

Frailty in elderly ICU patients in Greece: a prospective, observational study

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Background: Of particular interest is the study of frailty syndrome in older patients in recent years. This syndrome is characterized by weight loss and muscle mass, a change in eating habits, movement and endurance, and a decline in cognitive function. The purpose of the study was the prevalence of frailty syndrome in subjects aged 65 years who were hospitalized in an intensive care unit (ICU) in Greece.

Methods: This is a prospective, observational study. The study sample consisted of families or carers of 36 patients over 65 years of age. The study was conducted in a General Hospital in Greece, over a period of 1 year. The Clinical Frailty Scale (CFS) and the 5 criteria frailty phenotype were used. In addition, the severity of the patients with the APACHE II, SAPS II and SOFA scales was assessed. For the analysis of the data, the SPSS 19 for windows statistical package was used and more specifically descriptive statistics and correlations with parametric methods were performed.

Results: Thirty-six severely ill patients aged 65 years and over (22 women, 14 men) were studied. 25% of the patients had a positive frailty phenotype, 44% were at an early stage, while 30.6% had a frailty negative phenotype. A significant correlation between CFS and APACHE ($P=0.041$), age ($P=0.033$), sex ($P=0.049$) and ADL mobility index ($P=0.001$) was found to be significant. Concerning mortality, 36.1% of patients died in ICU, 11.1% died within the next 6 months and 38.9% were alive.

Conclusions: The findings of the study highlighted the onset of frailty syndrome in ICU patients. The objective assessment of the frailty syndrome of the seriously ill patient as well as the prognostic markers provides a clearer picture of its out-of-hospital condition and contributes to the collection of information on the outcomes of the in-hospital treatment.

Keywords: Clinical Frailty Scale (CFS); frailty phenotype; critically ill patients

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Introduction

In recent years, several studies have been conducted on the onset of frailty syndrome in older patients (referrals). It has been observed that such individuals have features such as weight loss and muscle mass, change in their eating habits,

movement and endurance, impairment of their mental function, which makes them more prone to adverse health outcomes. Perhaps these characteristics may be the reason why there has been a marked increase in hospitalization in ICU in Greece by the elderly (1-5).

The frailty syndrome is closely related to the mental

state of the sufferers. Surveys conducted in the community have shown that individuals characterized as weak have multiple mental deficits that indicate disability and are related or caused by both endogenous and environmental factors. Approximately at the age of 70 years, a significant percentage has been observed to have mild cognitive decline and another percentage of dementia. The age and cessation of cognitive function are two events interrelated and not randomly linked to each other. At the end of time, lesions at the cellular and molecular levels accumulate and become visible in the form of diseases (2,6,7).

The state of the patient's health as determined by the biological characteristics rather than the chronological age prior to admission, provides information on the patient's progress in the ICU and the probability of mortality. Knowing the needs and deficits of each patient individually, it is possible to create a care plan suitable to cover all the patient's needs. This assessment of the baseline functional situation and the burden posed by pre-existing illness have a predictive value and are an important criterion in assessing a patient who needs intensive care (1).

Based on the foregoing, it is understandable that the nature of the syndrome is a challenge in formulating its definition. Frailty extends beyond deficits (functional limitation) and coexisting illnesses and recognizes that a patient can be sick without being weak or vice versa. Aging is influenced by both the genetic background and the environment and begins from the embryonic period. The mechanisms that determine the aging process as soon as they become clear. Recognizing that aging is a heterogeneous process, many doctors are looking for a method to quantify biological age rather than just chronological age. Since frailty syndrome is directly related to the aging process, it is assumed that this syndrome is measurable (1,4).

The purpose of the study was the prevalence of frailty syndrome in subjects aged 65 years who were hospitalized in an intensive care unit in Greece.

Methods

This is a prospective, observational study by investigating groups of patients who differ in the stage of development of the frailty syndrome. The sample of the study consisted of the families or carers of 36 patients hospitalized in ICU. Patient selection criteria were over 65 years of age and have 1 to 5 criteria for controlling the phenotype. The study was

conducted in a General Hospital in Greece over a period of 1 year (01/06/2016–01/06/2017). The simple random sampling method was chosen to collect the sample. The CSHA Clinical Frailty Scale (CFS) consisting of 7 levels was used and was answered by the patient's family or carer. It was preceded by a 5-criterion frailty phenotype test, so that the patient, depending on the number of criteria he had, would fall into one of three categories: positive frailty syndrome, pre-developmental stage and negative (absence of criteria). In addition, the severity of the patients with APACHE II (Acute Physiology and Chronic Health Assessment), SAPS II (Simplified Acute Physiology) and SOFA (Sequential Organ Failure Assay) were assessed, and all possible correlations were made (8).

Statistical analysis

For the analysis of the data was used the SPSS 19 for windows statistical package and more specifically descriptive statistics and correlations with parametric methods.

Results

The sample of the study

Thirty-six heavy patients who were admitted to the ICU General Hospital of the Prefecture of Attica, aged 65 years and older, were studied. The female population amounted to 22 and the male to 14. The other demographic and other data are shown in *Table 1*.

In 36 patients the gravity of their condition was assessed with APACHE, SAPS II, SOFA (24, 48, 92 h) and Glasgow scales. In addition, McCabe's life expectancy was used, co-occurring Charlson diseases, as well as memory disorders. In particular the effects of phenotype frailty, and CFS (*Table 2*), were tested.

In the framework of the present study, the basic elements of patient hospitalization were recorded (*Table 3*).

The course of patient health after hospitalization in the ICU was recorded, as well as mortality rates (*Table 4*).

CFS correlation and determinants

A significant correlation between the CFS scale and APACHE ($P=0.041$), age ($P=0.033$), sex ($P=0.049$) and activities of daily living (ADL) mobility index ($P=0.001$) was found to be significant. In contrast, no correlation was

Table 1 Demographic and other data

Variable	F	%
Sex		
Man	22	61.1
Woman	14	38.9
Average age	75.56	–
Reason for entry		
Pathological cause	9	25.0
Scheduled surgery	7	19.5
Unplanned surgery	9	25.0
Wound	11	30.5
Special import problems		
Brain damage	12	33.3
Heart attack	4	11.1
Infection	2	5.6
Other	12	33.3
Department of origin		
Chamber	13	36.1
ED	6	16.7
After surgery (within 48 hours)	11	30.6
Another hospital	3	8.30
Other	3	8.30
Introduction to the hospital last year		
Yes	9	25.0
No	27	75.0
Urgent introduction		
Yes	25	69.4
No	11	30.6

F, frequency; ED, emergency department.

found between CFS and memory impairment ($P=0.910$) and the Glasgow scale ($P=0.713$).

Discussion

The 36 patients were categorized based on the phenotype of frailty, which separates them into positive and negative, but also takes into account the individuals who are in the pre-stage of the onset of the syndrome. Thus, 25% of them

seemed to collect over 3 features. 44.4% were at an early stage of the syndrome with 1–2 characteristics, while 30.6% had no symptoms. Similarly, in France, of the 961 patients enrolled in the ICU, 73.3% of the subjects were not weak, while 26.7% were found to be weak. 20.3% of them had 3 or more characteristics and 79.7% had 1 or 2 characteristics. In both cases these people were ranked high in the CFS scale (5).

The age limit of this study was similar to the criterion in French and Canadian research. The study, which took place in a hospital in Brisbane, Australia, was composed of 110 patients of the same age category (5). The collection of information so far has been done by the patients themselves in the Canadian and Australian research, and due to the nature of the ICU hospitals, for the French research, and for the present survey the information was collected from the close family environment (4,9,10).

For a clearer determination of health status, scales that are easy to use in ICUs such as SAPS II, SOFA, APACHE and the Glasgow scale were used in the present study, as was done in the French survey, except that they were not taken into account the SOFA results of the first three twenty-four hours as was the case in the current survey. In both cases the results were useful as prognostic tools (5).

Significant correlation in French research on the scale of inability to determine the degree of ADL mobility. Particularly, the distribution of patients who proved to be weak, have common characteristics with those with low mobility (11–13). Results similar to this survey.

A significant role is played by memory disorders, where the rate of this research is positive in 44.4% of the severely ill patients. In the French survey the incidence of these disorders is 43%. The incidence of cognitive impairment in Canadian research is 39.7%. In addition to the Australian survey, the discount rate is at 20% (5,9,10).

In addition to the above features, which are related to patient assessment, with the onset of frailty syndrome, their stay and hospitalization are important. In particular, in this research and in French research, the causes of admission were segregated into pathological causes, planned surgeries, unscheduled surgical interventions and the cause of trauma. In our own research, the proportion of patients admitted with pathological causes was 25%, while in France 50%. Scheduled surgical interventions amounted to 19.5% of the sample and 52% to France. The proportion of people who have undergone unplanned surgery has reached 25% and at the same time France in 72%. Wounding accounted

Table 2 Patient assessment data

Variable	F	%
APACHE score		
Yes	36	100
No	0	0
Average APACHE	22.56	–
SAPS II		
Yes	36	100
No	0	0
Average SAPS II	50.28	–
SOFA (24 h)		
Yes	36	100
No	0	0
Average SOFA (24h)	9.39	–
SOFA (48 h)		
Yes	36	100
No	0	0
Average SOFA (48 h)	8.94	–
SOFA (96 h)		
Yes	36	100
No	0	0
Average SOFA (96 h)	8.83	–
Glasgow Scale		
Yes	36	100
No	0	0
Average Glasgow Scale	10.89	–
Life expectancy by McCabe		
Non-lethal disease (diabetes, urogenital diseases and obstetrics)	13	36.1
End stage disease (patients estimated to be fatal within 4 years, e.g., aplastic anemia, metastatic cancer, liver cirrhosis, chronic renal failure)	19	52.7
Acute lethal disease (acute leukemia, blast deflection of chronic leukemia).	4	11.1
Frailty phenotype results		
Positive (≥ 3 criteria)	9	25
Pre-start phase (1–2 criteria)	16	44.4
Negative phenotype (0 criteria)	11	30.6

Table 2 (continued)

Table 2 (continued)

Variable	F	%
Clinical Frailty Scale (CFS)		
Very good condition	0	0
Good condition	5	13.9
Good management of health problems	13	36.1
Vulnerable	8	22.2
Mildly weak	2	5.6
Moderately weak	8	22.2
Seriously weak	0	0
Very seriously weak	0	0
Incurable disease	0	0
Average degree of ADL mobility	5.19	–
Average grades of coexisting Charlson diseases	1.97	–
Memory disturbances in the last 6 months		
Yes	16	44.4
No	20	55.6

F, frequency; ADL, activities of daily living.

Table 3 Nursing data

Variable	F	%
Average days in mechanical ventilation	28.86	–
Average days in automatic breathing	8.06	–
Re-fitting		
Yes	16	44.4
No	20	55.6
Tracheotomy		
Yes	35	97.2
No	1	2.8
Type of tracheotomy		
Open surgical procedure	6	16.7
Transdermal tracheostomy	30	83.4
Administration of vasoconstrictors		
Yes	33	91.7
No	3	8.3

Table 3 (continued)

Table 3 (continued)

Variable	F	%
Use of neuromuscular blockers		
Yes	2	5.6
No	34	94.4
Treatment with corticosteroids		
Yes	20	55.6
No	16	44.4
Surgery or repopulation		
Yes	11	30.6
No	25	69.4
Blood transfusions		
Yes	26	72.2
No	10	27.8
Average transfusion	4.21	–
Serious sepsis		
Yes	11	30.6
No	25	69.4
Septic shock		
Yes	4	11.1
No	32	88.9
Acute kidney damage		
Yes	12	33.3
No	24	66.7
Substitution of renal function		
Yes	9	25
No	27	75
ARDS		
Yes	4	11.1
No	32	88.9
Delirium		
Yes	0	0
No	36	100
Mean length of stay in ICU	38.82	–

F, frequency.

Table 4 Outcome of patients

Variable	F	%
Outcome		
Death	13	36.1
Sutured with facial mask	10	27.8
Trapezed with T-piece	10	27.8
Trained with mechanical breathing support	2	5.6
Other	1	2.8
Transfer at exit from ICU		
Part	19	52.8
CCU	3	8.3
Rehabilitation foundation	0	0
Another hospital	1	2.8
Death	13	36.1
Other		
Average stay in nursing	26.38	–
Average stay in the hospital	69.57	–
Transfer at hospital exit		
Home	12	33.3
CCU	0	0
Rehabilitation foundation	1	2.8
Another hospital	10	27.8
Death	13	36.1
Other	0	0
Re-enter in 30 days		
Yes	6	16.7
No	30	83.3
Mortality		
In ICU	13	36.1
At the hospital	5	13.9
Within 6 months	4	11.1
In life	14	38.9

F, frequency; CCU, critical care unit.

for 30.5% of the current survey, while in France only 18%. Additionally, special import problems such as brain injury, cardiac arrest or a serious infection in the two investigations (5) play an important role.

In addition, hospitalization in the ICU was significantly significant, during which the average mechanical ventilation was recorded (28.86 days), while in France the average days were 11. Neuromuscular blockade was used on average at 5.6% France were granted 24%. Corticosteroids were used at 55.6% in our own research and in France research 43% respectively. During hospitalization, 30.6% of our patients experienced severe sepsis, while the ICU of the French Hospital accounted for 37% (5).

In all the above, an attempt was made to relate the length of hospitalization to the ICU, where our patients stayed for an average of 38.82 days while the stay in the ICU of France lasted about 8 days. The total stay in the Greek hospital averages 69.57 days, while on average the days of hospitalization are on average 33.99 days (5).

Finally, what was considered was the viability and mortality of the severely ill patients, both within the ICU and 6 months after their discharge. In the present study 36.1% of patients died in the ICU, 11.1% died within the next 6 months and 38.9% were alive. Respectively, in the ICU of France these percentages were 23.03%, 56% and 20.97% respectively. The Canadian survey set the mortality study as a plan up to 5 years after leaving the hospital for this and its results are not compared with the above data. It is therefore assumed that the prognosis of the syndrome of frailty is carried out at various levels taking into account a variety of information on the health condition of the patient before and at the time of import, and draws conclusions about his/her outcomes until and after leaving the hospital (5,9).

Conclusions

The findings of the study highlighted the onset of frailty syndrome in ICU patients. The objective assessment of the frailty syndrome in the severely ill patient provides a clearer picture of its out-of-hospital condition and contributes to the collection of information on the outcomes of the inpatient. In attempts to quantify and measure the frailty that have been done so far, a tool widely used mainly in surgery has been the frailty index. A questionnaire of seventy questions capable of detecting patient deficits, creating an image of individuals who are likely to have an adverse outcome on their introduction to the ICU. However, the Frailty Index alone is difficult to integrate

into an ICU where work rates are intense and medical staff are dealing with heavy sufferers to the extent that detailed information is required. At the same time, estimation of predictive indicators such as APACHE II, SAPS II and SOFA is required.

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None.

Footnote

Conflicts of Interest: The authors have no conflicts of interest to declare.

Ethical Statement: The ethical review board of our hospital approved this study (IRB# 2016-04).

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