



Clinical frailty scale as a novel tool to evaluate patients' eligibility for allogeneic stem cell transplantation: a single Center experience on 234 patients >50 years old

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Introduction

The process of selection of eligible elderly patients is crucial to maximize the benefit of allo-SCT, thus limiting non-relapse mortality (NRM). In a recent French-Italian experience a multidimensional score (the FIL score) was found to accurately predict allo-SCT outcome in patients older than 60 years (Polverelli et al. BMT 2020; 55(12):2224-2233).

Clinical frailty scale (CFS) is a easy-to-use scale ranging from 1 (very fit) to 9 (terminally ill) for increasing degrees of frailty validated in several Geriatric contexts. Currently, no study on CFS is available in allo-HCT setting.

Clinical Frailty Scale*

1 Very Fit – People who are robust, active, energetic and motivated. These people commonly exercise regularly. They are among the fittest for their age.

2 Well – People who have **no active disease symptoms** but are less fit than category 1. Often, they exercise or are very **active occasionally**, e.g. seasonally.

3 Managing Well – People whose **medical problems are well controlled**, but are **not regularly active** beyond routine walking.

4 Vulnerable – While **not dependent** on others for daily help, often **symptoms limit activities**. A common complaint is being “slowed up”, and/or being tired during the day.

5 Mildly Frail – These people often have **more evident slowing**, and need help in **high order IADLs** (finances, transportation, heavy housework, medications). Typically, mild frailty progressively impairs shopping and walking outside alone, meal preparation and housework.

6 Moderately Frail – People need help with **all outside activities** and with **keeping house**. Inside, they often have problems with stairs and need **help with bathing** and might need minimal assistance (cuing, standby) with dressing.

7 Severely Frail – Completely dependent for **personal care**, from whatever cause (physical or cognitive). Even so, they seem stable and not at high risk of dying (within ~ 6 months).

8 Very Severely Frail – Completely dependent, approaching the end of life. Typically, they could not recover even from a minor illness.

9 Terminally Ill - Approaching the end of life. This category applies to people with a **life expectancy <6 months**, who are **not otherwise evidently frail**.

Scoring frailty in people with dementia

The degree of frailty corresponds to the degree of dementia. Common **symptoms in mild dementia** include forgetting the details of a recent event, though still remembering the event itself, repeating the same question/story and social withdrawal.

In **moderate dementia**, recent memory is very impaired, even though they seemingly can remember their past life events well. They can do personal care with prompting.

In **severe dementia**, they cannot do personal care without help.

* 1. Canadian Study on Health & Aging, Revised 2008.
2. K. Rockwood et al. A global clinical measure of fitness and frailty in elderly people. CMAJ 2005;173:489-495.

Methods

We analyzed 234 patients with hematological diseases, aged >50 years consecutively submitted for allo-SCT at Spedali Civili of Brescia, from 2006 to 2020. Median follow-up was 4.03 years (95%CI 3.54-5.90). CFS was retrospectively calculated by an external physician blind to transplant outcome.

Primary endpoint: to evaluate the prognostic role of the CFS score in predicting NRM and OS in elderly (>50y) allo-SCT patients

Results

	N = 234
Age in years, median (range)	59 (50-73)
Gender male, no (%)	147 (62.8%)
Diagnosis, no (%)	
AML	104 (44.4%)
Lymphoid Neoplasms	50 (21.4%)
Multiple Myeloma	30 (12.8%)
MDS	22 (9.4%)
MPNs	19 (8.1%)
Others	9 (3.8%)
Disease Risk Index* (DRI) on 227 evaluable pts, no (%)	
Low-Intermediate	192 (82.1%)
High-Very High	42 (17.9%)
Type of donor, no(%)	
Sibling	97 (41.5%)
MUD	108 (46.2%)
Haploidentical	26 (11.1%)
Cord Blood	3 (1.3%)
Stem cells source, no (%)	
Peripheral blood	186 (79.5%)
Bone marrow	45 (19.2%)
RIC conditioning regimen, no (%)	170 (72.6%)
HCT-CI score ≥3, n (%)	101 (43.2%)
KPS <90, n (%)	20 (8.5%)
FIL score unfit/frail, n (%)	16 (6.8%)

Patients' stratification according to CFS score

- Very Fit (1)
- Well (2)
- Managing well (3)
- Vulnerable/Frail (4+)

	Very Fit (16)	Well (120)	Managing Well (70)	Frail (28)	p
Median age, y (range)	61 (51-70)	58 (50-71)	59 (50-73)	61 (51-68)	0.18
Sex, male (%)	13 (81.2)	69 (57.5)	49 (70.0)	16 (57.1)	0.13
AL/MDS, n (%)	8 (50.0)	76 (63.3)	42 (60.0)	18 (64.3)	0.75
High/very high DRI, n (%)	1 (6.2)	18 (15.0)	17 (24.3)	6 (21.4)	0.23
FIL score unfit/frail, n (%)	0 (0.0)	3 (2.5)	5 (7.1)	8 (28.6)	<0.001
HCT-CI ≥3, n (%)	4 (25.0)	46 (38.3)	36 (51.4)	15 (53.6)	0.09
KPS <90, n (%)	1 (6.2%)	6 (5.0%)	7 (10.0)	6 (21.4)	0.043

Results

At last follow-up, 149 (63.7%) patients had died. The cause of death was related to NRM in 41.6% of cases (33 infection, 9 aGVHD, 5 cGVHD, 4 toxicity, 6 other causes)

Overall survival and Non-relapse mortality according to CFS

Overall survival (%) $p < 0.0001$

Non-relapse mortality (%) $p = 0.0003$

Uni and multivariate analysis of factors associated to OS and NRM

OS

NRM

As evaluated by the likelihood ratio test and C-statistics, CFS showed a strong predictive value (65.47 and 30.75; 0.695[SE 0.019] and 0.708[SE 0.031], for OS and NRM, respectively).

Conclusions

CFS appears a simple tool highly effective in transplant outcome prediction among onco-hematological patients aged >50y. These results might suggest the use of this score for improving patients' selection.