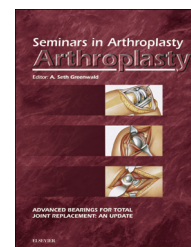


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Treatment options for displaced femoral neck fractures in the <60-year-old, active patient

Edwin P. Su, MD^{a,b,*}, and Sherwin L. Su, MD^b

^aDepartment of Orthopaedics, Weill Cornell Medical College, New York, NY

^bAdult Reconstruction and Joint Replacement Division, Hospital for Special Surgery, 535 East 70th St, New York, NY 10021

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ABSTRACT

Displaced femoral neck fractures are common injuries that can impart substantial morbidity, disability, and functional limitations to patients. Displacement of the fracture by greater than 50% has been shown to have a higher rate of subsequent osteonecrosis of the femoral head. In younger, active patients, open reduction and internal fixation (ORIF) may be desirable in order to preserve the patient's own hip joint. However, in the last decade, arthroplasty technologies and techniques have improved substantially, making total hip replacement a viable option for younger patients. Furthermore, there are numerous clinical studies demonstrating that arthroplasty has superior functional results as compared to internal fixation in the treatment of displaced femoral neck fractures, namely higher clinical scores and a lower reoperation rate. A higher risk of dislocation has always been the concern with performing total hip arthroplasty in the setting of femoral neck fracture, but fortunately, there are newer technologies such as larger head sizes and dual-mobility bearings that can help reduce the risk of dislocation.

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1. Introduction

Femoral neck fractures are one of the most common orthopaedic injuries requiring surgical treatment. Factors such as an increased patient lifespan, a higher patient activity level, and widespread osteoporosis contribute to an increasing number of femoral neck fractures annually [1]. An article examining the number of femoral neck fractures in the Medicare population (>65 years old) in the United States found that over 1 million occurred between 1991 and 2008 [2].

In cases of non-displaced fractures, internal fixation of the fracture is advocated, in order to preserve the patient's own hip joint and avoid the complications associated with

arthroplasty, such as dislocation and activity limitations. Traditionally, displaced femoral neck fractures are treated with hip arthroplasty, due to the risk of ensuing femoral head osteonecrosis. However, in younger patients, open reduction and internal fixation of a displaced femoral neck fracture is often advocated, because of the perceived limitations of hip arthroplasty. In the past, total hip arthroplasty (THA) was seldom performed because of a historically high dislocation rate [3–5]. However, in recent years, there appears to be a paradigm shift in the treatment of femoral neck fractures, due to emerging evidence that total hip arthroplasty often results in better functional outcomes and a lower revision rate than hemiarthroplasty [6,7]. Furthermore, alternative

* Corresponding author at: Adult Reconstruction and Joint Replacement Division, Hospital for Special Surgery, 535 East 70th St, New York, NY 10021.

E-mail address: sue@hss.edu (E.P. Su).

surgical approaches and new technological advances such as larger diameter heads, highly cross-linked polyethylene, and “dual-mobility” designs have made it possible to perform THR with improved stability and function.

Thus, authors are in favor of total hip arthroplasty for the treatment of displaced femoral neck fractures, even in patients who are active and younger than 60 years of age.

2. Surgical considerations

The goals of hip fracture management are to restore patient function to as close to their preoperative state as possible, with a single operation, and with the lowest complication rate. Although the majority of patients sustaining hip fractures are >75 years old [8], the patients are a very heterogeneous group, with different preoperative states. Thus, treatment of femoral neck fractures must be tailored to the individual patient with these principles in mind. For example, one is less likely to perform THA in a patient with impaired cognitive ability because of the risk of non-compliance and subsequent dislocation. Conversely, a fit, active patient, while older, may be better served with internal fixation, in order to avoid activity restrictions with an arthroplasty.

Hip fractures remain a source of increased patient morbidity and mortality, or a surrogate marker of declining patient health. Li et al. [9] found that 20–30% of hip fracture patients died within 1 year of surgery. Factors such as age, preoperative activity status, American Society of Anesthesiologists (ASA) scores influenced the likelihood of patient mortality. Studies have also found a 3% in-hospital mortality rate after hospitalization for a hip fracture [9,10]. Furthermore, owing to the heterogeneity of fracture patterns, treatment options, and patient characteristics, up to 30% of hip fracture operations will require revision surgery at some point [11]. These revision operations may be due to progression of arthritis, loss of fixation, or functional limitations.

Each patient poses a different combination of pre- and post-operative considerations and thus should be assessed with regard to the following aspects: the patient’s pre-fracture activity level, presence of co-morbidities, and patient compliance with postoperative restrictions such as hip precautions or partial weight bearing.

3. Internal fixation (IF)

Internal fixation is generally performed for minimally displaced femoral neck fractures in younger patients. In an attempt to avoid bone loss and the use of artificial implants, IF allows for fracture healing and retention of the patient’s own hip joint. This option is clearly preferable if the joint has minimal arthritis, the femoral head is viable, and the patient will be able to comply with postoperative limitations of weight bearing. Asnis et al. reported on the rates of osteonecrosis development with different degrees of displacement, using the Garden classification [12]: stages 2 and 3 had a 20% risk and stage 4 (complete displacement) had a risk of 30% [13]. These figures can be used in conjunction with patient

characteristics to determine whether internal fixation can be reasonably successful.

The benefits of IF include the preservation of a patient’s own hip joint, less invasive surgery, and freedom from movement and activity restrictions typically imposed by an arthroplasty. The disadvantages include a longer healing time, the possible development of arthritis or osteonecrosis, and the potential loss of fixation due to inadequate bone strength (Fig. 1).

With these considerations in mind, the authors believe that IF should be performed in minimally displaced femoral neck fractures, in younger patients. Definite contraindications include pre-existing hip joint arthritis, and the presence of a displaced fracture in older patients. The distinction between older and younger, however, is subjective. Therefore, a patient’s age, preoperative activity level, and the amount of displacement are evaluated; the less active and the more displaced the fracture, the more likely arthroplasty is to be performed.

4. Arthroplasty

Arthroplasty for femoral neck fracture is the definitive operation to treat both the fracture and concomitant hip arthritis, if present. Historically, however, THR has had a higher dislocation rate when performed for a femoral neck fracture, as compared to osteoarthritis [3,5]. Greater soft-tissue trauma around the hip joint and a greater preoperative hip range of motion as compared to the osteoarthritic hip may be contributing factors. Furthermore, the higher dislocation rate may be related to the frequency in which the operating surgeon performs THA, as it is known that high volume arthroplasty surgeons have fewer complications than lower



Figure 1 – AP x-ray showing the loss of screw fixation and displacement of the fracture.

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