

**Received:** 2011.11.08  
**Accepted:** 2011.12.20  
**Published:** 2012.02.08

## Complete spontaneous improvement of non-displaced femoral neck fracture without any surgery modality

Masoud Shayesteh Azar<sup>1</sup>, Majid Sajjadi Saravi<sup>2</sup>,  
 Mohammad Hossein Kariminasab<sup>2</sup>, Mehrdad Taghipour<sup>3</sup>, Rayka Sharifian<sup>3</sup>

<sup>1</sup> Department of Orthopedic Surgery, School of Medicine, Mazandaran University of Medical Sciences, Sari, Iran

<sup>2</sup> Department of Orthopedic Surgery, School of Medicine, Mazandaran University of Medical Sciences, Sari, Iran

<sup>3</sup> Cancer Research Center, Student Research Committee, School of Medicine, Mazandaran University of Medical Sciences, Sari, Iran

### Summary

**Background:**

Fracture of the femoral neck is still a medical dilemma due to high rates of complications and the choice of treatment. Although rigid internal fixation with cannulated screws through open or percutaneous approaches is the traditional treatment for undisplaced fractures (Garden type I and II) to avoid secondary displacement, considerable controversy still exists regarding the rate of this problem, thus it seems that a new trend in conservative management of this types of femoral neck fracture is emerging.

**Case Report:**

Our case is a 46-year-old woman with Garden type II femoral neck fracture, who refused all surgical options and willingly ignored her problem. Six months later she returned to our center with uneventful recovery of her fracture.

**Conclusions:**

The previous belief about the absolute poor prognosis of Garden type II with 100% rate of secondary displacement with non-operative management must have been an overestimation or the success histories in the literature about non-operative treatment of these fractures originates from inherited weakness of the Garden classification in differentiating type I from type II. The patient gave the informed consent prior being included into the study.

**key words:**

**femoral neck fracture • non-displaced fracture • non-operative treatment**

**Full-text PDF:**

<http://www.amjcaserep.com/fulltxt.php?ICID=882472>

**Word count:**

1197

**Tables:**

–

**Figures:**

2

**References:**

34

**Author's address:**

Mehrdad Taghipour, Student Research Committee, School of Medicine, Mazandaran University of Medical Sciences, Sari, Iran, P.O. Box: 48178-44718, e-mail: mehrdadtaghipour@gmail.com

## BACKGROUND

Femoral neck fractures are serious injuries that are associated with high mortality and morbidity [1–3]. They have a significant impact on the National Health Service and on society in general. Hip fractures are a significant health care problem worldwide, with an annual incidence of approximately 1.7 million [4]. In the US, 250,000 fractures happen each year [5]. The incidence has increased since the 1960s and is expected to double by year 2050 [6,7]. In the UK, the mortality following a femoral neck fracture is between 20% and 35% within 1 year in patients, of which 80% were women [8]. Falls are the main reason for fracture in the elderly and high energy trauma is the major cause in younger patients. Most hip fractures in people with normal bone are the result of high-energy trauma such as car or motor crashes.

Among the various classification systems being used for fracture of the femoral neck, Garden classification is the most widely used today. In this system, Garden I and Garden II consist of non-displaced fractures [9]. Garden I is an incomplete fracture in which the line of fracture does not reach to the medial cortex and the head stays in relative valgus, while Garden II refers to all those complete but undisplaced fractures. In Garden III and IV there is complete and incomplete displacement, respectively [9,10].

Displaced fractures of the femoral neck are necessarily treated through open reduction and internal fixation with cannulated screws or sliding hip screws or hip arthroplasty, depending on the age of the patients [11–13].

For non-displaced Garden I and Garden II, the traditional approach is rigid internal fixation with cannulated screws through open or percutaneous approaches on the grounds of high probability of secondary displacement [14–17].

The problem is the high level of controversy about the exact rate of secondary displacement as the basic rationale of operative treatment and the weakness of Garden classification with low level of interobserver agreement in differentiating incomplete Garden I from complete Garden II.

## CASE REPORT

In May 2010, a 46-year-old woman was referred from the legal medicine office to the orthopedic clinic due to limping 20 days after trauma. Radiographs of the left hip showed a non-displaced femoral neck fracture due to a motor vehicle crash (Figure 1). The patient was advised to go through internal fixation but she declined this plan. She came back to the orthopedic clinic about 6 months later without any pain or limitation of motion. She described her treatment as 1 month of complete bed rest and the unrestricted but cautious activity afterwards (Figure 2). The patient gave informed consent prior to being included into the study.

## DISCUSSION

About half of the fractures of the proximal femur are located in the femoral neck. The frequency of this “sickness of the aged” will increase enormously in the wealthy parts of the world, where the number of old people is growing



**Figure 1.** Simple X-Ray of the left hip showed non-displaced femoral neck fracture 20 days after trauma (May 2010).



**Figure 2.** Simple X-Ray of the left hip, 6 months after trauma (November 2010).

very rapidly. Melton [18] estimated the global incidence of hip fractures to be 1.6 million in 1990. This figure is expected to rise to 4 million per year in 2025 and to 6.3 million in 2050. In some papers the etiological factors of femoral neck fracture are reported, in which 66% were due to high energy trauma and 8% were due to falls. They have clinical importance because of the serious complications that often happen and which may lead to a life-long disability. Hip fractures, therefore, represent an enormous socio-economic and medical problem and challenge (orthopedic) surgeons and anesthetists to find the cheapest and most effective way to treat them [19]. Femoral neck fractures are of great importance in treatment and follow-up. In our presented case the patient did not follow-up and came back about 6 months after trauma. It is said that the non-operative treatment is acceptable for non-displaced femoral

neck fracture. In a prospective study, 170 impacted femoral neck fractures were treated by early mobilization and weight-bearing [20]. About 143 fractures (86%) were united. There is a major difference in outcome on comparing non-displaced and displaced femoral neck fractures in elderly patients treated with internal fixation [21]. The ethical concern however is the morbidity and mortality associated with non-operative treatment of femoral neck fracture. Preoperative medical conditions are useful indicators for determination of functional prognosis and survival [22]. In Adnan's FARA study, 2 out of 16 patients treated non-operatively died within 4 months of injury (12.5%) and the overall mortality at 4 years was 25% [20]. The mortality rate therefore is not any worse than that reported in the literature for patients whose fracture was treated surgically [22–25]. Crawford [26] was the first to report good results of early mobilization – about 8% secondary instability (SI). More recent papers have reported 20% (28) and 47% [28] SI. Primary internal fixation is able to reduce the SI rate dramatically, but can nevertheless go up to 9% [29]. Cserhati and Conn [27,29] are strong advocates of operative treatment of the impacted femoral neck fracture (IFN), although they know that the operation is unnecessary in about half of their patients. In the discussion on IFNs the supposed increased risk of avascular necrosis after SI in younger patients continues to be the main controversy. Several authors [30,31] proposed that the risk of avascular necrosis was increased by SI and therefore recommended primary internal fixation of all patients, especially those under 60 years of age. Calandruccio and Anderson [32] mentioned that in IFNs the main damage is to the vessels in the bone at the level of the fracture.

Zlomenina [19] treated non-displaced fractures non-operatively. By the end of the first week of treatment 93% of the patients could walk with the help of crutches or other support. Partial weight-bearing was preferable in the first 8 weeks but if this was not possible, full weight-bearing was accepted. About 341 non-displaced femoral neck fracture cases were treated. The overall mortality at 1 year was about 19%. Of the 311 fractures which were followed-up until healing or secondary instability (SI), 216 (69%) united. Helbig [28] supporting his point of view that patients with an IFN should be given the benefit of a doubt and the fracture should be treated non-operatively. Avascular necrosis was observed in 18 (11%) of the 160 fractures, which healed after non-operative treatment and could be followed for at least 2 years after the injury. Every change of the shape of the femoral head was considered as such [19]. Recumbency [33] and traction [34] have been practiced as non-operative treatment in the Netherlands. They reported that these methods require a long period of bed rest and have a high rate of complications such as decubitus, thromboembolic complications and mental status deterioration. Because of this, as well as for economic and psychological reasons, these treatment options can no longer be advocated. Furthermore, it does not seem logical to pull at a nicely impacted fracture.

## CONCLUSIONS

In all studies, various methods have been used for the treatment of femoral neck fractures, which include surgical and non-operative treatment. Although rigid internal fixation of femoral neck fractures has long been the cornerstone of

treatment, especially in non-impacted cases, non-operative management does not mean a poor result.

## REFERENCES:

1. Raaymakers EL: Fractures of the femoral neck: a review and personal statement. *Acta Chir Orthop Traumatol Cech*, 2006; 73(1): 45–59
2. Schmidt AH, Swiontkowski MF: Femoral neck fractures. *Orthop Clin North Am*, 2002; 33(1): 97–111, viii
3. Macaulay W, Yoon RS, Parsley B et al: Displaced femoral neck fractures: is there a standard of care?, *Orthopedics*, 2007; 30(9): 748–49
4. Miyamoto RG, Kaplan KM, Levine BR et al: Surgical Management of Hip Fractures: An Evidence-based Review of the Literature. I: Femoral Neck Fractures. *J Am Acad Orthop Surg*, 2008; 16(10): 596–607
5. Zuckerman JD: Hip Fracture. *NEJM*, 1996; 334: 1519–25
6. Brutel C, Omalek L: Demographic projections for France, its regions and departments on the horizon in 2030. *Résultats INSEE*, 2003
7. Cummings SR, Rubin SM, Black D: The future of hip fractures in the United States: Numbers, costs, and potential effects of postmenopausal estrogen. *Clin Orthop*, 1990; 252: 163–66
8. Goldacre MJ, Roberts SE, Yeates D: Mortality after admission to hospital with fractured neck of femur: database study. *BMJ*, 2002; 325 (7369): 868–69
9. Greenspan A: *Orthopedic Radiology: A Practical Approach*. 3<sup>rd</sup> ed. Philadelphia, Pa: Lippincott Williams & Wilkins, 2000
10. Wu CC, Shih CH: Ipsilateral femoral neck and shaft fractures: retrospective study of 33 cases. *Acta Orthop Scand*, 1991; 62: 346–51
11. DeLee JC: Fractures and dislocations of the hip. In Rockwood CA Jr, Green DP, Bucholz RW (eds.). *Rockwood and Green's fractures in adult*. 3<sup>rd</sup> ed. Philadelphia, PA: Lippincott-Raven, 1991; 1481–51
12. Johansson T, Jacobsson SA, Iverson I et al: Internal fixation versus total hip arthroplasty in the treatment of displaced femoral neck fractures: a prospective randomized study of 100 hips. *Acta Orthop Scand*, 2000; 71: 597–602
13. Rogmark C, Carlsson A, Johnell O et al: A prospective randomized trial of internal fixation versus arthroplasty for displaced fractures of the neck of femur. *J Bone Joint Surg Br*, 2002; 84: 183–88
14. Yih-Shiunn L, Chien-Rae H, Wen-Yun L: Surgical treatment of undisplaced femoral neck fractures in the elderly. *International Orthopaedics (SICOT)*, 2007; 31: 677–82
15. Eisler J, Cornwall R, Strauss E et al: Outcomes of elderly patients with nondisplaced femoral neck fractures. *Clin Orthop*, 2002; 399: 52–58
16. Heetveld MJ, Raaymakers ELFB, van Walsum ADP et al: Observer assessment of femoral neck radiographs after reduction and dynamic hip screw fixation. *Arch Orthop Trauma Surg*, 2005; 125: 160–65
17. Heyse-Moore GH: Fixation of intracapsular femoral neck fractures with a one-hole plate dynamic hip screw. *Injury*, 1996; 27: 181–83
18. Melton LJ: Hip fractures: a worldwide problem today and tomorrow. *Bone*, 1993; 14: S1–8
19. Zlomenina krčku stehenní kosti – osobní zkušenosti autora Ernst L.F.B. Raaymakers, Zlomenina krčku stehenní kosti – osobní zkušenosti autora. *Acta Chirurgiae Orthopaedicae et Traumatologiae Čechos.*, 2006; 73: 45–59 [in Czech]
20. Adnan A: FARA, Non-operative treatment of elderly patients with femoral neck fracture *Acta Orthop Belg*, 2008; 74: 627–29
21. Tidermark J, Zethraeus N, Svensson O et al: Quality of life related to fracture displacement among elderly patients with femoral neck fractures treated with internal fixation. *J Orthop Trauma*, 2002; 16: 34–38
22. Kyo T, Takaoka K, Ono K: Femoral neck fracture. Factors related to ambulation and prognosis. *Clin Orthop*, 1993; 292: 215–22
23. Raaymakers EL, Marti RK: Non-operative treatment of impacted femoral neck fractures. A prospective study of 170 cases. *J Bone Joint Surg*, 1991; 73-B: 950–54
24. Tidermark J, Zethraeus N, Svensson O et al: Quality of life related to fracture displacement among elderly patients with femoral neck fractures treated with internal fixation. *J Orthop Trauma*, 2002; 16: 34–38
25. Van Balen R, Steyerberg EW, Polder JJ et al: Hip fracture in elderly patients: outcomes for function, quality of life, and type of residence. *Clin Orthop*, 2001; 390: 232–43
26. Crawford HB: Conservative treatment of impacted fractures of the femoral neck. *J Bone Jt Surg*, 1960; 42-A: 471–79

27. Cserhati P, Kazar G, Manninger J et al: Non-operative treatment for undisplaced femoral neck fractures: a comparative study of 122 non-operative and 125 operatively treated cases. *Injury*, 1996; 27: 583-88
28. Helbig L, Werner M, Schneider S, Simank HG: Die mediale Schenkelhalsfraktur Typ 1 nach Garden: konservative vs. operative Therapie. Ergebnisse einer retrospektiven Studie. *Orthopade*, 2005; 34: 1040-45
29. Blomfeldt R, Tornqvist H, Ponzer S et al: Comparison of internal fixation with total hip replacement for displaced femoral neck fractures. *J Bone Jt Surg*, 2005; 87-A: 1680-88
30. Jeanneret B, Jakob RP: Konservative versus operative Therapie der Abduktions- Schenkelhalsfrakturen. Resultate einer klinischen Nachkontrolle. *Unfallchirurg*, 1985; 88: 270-73 [in German]
31. Philips JE, Christie J: Undisplaced fracture of the neck of the femur: results of treatment of 100 patients treated by single Watson-Jones nail fixation. *Injury*, 1988; 19: 93-96
32. Calandruccio RA, Anderson WE: Post-fracture avascular necrosis of the femoral head: correlation of experimental and clinical studies. *Clin Orthop*, 1980; 152: 49-84
33. Eklund J, Eriksson F: Fractures of the femoral neck: with special regard to the treatment of stable abduction fractures. *Acta Chir Scand*, 1964; 127: 315-37
34. Waldenstrom J: Fractures recentes du col femoral. *J Chir*, 1924; 2: 129-62