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Frailty syndrome and functional correlates of atrial fibrillation in patients admitted to the geriatric ward

Zespół słabości i korelaty funkcjonalne migotania przedsionków u pacjentów hospitalizowanych w oddziale geriatrii

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Abstract

Introduction. *Frailty is an important prognostic factor in older adults with cardiovascular diseases. However, the relationship between frailty syndrome and atrial fibrillation (AF) is still discussed.* **Purpose.** *The aim of the study was to explore functional correlates of AF and its association with frailty syndrome in older inpatients.* **Material and methods.** *Cross-sectional study of patients consecutively admitted to the geriatric ward. Functional correlates were assessed based on the comprehensive geriatric assessment. Frailty was assessed using the 7-item Clinical Frailty Scale. Multivariable logistic regression model with AF as a dependent variable was built.* **Results.** *98 (23.6%) of 416 patients hospitalized in the study period presented with AF. Frailty syndrome (CFS>3) was observed in 55.2% of patients, significantly more frequently in AF group (66.3% versus 51.9%, P-0.01). AF patients were significantly older, more frequently of mail gender, significantly more frequently burdened with multimorbidity, polypharmacy, disability in instrumental daily-life activities and were physically inactive. The multiple regression model indicated CFS score as the independent predictor of AF (OR-1.28; 95%CI-1.03-1.58; P-0.02), controlling for age, gender, multimorbidity and polypharmacy.* **Conclusions.** *Among patients hospitalized in the geriatric ward, those with atrial fibrillation present a high prevalence of frailty and disability. Screening for these variables in clinical practice may allow better strategies for intervention in this high-risk population. (Gerontol Pol 2019; 27; 11-15)*

Keywords*: atrial fibrillation, older people, frailty, disability*

Streszczenie

Wstęp. *Zespół słabości jest ważnym czynnikiem prognostycznym u pacjentów w wieku podeszłym ze zdiagnozowanymi schorzeniami układu krążenia, jednak jego związek z migotaniem przedsionków jest nadal dyskutowany.* **Cel.** *Celem badania była ocena korelatów funkcjonalnych migotania przedsionków i jego związek z zespołem słabości u pacjentów w wieku podeszłym.* ***Metody.*** *Zrealizowano badanie przekrojowe wśród pacjentów kolejno przyjętych do oddziału geriatrii. Parametry funkcjonalne oszacowano w oparciu o całościową ocenę geriatryczną. Zespół słabości określono przy pomocy 7-stopniowej skali Clinical Frailty Scale (CFS). Zbudowano model uwarunkowań migotania przedsionków oparty na wieloczynnikowej regresji logistycznej.* **Wyniki.** *Migotanie przedsionków zdiagnozowano u 98 (23.6%) z 416 pacjentów hospitalizowanych w okresie badania. Zespół słabości (CFS>3) obserwowano u 55.2% pacjentów, istotnie częściej w grupie chorych z migotaniem przedsionków (66.3% versus 51.9%, P-0.01). Migotanie przedsionków częściej występowało u osób starszych, mężczyzn, u pacjentów obciążonych wielochorobowością, polifarmakoterapią, niesprawnością w instrumentalnych czynnościach dnia codziennego oraz nieaktywnych fizycznie. Model regresji wieloczynnikowej wykazał, iż wynik*

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w skali CFS jest niezależnym korelatem migotania przedsionków (OR-1.28; 95%CI-1.03-1.58; P-0.02), przy kontrolowanym wpływie wieku, płci, wielochorobowości i polifarmakoterapii. **Wnioski.** *Wśród pacjentów z migotaniem przedsionków hospitalizowanych w oddziale geriatrii istotnie częściej niż w grupie bez tej arytmii obserwuje się zespół słabości i niesprawność życiową. Ocena tych parametrów może pozwolić na stworzenie lepszej strategii postępowania klinicznego w tej populacji wysokiego ryzyka. (Gerontol Pol 2019; 27; 11-15)*

Słowa kluczowe: *migotanie przedsionków, ludzie starsi, zespół słabości, niesprawność*

Introduction

Atrial fibrillation (AF), the most common arrhythmia in old age, is associated with significant morbidity and mortality. Studies show that the disease burden of AF in developed countries is increasing, which results, inter alia, from the aging of the population [1-4]. AF worsens patients' quality of life and increases the risk of stroke and its consequences, including mood and cognitive disorders [1].

AF is also described as an independent marker of frailty. The severity of the symptoms of AF permitted higher levels of frailty syndrome to be predicted [4]. Frailty is an important prognostic factor in older adults with cardiovascular diseases [5]. However, the relationship between frailty syndrome and atrial fibrillation is still discussed [6]. Frailty has got the prognostic value in older hospitalized patients with AF. It is associated with prolonged length of stay and increased mortality [7]. It is observed that frailty status influences the decision for long-term anticoagulation therapy in elderly patients with atrial fibrillation [8]. Some authors underline that the choice of appropriate antithrombotic strategy in frail elderly patients is complicated and should take into account various factors apart from the assessment embolic and haemorrhagic risk. It should be based on comprehensive geriatric assessment results which enable the proper, individualized approach to therapeutic decisions, that should be also periodically reviewed [9,10]. Frailty assessment should be an integral part of an individualized risk assessment in predicting the prognosis of older patients and for making decisions about antithrombotic treatment in patients with AF [11].

The aim of the study was to explore nutritional and functional correlates of AF and association between AF and frailty syndrome in older patients hospitalized in the geriatric ward.

Material and methods

Study design and methods

Cross-sectional study of all patients consecutively admitted to the geriatric ward between 1st September, 2014 and 30th April, 2015 was performed. Following data were analyzed: age, gender, place of residence (urban/rural), comorbidities (of 14 chronic diseases medically confirmed or self-reported: peripheral arterial disease, ischemic heart disease, chronic cardiac failure, hypertension, stroke, chronic obstructive pulmonary disease, diabetes, neoplasm, thyroid gland disease, parkinsonism, chronic arthritis, chronic renal disease, dementia), number of medications taken before hospitalization, history of falls in the last 12 months, inability to take medicines and walking out of house without help. Functional correlates of AF were assessed based on the comprehensive geriatric assessment (basic activities of daily life with the Barthel Index, instrumental activities of daily living with Duke OARS I-ADL, risk of recurrent falls with the Performance Oriented Mobility Assessment- POMA, and Timed Up and Go test- TUG, the cognitive state with the Abbreviated Mental Test Score-AMTS, risk of depression with Geriatric Depression Scale - GDS, and risk of malnutrition with Mini Nutritional Assessment-Short Form- MNA-SF). For self-reported level of physical activity the 4-level Saltin-Grimby Physical Activity Level Scale (SGPALS) was used [12]. Orthostatic blood pressure measurement was conducted. Frailty syndrome was assessed with the 7-item Clinical Frailty Scale [13].

Study parameters

Frailty was diagnosed if CFS score was above 3. Multimorbidity was defined as 5 or more diseases of 14 listed above. Polypharmacy was defined as 5 or more drugs taken. Disability in PADL or IADL was diagnosed if the person was dependent on others in at least one basic or instrumental activity of daily living. The high risk of falls was diagnosed if POMA score was<19, and if TUG time was ≥14s. Malnutrition was suspected if MNA-SF score was below 8. Patients were classified as physically inactive if during leisure-time they were mainly reading, watching television, using computers or doing other sedentary activities.

Statistical analysis

Data were collected and analyzed using IBM SPSS Version 18 Software suit (SPSS, Chicago, IL, USA), and presented as means and standard deviation for nor-

mally distributed and as medians and interquartile range for not normally distributed continuous variables, and the number of cases and percentage for categorical variables. Proportions were compared using $\chi 2$ tests, while the independent samples t-test and Mann-Whitney U test were used to compare measures of central tendency (means and medians). Multivariable logistic regression model of AF as a dependent variable was built including all predictors with a *P* value less than 0.1, without those with high multi- collinearity effect. A *P* value of less than t 0.05 was regarded as significant. Missing values were omitted and statistics in such cases were calculated for the adequately reduced groups.

The study was approved by the Ethics Committee at Medical University of Bialystok. (R-I-002/305/2013). All procedures performed in the study were in accordance with the ethical standards of the Medical University of Bialystok research committee and with the Helsinki declaration and its later amendments. Personal data were not identifiable during the analysis. The study can be classified as a study of 'usual practice'.

Results

Our research showed that out of 416 people hospitalized in the geriatric ward enrolled into the study, 98 (23.6%) had atrial fibrillation. AF participants were significantly older (Me- 84, IQR 84-87 years versus Me-82, IQR 76-86 years in non-AF group, *P-0.002*), significantly more frequently of mail gender (31.6% versus 19.8%; *P-0.01*). They were burdened significantly more often with multimorbidity (87.8% versus 48.1%, *P < 0.001*) and polypharmacy (89.6% versus 75.9%, P-0.004) (table I).

The AF group was characterized by a higher prevalence of disability in I-ADL, but not in self-care activities. AF and non-AF groups did not differ in the prevalence of depression, cognitive impairment in screening test and dementia diagnosed at discharge. The results of the POMA and TUG score were also similar in both groups. AF group had significantly higher scores in CFS. Frailty was diagnosed with this scale significantly more frequently in patients with AF (66.3% *versus* 51.9%, *P-0.0*1), and more frequently high risk of recurrent falls diagnosed with TUG was observed in this group- Table I. The majority (52%) of patients with AF were classified as physically inactive with Saltin–Grimby Physical Activity Level Scale, comparing to 37.5% of non-AF group, *P-0.04* (table II). In multivariable logistic regression analyses, an independent effect associated with the prevalence of AF was observed among patients with higher scores of Clinical Frailty Scale (odds ratio, 1.28; 95%

Table I. Functional correlates of atrial fibrillation

Parameter	Total	AF+ group	AF- group	*P* values [a]	*Missing data*
No. (%) of patients	416 (100)	98 (23.6)	318 (76.4)		
Age, y, Me (IQR)	82 (77-86)	84 (84-87)	82 (76-86)	0.002	-
Age, 75+, n (%)	350 (84.1)	93 (94.9)	257 (80.8)	0.001	-
Gender, men, n (%)	94 (22.09)	31 (31.6)	63 (19.8)	0.01	-
Place of residence, rural, n (%)	87 (20.9)	21 (21.4)	66 (20.8)	0.89	-
Number of chronic diseases, Me (IQR)	4 (3-6)	6 (5-7)	4 (3-5)	< 0.001	-
Multimorbidity Me (IQR)	201 (48.3)	86 (87.8)	153 (48.1)	< 0.001	-
Number of drugs, Me (IQR)	7 (5-9)	8 (6-10)	7 (5-9)	0.001	9
Polypharmacy, n (%)	322 (79.1)	86 (89.6)	236 (75.9)	0.004	9
Falls in the last 12 months, n (%)	157 (43.9)	36 (43.9)	121 (43.8)	0.99	58
Depression (GDS > 5pts), n (%)	181 (56,9)	37 (51,4)	144 (58,5)	0,28	98
Cognitive impairment (AMTS < 6pts), n (%)	111 (29,1)	30 (34,1)	81 (27,6)	0,24	35
Dementia diagnosed at discharge, n (%)	133 (32.0)	35 (35.7)	98 (30.8)	0.36	-
Disability in PADL, n (%)	291 (70)	72 (73,5)	219 (68,9)	0,38	-
Disability in IADL, n (%)	325 (80,1)	83 (88,3)	242 (77,6)	0,02	10
Unable to take medicines without help, n (%)	174 (42,5)	44 (46,3)	130 (41,4)	0,39	7
Unable to walk out of house without help, n (%)	150 (37,5)	34 (35,1)	116 (38,3)	0,56	16
POMA < 19, n (%)	95 (29.5)	21 (30.0)	74 (29.4)	0.92	94
TUG ≥ 14s, n (%)	195 (64.8)	50 (73.5)	145 (62.2)	0.09	115
CFS, Me (IQR)	5 (4-5)	5 (4-6)	5 (4-5)	0.004	-
Frailty, n (%)	230 (55.2)	65 (66.3)	165 (51.9)	0.01	-
MNA-SF < 8, n (%)	72 (17.8)	15 (16.1)	57 (18.3)	0.63	12

Table II. AF status and physical activity

Parameter	Total	AF+ group	AF- group	*P* value [a]
No. (%) of patients	410(100.0)	98 (23.9)	312 (76.1)	
SGPALS – level 1 - inactive	168 (41.0)	51 (52.0)	117 (37.5)	0.04
SGPALS – level 2 - light physical activity	237 (57.8)	46 (46.9)	191 (61.2)	
SGPALS – level 3 - moderate physical activity	5 (1.2)	1 (1.0)	4 (1.3)	

[a] – χ^2 test or Fisher exact test

CI, 1.03-1.58; *P-0.02*), when controlling for age, gender, multimorbidity and polypharmacy (table III).

Table III. Correlates significantly associated with atrial fibrillation- multivariable logistic regression model

	OR	95% CI	P value
Age, 75+ years	3.32	1.26-8.73	0.02
Gender, men	1.95	1.13-3.39	0.02
Multimorbidity	2.04	1.22-3.40	0.006
Polypharmacy	2.24	1.07-4.69	0.03
Clinical frailty scale	1.28	1.03-1.58	0.02

Discussion

The study confirmed that frailty is a very common geriatric syndrome in older hospitalized patients. Its prevalence in our study was 55.2%, and it was observed significantly more frequently in patients with AF (66.% compared to 51.9%, P-0.01). AF was connected with significantly higher scores of CFS, and it was also an independent predictor of AF in multivariable logistic regression model, when controlling for age, gender, multimorbidity and polypharmacy, significant correlates of AF. It agrees with findings from previous research [4,10], although definitions for frailty syndrome vary significantly across the literature, making the reported prevalence of frailty in this population variable. In our study we used 7-item Clinical Frailty Scale to classify frailty status, because the feasibility of this scale in hospital conditions is high [10]. We detected that AF significantly worsens the frailty state and has substantial impact on independence in performing the routine daily activities. It can confirm that AF can be a marker of frailty in elderly.

AF correlated significantly with leisure time physical inactivity in our research. It is widely acknowledged that physical activity represents one of the foremost interventions capable in reducing the health burden of cardiovascular disease. Furthermore, the benefits of moderate-intensity physical activity have been established both in young and elderly subjects [14]. But the relationship between AF and physical activity can be bilateral- AF can negatively influence the ability to undertake physical activity [15]. It was confirmed in our study- self-reported physical activity level, according to the SGPALS, was negatively associated with the prevalence of AF.

Older patients with AF are burdened with multimorbidity, and its consequence is polytherapy. The later one, definied as taking more than 5 medications, was a common problem in our patients, and significantly more frequent in AF group. Our research confirmed also the high prevalence of ADL dependency in older patients that concerned also taking medications. Together with the frailty and frequently observed impairment of cognitive functions, it may negatively affect the compliance and adherence to doctor's recommendations in older patients, and is associated with a high risk of drugs side effects. This is extremely important in case of anticoagulants used for the prevention of thromboembolic complications of AF. According to the European Commission 2020 strategy, general practitioners are obliged to design and implement prevention services and programmes to promote healthy ageing, and their main focus should be on interventions on multimorbid patients, either by improving prescribing and adherence to medical plans or by targeting to frailty prevention [16]. For older patients with atrial fibrillation screening should be considered for frailty and other clinically relevant factors, such as dependency in ADL or dementia, to individualize the patient's treatment plan [11].

The completed study has got its limitations. It should be noted that the sample was not randomly selected from the general population of older people, therefore, the data included in should be approached with caution. The diagnosis of atrial fibrillation was based primarily on ECG examination and only in some cases using the 24-hours ECG. This could result in not recognizing all of the cases of "silent paroxysmal AF". On the other hand all data were collected during the daily clinical work of the ward, which influences the value of the study.

Conclusions

Among patients hospitalized in the geriatric ward, those with atrial fibrillation present a high prevalence of frailty and disability. Screening for these variables in clinical practice may allow better strategies for intervention in this high-risk population. AF can be a marker of frailty in older patients.

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Conflict of interest

None

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