

## Case Report

## Intra-bronchial migration of peritoneal catheter of lumboperitoneal shunt

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**Abstract****Background:** A rare case of intra-bronchial migration of peritoneal catheter of lumboperitoneal (LP) shunt was treated under the bronchoscopic and fluoroscopic observation.**Case Description:** A 71-year-old man, who underwent LP shunt installation due to idiopathic normal pressure hydrocephalus a year before, presented with history of high fever and sputum production. Roentgenography and computed tomography of the chest revealed migration of distal end of the peritoneal catheter into the left main bronchus. Migrated catheter was gently extracted through the abdominal wound incision under the bronchoscopic and fluoroscopic observation. Contrast material infused into the catheter did not spread into the pleural cavity. The patient was free of the symptoms within 2 postoperative weeks. Moreover, he underwent the ventriculo-peritoneal shunt surgery 1-month later.**Conclusion:** This is the first case of the migration of peritoneal catheter of LP shunt into the main bronchus.**Key Words:** Bronchial migration, contrast medium injection, lumboperitoneal shunt

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**INTRODUCTION**

Lumboperitoneal (LP) shunt is a common and less invasive method, in which brain injury is avoidable, for treating idiopathic normal pressure hydrocephalus (iNPH).<sup>[3]</sup> However, migration of the peritoneal catheters of LP or ventriculo-peritoneal (VP) shunts into various body spaces is often encountered.<sup>[1,9]</sup> Trans-diaphragmatic intra-pleural migrations of the distal end of peritoneal catheter of LP shunt tube have been also reported.<sup>[7,8]</sup> We here report the first case with the migration of peritoneal catheter into the main bronchus.

**CASE REPORT**

A 71-year-old man presented with history of high fever and sputum production accompanied with inflammatory

reaction (white blood cell: 23,100/ $\mu$ L, C-reactive protein: 3.92 mg/dL). One-year before, he had undergone an LP shunt surgery at another hospital for iNPH manifesting as gait disturbance and urinary incontinence. On admission, however, the shunt system did not work.

A chest roentgenography showed a tube, coinciding with the peritoneal catheter of LP shunt, in the left thorax.

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Computed tomography scan demonstrated distal end of the catheter in the left main bronchus [Figure 1].

We planned to remove the migrated peritoneal catheter with preparation for repair of bronchial air leak. Under the general anesthesia, the tip of the peritoneal catheter was viewed with bronchoscope [Figure 2]. The peritoneal catheter was secured by reopening the left paraumbilical abdominal wound. It was cut down and connected to a syringe containing the contrast medium (Sodium iohalamate: CONRAY 400®). During gradual extraction of the peritoneal catheter under the bronchoscopic view, the contrast medium was infused into the catheter. The contrast medium remained in the bronchus and the fistulous tract; it neither spread out into the pleural cavity nor into the abdominal cavity during its removal [Figure 3]. Residual parts of the shunt system were then removed. The symptoms disappeared within 2 weeks.

The extracted peritoneal catheter was found angulated using a silicon sheath, which was tethered to peritoneum

[Figure 4]. Remodeling of the catheter seemed to have been employed in the previous surgery for prevention of the migration of catheter into the abdominal subcutaneous adipose space.

One month later, he underwent the VP shunt surgery, and peritoneal catheter was placed in the pelvic cavity using the method previously reported.<sup>[5]</sup>

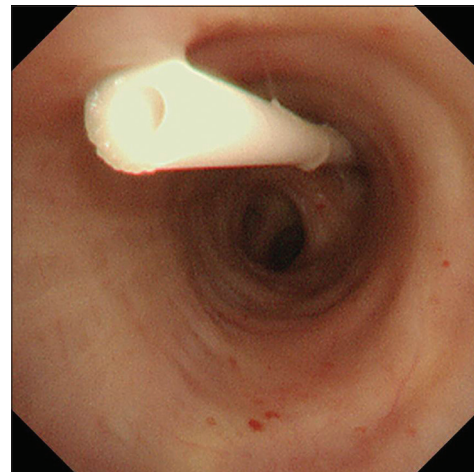
## DISCUSSION

There have been reports about the migration of peritoneal catheters of VP or LP shunt to various sites including subcutaneous space, sigmoid colon, intestine, stomach, and heart.<sup>[1,2,5,9]</sup>

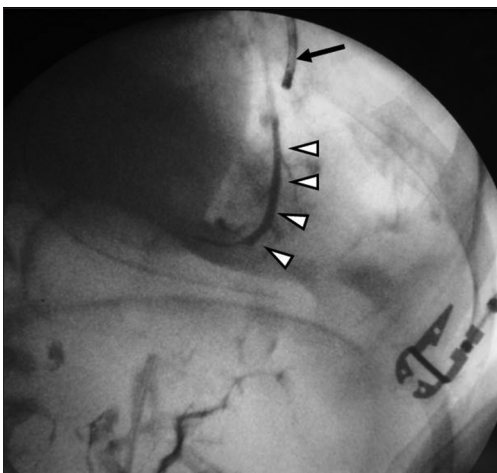
Intra-pleural migration of peritoneal catheter of the shunt systems through the diaphragm is also reported in patients who underwent VP shunt surgery.<sup>[4,7,8]</sup> In pediatric cases, migration might be possible through the immature diaphragm.<sup>[4]</sup> Moreover, in posttraumatic patients, the catheter might migrate through



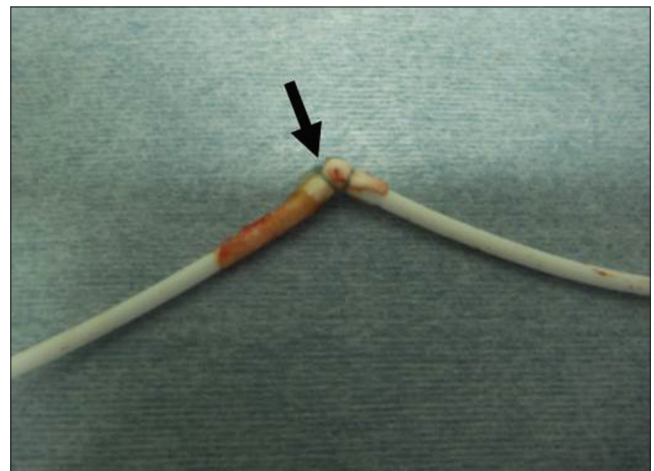
**Figure 1:** Chest computed tomography scan revealed the peritoneal catheter in the bronchus (arrow)



**Figure 2:** Bronchoscopy showed the distal end of the peritoneal catheter in the left main bronchus



**Figure 3:** Fluoroscopy revealed the contrast medium confined to the bronchus (arrow) and the fistulous tract (arrow heads) but did not spread out in the pleural cavity



**Figure 4:** A part of peritoneal catheter was remodeled in angular shape (arrow) using silicon tube in the previous surgery

diaphragmatic laceration.<sup>[6]</sup> However, in other cases, the etiology of diaphragm perforation is unclear. We, like other authors, thought that the formation of a local inflammatory reaction or fibrosis around the peritoneal catheter, induced by the pressure on the diaphragm, might finally cause perforation of the wall.<sup>[2,6,7]</sup> In our patient, remodeling and anchoring the catheter to the peritoneum might have contributed to its upward displacement. In addition, the decreased mobility may have somehow caused the constant pressure on the diaphragm and then bronchus by the catheter.

Pulling out the migrated catheter through the bronchial wall and diaphragm could cause complications including pneumothorax and pneumoabdomen. Therefore, we prepared for these risks with the assistance of thoracic and general surgeons. Intraoperatively, bronchoscopic observation assured the absence of bronchial wall disruption or bleeding and infusion of contrast media into the migrated catheter showed absence of leakage of the media from the fistulous tract. The fistulous tract seemed to have collapsed immediately after the removal of the catheter.

In summary, migration of peritoneal catheter of LP shunt into the bronchus can occur rarely when the free movement of the peritoneal catheter is restricted. Removal of the catheter should be performed with sufficient precautions and preparations for the possible thoraco-abdominal complications.

## CONCLUSIONS

Trans-diaphragmatic intra-bronchial migrations of distal end of peritoneal catheter of LP or VP shunt are

rarely encountered. Removal of the migrated catheter should be performed properly for the possible thoraco-abdominal complications.

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## Conflicts of interest

There are no conflicts of interest.

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