The importance of stable distal locking in intramedullary nail stabilisation of proximal femoral metastatic deposits

Shantanu Mandal *, Saad Malik, James Jeffery

Department of Trauma and Orthopaedics, Queen Elizabeth Hospital, King’s Lynn, Gayton Road, King’s Lynn, Norfolk PE30 4ET, UK

Accepted 15 December 2004

Introduction

Prophylactic intramedullary nailing is the treatment of choice for impending pathological femoral fractures where metastatic lesions affect the subtrochanteric region.¹,²,⁴,⁶ There is debate whether to distally lock the nail in such cases where the isthmus is intact.⁶ Recent reports suggest that distal locking is necessary to prevent pathological fractures through the bone lesion.¹,² We report a case where a pathological fracture occurred through a subtrochanteric metastatic deposit after prophylactic femoral nailing in spite of distal locking with a single screw placed through the dynamic locking hole.

Case report

A 54-year-old female patient was referred with proximal right thigh pain. Seven months previously she had undergone an oesophago-gastrectomy for oesophageal adenocarcinoma. Bone scan and plain radiographs revealed an isolated osteolytic lesion in the intertrochanteric and subtrochanteric region of her right femur (Fig. 1).

Her Mirels score² was 11 out of 12 indicating a high risk of impending pathological fracture. An AO Proximal Femoral Nail (STAREC Medical, CH-4436 Oberdorf) was inserted prophylactically. This was locked proximally using two screws and distally using a single screw through the dynamic locking hole. Biopsy of the lesion was performed per-operatively taking curettings from the lesion through the proximal femoral entry hole.

Her initial postoperative progress was satisfactory though she remained aware of mild proximal femoral discomfort. Post-operative radiographs were satisfactory (Fig. 2). She underwent subsequent radiotherapy to her proximal right femur 6 weeks post-operatively.

The bone biopsy confirmed metastatic adenocarcinoma. Twelve weeks following intramedullary nail stabilisation she was readmitted with sudden severe right thigh pain and inability to weight bear on the affected leg. There was no history of injury. Radiographs revealed a pathological fracture of the proximal femur at the site of the original lesion (Fig. 3). There was no loss of fixation of the proximal locking screws.

A second distal locking screw was inserted through the static locking hole to increase stability.
The thigh pain resolved completely within a day of surgery and the patient was then able to comfortably mobilise with crutches. She was discharged home on the second post-operative day.

Discussion

Intramedullary nailing is an effective way of treating subtrochanteric femoral deposits.\(^1,2,4,6\) It reduces pain, allows immediate mobilisation and facilitates subsequent oncological therapy. Such devices must incorporate the facility for insertion of rigid proximal cross locking screws of weight bearing dimensions into the femoral head.\(^2,6\) The device in use at our hospital is the AO Proximal Femoral nail. This also incorporates two distal locking screw holes, one for static and one for dynamic locking.

Recommendations regarding the need for distal locking of femoral intramedullary nails in pathological circumstances have been conflicting. No distal locking has previously been advocated for patients with metastatic lesions affecting the proximal femur in the absence of fracture if the femoral isthmus is intact.\(^6\) It is suggested that the additional operative time taken for distal screw insertion may be unwarranted in patients with terminal illness.\(^1\)

However, others recommend distal locking in these circumstances as fractures through proximal lytic deposits have been observed in patients who

\(\text{Figure 1}\) An isolated osteolytic lesion in the proximal femur.

\(\text{Figure 2}\) Prophylactic nailing with 2 proximal screws and 1 distal locking screw through dynamic hole.
have been stabilised with intramedullary nails in which no distal locking has been undertaken.\(^1\),\(^2\)

It is recommended that the femur is overreamed by 1.5—2.0 mm to allow smooth nail insertion and allow rotatory adjustments for proximal locking.\(^1\),\(^2\),\(^4\)

With such overreaming, interference fit at the isthmus cannot be relied upon to give stability to the construct and distal locking has been recommended.\(^1\)

It is important to stabilise long bones with metastatic deposits to prevent occurrence of a fracture, which carries a poorer prognosis for subsequent mobilisation.\(^2\)

In the presence of a pathological fracture, overall union rate is 35%.\(^3\)

Ununited fractures may result in implant failure and for metastatic deposit stabilisation, any implant used should be expected to last for the lifetime of the patient.\(^2\)

Our recent experience underlines the importance of achieving stable fixation of a locked intramedullary nail both proximally and distally in stabilisation of a proximal femoral metastatic deposit. We believe that distal locking through the dynamic locking screw hole alone is inadequate.

References

1. Chesser TJS, Kerr PS, Ward AJ. Pathological fracture after prophylactic reconstruction nailing of the femur. The need for distal locking. Int Orthop (SICOT). 1996;20:190—1.
2. Edwards SA, Pandit HG, Clarke HJ. The treatment of impending and existing pathological femoral fractures using the long gamma nail. Injury 2001;32:299—306.
3. Gainor BJ, Buchert P. Fracture healing in metastatic bone disease. Clin Orthop 1983;178:297—302.
4. Karachalios T, Atkins RM, Sarangi PP, Critchlow TPKR, Solomon L. Reconstruction nailing for pathological subtrochanteric fractures with coexisting femoral shaft metastasis. J Bone Joint Surg [Br] 1993;75-B:119—22.
5. Mirels H. Metastatic disease in long bones. A proposed scoring system for diagnosing impending pathologic fractures. Clin Orthop 1989;249:256—64.
6. Weikert DR, Schwartz HS. Intramedullary nailing for impending pathological subtrochanteric fractures. J Bone Joint Surg [Br] 1991;73-B:668—70.