Peritrochanteric Fractures: Choosing Your Weapon!

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Two main choices are available for fixation of intertrochanteric fractures and intertrochanteric-subtrochanteric fractures—a sliding hip screw or a second-generation nail. An intertrochanteric fracture is unstable because of the loss of posteromedial buttress of bone.1-4 Fixation devices are designed to resist the varus moment placed on these fractures.

INTERTROCHANTERIC FRACTURES

Approximately 50% of intertrochanteric fractures are stable and have minimal or no posteromedial comminution. The remaining 50% are unstable and have posteromedial instability and little resistance to varus deformity.1,4,5 Older rigid devices led to cutout or penetration of the nail as the fracture impacted. In the late 1960s, sliding devices were developed to allow impaction without cutout.1,6

The workhorse for intertrochanteric fractures in the new millennium is still the sliding hip screw. Intramedullary devices may also be used but these devices are most valuable in the combined intertrochanteric-subtrochanteric fracture.

The single most important technical factor is proper placement of the guide pin that guides the screw into the center of the femoral head (Figure 1).3,5 On hip radiographs, the compression trabeculae and tension trabeculae that coalesce in the center of the head are clearly visualized (Figure 2).7,8 This means that no matter how osteoporotic the fracture, the best bone for placement of any screw will be at the confluence of the compression and tension trabeculae in the center of the head. That is the reason that center-head placement is critical in fixation of these fractures. The hip screw should be within 5 mm of subchondral bone to allow its deepest penetration with secure purchase in trabecular bone.

In a recent study at Hennepin County Medical Center, >350 intertrochanteric fractures were evaluated and a new variant of intertrochanteric fracture was found. This variant is an intertrochanteric fracture with extension into the femoral neck region.9 This represented only 8% of intertrochanteric fractures in this series but it is the most problematic fracture, as it resulted in a 23% failure rate. Because this fracture pattern is unstable and routinely occurs in osteoporotic bone, special techniques in fixation may be necessary. A short barrel hip screw to allow impaction is essential. Bone substitutes, such as calcium phosphates and the Talon hip screw (Orthopaedic Designs Inc, St Petersburg, Fla), may be of value. This is the one intertrochanteric fracture where primary hip replacement may be used in healthy individuals.

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INTERTROCHANTERIC-SUBTROCHANTERIC FRACTURES

The other problematic fracture is the intertrochanteric-subtrochanteric fracture. These fractures do not do well with a regular angled hip screw because medial displacement of the femoral shaft leads to excessive shortening (Figure 3). A right-angle hip screw or blade plate can be used for treatment in these patterns. This construct does not allow impaction or medial shift of the femoral shaft, preventing excessive shortening. Indirect reduction must be used with the plating technique. The surgeon no longer reconstructs the fracture anatomically but fixes the proximal fragment solidly with center head placement of the screw deep within the femoral head. Distal fixation of the plate to the distal shaft is accomplished by placing at least four cortical screws past the distal most aspect of the fracture. The fracture fragments spanned will heal faster because the blood supply of the fracture site is not disturbed.

The workhorse of the intertrochanteric-subtrochanteric fracture is the intramedullary rod, which allows percutaneous fracture fixation and prevents medial displacement of the shaft thus preventing excessive collapse.

CHOOSING THE RIGHT DEVICE

If the greater trochanteric fragment is present and a subtrochanteric component is not present, the ideal device is the standard angled hip screw (Figure 4). It is cheaper, easier to use, and reliable. If a subtrochanteric component is present, the device of choice is a second-generation intramedullary rod (Figure 5). A right-angled hip screw or blade plate may be used if the surgeon is not familiar with intramedullary rodding techniques. The combined intertrochanteric femoral neck fracture requires the use of a shorter barrel to allow more collapse, and calcium phosphate substitutes may be of use in osteoporotic bone. This is the one intertrochanteric fracture pattern where hip replacement may be considered.

REFERENCES