Urinary Bladder Perforation by Ventriculoperitoneal Shunt Manifested as Spontaneous Per-Urethral Extrusion of Shunt Catheter

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ABSTRACT

Various complications of distal end of ventriculoperitoneal shunt (VPS) have been described in the literature, but bladder perforation by VPS is considered extremely rare. We report a case of 35-year-old man who had underlying recurrent 4th ventricle ependymoma and hydrocephalus. Five months prior to current presentation, he had VPS revision for dislodged peritoneal catheter. Intraoperatively, the dislodged catheter had to be left in situ as it had completely gone intraperitoneally. He was apparently asymptomatic until he presented with spontaneous passage of VPS catheter per-urethra without signs of peritonitis or central nervous system (CNS) infection. Computed tomography (CT) revealed intact new VPS and no contrast extravasation from bladder. We postulated that the dislodged peritoneal catheter might have eroded into the bladder for a considerable period of time and the perforation had already spontaneously sealed. He was managed conservatively with an indwelling urinary catheter for a week and given prophylactic antibiotics against CNS infection. Since dislodged pieces of shunt tubing in the peritoneal cavity are generally believed to be asymptomatic, it is a common practice to leave them particularly if they are deeply embedded in surrounding tissues. Nevertheless, clinician must be mindful that such practice may potentially lead to serious complications as exemplified in our case.

Key Words: Bladder perforation, ventriculoperitoneal shunt

INTRODUCTION

The placement of ventriculoperitoneal shunt (VPS) is the most common form of treatment for hydrocephalus. However, it does carry the risk of potential complications which may be broadly categorized into obstruction, infection, mechanical shunt failure, overdrainage, and distal catheter site-specific issues(1). One of the rare complications related to distal peritoneal catheter is hollow viscus perforation. The current case report illustrates an extremely rare entity of bladder perforation by VPS catheter with its subsequent spontaneous extrusion per-urethra.

CASE REPORT

We present a 35-year-old man with recurrent 4th ventricle ependymoma and hydrocephalus post multiple surgery for tumor excision and VPS insertion. Five months prior to current presentation, he had VPS revision for dislodged VPS peritoneal catheter. Intraoperatively, a new VPS was successfully placed. Unfortunately, the previous dislodged peritoneal catheter was unable to be retrieved as it had completely migrated intraperitoneally. Decision was made for conservative management with observation as the catheter is made of silicone which was thought to be inert.
He was subsequently discharged home and remained asymptomatic until five months later when he presented with passage of VPS catheter per-urethra. (Fig 1) At presentation, he had no signs of peritonitis, raised intracranial pressure or intracranial infection. From shunt series x-rays, the revised VPS was found to be intact with high suspicious of the extruded catheter being the one that was dislodged earlier. (Fig 2) We proceeded with computed tomography (CT) cystogram which confirmed our suspicion and also demonstrated no intraabdominal collection or contrast extravasation from the bladder. (Fig 3). Bedside removal of the extruded catheter per-urethra was done successfully without any undue force (Fig 4), following which he was put on an indwelling urinary catheter for a week and prophylactic antibiotics against intracranial infection. He remained well during clinic follow-up at 1 month.

Figure 1: VPS catheter extruded via urethra

Figure 2: Abdominal X-rays of shunt series outlines coils of dislodged peritoneal catheter (red-arrow) and an intact in situ revised VPS (yellow-arrow)

DISCUSSION

Various complications of the peritoneal catheter of VPS have been reported in the literatures namely migrated peritoneal catheter, peritoneal pseudocyst and erosion through hollow organs such as bowels or urinary bladder (1). Bladder perforation by VPS catheter followed by its spontaneous extrusion per-urethra is considered an extremely rare presentation. Other common manifestations of VPS perforating urinary bladder are those related to recurrent lower urinary tract infection, bladder calculus, meningitis, peritonitis and intraabdominal collection (2,3,4).

The pathogenesis of distal catheter penetration into viscera is not clearly understood. Hypothesized mechanisms include direct pressure erosion after fibrous adhesion of catheter tubing to viscera, water-hammer pressure by cerebrospinal fluid pulsation, direct penetration by the rigid catheter tip and allergy to catheter material such as silicone (3,5). Silicone which was previously thought to be biologically inert, has been demonstrated in some studies to have the ability to breach cellular barriers and being absorbed causing accumulation, degradation and toxicity in the living organism. These undesirable characteristics are particular observed in low molecular weight silicone (6).

In the current case, the absence of peritoneal or CNS infection combined with radiological findings showing the extruded catheter being of the dislodged catheter, allowed a successful conservative management approach. However, this may not be as straightforward in the case of bladder perforation by a still functioning VPS catheter. Miranda et al proposed two strategies for such occurrence in the absence of CNS or peritoneal infection. A transperitoneal approach either laparotomy or laparoscopy where the extruded catheter is removed transurethrally after being cut close to the bladder serosa. The remaining peritoneal catheter is then repositioned inside the peritoneal cavity followed by bladder wall repair. On the other hand, in the case of intravesical catheter retention, cystoscopic removal of catheter after cutting it near the bladder mucosa is advocated (2). Of note, it is important for all cases to receive a course of prophylactic antibiotic covering for CNS infection.
In the past, dislodged pieces of shunt tubing in the peritoneal cavity were generally believed to be asymptomatic, hence it was a common practice to leave them in place particularly if they are deeply embedded in surrounding tissues (3).

**CONCLUSION**

Although it is rare, clinician should be aware of the potential complications related to distal catheter of VPS as exemplified in our case. It may be wise to retrieve all dislodged peritoneal catheter despite it being completely migrated into peritoneal cavity.

**Conflict of interest**

No conflict of interest was declared by the authors.

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