Case Report

Extrusion of Peritoneal end of Ventriculoperitoneal Shunt Catheter from Scalp Wound: A Case Report

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Abstract: Ventriculo Peritoneal Shunt (VPS) implantation for hydrocephalus is associated with several complications. Proximal migration of the VPS catheter is a rare complication following ventriculo-peritoneal shunting. This is a report of a management of 8-month-old-boy who had extrusion of peritoneal end of VPS catheter through scalp wound. VPS was placed at the age of 4-month for congenital / obstructive hydrocephalus. One and half month after VPS placement, he had redness and subcutaneous fluid collections around the VPS catheter tract at neck and chest area and were treated well with oral antibiotics. Four months after the shunt implantation, he was admitted with a complaint of that the end of peritoneal catheter was extruding out through scalp wound. He was managed well with removal of entire VPS tubing through scalp incision, injectable antibiotics, and delayed re-VPS placement on right side. Three-week after shunt revision, he again presented with extrusion of part of peritoneal catheter from neck area and was managed with removal of peritoneal catheter, and ventricular catheter was used as external ventricular drainage (EVD). His Computed Tomography (CT) scan of head showed dilatation of lateral ventricles (more on right side) and therefore right sided VPS was placed again after a month. Extrusion of distal / peritoneal end of VPS catheter from scalp is unique and probably not reported earlier.

Keywords: Hydrocephalus, Ventriculoperitoneal Shunt, VPS Complication, Ventriculoperitoneal Shunt Extrusion, VPS Revision

1. Introduction

Placement of VPS is widely accepted and most frequently performed operation for the management of hydrocephalus, across all the age groups [1], [2]. VPS implantation is associated with several complications, occurring in one-fourth to three-fourth of the cases, and many of the complication require shunt revision [3], [4]. Complications’ relating to peritoneal / distal end of VPS catheter includes; perforation of hollow viscus and extrusion of VPS catheter through natural orifices, pseudocysts formation, penetration into solid organs, extrusion from umbilicus, abdominal wall, chest wall and neck wound [4], [5], [6]. Spontaneous, proximal migration and extrusion of the end of peritoneal part of VPS catheter from scalp wound has not been reported earlier, and this is probably a first case report of such an entity.

2. Case Report

A 4-month-old boy was transferred from the department of paediatric medicine for VPS implantation for congenital, moderate hydrocephalus, which was confirmed by cranial CT scan, and a Chhabra “slit n spring” valve, medium pressure, whole length of VPS was placed on right side. One and half month after VPS placement, he presented with redness and subcutaneous fluid collection around the VPS catheter tract at neck and chest area, and was treated well with oral antibiotics. Four months after the shunt implantation, at the age of 8-month he was admitted to the author’s department of pediatric surgery with a complaint of that the distal end of peritoneal catheter of VPS was extruding out through scalp wound. Examination of VPS catheter tract revealed that there was a wound at posterior auricular region on right side, from that site end of peritoneal catheter was extruding out (Figure 1, and figure 2). Initially the extruded catheter was suspected that...
a ventricular catheter of VPS was migrated down and extruded out, but on close observation there was a slit valve on extruded catheter, indicating that it was an “end of peritoneal catheter” of VPS catheter (figure 3). Examination of shunt tract also revealed that there was a small healing wound at neck area over shunt catheter, and shunt was also not functional. Features of meningitis, peritonitis or raised intra cranial pressure were absent. Examination of other systems was also normal.

Skiagram of abdomen, chest, neck and head revealed that the VPS catheter travelled upwards from right hypochondrium and extruded from right side of head (figure 4). Skiagram of abdomen also showed no gas under the diaphragm or no fluid collection in peritoneal cavity. On close observation of skiagram of abdomen revealed that there was an acute angulation of peritoneal catheter, and may be the cause for non-functioning of VPS (figure 5). Ultrasonography of abdomen was within normal limits and showed no any fluid collection. Under local anaesthesia, entire VPS tubing was removed via scalp incision that was made just proximal to shunt chamber. During shunt removal it was also noted that ventricular catheter was draining well, and CSF was also clear. CSF was also obtained from ventricular catheter during shunt removal for culture. He was managed with injectable antibiotics for 15 days, during this period scalp, and neck wounds were also healed well, and VPS was implanted again after 2-week on the right side. Chhabra “slit n spring” valve and a regular reservoir medium pressure, whole length (peritoneal / distal catheter length 75 cm), hydrocephalus shunt system (G Surgiwear Limited, Shahjahanpur, Uttar Pradesh, India) was used during initial shunting and during re-VPS placement.

Figure 1. Clinical photograph showing extruded peritoneal end of VPS catheter, posterior auricular wound, and healed abdominal scar.
Figure 2. Clinical photograph (Close-up view) showing extruded peritoneal end of VPS catheter through right posterior auricular wound.

Figure 3. Clinical photograph showing slit-valve at the end of extruded peritoneal catheter of VPS.

Figure 4. Skiagram of abdomen, chest, neck and head showing radio-opaque VPS tubing / catheter without break, upward and migrated peritoneal end of VPS catheter at right auricular area, and coiling of shunt tubing at abdomen.

Figure 5. Skiagram of abdomen (close-up view) showing radio-opaque peritoneal catheter without break, coiling of catheter, and an acute angulation of peritoneal catheter at one place.

Three-week after shunt revision, he again presented with extrusion of part of peritoneal catheter from neck area (figure 6). At this time also he had no features of meningitis, peritonitis or raised intra cranial pressure, and therefore decided for removal of peritoneal catheter, and the ventricular catheter was used as EVD.
His CT scan of head showed dilatation of lateral ventricles, more on right side and sub-dural collection of CSF at left parietal area (figure 7). CSF culture also reported *Klebsiella* and he was treated with injectable antibiotics along with EVD. After a month, right sided, medium pressure, VPS was inserted again. His post-operative period was well, and he was discharged after a week following re-VPS insertion.

**Figure 6.** Clinical photograph showing extrusion of part of distal / peritoneal catheter of VPS from neck area.

**Figure 7.** CT scan of head showing sub-dural CSF collection at left side, and dilatation of lateral ventricles (more on right side).

### 3. Discussion

Commonest site for the hollow visceral perforation by peritoneal end of VPS is colon, and in such cases the peritoneal part of VPS catheter also protruded / extruded out through anus and reported in up-to 2.5% of the cases [4], [5]. Extrusion of peritoneal part of VPS catheter through mouth is also an extremely rare complication following VPS insertion. A review of the management of peroral extrusion of peritoneal part of VPS catheter observed only 22 such cases; most frequently observed in children (n=20), although also reported in adults (n=2) [6]. Perforation of urinary bladder and extrusion of distal end of VPS catheter through urethra has also been reported in literature as a very rare complication following VPS insertion [7]. Extrusion of VPS catheter through vaginal orifice has also been reported in literature as an extremely are complication following VPS insertion [8]. Extrusion of distal end of VPS catheter through gastrostomy wound, and through Mitrofanoff appendicovesicostomy has also been reported in literature [9], [10]. Non-viscus perforation by VPS catheter and extrusion through abdominal wound, chest wall, neck wound, lumper area, and umbilicus has all being reported in literature [4], [8], [11].

Migration of peritoneal catheter following VPS placement for hydrocephalus, into the heart and pulmonary artery has also been reported [12]. Proximal migration of peritoneal catheter following VPS placement into the breast may lead to pseudocyst formation and galactorrhea, but very rarely coiling of the peritoneal catheter and pseudocyst formation into a breast [13]. Proximal migration is a rare complication following VPS placement, and also migrated at subgaleal space, scalp, and subdural space [14], [15], [16]. Proximal migration of entire VPS catheter within the ventricles is very rare complication following VPS placement for hydrocephalus and only few cases has been reported [17], [18].

The occurrence of proximal migration of VPS catheter is multi-factorial and includes shunt traction, point of shunt fixation at proximal end, large dural hole, tortuous subcutaneous tract, increased intra-abdominal pressure, vigorous flexion-extension movement of the head acting as a windlass and facilitating upward movement of the peritoneal catheter, and mechanism of “retained memory” of the VPS tubing [14], [15], [16], [17], [18]. Most of time, upward migrations of VPS catheter were reported to occur within few months after the placement of VPS [14], [15], [16], [17].

In present case the extrusion of the end of peritoneal catheter occurred 4-month after VPS placement. Possible mechanism for upward migration of peritoneal catheter in this present case were fixation of VPS catheter at cranial site, weak subcutaneous plane around shunt tubing due to previous shunt tract infection, tortuous subcutaneous tract, excessive movements of head and neck, and increased intra abdominal pressure. Present case is unique and probably not reported earlier, that the distal end of peritoneal catheter of VPS tubing was migrated upward alongside with implanted shunt tubing, and extruded out from post auricular scalp wound. The possible reason for extrusion from that point was due to the fact that there was a wound over shunt tubing which provided a weakest point for exit. In this case skiagram also showed there was acute angulation at one point in peritoneal catheter and was probably the cause of non-functioning of VPS system.
4. Conclusion

A wide variety of complications are occurring following placement of VPS catheter for the treatment of hydrocephalus, not only in infants and children but also in adults. Varieties of VPS related complications may occur in same patient and requiring multiple shunt revisions. Spontaneous proximal migration and extrusion of the “end of peritoneal part of VPS catheter” through scalp wound is an extremely rare complication following VPS insertion.

References


