranial End Of VP Shunt Catheter

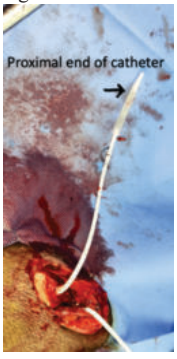

Figure3: Intraoperative Image Showing The Proximal End Of VP Shunt Catheter

DISCUSSION

Hydrocephalus is a disorder of abnormal expansion of cerebral

ventricles as a result of excessive CSF[11]. It is frequently treated by cerebral shunts[12]. A ventriculoperitoneal (VP) shunt is a cerebral shunt that is a commonly exercised method for CSF diversion when there is an excess of CSF due to obstruction in the normal outflow or a decrease in its absorption[12,13]. CSF provides buoyancy, nourishes neural tissue, and removes toxic products of metabolism[14]. Typically, hydrocephalus is classified as either obstructive or communicative[14,15]. There is also a condition known as chronic hydrocephalus incidence of which increases with age and; Normal Pressure Hydrocephalus (NPH) which is a frequent neuropsychiatric entity, characterized by Hakim's triad of urinary incontinence, dementia and, gait disturbances[16,17]. It is generally diagnosed using a combination of clinical presentations, imaging studies such as ultrasonography, CT (computed tomography) and MRI (magnetic resonance imaging) to assess ventricular enlargement and brain edema; and other methods may also include CSF pressure analysis[14]. In many cases, lumbar puncture is performed for diagnostic purposes and if it results in significant improvement, a shunt surgery could be considered[14]. Treatment is individualized according to the case which includes shunt surgery and other endoscopic approaches[11]. Surgical management commonly includes the placement of ventriculoperitoneal or lumboperitoneal shunts[18]. Its complications could be a result of occlusion, infection, disconnection, distal catheter site-specific failures or inappropriate drainage[19,20]. Hence, to manage these complications ventriculoatrial or ventriculopleural shunt are few other options which are commonly considered[21]. However, peroral extrusion of the peritoneal end of VP shunt catheter is an extremely rare complication commonly encountered in the paediatric age group, often seen within one year of surgery or following revision surgery due to some complication[22]. For further testing of shunt catheter continuity, various investigations are carried out such as a Skiagram of the abdomen and chest, cranial CT scan, upper Gastrointestinal (GI) endoscopy, or Laparoscopic technique which could be both diagnostic as well therapeutic in cases of bowel perforations[22]. Also, CSF should be examined for any infection[6]. In this case, however, the patient underwent surgical removal of the shunt with a revised VP shunt procedure, all this led to an uneventful recovery.

Treatment options for peroral extrusion of VPS catheter vary from case to case depending on shunt or shunt tract infection, peritonitis due to bowel perforation; CSF infection and meningitis[22].

CONCLUSION

The peroral expulsion of a ventriculoperitoneal shunt is one of the rarest complications. Hence, clinicians should be aware of such complications and should recognise subtle changes or neurological dysfunctions related to shunt malfunction and hydrocephalus. It should be managed timely with a shunt removal surgery to prevent any further complications and; revision surgeries could be done if required. Timely diagnosis and proper management of such cases could lead to better outcomes with a decrease in morbidity and mortality.

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