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Retrieval of a broken guide wire transfixing the hip through the proximal femoral nail hole

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【**Abstract**】Retrieval of a broken guide wire transfixing the acetabulum or with intrapelvic migration is challenging and frustrating for surgeons. We here present a case report on a method to remove a broken guide wire transfixing the acetabulum through the proximal hole of recon nail using a grasping forceps. This method is little invasive, easy, time-saving and without need for changing the inital fixation.

Key words: ***Hip fractures; Complications; Instrumentation***

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Threaded guide wires and cannulated reamers are used for internal fixation around the femoral head. Broken wire transfixing the acetabulum and its intrapelvic migration can lead to devastating and catastrophic complications; retrieval of it is very challenging. We here present a new retrieval method through the hole of proximal femoral nail using a grasping forceps.

CASE REPORT

A 30 years old male presented with unstable Boyd and Griffth type III intertrochanteric fracture, combined with subtrochanteric extension and varying degrees of comminution following a road traffic accident. After closed reduction prior to surgery, the patient was taken for internal fixation with cephalomedullary nail, i.e. proximal femoral nail under spinal anaesthesia on a standard fracture table. With 5 cm long lateral incision, the tip of the greater trochanter proximally was exposed and an entry point was made there. Subsequently guide wire was passed through and reaming of the canal with gradually increasing reamer was done. Finally proximal femoral nail with appropriate size and diameter was mounted on a jig inserted into the canal under fluoroscopic control. Using a drill guide sleeve and jig-zag attachment from the lateral incision, two guide wires were passed through the lateral femoral cortex, then the holes in the proximal femoral nail and finally into the femoral neck and head (Figure 1A).

Reaming was initially started over the inferior guide wire from lateral femoral cortex through the nail into the neck and the head. As the reamer passed from the neck to the head of the femur the guide wire broke about 5 cm from the threaded end, i.e. the proximal end and the broken guide wire further migrated to the acetabulum, transfixing the hip joint, but not protruding into the pelvis. The proximal threaded end of the wire was just beyond the acetabulum and the distal or near end of the wire was placed into the head about 3 cm from the articular margin of head in the centero-inferior quadrant (Figure 1B).

Since the jig was in place along with nail without any proximal or distal fixation, leaving insufficient space for wire removal, we proceeded further with proximal most and distal locking aiming to fix the intertrochanteric fracture first, and thereafter to remove the broken wire. After the proximal most locking in the head and distal most locking into the supracondylar femur and fixation of the nail were finished, we removed the jig and attempted to remove the broken guide wire through the nail only.

As the guide wire was threaded and fixed into the head and acetabulum, initially we tried to loosen it from the femoral head by drilling the surrounding bones. For this a Steinman pin was mounted over the drill and passed through the same hole in the nail to reach the broken end of the wire (Figure 2). As the hole in the nail was only 8 mm wide, we were unable to pass and manuplate triple reamer, long curette, long straight ar-

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tery forceps or any other big instruments for removal of the wire. Hence we introduced a grasping forceps through the same hole from the lateral cortex to reach the nail, neck and then femoral head and grasped the broken guide wire under fluoroscopic control (Figure 3). However we were still unable to remove the broken wire by the grasping force alone as it was threaded. Therefore, with it tightly held by the grasper in anticlockwise direction, the guide wire was rotated and finally removed (Figure 3). After then the proximal hole was locked with appropriate screws and closed in layers following thorough wash (Figure 4).

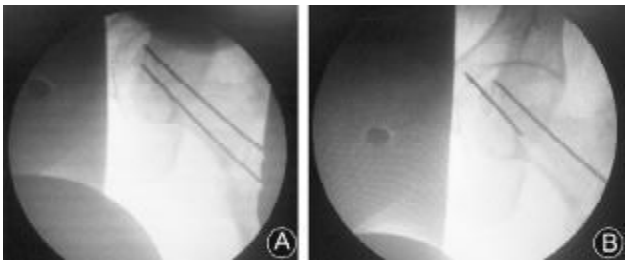

Figure 1. Intraoperative fluoroscopic image showing that (**A**) two guide wires were placed in the head passing through the proximal femoral nail and (**B**) the distal guide wire broke about 5 cm from the threaded end and migrated to the acetabulum, transfixing the hip joint.

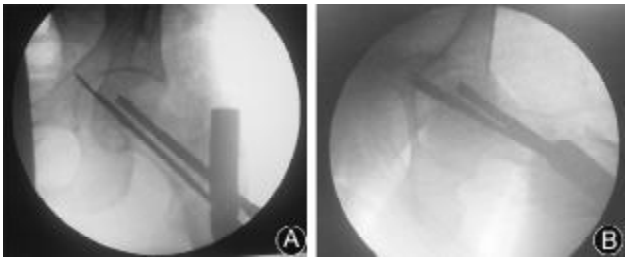

Figure 2. Intraoperative fluoroscopic (**A**) anteroposterior and (**B**) lateral images showing Steinman pin passing through the nail to drill bones around the broken guide pin, aiming to loosen the guide wire.

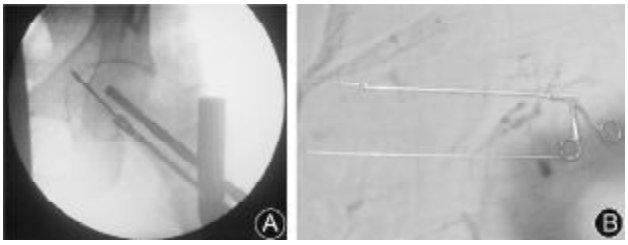

Figure 3. A: Intraoperative fluoroscopic images showing the grasping forceps holding the broken guide pin firmly. **B:** Photograph of the grasping forceps and the broken guide wire after removal.

Figure 4. Postoperative anteroposterior X-ray showing the proximal femoral nail in place.

DISCUSSION

Intramedullary nails and standard compression hip screws are well known treatment options for proximal hip fractures. The former has biomechanical and biological advantages over the latter, especially in subtrochanteric fractures and reverse oblique fractures. But both of them can proximally hold the femoral head with the help of cannulated screws, which are inserted over the guide wires used for localizing the exact position in the head. Breakage of guide wire is a rare iatrogenic complication encountered during the surgery and its further migration into the acetabulum and pelvis is among the rarest complications.

Guide wires are usually designed for single use. The main cause of their breakage is multiple use, which causes decrease in mechanical and bending strength and makes deformation easily happen.[1] When cannulated reamers or drill bit is passing over deformed wires, eccentric loading and jamming may occur, followed by breakage and acetabular or pelvic migration.[2,3] Fatal complications like damage to external iliac vein, urinary bladder, visceral perforation can occur secondarily to intrapelvic migration of these wires.[4-6] Apart from this it is a surgical challenge and frustration to remove such a broken wire for the surgeons.