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Despite the availability of endoscopic third ventriculostomy (ETV), Ventriculo Peritoneal (VP) shunting is still a common surgery done in routine practice. VP shunt causing bowel perforation and migration through the multiple natural orifices is commonly seen.^[1-3] Solid organ penetration is unusual and the present case of Kidney penetration is only one of its kinds.

Case report:

Eighteen months old female child, an operated VP shunt case came from another neurosurgical centre to us with features of excess cry, refusal to feeds. On examination, child was irritable, bulged anterior fontanel and tender abdomen.

Ventriculo Peritoneal shunt catheter penetrating the Kidney: Un unusual complication of shunt surgery

Ventriculo Peritoneal (VP) shunt surgery is one of the commonly performed neurosurgical procedure in the management of hydrocephalus. Numerous complications related to this procedure are reported in the literature. Shunt malfunction related to the abdominal catheter is seen nearly 10-40% of cases. The catheter can perforate hollow viscous or solid organs. Among the solid organs, the kidney penetration was not reported in the English literature. We report an unusual case of VP shunt abdominal catheter migration in to kidney

Ventriculo peritoneal shunt being one of the commonest procedures done by any neurosurgeon has many complications. Among them abdominal catheter complications like halo viscous perforation, abdominal wall perforation and extrusion through the natural orifices are considered to be rare. Solid organ perforations are very unusual and very limited numbers of these are reported.

Key words: Hydrocephalus; Shunt migration; Kidney penetration and solid organs; VP Shunt complications; shunt migration

Plain X-ray abdomen (**Figure 1**) revealed coiling of the shunt tube and the shunt tube tip noted in the right hypochondrium. Ultra sonogram (USG) abdomen (**Figure 2**) revealed the shunt penetrating to the superior pole of the right kidney, tip showed beneath the capsule and migrating into the renal parenchyma.

Based on the clinico radiological findings, shunt malfunction due to right kidney penetration was suspected and child was taken up for elective shunt revision. Through a small sub costal incision, the catheter was identified and with gentle milking action, it was slowly removed. Later the lower end of the shunt was replaced with a new system. Postoperative USG (**Figure 3**) done on second day did not show perinephric collection. Child discharged on third day in stable neurological status.

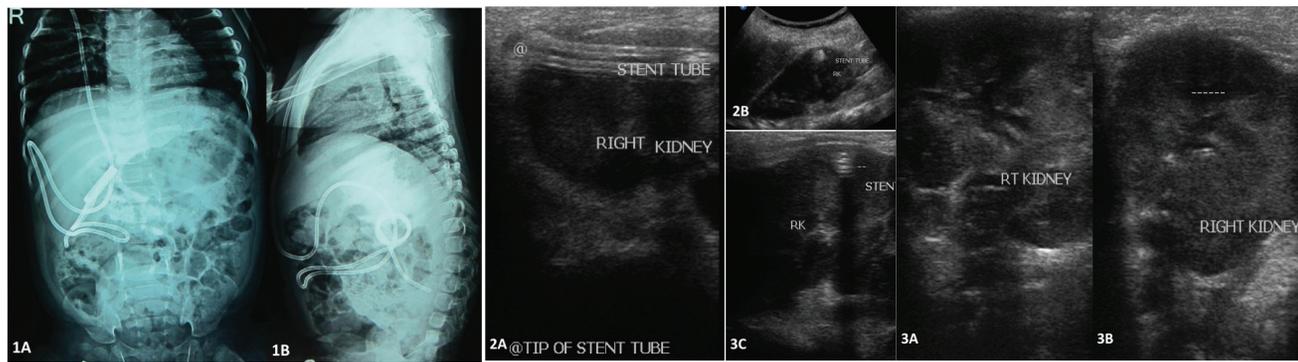


Figure 1(A,B): Plain X-ray Abdomen (AP & Lateral Views) showing the coiled VP shunt catheter with its tip in renal area.

Figure 2 (A,B,C): Pre operative USG scan images showing the VP shunt catheter in the upper pole of right Kidney in different angles

Figure 3(A,B): Postoperative USG scans images showing kidney with minimal perinephric collection

Discussion:

Hydrocephalus is common in pediatric age group and is associated with many complications like infection, shunt block, perforation of intra abdominal organs and migration through normal orifices.³ Shunt perforation of hollow viscous like bowel, gallbladder, vaginal wall and bladder and their exit through anus, oral cavity and vagina etc are reported.³ In the same way shunt catheter piercing the potential spaces like pleural cavity, hernial sac, abdominal wall, or umbilicus are also reported.^{1,3} The solid organ penetrations are very rare and perforation of liver⁴, heart⁵ was reported previously. There was no report of kidney penetration. The rare occurrence kidney perforation might be due to its retroperitoneal location. The exact pathophysiology of these migrations is not known, but there are some postulations discussed in the literature to explain this entity.

The tip of the lower end of the shunt tube might have adhered to these organs due to inflammation. Chronic pressure by the stiff end of the shunt tip and continuous hammer effect of the CSF pulsations could lead to the perforation of hollow viscera or penetrating into solid intra abdominal organs.³ kidney perforation could have happened following the penetration of posterior abdominal wall through the peritoneal cavity and subsequent adherence to the kidney. Chronic inflammation along the shunt catheter causes fibrosis of the tract and the same makes it easy to remove the catheter with out major explorations.^{2,4,6,7}

At times, the management of these cases is difficult and needs to be individualized. The standard method of treatment is removal of the extruded shunt system followed by new CSF diversion procedure.

Conclusion:

Abdominal end shunt catheter related complications are unusual and mostly seen in pediatric age group. Apart from the hollow viscous perforations, solid organ penetrations are very rare and perforation of the kidney was never reported previously. The treatment of these complications needs to be individualized.

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