

# Atrial fibrillation onset circumstances and their relation to patients' quality of life

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## Abstract

**Introduction:** As assessed by patients, paroxysmal atrial fibrillation (AF) is very bothersome and significantly decreases quality of life (QoL).

**Aim:** To learn the circumstances that patients attribute to the onset of episodes of paroxysmal AF and attempt to characterise the psychological importance of these situations and their influence on patients' QoL.

**Methods:** The study involved 76 patients (54 males, aged 17–74 years, mean 53.2), referred for ablation of paroxysmal AF. Disease duration ranged from 1 to 30 years, mean 8.3 years. Physical examination included searching for comorbidities and maximum ventricular rate during AF. Patients underwent psychological evaluation prior to ablation. The QoL was assessed with the SF-36v2 questionnaire. Questionnaire detailing the symptoms was also used.

**Results:** Fifty-five (72%) patients were able to indicate situations accompanying onset of paroxysmal AF. From depicted situations cluster analysis distinguished three clusters: I – heavy meals, alcohol and coffee intake, exercise or stress; II – single sudden movement and rest following stressful events; III – sleep. Significant difference in QoL assessment was observed between these 3 groups. Patients in whom paroxysmal AF occurred after a single sudden movement and at rest find their QoL definitely the worst. The best QoL was in subjects with AF starting at night. Maximum ventricular rate during AF did not correlate with QoL in the whole study group; however, gender-matched analysis revealed significant correlation in females ( $r=-0.58$ ;  $p=0.03$ ). There was no significant correlation between other analysed variables and QoL.

**Conclusions:** Objective indicators between patient health, such as disease duration or comorbidities, do not affect patients' subjective assessment of QoL. Maximum ventricular rate during AF correlated with QoL only in females. Circumstances of AF event onsets, their relationship with disorganisation of activities and psychological value significantly influence QoL of the patients.

**Key words:** paroxysmal atrial fibrillation, quality of life

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## Introduction

Paroxysmal atrial fibrillation (AF), as perceived by patients, is very bothersome and limiting or simply prevents normal occupational activity, family and social life. A number of studies indicate significant reduction of quality of life (QoL) in patients with AF, affecting both exercise capacity and emotional health. It may be surprising that QoL rated by patients poorly correlates with objective measures of health and severity of symptoms [1, 2]. Multicentre trials (Toronto, Milwaukee,

London, Bonn) involving 152 patients with paroxysmal AF showed that factors such as left ventricular diameter, EF, NYHA functional class, incidence and duration of AF episodes accounted for no more than 8% of variance of the total variability in QoL scores [1]. Also the concept that patients with AF present personality features that favour worse self-esteem and appraisal of capabilities has not been confirmed. The study by van den Berg et al. evaluating 73 patients with AF concluded that the degree of neuroticism observed in patients was similar

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to age- and sex-matched controls (mean EPQ score on neuroticism  $4.1\pm 3.0$  and  $3.9\pm 3.1$ , respectively) [3].

Quality of life, according to the WHO definition, is referred to as: "individuals' perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations and standards..." [4]. Such an approach highlights the value of subjective self-evaluation of one's own condition. The judgment may be influenced by various factors which are often neglected by an external observer providing therapy and evaluating its results, including patient's attending physician. However, awareness of these factors helps to understand the patient's complaints and experienced symptoms, as well as to plan the therapeutic approach and to assess the outcomes.

The studies mentioned above of patients suffering from AF, showed that assessment of their QoL and subjective malaise and mental discomfort was not influenced by objective indicators of health. Additionally, personality features such as degree of neuroticism were not associated with assessed QoL. We sought to learn the circumstances that patients attribute to the onset of paroxysmal AF and attempt to characterise the psychological importance of these situations and their influence on patients' QoL.

## Methods

### Patients

The study involved 76 patients referred for ablation for paroxysmal AF. The study group comprised 54 (73%) males and 22 (27%) females aged 17 to 74 (mean 53.2) years. Disease duration (from the first AF episode) ranged from one year to 30 years (mean of 8.3 years). Evaluation of patient's physical condition included factors such as comorbidities (arterial hypertension, dyslipidaemia) and maximum ventricular rate (VR) during AF.

### Psychological assessment

Patients underwent in-hospital psychological evaluation prior to ablation. Each patient completed a psychological clinical survey. Quality of life was assessed using the Polish version of the SF-36v2 health survey (adapted by the International Quality of Life Assessment (IQOLA) Project). It measures 8 health domains: 1) physical functioning; 2) role limitations due to physical health; 3) role limitations due to emotional problems; 4) vitality; 5) mental health; 6) social functioning; 7) pain; and 8) general health perceptions. The range of 0 to 100 points may be assigned to each domain – the higher the score the better QoL. Such design of the survey allows various aspects of health-related QoL to be evaluated and compared [5, 6]. Additionally, an in-house symptom survey was used.

### Statistical analysis

Statistical analysis was performed using cluster analysis, analysis of variance, NIR testing, analysis of correlation and Student's *t*-test for independent variables. The results were found statistically significant when the *p* value was  $<0.05$ .

## Results

Incidence of AF in the study patients varied and ranged from one per month to one per day. Subjective discomfort associated with such episodes depends, however, not only on their rate but largely on their course. Rare AF paroxysms requiring in-hospital cardioversion may pose a much greater burden for patients than daily attacks relieved spontaneously or after administration of additional drugs. Taking into account the fact that analysis included only patients referred for ablation, it may be assumed that patients' symptoms, both subjective and confirmed on physical examination, were found very distressing and refractory to pharmacotherapy.

Maximum VR during AF in individual patients ranged from 120 to 250 beats per minute (mean of  $183.3\pm 35.3$  bpm). Arterial hypertension was confirmed in 44 (58%) patients and dyslipidaemia in 33 (43%) subjects.

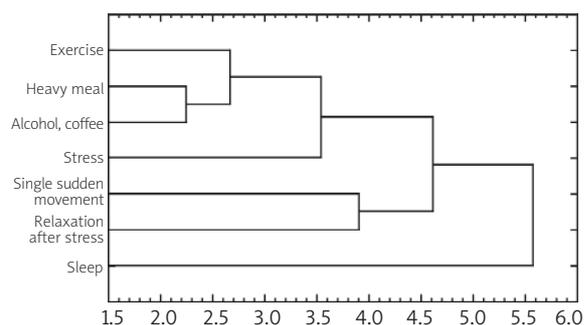
### Circumstances of AF paroxysms

In the study population, 55 (73%) patients were able to indicate one or more situations when answering the question: "In what circumstances does your paroxysmal AF begin?" Many subjects admitted that they willingly made attempts to verify if a specific situation precipitated AF; some of them purposely undertook activities associated with paroxysms during Holter ECG monitoring.

The repeatability of gathered information is striking regarding the precipitating situations. In practice, they are limited to a few activities. These activities along with their frequencies are listed in Table I.

**Table I.** Situations linked by patients to onset of paroxysmal AF

Circumstances of AF onset	N	%
Relaxation after stress	21	38
Sleep	21	38
Stress	18	33
Single sudden movement	17	30
Heavy meal	13	24
Alcohol, coffee	12	22
Exercise	11	19



**Figure 1.** Cluster analysis of circumstances of paroxysms of AF

The situation most often associated by patients with the onset of paroxysmal AF was relaxation after stress and emotional strain. One of the patients provided the following description of the symptoms: *I might say that the paroxysm comes when there is no exact cause. I came back home in the evening, the day was full of activity, I was nervous, but everything went well, it finally turned out well. I sit down in the armchair, I feel calm, I'm satisfied and suddenly it (the heart) starts to thump* (male, 65 years old). A female, 57 years old, said the following: *I was very afraid not to get the paroxysm during the funeral of my father, as this was enormously stressful and a terrible experience for me. But everything went fine. Only a few days later when I thought I was finally rested and calmed did it start. I had fibrillation and it didn't stop...*

Similar was the frequency of paroxysmal AF starting during sleep. In the majority of cases it does not lead to waking; only in the morning does the patient find out that he or she has AF.

On rarer occasions, paroxysmal AF starts while in emotional stress and strong annoyance. *Sometimes it starts when I'm irritated. For example during some meeting, I'm angry when they are talking nonsense, but I cannot burst out. Then, I feel palpitations and there it is... fibrillation* (male, 49 years old).

One third of patients indicated a single sudden movement, most likely tilting or rapid bending, as a cause of paroxysmal AF. *My family laugh at me but when I'm lying down I worry about turning on my other side, because if I do it fast, atrial fibrillation starts. So I turn very slowly, and they laugh that I'm crazy about my heart* (female, 56 years old).

Some of the patients attribute AF to heavy meals as well as to alcohol, coffee or strong tea consumption. They often emphasise that only a small amount is needed to start the paroxysmal AF: *I can't drink at all. If*

*I drink a beer, even a small one, atrial fibrillation starts. I don't even think about vodka* (male, 49 years old).

Relatively the least frequent cause of paroxysmal AF is exercise, including short, forced exercise rather than longer moderate physical efforts: *I can dig my whole allotment, sometimes I can play tennis and it's mostly all right. The worst is when I need to carry some heavy objects for a short distance* (male, 65 years old).

Cluster analysis distinguished three main clusters from the circumstances of paroxysmal AF listed by patients; it means that several specific situations promoting paroxysmal AF show coexistence. The first cluster included heavy meals, alcohol and coffee consumption, exercise and stress. This group comprised 14 (25%) patients. The second cluster included single sudden movement and relaxation following stressful events – 12 (21.5%) subjects, whereas sleep was a separate cluster – also 12 (21.5%) patients. The other 17 (32%) patients remained in the mixed group. A diagram of cluster analysis using Ward's method is presented in Figure 1.

No significant differences were found between groups from specific clusters with respect to gender, age, symptoms duration and comorbidities. Furthermore, max VR during paroxysm did not differ significantly between the studied groups.

### QoL assessment

In the study group there were few significant correlations between patient-assessed QoL and analysed variables (Table II).

No differences in individual domains were found between males and females. Arterial hypertension observed in addition to AF did not influence patients' QoL, whereas subjects with dyslipidaemia provided significantly worse assessment of health-related QoL.

Age did not correlate significantly with the majority of aspects of QoL; there was a significant negative correlation only with physical activity domain ( $r=-0.28$ ;  $p=0.023$ ). Limitation of physical capabilities in the older patients in this study was most likely associated with the influence of other factors, not limited to AF. Moreover, no significant relationship was shown between QoL and disease duration. The coefficient of correlation for each domain ranged from 0.10 to  $-0.19$ .

Maximum VR during paroxysmal AF did not correlate with QoL when analysing the entire group and a significant difference became apparent after gender-matching. In females a strong negative correlation was found between max VR during paroxysm and general physical feeling on daily activity ( $r=-0.58$ ;  $p=0.03$ ). In males no significant correlations were observed.

**Table II.** Assessment of QoL in the study group

SF-36 survey		F	M	p	HA+	HA-	p	D+	D-	p
		N	22		54	44		32	33	
Physical functioning	M	57.8	64.1	0.33	64.0	70.3	0.35	63.1	69.2	0.36
	SD	18.1	23.4		20.9	20.1		22.0	19.5	
Role limitations due to physical health	M	18.8	16.8	0.82	15.0	32.4	0.10	23.6	20.8	0.80
	SD	34.8	28.0		30.6	35.1		38.8	28.2	
Role limitations due to emotional problems	M	43.7	42.1	0.89	43.9	56.8	0.32	37.0	58.3	0.09
	SD	39.8	42.4		43.3	36.9		40.8	40.5	
Vitality	M	40.0	46.7	0.22	46.4	49.4	0.61	41.4	52.3	0.06
	SD	17.3	19.1		17.8	19.2		17.3	17.7	
Mental health	M	49.3	52.8	0.52	51.4	55.8	0.48	48.7	56.5	0.21
	SD	17.2	19.7		19.9	18.2		18.2	19.6	
Social functioning	M	48.3	56.7	0.20	50.5	52.2	0.81	45.7	55.3	0.17
	SD	22.0	22.5		20.9	23.1		21.8	20.9	
Pain	M	62.0	66.7	0.55	66.6	69.6	0.74	67.9	67.7	0.98
	SD	29.7	25.9		26.4	28.9		30.2	24.9	
General health perception	M	39.0	42.3	0.49	36.4	44.2	0.12	32.8	44.6	0.01
	SD	12.4	16.0		14.0	16.3		14.4	14.6	

F – females, M – males, HA+ – arterial hypertension, HA– – without arterial hypertension, D+ – dyslipidaemia, D– – without dyslipidaemia; p – significance levels for Student's t-test for independent variables

It may be supposed that females' toleration of faster heart rate is worst; the occurrence of rapid VR was associated with greater fatigue and worsening of physical capacity.

#### Circumstances of paroxysmal AF and QoL

Among analysed variables the circumstances associated with the onset of paroxysmal AF had the greatest impact on patients' QoL. Significant differences were confirmed between domains specified in cluster analysis (Table III).

As shown in Table III patients with paroxysmal AF starting after a single sudden movement or relaxation find different aspects of their QoL definitely the worst. In particular, extremely low results with respect to role limitations due to physical health (mean = 0) and role limitations due to emotional problems (mean = 8.3) were striking. It means that all patients from this group report that the experienced symptoms considerably limit their capabilities with respect to casual duties and require them to give up many activities. Additionally, almost all subjects think their emotional condition leads to similar negative effects.

Patients with paroxysmal AF occurring during sleep find their QoL the best. The results in the majority of examined domains are the highest in this group.

#### Discussion

The study population, as observed in other studies [1, 2], was characterised by decreased QoL, which was however neither associated with the objective health indices nor age- and gender-related. The only variable that significantly influenced patients' perception of physical and emotional condition as well as QoL was circumstances of onset of paroxysmal AF. Thus, the question was why this factor was so important for patients. What is the difference between the situation of patients in whom paroxysmal AF occurs during sleep (the best QoL) and the ones in whom it was precipitated by relaxation after a stressful event or single sudden movement (the worst QoL)?

Every disease is a difficult experience; however, patients with paroxysmal dysfunctions present a specific group. This refers also to patients with paroxysmal AF. The symptoms are not continuous but repeat with different frequencies. One of the patients said: *...I don't know if I should say I'm ill but sometimes I'm healthy or rather I'm healthy but sometimes I catch the disease* (male 31 years old).

The paroxysmal nature of the symptoms causes patients to experience a loss of control over their lives. It results in considerable mental discomfort, and prolongation of such a situation may pose a risk of

**Table III.** QoL and circumstances of paroxysmal AF onsets: I – sleep; II – sudden movement and relaxation; III – alcohol, coffee, stress, exercise; IV – mixed. Between-group comparison: ↑ – significantly higher result; ↓ – significantly lower result, \* –  $p < 0.05$ ; \*\* –  $p < 0.01$

SF-36 survey	I	II	III	IV
Physical functioning	66.0	41.3↓*	60.7	73.8↑*
Role limitations due to physical health	35.0	0.0	17.9	21.9
Role limitations due to emotional problems	59.9↑**	8.3↓**	28.5	45.9↑**
Vitality	59.0↑*	21.3↓*	50.7↑*	49.0↑*
Mental health	68.0↑**	28.0↓*	43.4	56.3↑*
Social functioning	66.0↑*	31.3↓*	48.9	59.4
Pain	72.5	66.3	65.4	66.9
General health perception	56.4↑*	28.0↓*	38.0↓*	46.0

depressive disorders [7, 8]. A natural need in the majority of patients is to determine when and why the paroxysmal AF happens. Less or more systematically patients carry out self-observation, sometimes performing “clinical experiments” [9]. As a result they are able to accurately name situations associated with the onset of AF and if possible they make attempts to avoid them.

Avoiding situations precipitating paroxysmal AF is more difficult in patients who experience AF after a single sudden movement or during relaxation after stress. The effort to “control” the way of movement obviously leads to constant emotional strain, disorganises many activities and finally turns out to be ineffective. The patient cannot avoid sudden twists, turning the head or simply bending in order to tie up their shoes. The paroxysm is unpredictable and may occur anytime and anywhere. This leads to a fear of leaving home, being alone, etc. In addition, paroxysmal AF occurring after sudden movement is often associated with paroxysms at some stage in relaxation. The effect though is paradoxical: patients who experience enormous stress fear to relax and remain in constant emotional strain. In the mentioned studies this was reflected by the self-assessment of patients’ physical and emotional function and their QoL.

The situation is relatively better in patients with AF occurring during stress, exercise, after a heavy meal, or consumption of coffee and alcohol. The disease is more comprehensible for these subjects. According to common knowledge regarding functioning of the human body it is obvious that alcohol abuse causes certain dysfunctions that overload the heart whereas for patients with AF following sudden movement or rest there is no reasonable explanation why the paroxysms occur in these specific circumstances, and thus they experience cognitive disharmony. It is also possible to avoid situations precipitating AF – patients should not consume

culprit products, limit their exercise, control stress as far as possible. And in case of violating these rules, the patient is aware of the cause of AF. The situation is therefore under control and is predictable. The emotional costs of the disease are significantly lower. However, the sense of the disease persists (significantly decreased score regarding this domain), resulting in self-imposed limitations and certain difficulties in social function.

The highest QoL was observed in patients with paroxysmal AF starting during sleep. This releases patients from attempts to control their activities. It also offers a sense of security – the paroxysm will not start during an unpredictable situation in a public place. On rare occasions, in predisposed patients, fear of sleeping progressing to anxiety neurosis may occur (one such case was found in the study population of 21 patients with AF starting during sleep).

Although the majority of patients were able to name situations which in their opinion were associated with the onset of paroxysmal AF, one fourth could not indicate in what circumstances the paroxysms occurred most often or declared that they could appear any time. It cannot be judged whether in these patients there is no factual relationship between activity and paroxysmal AF or if they have not tried to discover such an association. Patients associating AF with particular situations often said that they willingly tried to find out which circumstances might provoke paroxysms. For that reason we may conclude that they present a task-focused style of coping with difficult situations, whereas patients that could not define the relationship between their activities and onset of paroxysmal AF present an emotion- or avoidance-focused style [10]. This issue may be further investigated to indicate which individual patient features influence perception of symptoms associated with AF.

From the patients’ point of view, the circumstances precipitating paroxysmal AF influence above all the range

of disorganisation of everyday life caused by the disease, real and self-imposed limitations of activity as well as psychological meaning of symptoms for the subjects. Taking this into consideration allows us to understand why – against all the odds – objective indicators of patient condition and severity of the disease do not significantly influence subjective assessment of QoL.

## Conclusions

1. The majority of patients (73%) associated the occurrence of paroxysmal AF with real life situations.
2. Objective indicators of patients' health, such as disease duration or presence of comorbidities, were not associated with patient-assessed QoL.
3. Maximum VR during paroxysmal AF correlated with QoL in females.
4. Circumstances of onset of AF, their relationship with disorganization of patients' activity and psychological importance significantly influence patients' QoL.

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## Okoliczności występowania napadów migotania przedsionków i ich związek z jakością życia pacjentów

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### Streszczenie

**Wstęp:** Napadowe migotanie przedsionków (AF) jest w ocenie pacjentów dolegliwością bardzo uciążliwą, obniżającą w znacznym stopniu jakość życia.

**Cel:** Poznanie okoliczności związanych przez pacjentów z występowaniem napadów AF, próba opisanie psychologicznego znaczenia tych sytuacji oraz ich wpływu na jakość życia (QoL) chorych.

**Metodyka:** Badaniami objęto 76 pacjentów (54 mężczyzn, wiek 17–74 lata, średnia 53,2), zakwalifikowanych do ablacji z powodu napadowego AF. Czas trwania choroby 1–30 lat, średnia 8,3. W ocenie stanu fizycznego pacjenta uwzględniono obecność chorób towarzyszących i maksymalną częstotliwość rytmu komór podczas AF. Pacjenci byli badani psychologicznie przed ablacją. Z każdym przeprowadzono psychologiczny wywiad kliniczny. Do oceny QoL zastosowano kwestionariusz SF-36v2. Wykorzystano także ankietę dotyczącą objawów.

**Wyniki:** 55 (72%) pacjentów potrafiło wskazać sytuacje wiążące się z rozpoczęciem napadu AF. Spośród wymienianych okoliczności analiza skupień wyodrębniła trzy skupienia: I – obfite jedzenie, alkohol i kawa, wysiłek lub stres; II – pojedynczy gwałtowny ruch i odprężenie po stresie; III – sen. Występowała istotna różnica w ocenie QoL pomiędzy pacjentami z tak wydzielonych grup: chorzy, u których napady AF rozpoczynają się w wyniku pojedynczego gwałtownego ruchu i podczas odprężenia, zdecydowanie najgorzej oceniają swoją QoL, najlepiej zaś oceniają QoL pacjenci z AF rozpoczynającym się podczas snu. Maksymalna częstotliwość rytmu komór podczas napadu AF nie korelowała z QoL w całej grupie badanej, jednak po uwzględnieniu płci chorych istotną korelację zaobserwowano u kobiet ( $r=-0,58$ ;  $p=0,03$ ). Inne analizowane czynniki nie wykazywały istotnego związku z QoL.

**Wnioski:** Obiektywne wskaźniki stanu zdrowia pacjenta, takie jak czas trwania choroby lub współwystępujące choroby, nie wiążą się z dokonywaną przez pacjentów oceną QoL. U kobiet maksymalna częstotliwość rytmu komór podczas napadu AF koreluje z QoL. Okoliczności występowania napadów AF, ich związek z dezorganizacją aktywności i znaczenie psychologiczne są czynnikami istotnie wpływającymi na QoL pacjentów.

**Słowa kluczowe:** napadowe migotanie przedsionków, jakość życia

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