Minimally invasive retrieval of incarcerated flexible intramedullary reamer

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Abstract  Reaming is an integral step of long bone nailing and is associated with low complication rate. We report a case of a flexible reamer that was broken and incarcerated in the femoral canal during a femoral canal reaming. The reamer was used without a ball-tipped guide wire, and thus, the routine extraction using the guide wire was not possible. The incarcerated reamer was successfully extracted after medullary decompression with small drilling corticotomies adjacent to the reamer head. This case report serves as a reminder of the importance of using the ball-tipped guide wire with a flexible reamer. It also describes a simple and minimally invasive technique of removing an incarcerated flexible reamer.

Keywords  Corticotomy · Extraction · Femoral nail · Reamer · Incarcerated reamer

Introduction

Reaming of the medullary canal is an essential component in the nailing of the long bone. Reaming enlarges the medullary canal and allows the use of a larger diameter nail with greater stiffness and fatigue strength. It also provides bone graft to facilitate union. Complications associated with the use of a reamer are rare. Two reported cases described broken rigid reamers during knee replacement surgery [1] and tibia nailing [2]. There are no reported cases of incarcerated reamers.

A flexible reamer could get jammed in the medullary canal during reaming due to the accumulation of reaming debris around the reamer head. This incarcerated reamer could not be pulled out forcefully due to the coil at the shaft of the reamer. If a ball-tipped guide wire is used with the reamer, the incarcerated reamer can be removed by pulling on the guide wire. Problems in extracting arise if a ball-tipped guide wire is not used or a smooth tip wire is used.

We are reporting a case of an incarcerated flexible reamer in the femoral canal and a new method of removal. To our knowledge, no similar cases or surgical techniques have been reported.

Case report

A 28-year-old man was involved in a motor vehicle accident and sustained closed fracture of the neck and the mid-shaft of the left femur (Fig. 1) and closed fracture of the distal end of the left radius and ulnar styloid. He underwent dorsal plating of the distal radius and cephalomedullary nailing for the ipsilateral fracture of the femoral neck and shaft.

The entry hole at the greater trochanter was made with a rigid 12.5-mm Entry Reamer. An 8-mm flexible reamer was then inserted into the medullary cavity of the shaft of the femur through the entry hole. Reaming was carried out without the use of a guide wire. The reaming continued with sequential 0.5-mm increments in reamer size. When the 10-mm reamer was used, the reaming end was jammed

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in the medullary canal at the distal end of the isthmus. At the same time, the coil on the reamer shaft was twisted and broken at the other end (Fig. 2). No further reaming was possible. Attempts to pull out the flexible reamer failed as the reaming end was tightly incarcerated in the medullary canal.

The lateral cortex overlying the reaming head was drilled with a 4-mm drill at three sites; just distal to the tip of the reamer head, at the middle of the reamer head, and just proximal to the reamer head (Fig. 3). The incarcerated flexible reamer was then successfully pulled out. Reaming was continued with another flexible reamer over a ball-tipped guide wire. The cephalomedullary nailing was completed successfully (Fig. 4).

### Discussion

To our knowledge, no previous cases of incarcerated flexible reamers have been reported. This complication is rare and would not have happened if the ball-tipped reamer
guide wire was used during reaming. The guide wire within the reamer prevents twisting damage to the coils of the reamer. Furthermore, the ball-tipped end of the guide wire allows the incarcerated reamer to be removed by simply knocking and pulling out the guide wire proximally.

The rationale behind the drilling corticotomies was to decompress the intramedullary cavity around the reamer head. Reaming debris invariably collects and becomes impacted in the flutes of the reamer head. This enlarges the tip of the reamer. The corticotomy holes over the lateral cortex allowed some of the debris to be extruded out though the holes and thus reducing the size of the debris mass at the reamer head. This allowed the incarcerated reamer to be dislodged from the tight canal when the reamer was pulled proximally.

An alternative option to remove this incarcerated reamer involves knocking out the reamer through the proximal fracture end using a Kuntscher nail. The disadvantages are the hassle of dismounting the patient from the traction device, the need for another large incision over the fracture site to deliver out the proximal fracture end and the risk of iatrogenic fracture of the femoral shaft during the forceful extraction.

This case report reminds us the importance of using a ball-tipped guide wire when using a flexible reamer. In cases of incarcerated reamers, the simple medullary decompression technique can help ease the difficult extraction.

Conflict of interest None.

References


Fig. 4 Anteroposterior (a) and lateral (b) views of the completed cephalomedullary nailing of the left femur