Distal femoral fracture with subsequent ipsilateral proximal femoral fracture

by

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Abstract

Less Invasive Stabilisation System (LISS) is the recent advancement in the stabilisation of femoral supracondylar fractures. It is a versatile implant and its usage can be modified according to the clinical situation.

We report a case of a patient with a distal femoral fracture who was treated by stabilisation with a LISS plate, and subsequently sustained a second fracture of the proximal femur before the initial fracture had healed. The LISS plate allowed the insertion of an intramedullary nail to treat the new fracture without necessitating implant removal or compromising the previous fracture fixation.
Introduction

Less Invasive Stabilisation System (LISS: Stratec, UK) is the latest advancement in management of fractures of the distal femur. The LISS consists of a precontoured plate to fit the distal femoral bone block utilising multiple fixed angle screws. These screws lock into the plate making a rigid construct. Availability of radiolucent handles allows submuscular sliding of its proximal end for percutaneous fixation of the plate by using monocortical self-drilling and self-tapping screws [4, 6, 9].

In the literature there have been very few series reported using the LISS [4, 5, 10, 12]. At our institute we have been successfully using the LISS plate to stabilize distal femoral fractures, and have found LISS to be a very versatile and adaptable implant [13].

We report a case of a patient with a distal femoral fracture who was treated by stabilisation with a LISS plate, and subsequently sustained a second fracture of the proximal femur before the initial fracture had healed. The LISS plate allowed the insertion of an intramedullary nail to treat the new fracture without necessitating implant removal or compromising the previous fracture fixation.

Case Report

A 53-year-old lady presented to the Accident and Emergency department following a fall in which she sustained an injury her right hip.

Her past history included a fracture of her right distal femur (AO type 32 C) [8], which she had sustained 6 weeks ago. This fracture had been successfully treated by a long LISS plate, as it was a low diaphyseal fracture with an extension to the distal femoral condylar region (Fig. 1). The patient had been successfully mobilising partial weight bearing with the aid of crutches at the time of the second fall.
On physical examination in the Accident and Emergency department, her right lower limb was shorter as compared to the left. Her right proximal thigh was swollen and tender and all hip movements were very painful.

Anteroposterior and lateral radiographs of her right hip and femur revealed a displaced subtrochanteric fracture of her femur with the LISS plate in-situ in the distal femur (Fig. 2). It was also evident from the radiographs that the distal femoral fracture had not united.
Fig 2  *AP and lateral radiograph of the right hip after the second injury, showing a displaced subtrochanteric fracture of the right femur. The LISS plate is in-situ in the distal femur.*

A decision was taken to treat the fracture by internal fixation with the solid femoral nail and its reconstruction option, the spiral blade (Synthes, UK). This surgery was carried out under general anaesthesia. The patient was placed on the fracture table and the proximal femoral fracture reduced by gentle traction. Then, the long proximal screws from the LISS plate were removed using the old stab incisions, to allow passage of the intramedullary nail. The femoral nail was then introduced under X-ray control. This was followed by the insertion of a spiral blade and a proximal locking bolt. The proximal screws of the LISS plate were then reinserted using shorter screw lengths engaging only the lateral cortex. The distal locking bolt of the nail was then inserted through the LISS plate into the nail providing a stable fixation (Fig. 3). Post-operatively the patient was mobilised partial weight bearing with the Zimmer frame and her recovery was uneventful. The patient was reviewed at regular intervals in the outpatient department. Both fractures united at 3 months in a good alignment. On final follow-up at 12 months the patient was mobilizing independently and was back to her preinjury status.
Fig. 3

Radiographs of the right hip and thigh after stabilisation of the right proximal femoral fracture with a cephalomedullary nail with the LISS plate in-situ.

Discussion

Better understanding of the pathophysiology of fracture healing has resulted in the evolution of minimally invasive fracture fixation techniques [1, 3, 7]. These techniques allow the surgeon to preserve the zone of injury from further violation and use submuscular planes created at a distance from the fracture site to slide in precontoured low profile plates to achieve fracture reduction and stability. LISS has been designed on these principles. It combines all the points of a modern approach to fracture stabilisation, using the biomechanical advantage of a blade plate with converging screws from a locked compression plate for maximizing bony purchase and allowing the use of biological fixation techniques [2].

In a clinical situation, where a patient who has a nonunited distal femoral fracture sustains a second fracture of the proximal femur; the treatment options are limited. The choice of second fixation depends upon the method of stabilisation used to treat the initial distal femoral fracture. In the case described herein a long LISS plate had been used to stabilize the initial
distal femoral fracture, and as this fracture had not yet united our treatment options for stabilisation of the subsequent proximal femoral fracture were limited. A dynamic hip screw was considered, but there were two problems; firstly it would result in an area of stress-riser between the two plates. Secondly, because of the initial fracture pattern a long LISS plate was used which was extending to the proximal femoral shaft and thus not allowing space to accommodate the implant. The other option was to use a cephalomedullary nail. This implant could be successfully used in the presence of a LISS plate distally without compromising the distal femoral fixation. Accordingly, a 9mm solid femoral nail with the reconstruction option was used allowing stabilisation of the proximal fracture and subsequent reinsertion of the unicortical LISS screws.

It is known from previous biomechanical studies, that the LISS plate acts as an internal fixator, and its screws by locking into the plate, do not toggle and provide a stable fixation [2, 6, 11]. By replacing longer with shorter monocortical screws, we were able to retain stability of the initial distal femoral fracture fixation and insert the intramedullary femoral nail to stabilise the proximal femoral fracture. This method of treatment led to uneventful fracture union and full recovery of the patient.

We feel that LISS is very versatile and adaptable implant and its usage can be modified according to the clinical situation, as seen in our case. This case clearly illustrates the versatility and adaptability of this implant in complex cases.
References


