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IN BRIEF

In Brief

Fractures in Brief

Femoral Neck Fractures

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Introduction

Femoral neck fractures are low-energy injuries in the aged, associated with frequent falls, ill health, and osteoporosis, and less commonly, high-energy injuries in the young. Femoral neck fractures are serious injuries. Although the surgical treatment for these fractures is refined, poor outcomes are not uncommon: many of the elderly patients die within a year of injury, and many of those who survive do not regain their preinjury level of function [5].

Structure and Function

The neck of the femur is the intracapsular region between the head proximally and the trochanters distally. The neck is important not only for its structural contribution, connecting the head to the shaft, but also as a conduit for blood vessels (branches of the medial and lateral circumflex femoral arteries) supplying the femoral head. As such, a fracture may disrupt vascularity and, even if there is eventual healing of the bone, still lead to osteonecrosis of the head. It is important to note the native anteversion of the neck and to recreate it when reducing a fracture.

Injury Considerations

The typical patient is frail, elderly, slight, and female with medical comorbidities who presents with a painful hip and a shortened and externally rotated lower extremity after a fall. Although the incidence in elderly males is increasing, an atypical presentation warrants consideration of a pathologic fracture. Excluding an acute medical condition such as seizure, syncope, or myocardial infarction as the cause of the fall and fracture should be routine.

Diagnosis and Classification

Detecting a hip fracture when present is obligatory. If plain films are negative when clinically suspected, MRI should be used to exclude an occult fracture (a bone scan may be falsely negative in the acute phase).

Femoral neck fractures can be described as subcapital and basicervical (which may behave more like an intertrochanteric fracture).

For subcapital fractures, the Garden classification is the most used: I, incomplete; II, complete but nondisplaced; III, complete, partially displaced; and IV, complete and fully displaced [4]. The stages can be simplified in practice into two, based on the presence or absence of displacement (see below). The seemingly easy task of detecting displacement apparently is difficult: a study examining

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this simplified classification reported an intraobserver reliability of approximately 75%, consistent with a maximal average accuracy of only approximately 85% [2].

Stress fractures of the femoral neck can occur, and their presence must be excluded as a cause of hip pain in young athletes, especially those presenting with disordered eating and amenorrhea (two components of the female athlete triad [3]).

Treatment

Among elderly patients with comparable medical histories, nondisplaced fractures generally are fixed whereas displaced fractures more often are replaced [6]. The right choice is based not only on outcomes data (eg, rates of failure or revision) but also on the consequences of the various possible outcomes. For instance, fixation may have a higher failure rate but can be revised with a primary arthroplasty, whereas a failed arthroplasty may require an extensive revision.

Older age, greater displacement, greater time from injury to treatment, and underlying hip arthrosis favor arthroplasty; however, there are no specific data that help establish thresholds for decision-making. In general, fractures in young people are worthy of attempted fixation, even if that surgery appears to have a high failure rate: the treatment of failed fixation is arthroplasty (the alternative acute treatment) whereas a failed joint arthroplasty in the young is a vexing problem.

If arthroplasty is selected, there still are additional treatment decisions to be made: partial versus total hip arthroplasty, and if partial, unipolar versus bipolar; for the stem, cemented, ingrowth, or neither; and surgical approach (as the risk of dislocation probably is greater with a posterior approach). Habit and skill, not data, appear to drive these decisions.

If fixation is chosen, the guiding principles of treatment are timely, accurate reduction and stable fixation. The best possible reduction should be achieved–open, if necessary. Two most common options for fixation are three screws in an inverted triangle (Fig. 1), with one screw placed in the posteroinferior neck or a sliding hip screw with a combined center-apex distance less than 25 mm.

Perhaps the most important aspect of treatment for these injuries is prevention. The greatest risk factor for hip fracture is a risk of falling. Patients reporting problems walking or a history of falls should be assessed for fall prevention. In addition, patients in high-risk groups, especially those sustaining a low-energy wrist fracture, should be screened and treated for osteoporosis. Diligent physical rehabilitation and maintenance of good vitamin D and calcium levels also are of utmost importance.

Fig. 1 Two important principles of fracture fixation are shown in this postoperative AP radiograph of the hip: (1) the fracture must be optimally reduced and (2) the screws should provide stability (eg, interior screw abutting the inferior cortex).

Outcomes

The ideal outcome, namely, a painless hip in a patient who has returned to preinjury levels of function, is disappointingly rare, seen only in a minority of cases. Patients and their families must be prepared for adverse outcomes. If fixation is chosen, osteonecrosis or nonunion is possible. Increased displacement and time to surgery may increase the likelihood of osteonecrosis of the femoral head; however, not all cases of osteonecrosis are painful enough to need treatment, let alone additional surgery [1, 5].

Complications of arthroplasty include dislocation, infection, and implant loosening (at rates up to two times greater than with elective joint arthroplasty) [5]. It also is not uncommon to find a patient with a perfectly performed, complication-free procedure who simply does poorly: in these patients, the fracture appears to be a marker rather than a cause of the patient's general decline.

Five Pearls

1. **Ask yourself why did this patient fall? Why did this fracture happen now? There is more to low-energy**

fractures than porous bones; and consideration of the risk of fracture will, it is hoped, remind you about prevention for other patients.

2. **The literature on THA for femoral neck fractures was written by arthroplasty specialists; their results may not be duplicated by the generalist.**
3. **The literature on "fixing" femoral neck fractures includes numerous studies in which open reduction of the fracture was not attempted.**
4. **Get a medical specialist on board. This is for risk stratification and postoperative management [2, 4, 5]. Medical clearance per se is a bankrupt concept.**
5. **Unnecessary delay in surgical treatment may be very harmful to the patient.**

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