

Case Report

Endoscopic Retrieval of a Broken Guidewire During Spinal Surgery

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Since the percutaneous posterolateral approach in treating lumbar disc herniation was introduced in 1973, percutaneous endoscopic lumbar discectomy (PELD) has become a routine minimally invasive spinal procedure. However, as clinical evidence accumulated, several complications of PELD have raised our concerns, including the intraoperative injury to neural, vascular structures and failure of surgery. Herein, we present 2 patients who experienced guidewire breakage during PELD procedure to demonstrate the details.

The 2 patients, who are 28 and 33 years old, were diagnosed with lumbar disc herniation with or without intervertebral foreman stenosis by magnetic resonance imaging. Following a preoperative evaluation, a PELD procedure was performed with the help of local anesthesia. During the advancement of the obturator and foraminotomy under fluoroscopy, the guidewire was found broken. With the patients' permission, the operator inserted the working cannula to the broken end of the guidewire and retrieved it by straight grasping forceps under endoscopy. The patients were reported to recover from their back pain immediately after the operation and hence the postoperative course was stable.

In conclusion, the guidewire breakage in PELD procedures is a rare but severe complication, which requires immediate removal. An appropriate manner and fluoroscopic control are recommended to forestall such problems. It is possible to retrieve the broken guidewire under endoscopy with skillful experience.

Key words: Endoscopic discectomy, intraoperative complication, instrument breakage, minimally invasive surgery

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Since the percutaneous posterolateral approach in treating lumbar disc herniation was introduced in 1973, percutaneous endoscopic lumbar discectomy (PELD) has become a routine minimally invasive spinal procedure (1). However, as clinical evidence accumulated, several complications of PELD have raised our concerns, including the intraoperative injury to neural, vascular structures and failure of surgery (2-4). Herein, we present a rare complication of guidewire breakage during PELD procedure.

Case 1

The study was approved by the Ethical Review Board of Tongji University School of Medicine. A 28-year-old man presenting with sciatica for 3 months was admitted. His pain started from the buttock and radiated down to the calf. Preoperative magnetic resonance imaging (MRI) confirmed a disc herniation at the L4-L5 level (Fig. 1). However, conservative treatment such as acupuncture and manipulation in the physical therapy department did not work for the

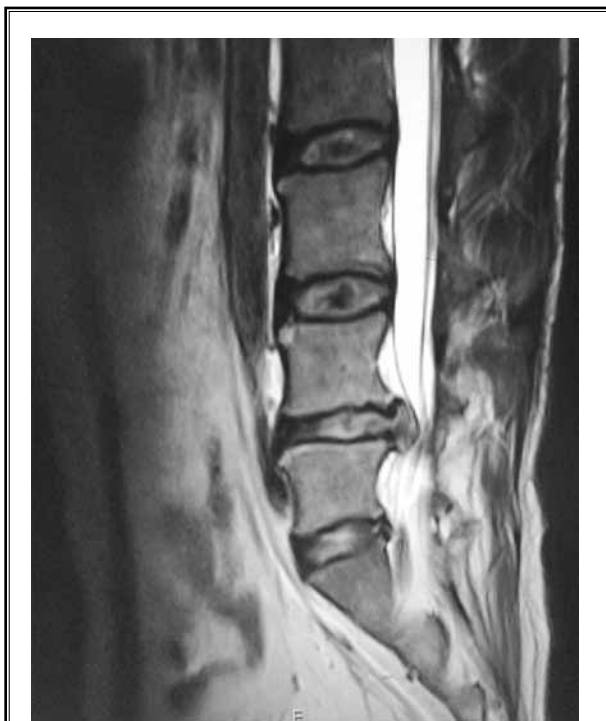


Fig. 1. Preoperative magnetic resonance imaging (patient 1) showed a disc herniation at the L4-L5 level.



Fig. 2. The broken guidewire stuck in the disc fragment under C-arm biplane imaging.



Fig. 3. The retrieved guidewire using endoscopic forceps.

case. Following a preoperative evaluation, a PELD procedure was performed with the help of local anesthesia. The skin entry point was determined with a novel instrument that was projected toward the isthmus of

the superior lamina under fluoroscopy (5). Afterwards, an 18-gauge needle was inserted to the isthmus of the superior lamina for the L4-L5 level. In the process of dilation, the guiding rod was found not in the vicinity of the extruding disc fragment. Thus the operator tried to redirect the guiding rod to the targeted position but failed. The guidewire was broken in the disc fragment (Fig. 2). At that point, the operator stopped the procedure and placated the patient. With the patient's permission, the operator inserted the working cannula to the broken end of the guidewire and retrieved it with straight grasping forceps (Fig. 3). The endoscopic procedure continued and the patient achieved an uneventful recovery.

Case 2

The study was approved by the Ethical Review Board of Tongji University School of Medicine. A 33-year-old man presented with right leg discomfort after his waist had been sprained 2 months earlier. No satisfactory improvement followed conservative treatment in the physiotherapy department. Preoperative MRI confirmed the presence of L5-S1 disc herniation with right side nerve compression (Fig. 4). The patient got a PELD procedure at the L5-S1 level. The initial target of the needle was the superior facet joint of S1 level (6). After decompression of the stenotic foramen, the tip of the guidewire was broken and migrated. The ob-

Fig. 4. Sagittal (A) and transverse (B) magnetic resonance imaging (patient 2) demonstrate a disc herniation at L5-S1 level.

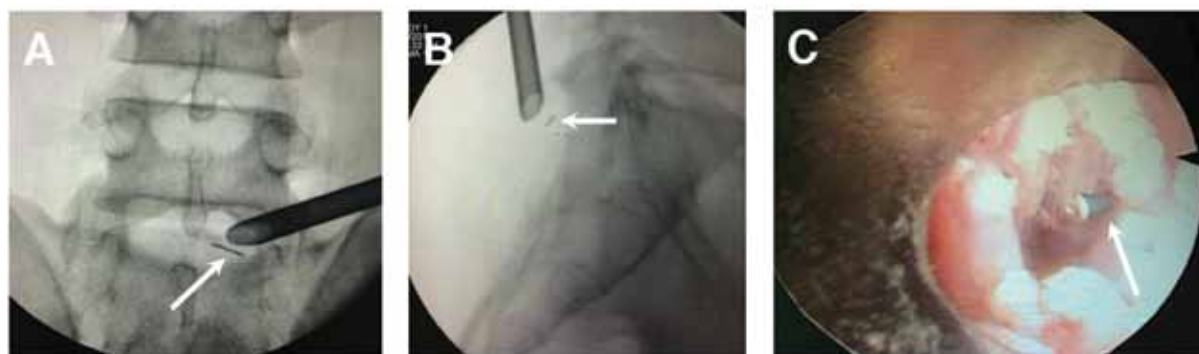
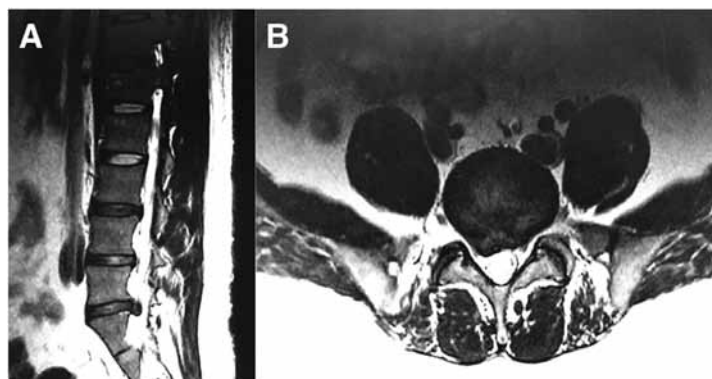


Fig. 5. Anterior-posterior (A), lateral (B) fluoroscopic images, and endoscopic view (C) showed the broken guidewire (white arrows) during PELD procedure.

turator and the remaining guidewire were taken out immediately, but the broken wire was left behind the S1 vertebrate. With the patient's permission, the operator inserted the guiding rod close to the broken wire under fluoroscopy. And the working cannula and endoscopy was placed to detect the broken guidewire. The endoscopic forceps were then introduced to grasp the guidewire (Fig. 5). The patient was reported recovered from his back pain immediately after the operation and the postoperative course was stable.

Discussion

Breakage of an instrument a rare and severe complication that occurs in spinal surgery. However, no evident solutions have been worked out. Only a case of laser tip breakage which caused recurrent symptoms and revision was described in previous literature (7). The breakage of a guidewire mostly results from metal fatigue or cutting force of the following rod or bone ramer. High lilac crests at L5-S1 level cause a larger needle

entry angle, where the guidewire is more likely to get broken. To forestall such rare complications, it is important to monitor the instruments under biplane fluoroscopic guidance. Once the right place is not achieved, the first step of the procedure should be repeated (3).

Once the diagnosis of entrapment complication has been established, an immediate removal is recommended. If the broken guidewire can be retrieved successfully using traditional methods, the patient will still suffer operation and general anesthesia once more. Considering the trauma to these young patients, we attempted to retrieve the broken guidewire under endoscopy in the 2 cases above.

Because the fracture usually happened in foraminotomy, the broken wire remains close to the foramen. To forestall further migration, we placed the cannula a little farther away from the break site, and then approached it step by step by rotating and moving the cannula under the endoscopic monitor. When the broken tip was found, it could be retrieved with straight

grasping forceps. If the wire is left in the canal or stuck in the disc fragment, much more concern should be taken to avoid nerve injuries. The success of surgery is determined by the familiarity of local anatomy and endoscopic experience. As for a surgeon at the beginning of the PELD learning curve, an open procedure is still recommended to guarantee the removal of the broken instrument.

CONCLUSION

The guidewire breakage during PELD procedures is a rare and severe complication that requires an immediate removal. An appropriate manner and fluoroscopic control are recommended to forestall such a problem.

It is possible to retrieve the broken guidewire under endoscopy with skillful experience.

Disclaimer

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Conflict of interest

Each author certifies that he or she, or a member of his or her immediate family, has no commercial association (i.e., consultancies, stock ownership, equity interest, patent/licensing arrangements, etc.) that might pose a conflict of interest in connection with the submitted manuscript.

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