# Management of hip fractures in the elderly: to fix or not to fix?

## Manejo de las fracturas de cadera EAE los ancianos: ¿operar o no operar?

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**Abstract**

Hip fracture **(**HF) is a frequent condition in the elderly population, especially females. It is associated with higher mortality, decreased functionality, higher dependency, and in general poorer quality of life (QoL) for the patients and caregivers. At present, there is no well-established evidence-based guideline regarding the ideal treatment approach for this condition. Most of the evidence suggests that surgical management is the optimal approach in most scenarios, providing the best outcomes, the highest survival rates, and the most improvement in QoL. However, other studies in specific subpopulations, like highly frail elder patients, or those with short life expectancy, indicate these subjects may not benefit as much from the procedure. Furthermore, most of the available information focuses on survival rates and other medical parameters, while ignoring other patient-centered aspects like QoL, comfort, and treatment satisfaction. In general, it is recommended to perform a proper and individualized evaluation before deciding to operate. Proper candidate selection, taking into consideration comorbidities, life expectancy, patient preference, and overall benefits should lead, in most cases, toward the surgical approach. However, non-operative management should not be neglected when the conditions to operate are not met. This review aims to understand the fundamentals behind the decision making for total hip replacement in the elderly, and to ponder the potential approaches after considering several risk and protective factors.

**Keywords:** Hip fracture, total hip replacement, elderly patients, frailty, quality of life.

## Resumen

La fractura de cadera (FC) es una patología frecuente en la población anciana, especialmente en el sexo femenino. Se asocia con una mayor mortalidad, una menor funcionalidad, una mayor dependencia y, en general, una peor calidad de vida (CdV) para los pacientes y cuidadores. En la actualidad, no existe una guía basada en evidencia bien establecida sobre el enfoque de tratamiento ideal para esta afección. La mayor parte de la evidencia sugiere que el tratamiento quirúrgico es el enfoque óptimo en la mayoría de los escenarios, ya que proporciona los mejores resultados, las tasas de supervivencia más altas y la mayor mejora en la calidad de vida. Sin embargo, otros estudios en subpoblaciones específicas, como pacientes ancianos muy frágiles o aquellos con una esperanza de vida corta, indican que estos sujetos pueden no beneficiarse tanto del procedimiento. Además, la mayor parte de la información disponible se centra en las tasas de supervivencia y otros parámetros médicos, ignorando otros aspectos centrados en el paciente como la calidad de vida, la comodidad y la satisfacción con el tratamiento. En general, se recomienda realizar una evaluación adecuada e individualizada antes de decidir operar. La selección adecuada del candidato, teniendo en cuenta las comorbilidades, la esperanza de vida, las preferencias del paciente y los beneficios generales, debería conducir, en la mayoría de los casos, hacia el abordaje quirúrgico. Sin embargo, no se debe descuidar la gestión no operativa cuando no se cumplen las condiciones para operar. Esta revisión tiene como objetivo comprender los fundamentos detrás de la toma de decisiones para el reemplazo total de cadera en personas mayores y reflexionar sobre los enfoques potenciales después de considerar varios factores de riesgo.


**Palabras clave:** Fractura de cadera, reemplazo total de cadera, pacientes ancianos, fragilidad, calidad de vida.

## Introduction

Hip fracture (HF) represents one of the major orthopedic health issues worldwide, especially for the elderly and female population[1,2]. The annual incidence of HF during the 90s decade was about 1.3 million, with a prediction to rise to 5-20 million by 2050[3]. Not only does HF has an alarmingly high incidence, but several studies have demonstrated that in the past 3 decades, there has indeed been a rising trend[4]. Moreover, it has been shown that this condition represents a remarkable burden to health care systems, since fractured patients incur an exponential rise in direct and indirect care costs, like pharmacological treatment, surgery, in-hospital stay, physical therapy and many others[5,6].

On the other hand, the impact of HF is not limited to financial aspects, but also to the functionality, quality of life (QoL), and life expectancy of the patient[7]. Firstly, mortality rate increases up to 25% within 1 year following HF or associated surgeries[8]. Furthermore, as a direct consequence of HF, patients' functionality, and independency is significantly compromised, as estimated by Barthel and Katz instruments, thus severely reducing QoL[9]. Similarly, reduced independency implies the need for caregivers. As a result, there is also a detriment towards mental and physical health of the caregivers[10–12]. However, hip prostheses can restore joint function, functionality and QoL in most of the patients within 2 years following the initial fracture[13]. Therefore, total hip replacement (THR) seems to be the gold-standard for HF management. Nonetheless, surgical approach may or may not be the best choice depending on several variables, particularly age.

Epidemiological analyses have shown that nearly 95% of all HF occur after 50 years of age. However, it is important to mention that the incidence has an uptrend that is linearly correlated with age, meaning that the older the patient, the more likely they are to have an HF[14]. Making the decision to perform THR in patients under 65 years is pretty standard. Nonetheless, after a certain threshold the decision becomes considerably more complex, as elderly patients have significantly more comorbidities, higher risk of complications and lower rates of total recovery[15]. This review aims to understand the fundamentals behind the decision making behind THR in the elderly, and to ponder the potential approaches after considering several risk and protective factors.

### TOTAL HIP REPLACEMENT IN THE ELDERLY: WHEN, HOW AND WHY?

Older patients are known to have higher odds of postoperative complications and mortality; with a higher amount of comorbidities that are associated with poorer postoperative outcomes[16]. Besides, other authors have

reported that geriatric syndromes such as frailty (Odds ratio (OR) 2.16) and cognitive impairment (OR 2.01), as well as depressive symptoms (OR 1.77), significantly increase postoperative complication rates[17]. Nevertheless, it has been question whether age itself is an independent risk factor, or if it tends to cluster several other risk factors.

In a study by Watt et al.[17], the pooled incidence of postoperative complications in patients over 65 years undergoing elective surgery was 25%, meaning that one in four older adults suffered some sort of negative outcome. However, it was also reported that older age was not independently associated with such complications (OR 1.07, 95% CI 1.00-1.14). Other authors have previously stated that frailty is a more representative image of a patient's biological age as opposed to their chronological age, which could explain why established frailty diagnosis and not older age was associated with negative postoperative outcomes[18].

Analyses from other studies regarding the outcomes of elder patients in the context of several types of surgeries are considerably heterogeneous. Older age has been recognized as an independent risk factor for postoperative complications and mortality in surgeries such as lung resection[19], and pancreaticoduodenectomy[20]. In contrast, other studies have reported age not to be an independent risk factor for complications in the scenario of autologous breast reconstruction[21], as well as cervical discectomy and fusion[22]. Given these mixed results, it is difficult to establish a well-founded and unbiased view on age as an independent risk factor for postoperative complications. Therefore, individual assessment of the impact of age on the outcomes of specific surgeries may be the best approach.

Although postoperative complications and mortality rates are important factors to consider in all procedures, it is also important to consider mortality rates when conservative approaches are taken[23–26]. Whilst the patient's survival is the most important medical outcome, the latter might differ from the patient's perspective. While in some cases the outcomes appear to be independent of the approach in this sense, like with distal radius fracture[27], that is not the case for the matter with HF, which has been reported to have significantly greater mortality at both one and two years after fracture when subjected to nonoperative management (NOM)[28].

A recent study compared mortality rates between patients with HF treated surgically against non-surgically. Nearly 340 patients with a mean age of 80 were assessed, most of them being ASA Grade III, as well as most of them being females. Follow-ups were performed at 1 year and 2 years after the fracture. The NOM group had four times more risk of mortality during the first year as compared to the surgical group. Similarly, in the second-year follow-up, the trend persisted, although the risk of mortality of the NOM group was only three times higher than its counterpart. The only significant independent predictor for mortality was treatment modality, whereas the number of comorbidities, ASA grade, or age were not relevant predictors of mortality[28].

Similarly, Hwang et al.[29] performed a retrospective analysis on 807 elderly patients with HF. Nearly 85% of the patients were treated surgically, and the rest received NOM. The mortality during the first year was 12% in the surgical group and 44% in the NOM group. Likewise, this trend persisted in the second-year follow-up ($p < 0.05$). Moreover, no difference was found between the types of fractures. In addition, regardless of the surgical approach, mortality rates were significantly higher in patients with heart failure, chronic renal disease, dementia, cancer, or in those with 3 or more comorbidities.



Furthermore, Wang et al.[30] analyzed the difference in outcomes between surgical and nonsurgical approaches in nonagenarians with HF. However, instead of comparing mortality rates, the authors decided to compare median survival time in months. The median survival time of the surgical group was 58 months. In contrast, the nonsurgical group had a mean survival time of 24 months. A multivariate analysis was performed to adjust for age, sex, Charlson Comorbidity index, fracture type, and injury severity score. It was concluded that surgery significantly reduced the risk of death (Hazard Ratio (HR) = 0.42; 95% CI).

In addition to mortality rates, other authors have focused on evaluating the QoL of patients depending on the provided treatment for their HF. For instance, a group of 172 institutionalized patients with a mean age of 88 years were given the option to choose between operative management and NOM, resulting in a distribution of 88 nonsurgical and 84 surgical patients. The EuroQol 5 dimension (EQ-5D) was used to quantitatively assess the results. The QoL in the NOM group was to that of those with the operative approach. Despite mortality being four times higher in the NOM group, the treatment satisfaction was high in both groups with no significant difference. These results show that NOM of HF is a viable option in the context of institutionalized patients with limited life expectancy[31].

Nonetheless, this study had several limitations. Firstly, it only considered institutionalized patients with a mean age significantly near the end of life. Likewise, the medical decision was taken entirely by the patients, which diverges from other studies that consider the medical judgment in this matter. Although the study shows patient satisfaction despite of the decision, the lack of other comparative studies hinders the assessment the effect of surgery on the QoL of patients. However, in relatively younger age groups, the impact of surgery in the QoL is significantly higher when compared to the nonsurgical approach. Despite the improvement of QoL after surgery, when compared to the pre-fracture status, it remains only a partial recovery independently of the

provided treatment[32,33]. Therefore, despite the positive findings regarding the improvement in QoL of surgically treated patients, more research is needed to further clear the panorama.

Research by Wijnen et al.[34] analyzed the outcomes of NOM of hip fractures in highly frail patients. It was reported that NOM was supported by advanced care planning and shared decision-making, providing both a well-founded medical suggestion as well as respecting the patient's decision. As expected, the mortality in the NOM group was nearly 99% in the first year, in contrast to the 28% of the operative group. NOM patients were selected according to medical grounds and patient and family preferences, considering aspects like minimal benefits from the surgery, and life expectancy. The authors concluded that NOM should be an alternative to surgery when it is medically demonstrated that there is no significant gain from the surgery.



Despite most studies showing that surgical management remains the leading approach towards HF in the elderly, some studies suggest non-inferiority for the NOM. Evidence-based guidelines regarding this subject are still lacking and usually imply a delay in medical decision-making. A systematic review by Kim et al.[35] reported patients who underwent NOM had higher in-hospital stay, higher complication rates, and higher mortality rates at 30 days and 1 year when compared to the operative group. Similarly, a meta-analysis by van de Ree et al.[36] had similar conclusions regarding mortality between the operative and NOM groups. However, it was also reported that no study included a comparison of QoL, functional outcome, or healthcare costs. These variables should be addressed to better inform patients and caregivers to enable shared-decision making.

Lastly, a meta-analysis by Loggers et al.[37] reported that despite obvious differences in the mortality rates between operative and NOM groups, current literature shows a lack of evidence regarding the true prognosis of NOM of frail patients with limited life expectancy. Likewise, there is a lack of information regarding QoL, pain, comfort, and direct and indirect costs of care. In conclusion, the greater part of the available information regarding HF management is limited to mortality and complication rates. Further data is required to assess other equally significant aspects surrounding this complex problem, in order to provide the best possible care for patients.

## Conclusions

HF is a frequent condition in the elderly population, especially females. In addition, HF is associated with higher mortality, decreased functionality, higher dependency, and in general poorer QoL for the patients and caregivers. There is a dilemma within the medical community since there is no evidence-based guideline regarding the ideal treatment approach for this group of patients. Most of the evidence suggests that surgical management is the optimal approach in most scenarios, providing the best outcomes, the highest survival rates, and the most improvement in QoL. However, other studies in specific subpopulations, like highly frail elder patients, or those with short life expectancy, indicate these subjects may not benefit as much from the procedure. Furthermore, most of the available information focuses on survival rates and other medical parameters, while ignoring other patient-centered aspects like QoL, comfort, and treatment satisfaction. In general, it is recommended to perform a proper and individualized evaluation before deciding to operate. Proper candidate selection, taking into consideration comorbidities, life expectancy, patient preference, and overall benefits should lead, in most cases, toward the surgical approach. However, NOM should not be neglected when the conditions to operate are not met.

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