

ABSTRACT

Introduction

Intertrochanteric femoral fractures are common injuries and they account for approximately 50% of hip fractures. They are associated with a high burden of morbidity and mortality globally. The optimal and prompt surgical management is crucial for functional rehabilitation of these patients and reduced morbidity and mortality

This study aims to reiterate the importance of the routine assessment of the lateral wall thickness of all intertrochanteric femoral fractures and determine which fixation device is more appropriate for use (dynamic/sliding hip screw versus intramedullary nail)

Materials & Methods

According to AO/OTA classification, multifragmentary intertrochanteric fractures with incompetent wall are classified as 31A1 or 31A2, depending on the lateral wall thickness of the greater trochanter. Lateral wall thickness is defined as the distance in millimeters (mm) from a reference point 3 cm below the innominate tubercle of the greater trochanter angled 135° upward to the fracture line on the anteroposterior (AP) plain radiograph. The thickness must be less than 20.5mm for the fracture to be considered as 31A2.

Results

31A2 peritrochanteric fractures treated with dynamic/sliding hip screw fixation have a higher risk of developing a secondary (post-operative) lateral wall fracture and subsequent risk of failure of fixation.

Conclusions

Lateral wall thickness should be measured/assessed in all intertrochanteric femoral fractures. Dynamic/sliding hip screw fixation alone should be avoided in the cases where lateral wall thickness is less than 20.5mm or in cases where there is already a lateral wall fracture.

CONTACT

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INTRODUCTION

Intertrochanteric femoral fractures are common injuries and they account for approximately 50% of hip fractures. They are associated with a high burden of morbidity and mortality globally. The optimal and prompt surgical management is crucial for functional rehabilitation of these patients and reduced morbidity and mortality.

MATERIALS & METHODS

Retrospective review of the literature and current management of the intertrochanteric femoral fractures.

CLASSIFICATION

Intertrochanteric fractures are classified by AO/OTA as 31-A. (Figure 1)

These are true intertrochanteric fractures. The fracture line passes between the two trochanters, above the lesser trochanter medially and below the crest of the vastus lateralis laterally. Both femoral cortices are involved.

This fracture type is subdivided: 31A3.1 – Simple oblique fracture 31A3.2 – Simple transverse fracture

31A3.3 – Wedge or multifragmentary fracture

According to AO/OTA classification, multifragmentary intertrochanteric fractures with incompetent wall are classified as 31A1 or 31A2, depending on the lateral wall thickness of the greater trochanter.



The Importance of the Integrity and Thickness of the Lateral Wall in the management of Intertrochanteric Femoral Fractures. Panagiotis Mantzanas¹, Michail Michalos², Stefania Kanata³, Stamatios Tsamados⁴ ¹North West University Healthcare NHS Trust, London UK, ²Imperial College Healthcare NHS Trust, London UK, ³University College London Hospitals NHS Foundation Trust, London UK, ⁴King's College Hospital NHS Foundation Trust, London UK

Femur, proximal, pertrochanteric simple (only 2 fragments) (31-A1)



trochanter (31-A1.2)



(31-A3.2)



3. Multifragmentary (31-A3.3) extending to greater rochante (2) extending to neck

DEFINITION

Hsu et al. defined the lateral femoral wall thickness (d) as the distance in mm from a reference point 3 cm below the innominate tubercle of the greater trochanter, angled at 135° upward to the fracture line (the midline between the two cortex lines) on anteroposterior radiograph. (Fig.2)

The lateral wall thickness threshold value for risk of developing a secondary lateral wall fracture was found to be 20.5 mm.



Figure 2. Diagram showing the lateral wall thickness (d), defined as the distance in mm from a reference point 3 cm below the innominate tubercle of the greater trochanter, angled at 135° upward to the fracture line (the mid-line between the two cortex lines) on anteroposterior radiograph

Reprinted from : Hsu CE, Shih CM, Wang CC, Huang KC. Lateral femoral wall thickness. A reliable predictor of postoperative lateral wall fracture in intertrochanteric fractures. Bone Joint J. 2013 Aug;95-B(8):1134-8. doi: 10.1302/0301-620X.95B8.31495. PMID: 23908432.

DISCUSSION

Intertrochanteric femoral (ITF) fractures are commonly seen in clinical practice, particularly in the elderly. For most ITF patients, surgical intervention is the standard treatment for pain relief and to regain joint movement or for palliative management.

Dynamic/Sliding hip screws (DHSs) are one of the most common fixation devices for AO/OTA 31-A1 and partial A2 fractures with an intact lateral femoral wall. For unstable fractures, fixation with intramedullary nails such as the proximal femoral nail anti-rotation (PFNA) has been shown to be a reliable and effective method for treating an ITF.

Palm et al. investigated the importance of an intact lateral femoral wall as a factor in postoperative fracture displacement after fixation with a dynamic/sliding hip screw (DHS). A postoperative fracture of the lateral femoral wall was found to be the main predictor for a reoperation after an intertrochanteric fracture.

RESULTS

Hsu et al. found that lateral wall thickness was a reliable predictor of post-operative lateral wall fracture with a threshold value of 20.5 mm being a reliable predictor for secondary lateral wall fracture. They suggested that treatment with a DHS alone is not advisable in the presence of a lateral wall thickness < 20.5 mm.

Palm et al. concluded that patients with preoperative or intraoperative fracture of the lateral femoral wall are not treated adequately with a dynamic/sliding compression hip-screw (DHS) device, and intertrochanteric fractures should therefore be classified according to the integrity of the lateral femoral wall, especially in randomized trials comparing fracture implants.

Babst et al. concluded that In unstable intertrochanteric fractures with small or missing lateral cortical buttress, the addition of a Trochanter Stabilizing Plate (TSP) to the DHS effectively supports the unstable greater trochanter fragment and can prevent rotation of the head-neck fragment. Excessive fracture impaction and consecutive limb shortening was prevented by this additional implant in 90 percent of these patients.

CONCLUSIONS

Lateral wall thickness should be measured/assessed in all intertrochanteric femoral fractures.

Dynamic/sliding hip screw fixation alone should be avoided in the cases where lateral wall thickness is less than 20.5mm or in cases where there is already a lateral wall fracture.







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Figure 3. Drawings showing a) preservation of adequate lateral wall thickness when the fracture line passes higher in the trochanteric region in A1 fractures, and b) the lateral wall decreases and the posteromedial section comminutes when the fracture line passes lower in the trochanteric region, resulting in A2 fractures.

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