



What is the frailty in elderly? Value and significance of the multidimensional assessments

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ABSTRACT

Authors perform a critical revision of the concept of frailty in elderly going back to its first indication (1978). It is a particular phenotypic condition, characterized by advanced age, clinically unstable polyopathologies in evolution, with cognitive disturbances, often very severe, loss of auto sufficiency and the critical socio-economic conditions. The diagnostic validity, both in the definition of the deficits and in the evaluation of the declines in the fundamental functions should be underlined. The first ones are needed particularly for the epidemiological and population studies, and the second one, at the individual level. Today, first of all in the geriatric field, the method of multidimensional evaluation (MDE) is the first choice for the early diagnosis of "elderly frailty" (EF), in order to determine the biological, functional, cognitive and clinical aspects of the elderly subjects, and also for the application of adequate programs of intervention at the sanitary-assistential-social levels.

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1. Introduction

The EF represents one of the most significant problems of the public health. It means a condition of risk and vulnerability, characterized by an unstable equilibrium, if facing negative events. It is caused by the incapacity of biological systems while maintaining the functional reserves of the apparatuses to regulate the life of the elderly subjects (Giordano et al., 2007).

The term EF was proposed by Federal Council on the aging (1978) to indicate elderly people characterized by physical disability, affective compromising, in an environment being structurally and socially disadvantageous; in addition they need an assistential and social support to assure the functional activities.

A working definition of frail elderly, as against to the fit elderly, was proposed by Woodhouse et al. (1988). This definition was based almost entirely on function and the ability (or not) to perform ADL. The fit elderly subjects are individuals, over 65 years of age, living independently at home or in sheltered accommodation. They are freely ambulant and without significant hepatic, renal, cardiac, respiratory or metabolic disorder on either clinical examination or laboratory investigation (Cheng and Nayar, 2009). They do not receive regular prescribed medication. The frail elderly consists of individuals, over 65 years of age, dependent on others for ADL, and often in institutional care. They are not independently

mobile, while they do not have overt cardiac respiratory, hepatic, renal or metabolic diseases; minor abnormalities may be revealed on laboratory investigations (Supercentenarians: Validated Living, 2009). They may require regular prescribed drug therapy. Conditions contributing to frailty commonly include Alzheimer's disease, multi-infarct cerebrovascular disease, Parkinson's, osteoporosis, osteoarthritis, and healed fracture events (Woodhouse et al., 1988).

After 10 years, Woodhouse and O'Mahony (1997) have established that the clinical characterization and differential diagnosis have continuously improved. Nevertheless, the necessity of further research and wide discussions is still evident.

The analysis of the gerontological literature reveals that the term frailty has a particular meaning, and the definitions have different characteristics and also often contradictions (Cherubini et al., 2007).

The evaluation of frailty cannot be considered to be valid, if one is not considering the existing numerous morbus states, chronic pathologies, disabilities, psychosocial alterations, however, the frailty cannot be confused or identified with those (Woo et al., 2005). Nowadays frailty is indicated as a "phenotype characterizing an elderly subject with a high risk of falls, disability, hospitalization and mortality (Fried et al., 2001).

2. The main definitions

The frailty, therefore, may be considered as an event not dependent from specific diseases deriving from the events identified during aging, from the advanced age, affected chronically by

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multiple pathologies, from instability or usually existing disabilities (Foroni et al., 2006). The diagnosis of frailty cannot be established on the basis of the existing specific morbid states of the internal medicine, such as the anamnesis, the clinical findings, and the laboratory and instrumental results. In addition it seems to be of importance to emphasize that the considerable differences of life span in various countries (e.g., from 32.23 years in Swaziland, up to 83.52 in Andorra), may cause clinical manifestations of aging with a wide variety of the ages of appearance of them, and also in the sex-dependent phenomenology of them. The following definitions are of particular importance:

“There is no single, generally, accepted clinical definition of frailty. Previously developed tools to assess frailty that have been shown to be predictive of death or need for entry into an institutional facility have not gained acceptance among practicing clinicians” (Rockwood et al., 2005, 2011).

“Frailty is a term widely used to denote a multidimensional syndrome of loss of reserves (energy, physical ability, cognition, health) that gives rise to vulnerability. It appears to be a valid construct, but how exactly to define, it remains unclear. The creation of so many scales to measure frailty reflects uncertainty about the term and its components. The ability to measure frailty is useful at a health care policy level as well as clinically: Information about frailty helps program planners by identifying the range of services that might be required and the anticipated need for them. Clinically, frailty stratification can help to plan interventions or to predict a patient’s risk of death or need for institutional care. Because the scales are intended to stratify risk, the ability to predict adverse outcomes serves a common goal” (Hogan et al., 2003).

The frailty in elderly is an object of increasing frequency of epidemiological studies, editorial articles, conferences and important scientific contributions. Its presence in the Medline now is 13-times more than that was in 1986: it was present 80-times in the first 9 months of 1992 (Rockwood et al., 1994), and we find now 1721-times in 2011. The various analyses reveal the diagnostic modes, the typology of cases, and the aims of different studies, which are not always in agreement.

Therefore, it seems to be evident the necessity of a comparative evaluation, particularly of the diagnostic tools, the clinical conditions, and the various alterations. In this sense, a particular significance can be attributed to the “Canadian Study of Health and Aging” (CSHA) conducted in the over 65 years of age, started in 1991 and performed in every 5 years until 2001 (Rockwood et al., 2005).

The CSHA has utilized:

- (i) A Clinical Frailty Scale, in which the elderly were distinguished in seven categories, starting from 1 (robust, healthy) up to 7 (complete functional dependence) (Table 1).
- (ii) The FI, based on fact that the frailty may be considered as a consequence of the decrease of functional reserves of the individual. The FI is defined by analyzing 70 deficits: items covering the presence and severity of common diseases, the capacity of performing the usual manual and instrumental activities (Table 2).

The methods applied by the CSHA offer an effective measure of fragility, which is predictive for the mortality and or the necessity of institutionalization, and may also constitute a valid tool for the clinical activities. The criteria proposed by the CSHA for the diagnosis and evaluation of fragility have frequently been used,

Table 1

The CSHA clinical frailty scale.

1.	Very fit: robust, active, energetic, well motivated and fit; these people commonly exercise regularly and are in the most fit group for their age.
2.	Well: without active disease, but less fit than people in category 1.
3.	Well, with revealed co-morbid disease: disease symptoms are well controls, compared with those in category 4.
4.	Apparently vulnerable, although not frankly dependent, these people commonly complain of being “slowed up” or have disease symptoms.
5.	Mildly frail: with limited dependence on others for instrumental activities of daily living.
6.	Moderately frail: help is needed with both instrumental and non-instrumental activities of daily living.
7.	Severely frail: completely dependent on others for the activities of daily living, or terminally ill.

Note: CSHA=Canadian Study of Health and Aging (Rockwood et al., 2005).

however, always reducing the number of considered deficits. The CSHA Scale is permanently used without essential modifications, and it represents the model of choice for the classification of the clinical conditions of the elderly, used in various geriatric structures in the whole world.

The FI was utilized several times, applying always with a reduced number of the functional deficits. As a matter of fact, Kulminski et al. (2006) were conducting a longitudinal study (NLTC) on 5 controls from 1982 until 1999. The particular characteristics used were only 32 deficits. The results obtained were considered as similar to those of the CSHA.

They found that the frequency, time-to-death, mortality-rate, and relative risk of death distributions over the FI and chronological age are remarkably similar. Analysis of various FI patterns shows that the FI can likely capture physiological processes underlying aging both on individual and population levels. In particular, we show that the FI can be associated with the limits of an organism’s homeostatic capacity and be characteristics of the organism’s stress-resistance.

In conclusion, the FI is an adequate indicator of aging and population heterogeneity suitable for various models of aging and mortality. Actually, FI appears to be a better indicator than chronological age. The FI also appears to be a measure, which captures physiological processes underlying aging on an individual and population levels (Kulminski et al., 2006).

Also the group performing the CSHA study (Rockwood et al., 1994) realized a population study using a reduced number of deficits (42). These authors have revealed that:

- (i) Their data suggest that the accumulation of deficits is a fact due to aging, not to age.
- (ii) At all ages, a higher FI was associated with higher mortality and greater use of health care services.
- (iii) The accumulation of deficits is closely linked to mortality and to admission to hospital or to an institution.

These data, however, must be interpreted with caution.

The studies of Fried et al. (2001) are of particular importance in this respect. As a matter of fact, FI was not interpreted in those studies as sign of the presence of deficits, but rather as a consequence of the decline of several fundamental physiological functions. Fried et al. (2001) conducted a detailed study analyzing multiple demographic, medical, and laboratory markers to determine statistically a definition of frailty. A diagnosis of frailty requires 3 of the following 5 characteristics (Timonen et al., 2002; Malaguarnera et al., 2008a,b, 2010):

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