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ORIGINAL ARTICLE

# Cementless total hip arthroplasty after acute femoral neck fracture in active patients. Prospective matched study with a minimum follow-up of 5 years☆

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**KEYWORDS**
Femoral neck fracture;
Cementless total hip replacement;
Hip fracture;
Elderly

**Abstract**
*Objectives:* To evaluate the outcomes of cementless total hip replacement after acute femoral neck fracture in active patients.
*Material and methods:* A prospective matched study was conducted to compare the results of 76 patients with fractures and 76 patients with osteoarthritis. The Harris score, short-WOMAC and SF-12 were used for the clinical assessment. The mean follow-up was 7.3 years (range 5–11).
*Results:* There were no significant differences in medical or surgical complications between the 2 groups. Functional outcomes were similar, but more walking aids were used in the fracture group. There were 6 revisions among the fracture group (one dislocation, 2 deep infections, 3 aseptic loosening), and 2 aseptic loosening among controls. There was no significant difference in arthroplasty survival at 10 years (88.7 vs. 96.1%, $P = .15$). The mortality rates at 2 and 10 years were similar.
*Conclusion:* Cementless total hip replacement for treatment of acute femoral neck fracture showed results similar to those of elective surgery for osteoarthritis in these selected patients.


**PALABRAS CLAVE**
Fractura cervical femoral;

**Artroplastia total de cadera no cementada tras fractura cervical femoral aguda en pacientes activos. Estudio prospectivo emparejado con seguimiento mínimo de 5 años**

**Resumen**
*Objetivos:* Evaluar los resultados de la artroplastia total de cadera no cementada tras fractura cervical femoral aguda, en pacientes previamente activos.

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Artroplastia total de cadera no cementada;
Fractura de cadera;
Ancianos

*Material y métodos:* Estudio prospectivo emparejado de 76 pacientes con fractura y 76 con coxartrosis. Para la valoración clínica se utilizó la escala de Harris, el WOMAC reducido y el SF-12. Seguimiento medio de 7,3 años (rango 5–11).
*Resultados:* No había diferencias significativas en las tasas de complicaciones médicas o quirúrgicas. Los resultados funcionales fueron similares, pero con mayor utilización de ayudas para caminar en los pacientes con fractura. Entre estos hubo 3 luxaciones, y ninguna en los controles. Entre los pacientes fracturados hubo 6 revisiones (una luxación, 2 infecciones profundas y 3 aflojamientos asépticos), mientras en el grupo de coxartrosis hubo 2 aflojamientos asépticos. No había diferencia significativa en la supervivencia de la prótesis a 10 años (88,7 vs. 96,1%, p = 0,15). Las tasas de mortalidad a 2 y 10 años fueron similares.
*Conclusión:* La artroplastia total de cadera no cementada para tratamiento de fractura cervical femoral aguda se mostró similar a la cirugía electiva por artrosis en estos pacientes seleccionados.


## Introduction

Hemiarthroplasty has proven to be a suitable treatment for the majority of displaced femoral neck fractures.[1] In general, total hip arthroplasty (THA) is not recommended for elderly patients with this fracture due to the poor postoperative functional expectations, increased risk of dislocation and greater cost.[2] However, the increase in life expectancy and improved physical condition of elderly patients in developed countries have led to an increase of the drawbacks of hemiarthroplasty, primarily those derived from erosion of the acetabulum in active elderly patients.[3,4] Systematic reviews, such as that conducted by Cochrane,[5] have shown that the use of THA in displaced femoral neck fractures is more effective than hemiarthroplasty, as it provides better function, less pain and a lower revision rate without increasing medical complications. Conversely, the downside is a higher dislocation rate. Nevertheless, there is no consensus regarding its use in these fractures, as shown by a study of national arthroplasty records,[6] in which THA in femoral neck fractures was used 6 times more frequently in Sweden than in England, 4 times more than in Australia and twice more than in Canada.

The effectiveness of elective THA has been extensively studied, including the use of uncemented THA in elderly patients.[7] This experience has been extrapolated to the treatment of hip fractures; however, these fractures entail certain characteristics inherent to the lesion itself and to patients suffering pathologies other than coxarthrosis (or hip osteoarthritis). Although numerous studies have compared THA and hemiarthroplasty in elderly patients with hip fractures,[8] very few studies have compared the use of THA in the treatment of these fractures and elective surgery.[9–12]

Our working hypothesis was that the initial diagnosis of femoral neck fracture did not influence the outcome of THA in previously active patients. Thus, our main objective was to evaluate the results of primary cementless THA as an initial treatment for acute femoral neck fractures in active patients with appropriate expectations regarding postoperative functional demand, compared with that of primary THA for coxarthrosis. The secondary objective was to assess the medical complications and mortality of hip fractures following primary THA.

## Materials and methods

In January 2001 we initiated a prospective comparative study of the treatment of femoral neck fractures using uncemented THA. The study was approved by the Clinical Research Ethics Committee of our institution. The criteria for inclusion in the study group were acute displaced fracture, age 60 years or above, patients with independence for activities of daily living, unlimited walking radius, walking without aids and no cognitive impairment, as described in the section on assessment. Inclusion in the study was independent of radiographic bone quality. Patients with pathological fractures caused by neoplasms, rheumatoid arthritis and other inflammatory or metabolic arthropathies were excluded from the study. In order to evaluate the results of the THA, the study required a minimum postoperative follow-up period of 5 years. As control group we selected a cohort of consecutive patients undergoing uncemented THA due to primary coxarthrosis, with a 1:1 ratio according to the following variables: age (±3 years), gender, body mass index, date of surgery, prosthesis model and surgeon. We did not match the baseline condition of the hip, as the coxarthrosis group could present greater deterioration. Except for the primary diagnosis, the inclusion and exclusion criteria were similar to those of the study group.

### Surgical Protocol

All interventions were performed by 2 specialists in hip surgery (ALU and JSR) in a laminar flow room with spinal anesthesia. The Hardinge lateral pathway[13] was used in all cases. We implanted 2 types of uncemented THA systems; one was the Meridian stem system with Trident® acetabular cup (Stryker, Mahwah, NJ, USA) used in 82 hips (41 following fracture and 41 following coxarthrosis) during the period 2001–2004 and the other was the stem system with Duofit® cup (Samo, Bologna, Italy) used on 70 hips (35 following fracture and 35 following coxarthrosis) during the period 2005–2007. In both systems, the stems were straight and collarless, made of titanium alloy with proximal porous coating of plasma spray and metaphyseal pressure fitting, with similar geometry. All acetabula were hemispherical,