

# Super-Elderly Patients with Distal Radius Fractures have Lower 1-Year Mortality rate than Age and Gender Matched Controls: A Register-based Study

Tägil Magnus<sup>1</sup>, Lööf Ellen<sup>1</sup>, Landgren Marcus<sup>2</sup>, Harding Anna-Kajsa<sup>1</sup>, Antonio Abramo<sup>3</sup> Arvidsson Linnea<sup>1</sup>

<sup>1</sup>Department of Orthopedics, Clinical Sciences, Lund University and Skåne University Hospital, Lund, Sweden. <sup>2</sup> Department of Orthopedic Surgery, Hand Surgery Unit, Copenhagen University Hospital, Herlev and Gentofte, Gentofte, Denmark. <sup>3</sup>Institute of Clinical Sciences, Department of Hand Surgery, Skåne University Hospital, Malmö, Sweden.

**INTRODUCTION:** Advanced age is one of the most important risk factors for DRF and the elderly constitutes the largest group of patients with DRFs. In published studies, elderly is often defined using a wide age span. Most often, the threshold for being elderly is set to somewhere between 50-70 years.<sup>2</sup> However, defining the elderly as a group this way is imprecise and differences do exist between a 60 and an 80-year-old patient regarding expectations and needs as determinants for successful outcome. In this study we analyze the super-elderly population, here defined as individuals aged 80 years or older.

The number of “super-elderly” patients are calculated to rise by 50% in Sweden from 2023 to 2030<sup>3</sup>. With an exponential increase of osteoporosis with age<sup>4</sup>, also the number of DRFs in the super-elderly can be anticipated to rise. We face a major challenge regarding the optimization of treatment of our oldest patients.

It is well known that increased mortality rates are found after *hip* fractures. In 55,716 patients, the 1-year mortality after a hip fracture was estimated to 26%.<sup>8</sup> In a study of patients 65 years or older, a fragility fracture occurring at any site, was associated with increased mortality for up to 6 years post-fracture. The mortality rate was mainly affected by a hip or a vertebral fracture.<sup>9</sup> In DRF-patients, the results were less clear and the mortality has been shown to be both increased<sup>10-13</sup>, decreased<sup>14,15</sup> or without difference.<sup>16-18</sup> The aim of this study was to examine the 1- and 5-year mortality in super-elderly DRF-patients in comparison with the background population and correlate the overall survival to non-fracture related factors.

**METHODS:** Patients aged  $\geq 80$  with DRFs in 2010-2012 were extracted from the prospective Lund Distal Radius Fracture register. 1- and 5-year standardized mortality rates (SMRs) were calculated using the Swedish standard population as a reference. Medical records were searched for non-fracture related factors including comorbidity (Charlson), medications, cognitive impairment and type of living. Cox proportional hazard regression models were used to identify prognostic factors of all-cause mortality.

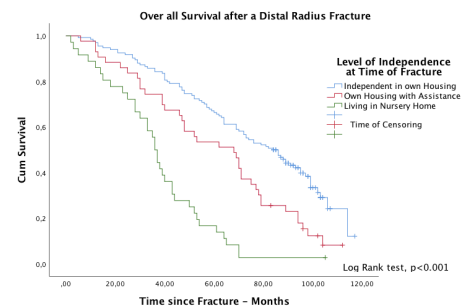
**RESULTS:** In the register, 240 patients were older than 80 years in 1317 patients fractured between January 2010 and December 2012. In 2022, 74% (178/240) of the super-elderly patients had died. The mean survival time for all patients was 5.2 years (95% CI 4.8-5.6). The crude overall 1-year mortality was 5 % (n=11/240) and the crude 5-year mortality was 44% (105/240). The 1-year standardized mortality rate (SMR) for the super-elderly DRF-patients was 0.44 (CI 0.18-0.69), thus, at short term the mortality rate was *only 44% of the expected when compared to the Swedish general population*. The overall 5-year mortality did not differ from the age- and gender adjusted Swedish population, SMR 0.96 (CI 0.78-1.14). The patient’s ability to live independently in their own home had the highest impact on survival.

**DISCUSSION:** Our main finding was, somewhat surprising, that patients 80 years or older had a substantially lower mortality 1 year after a DRF compared to the age and gender matched standard population. This finding differs from several previous reports. However, since the majority of previous studies analyze a wider range of age categories it is difficult to compare the results. One can speculate that a DRF in our cohort simply was an indirect sign of a healthier patient. A DRF could be an indicator of a better balance and a functioning reflex system enabling the patient to fall on the outstretched hand instead of landing on for example the hip. A DRF could also indicate a relatively active lifestyle in order to sustain a fracture. In our study, the difference between the mortality in the cohort and the reference population decreased over time. Even though the super-elderly has a great chance of living another year, the chance of living many more years decreases significantly per year in higher age. This could explain the fact that the differences no longer appear in the 5-year analysis

The best marker of expected survival was type of accommodation which could be seen as an indirect indication of the patient's level of autonomy. The low mortality in this study was not explained by a lower proportion of patients living in their own homes. In the same geographic area as the hospital serves, statistics from the Swedish National Board of Health and Welfare show that 15% of those over 80 lived in nursing homes or residential care facilities in 2014<sup>24</sup>, while that number was 17% in this study.

With limited resources in healthcare and a large and increasing number of patients, we should consider how we allocate resources and which patients benefit best from surgical treatment. For a long time, the perception has been that the oldest patients do not need advanced care for DRFs, and that they will be “good enough” regardless of type of treatment, but is this really true? In recent years, opinions seem to shift as more and more studies demonstrate that the elderly patients actually benefit from surgical treatment. Elderly patients treated with volar locking plates have a better functional outcome than the conservatively treated<sup>25,26</sup> and a similar early complication rate as in younger patients.<sup>25,27</sup> It has been shown that surgery can lead to a faster start of range of motion training and an earlier increase in grip strength<sup>25</sup>, leading to a quicker return to regular activities.<sup>2</sup> For a super-elderly patient time is a scarce commodity and early activation and return of hand function could allow the patient to maintain independence.

**SIGNIFICANCE/CLINICAL RELEVANCE:** (1-2 sentences): This study is the first to analyze the 1- and 5-year mortality rates in super-elderly DRF-patients. The super-elderly patients had a substantially lower mortality rate one year after fracture compared to the age and gender matched standard population.



Kaplan Meier estimation of the overall mortality after a distal radius fracture, in relation to level of independence in super-elderly patients.