Case Report

DOI: 10.7860/JCDR/2026/84094.24742

Urology Section

# Fractured and Migrated Ventriculoperitoneal Shunt into the Urinary Bladder: A Case Report

WALI AHMAD[1], SOUVIK CHATTERJEE[2], DEBANSU SARKAR[3]

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## ABSTRACT

Ventriculoperitoneal Shunting (VPS) is a standard and widely performed surgical treatment for hydrocephalus; however, distal shunt-related complications such as obstruction, infection, disconnection, and migration may occur. Fracture and migration of the distal catheter into hollow viscera has been documented, but bladder perforation with intravesical migration of shunt remains an exceptionally rare late complication. We report a 55-year-old woman with bilateral VPS placed for recurrent third ventricular colloid cyst who presented with extrusion of a shunt fragment through the urethra one week before outpatient visit, associated with abdominal pain, burning micturition, and fever. Ultrasonography and Contrast-Enhanced Computed Tomography (CECT) of the abdomen revealed a fractured distal catheter with intravesical migration and a localised collection near the bladder dome. Cystourethroscopy confirmed a coiled shunt within the urinary bladder. The intravesical segment was successfully removed endoscopically under local anaesthesia while preserving the cranial component. The patient recovered uneventfully. Early recognition and minimally invasive management can result in favourable outcomes for this rare but potentially serious complication.

**Keywords:** Cystourethroscopy, Endoscopic management, Intravesical migration, Shunt fracture

## CASE REPORT

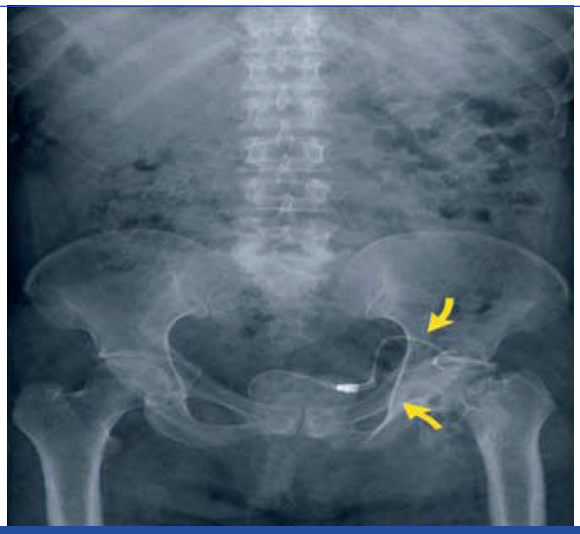
A 55-year-old woman presented with extrusion of a VPS fragment through the urethra one week before a urology outpatient visit, associated with abdominal pain, burning micturition, and fever. She had experienced similar urinary symptoms three months earlier and had been diagnosed with genitourinary tuberculosis, for which she was receiving antitubercular therapy.

She is a known case of recurrent third ventricular colloid cyst requiring multiple computed tomography-guided aspirations. Bilateral VPS were inserted almost 30 years ago. About 20 years back, she developed left-sided shunt dysfunction with headache and vomiting. As the cranial end could not be removed, another VPS was inserted through a separate burr hole. A subsequent revision of the left VPS was performed almost seven years back. She was on regular antiepileptic therapy with tablet levetiracetam 500 mg once daily, which was continued, and capsule levothyroxine 50 µg once daily for hypothyroidism.

On examination, she was conscious and oriented, with stable vital parameters. Abdominal examination revealed lower abdominal tenderness. Urine microscopy demonstrated 10-15 pus cells and 20-30 red blood cells per high-power field, while urine culture showed no growth. Haematological and renal function parameters were within normal limits, with haemoglobin 11.2 g/dL, white blood cell count 8,600/µL, blood urea 28 mg/dL, and serum creatinine 1.2 mg/dL.

Ultrasonography of the kidney, ureter, and bladder region demonstrated a coiled tubular structure within the urinary bladder. Xray abdomen and pelvis [Table/Fig-1] and CECT of the abdomen [Table/Fig-2] revealed the distal end of a fractured VPS in the left lower abdomen with intravesical migration and a focal encysted collection measuring 13×18×34 mm abutting the anterosuperior bladder dome. Computed tomography of the brain revealed intraventricular haemorrhage and subdural hygroma, with bilateral VPS in situ.

Cystourethroscopy [Table/Fig-3] using a 21 French, 30-degree lens confirmed a coiled VPS within the bladder. Two fistulous openings were identified in the left posterolateral bladder wall approximately 2-3 cm lateral to the left ureteric orifice. Following multidisciplinary

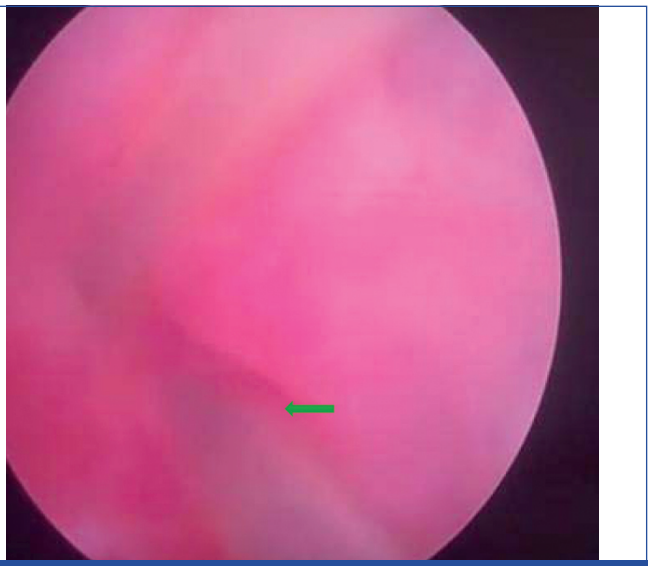


**[Table/Fig-1]:** X-ray abdomen and pelvis with broken VP shunt.

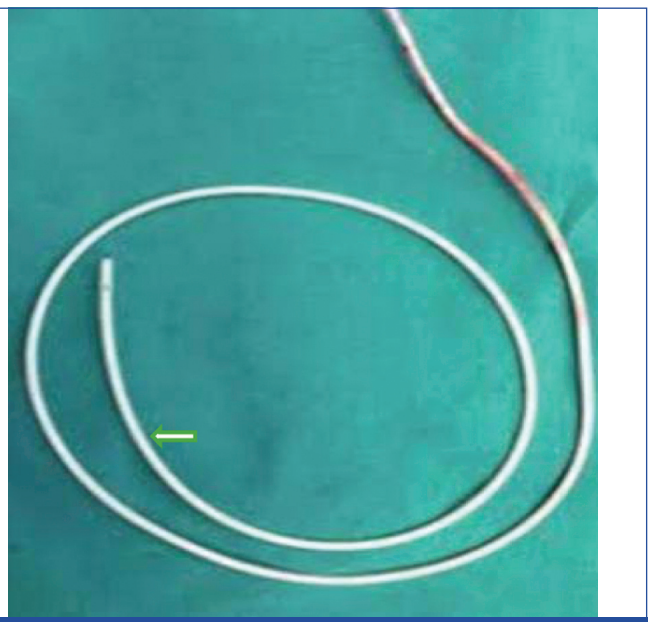


**[Table/Fig-2]:** CECT-Broken shunt in UB.

discussions involving urology, neurosurgery, and neurology teams, the intravesical segment was successfully removed [Table/Fig-4] cystoscopically under local anaesthesia while preserving the cranial component. Bladder repair or other intervention was not needed. The postoperative course was uneventful, and the patient was discharged on postoperative day two in stable condition. Later on, the patient was on follow-up with neurosurgery. Neurosurgical evaluation suggested that the intracranial findings were chronic and stable, requiring no immediate intervention, but long-term follow-up was needed. Sterile pyuria was presumed to be secondary to chronic bladder irritation from the intravesical shunt and possible prior antitubercular treatment; repeat urine microscopy after shunt removal was normal. Further evaluation for genitourinary tuberculosis, including Cartridge-Based Nucleic Acid Amplification Test (CBNAAT), was negative. However, as the patient had already been initiated on antitubercular therapy before presentation, she was advised to continue the ongoing treatment. She remained under regular follow-up with the Departments of Pulmonary Medicine and Urology. In view of the negative microbiological evaluation and subsequent clinical course, the patient's urinary symptoms were considered more likely related to the migrated intravesical shunt.



**[Table/Fig-3]:** Migrated VP shunt in UB (Cystopanendoscopy).



**[Table/Fig-4]:** Extricated VP shunt.
Pictures taken after due consent of patient. Broken VP shunt marked with arrow

## DISCUSSION

The VPS remains the most commonly performed surgical procedure for the management of hydrocephalus [1]. The complications of VP shunt surgery may be broadly divided into: (a) mechanical complications; and (b) infective complications. Mechanical complications include obstruction, disconnection or migration of any components of a shunt system either at the ventricular or peritoneal end. Infective complications include shunt tract abscess, skin necrosis overlying the shunt device and most importantly ventriculitis [2].

Various mechanisms and contributing factors have been suggested to explain bladder perforation caused by VPS catheters. Proposed factors include the bio-reactive nature of catheter materials, chronic local inflammation, and infection. The use of relatively rigid or sharp-tipped catheters may further predispose to erosion. Persistent mechanical pressure or irritation at a fixed point on the bladder wall is thought to gradually weaken the tissue, eventually leading to perforation. Other reported contributing factors include the thinner bladder wall seen in paediatric patients, inadvertent iatrogenic placement of the distal catheter near the bladder, and excessive length of the abdominal portion of the shunt catheter [3].

Clinically, patients may present with dysuria, recurrent urinary tract infections, haematuria, abdominal pain, urinary incontinence, or extrusion of the catheter through the urethra [4].

Imaging plays a pivotal role in diagnosis. Ultrasonography may demonstrate an intravesical foreign body; however, CECT provides accurate anatomical localisation and identifies associated collections. Cystourethroscopy remains the definitive diagnostic and therapeutic modality [4].

Recent reports continue to highlight the rarity of intravesical migration of VPS. Guimarães AS et al., described a paediatric case of bladder perforation with intravesical knot formation requiring surgical intervention [3]. Xu S et al., reported a 38-year-old male who had had hydrocephalus and a V-P shunt for 12 years. Two years ago, he found himself with recurrent urinary tract infections, haematuria, and urge incontinence, and then he was diagnosed with bladder perforation and merge stones. The patient had an abdominal operation to cut-off and take out the shunt catheter, as well as a transurethral holmium laser lithotripsy [5].

Gema RM et al., reported that a 23-year-old woman with a VPS placed during childhood for post-traumatic non-communicating hydrocephalus presented with seizures and discomfort along the shunt tract. Imaging revealed inflammatory changes surrounding the distal catheter and free intraperitoneal fluid. She subsequently reported intermittent extrusion of the VPS catheter through the urethra during micturition, which was confirmed clinically. Ultrasonography and abdominal radiography demonstrated intravesical migration of the distal VPS catheter secondary to bladder perforation. Emergency surgery was performed with exteriorisation and resection of the distal catheter. The bladder wall was managed conservatively without repair [6].

Early recognition and coordinated multidisciplinary management are essential to prevent further complications and ensure favourable outcomes.

## CONCLUSION(S)

Intravesical migration of a fractured VPS is an exceptionally rare and late complication that may present with non-specific urinary symptoms. A high-index of suspicion is essential in patients with a prior VPS. Prompt radiological evaluation and cystourethroscopic confirmation facilitate timely diagnosis.

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**PARTICULARS OF CONTRIBUTORS:**
1. Postdoctoral Trainee, Department of Urology, IPGMER and SSKM Hospital, Kolkata, West Bengal, India.
2. Associate Professor, Department of Urology, IPGMER and SSKM Hospital, Kolkata, West Bengal, India.
3. Professor and Head, Department of Urology, IPGMER and SSKM Hospital, Kolkata, West Bengal, India.

**NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:**
Wali Ahmad,
Postdoctoral Trainee, Department of Urology, IPGMER and SSKM Hospital,
Kolkata-700020, West Bengal, India.
E-mail: drwaliahmad06@gmail.com

**PLAGIARISM CHECKING METHODS:** [Jain H et al.]
- Plagiarism X-checker: Sep 09, 2025
- Manual Googling: Jun 26, 2026
- iThenticate Software: Jun 29, 2026 (1%)

**ETYMOLOGY:** Author Origin

**EMENDATIONS:** 7

**AUTHOR DECLARATION:**
- Financial or Other Competing Interests: None
- Was informed consent obtained from the subjects involved in the study? Yes
- For any images presented appropriate consent has been obtained from the subjects. Yes

Date of Submission: **Sep 08, 2025**
Date of Peer Review: **Jan 31, 2026**
Date of Acceptance: **Jul 02, 2026**
Date of Publishing: **Dec 01, 2026**