An intramedullary alignment guide lodging within the femoral canal during total knee arthroplasty: a case report

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ABSTRACT

The usual complications of total knee arthroplasty include thrombo-embolism, infection, and loosening. We report an unusual and potentially serious complication of an intramedullary guide lodging within the femoral canal during the procedure. Considering the risk of fracture and additional exposure, the guide was not removed and was cut in situ. The rest of the operation was completed successfully and the patient made an uneventfully recovery.

Key words: arthroplasty, replacement, knee; intraoperative complications

INTRODUCTION

In the United States, the number of primary total knee arthroplasties (TKAs) increased substantially from approximately 129 000 in 1990 to 381 000 in 2002. Complications are typically classified as either general (e.g. cardiovascular, thrombo-embolic), or specific to arthroplasty (e.g. haemorrhage, infection, loosening). We report an unusual and potentially serious complication of an intramedullary alignment guide lodging within the femoral canal during TKA.

CASE REPORT

In January 2003, a 64-year-old woman of Asian descent underwent a right primary TKA for osteoarthritis using the NexGen Legacy Posterior Stabilized knee implant system (Zimmer, Warsaw [IN], USA) via a medial para-patellar approach. She had no history of fracture or surgery to this leg.

The tibia was resected according to the extramedullary alignment guide. A hole was then drilled in the centre of the patellar sulcus of the distal femur, approximately 1 cm anterior to the origin of the posterior cruciate ligament. The distal femur was sized, and the femoral intramedullary
alignment guide was inserted into the drilled canal in 6° of valgus and 3° of external rotation until seated on the femoral condyle. The femoral mounting bases and the corresponding size femoral anteroposterior positioning guide were then inserted into the intramedullary alignment guide and fixed to the correct position by tightening the thumb screws. Four femoral fixation pins were inserted into the mounting bases to secure the construct. The 2 mounting base thumb screws were then loosened to enable extraction of the anteroposterior positioning guide and the intramedullary alignment guide using the slap hammer.

However, the extraction was unsuccessful. All other attempts to dislodge the intramedullary alignment guide including striking from behind the femoral plate failed. An image intensifier revealed that the intramedullary alignment guide had lodged along the narrow isthmus (Fig.). Considering the risk of fracture and additional exposure, the guide was not removed and was cut in situ using a Midex Rex metal cutting device. The distal femur was resected using the 5-in-1 saw guide. The rest of the operation was completed successfully and the patient made an uneventful recovery.

DISCUSSION

Problems associated with the femoral intramedullary alignment guide during TKA are uncommon. Reported complications include fat embolism syndrome, increase in postoperative blood loss, trapping of the tibial locking pin into the medullary cavity, and breaking of an intramedullary alignment guide. Fat embolism syndrome is reported to occur after insertion of both fluted and solid intramedullary guides. Intramedullary canal marrow aspiration or over-drilling of the entry hole to reduce the intramedullary pressure is suggested. An increase in postoperative blood loss during the first 24 hours is reported following the use of an intramedullary guide. Blood loss can be reduced significantly by using a plug of cement or bone to close the defect left by the intramedullary guide. Three cases of a tibial locking pin trapping within the femoral canal are reported during trial reduction after insertion of the intramedullary guide. Various methods are used to remove the locking pins including the use of gravity, strong suction, and a Kirschner wire bent into the shape of a hook. A case of breaking and jamming of the femoral intramedullary guide into the isthmus of the femur is reported. The isthmus is opened and the broken rod pushed down to the distal femoral entry site under image intensification. The importance of preoperative planning, inspection of the instruments, and the use of a shorter guide is stressed.

These complications may have been avoided by using a femoral extramedullary alignment guide for component positioning, but intramedullary guides have been shown to provide higher percentages of component positioning in the desired ranges. Accurate positioning of the femoral component is important to create a neutral mechanical axis and prevent misalignment and early failure of the TKA. Computer-assisted navigation systems have been suggested to improve component alignment and mechanical axis accuracy while avoiding the intramedullary instrument–related complications. These complications are highlighted to raise surgeons’ awareness, particularly in Asian women who have smaller anthropometrical measurements than their western counterparts. A more pronounced anteroposterior bowing of femora is reported in Asian compared to Caucasian patients. It is important to screen out such patients using preoperative long films in both the anteroposterior and lateral orientations. It may be necessary to use a shorter guide or an extramedullary device for femoral component positioning. Although accuracy may be compromised, it would avoid the risk of lodging the intramedullary guide within the canal. Computer-assisted navigation systems are beneficial in preoperative planning. Special devices for conventional arthroplasty should be considered.
REFERENCES


