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Clinical characteristics and quality of life in patients with atrial fibrillation before and after radiofrequency catheter ablation at the Department of Cardiology, Military Hospital 103

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ABSTRACT

Objective: *To evaluate the clinical characteristics and quality of life (QoL) of atrial fibrillation (AF) patients before and after radiofrequency catheter ablation, using the Atrial Fibrillation Effect on Quality of Life (AFEQT) questionnaire.* ***Methods:*** *A longitudinal follow-up study was conducted on 57 patients who underwent radiofrequency catheter ablation at the Department of Cardiology, Military Hospital 103, from March 2023 to June 2025. Clinical characteristics were obtained through medical interviews and record reviews. QoL was assessed using the AFEQT questionnaire at baseline and at 3 months post-ablation.* ***Results:*** *The mean age of the study population was 61.8 ± 10.9 years, with a male-to-female ratio of 2.8:1. The prevalence of hypertension, type 2 diabetes mellitus, chronic coronary syndrome, and heart failure was 57.9%, 14.0%, 7.0%, and 12.3%, respectively. Most patients had paroxysmal atrial fibrillation (70.1%) and a time from AF diagnosis to ablation of ≤ 1 year (64.7%). Common symptoms included palpitations, dizziness/lightheadedness, and chest discomfort. At the 3-month follow-up, both clinical symptoms and AFEQT scores (overall and across all subscales) improved significantly ($p < 0.05$). Improvements were particularly notable in male patients, those aged ≥ 60 years, those without heart failure, those with paroxysmal atrial fibrillation, and those adherent to treatment ($p < 0.05$).* ***Conclusion:*** *Radiofrequency catheter ablation significantly improved clinical symptoms and QoL at 3 months post-procedure, especially among male, older adult patients with paroxysmal AF, no heart failure, and good treatment adherence.*

Keywords: *atrial fibrillation, quality of life, radiofrequency catheter ablation*

INTRODUCTION

Atrial fibrillation (AF) is one of the most common cardiac arrhythmias in clinical practice, affecting an estimated 60 million individuals worldwide as of 2023, with a prevalence that continues to rise [1]. After the age of 40, the lifetime risk of developing AF is estimated at 26% for men and 23% for women [2]. The clinical presentation of AF is highly variable, ranging from asymptomatic cases to common symptoms such as palpitations, chest pain, and dyspnea, as well as more severe manifestations including episodes

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of dizziness, syncope, hemodynamic instability, and thromboembolic events resulting from AF-associated thrombus formation [3]. Patients with AF have a five-fold higher risk of stroke, a three-fold higher risk of heart failure, and a two-fold higher risk of mortality compared to individuals without AF [4]. Collectively, these factors contribute to a substantial disease burden, adverse socioeconomic consequences, and significant psychological distress, thereby impairing the overall quality of life (QoL) of AF patients.

Radiofrequency catheter ablation (RFCA), which aims to isolate the pulmonary veins - one of the most common electrophysiological triggers of AF - is increasingly recommended over pharmacological rhythm control for symptomatic AF patients to achieve sustained symptom relief and long-term QoL improvement [5, 6]. However, the early post-ablation period (1–3 months) is characterized by atrial electrical remodeling, during which patients remain at risk for recurrent atrial arrhythmias. In addition, this stage often requires the initiation of antiarrhythmic and anticoagulant therapies, as well as the potential occurrence of both early and late complications [7]. These factors may significantly affect patients' QoL, psychological well-being, and adherence to treatment. Understanding the clinical characteristics and QoL during this critical phase is essential for developing tailored health education, psychological support, and motivational strategies to enhance treatment adherence, and improve long-term outcomes in AF management. Therefore, this study aims to evaluate the clinical characteristics and quality of life of AF patients before and after RFCA at the Department of Cardiology, Military Hospital 103.

PARTICIPANTS AND METHODS

Study participants: A total of 57 patients diagnosed with atrial fibrillation (AF) and indicated for radiofrequency catheter ablation (RFCA) were enrolled.

Inclusion criteria:

- Patients with a confirmed diagnosis of AF, based on electrocardiographic (ECG) evidence of AF on a single-lead recording lasting ≥30 seconds or on a standard 12-lead ECG, in accordance with the 2020 European Society of Cardiology (ESC) guidelines for the diagnosis and management of atrial fibrillation [8]. Diagnostic criteria included: absence of P waves, presence of fibrillatory waves (f-waves) at a frequency of 400–600 cycles per minute, and irregular RR intervals varying in frequency and amplitude.

- Patients with an indication for and undergoing RFCA for AF, according to the 2020 ESC guidelines [8] (including paroxysmal AF and persistent AF refractory to or intolerant of antiarrhythmic drugs).

- Patients who provided informed consent to participate in the study.

Exclusion criteria:

- Patients with valvular AF requiring open-heart surgery; or AF secondary to conditions such as active thyrotoxicosis (Graves' disease), acute exacerbation of chronic obstructive pulmonary disease (COPD), or sick sinus syndrome.

- Patients with severe heart failure, chronic kidney disease stage IIIB or higher, Child-Pugh B or higher liver cirrhosis, intracardiac thrombus, severe systemic infection, or acute trauma.

Study period and location

- *Study period:* From March 2023 to June 2025.

- *Study location*: Department of Cardiology, Cardiovascular Center, Military Hospital 103.

Study design and sample size

Study design: A longitudinal follow-up study.

Sample size: A convenience sample of 57 AF patients who underwent RFCA during the study period.

Data collection methods

- Step 1: Baseline data on clinical and paraclinical characteristics were collected through patient interviews and medical record reviews. The baseline AFEQT (Atrial Fibrillation Effect on Quality-of-Life) score was assessed before ablation.

- Step 2: Early (within 24 hours) and late complications post-ablation were documented during hospitalization.

- Step 3: Patients were monitored and scheduled for a follow-up visit 3 months post-procedure, during which clinical symptoms and AFEQT scores were reassessed.

Data collection instruments

- The AFEQT (Atrial Fibrillation Effect on Quality-of-Life) Questionnaire, initially developed and validated by Spertus et al. in 2011, is designed to assess the impact of atrial fibrillation on patients' quality of life [9]. The scale consists of 20 items, divided into four main domains: Symptoms (items 1-4), Daily activities (items 5-12), Treatment concern (items 13-18), and Treatment satisfaction (items 19-20). Patients rate each item on a 7-point scale (1 = no symptoms/limitations; 7 = very severe symptoms/limitations). Scores are standardized to a 0–100 scale, with higher scores indicating better quality of life.

- Formulas used:

$$\text{Overall AFEQT Score} = 100 - \frac{(\text{Total symptom severity score} - \text{Number of answered items}) \times 100}{\text{Number of answered items} \times 6}$$

$$\text{Domain Score} = 100 - \frac{(\text{Total domain symptom severity score} - \text{Number of items in domain}) \times 100}{\text{Number of items in domain} \times 6}$$

Data analysis: Data were analyzed using IBM SPSS Statistics version 22.0. Statistical tests included: Independent Samples T-test for normally distributed continuous independent variables, Mann–Whitney U test for non-normally distributed independent variables, Paired Samples T-test for normally distributed paired variables, McNemar's test for non-normally distributed paired variables.

Ethical considerations: The study protocol was reviewed and approved by the Institutional Review Board (IRB) for Biomedical Research at Military Hospital 103 (Decision No. 2404/QĐ-HVQY, dated March 25, 2023). All participants provided written informed consent prior to enrollment

RESULT

Table 1. General characteristics of the participants (n = 57)

Items	n	%
Age (years): X ± SD (Min; Max)	61.82 ± 10.91 (30; 82)	
Gender:		
Male	42	73.7
Female	15	26.3
BMI (kg/m^2): X ± SD	23.10 ± 1.79	
Smoking	6	10.5
Alcohol consumption	2	3.5
Hypertension	33	57.9
Type 2 diabetes	8	
Chronic kidney disease	5	8.7
Chronic coronary syndrome	4	7.0
Heart failure	7	12.3
CHA_2DS_2 - VASc Score		
≤ 1 point	34	59.6
≥ 2 points	23	40.4
Atrial fibrillation classification		
Paroxysmal atrial fibrillation	40	70.1
Persistent and long-standing persistent AF	17	29.9
Time since atrial fibrillation onset		
≤ 1 year	37	64.9
>1 year	20	35.1
Mean duration (months): X ± SD (Min; Max)	12.48 ± 5.07 (1; 36)	
Treatment characteristic		
Ablation procedure time (minutes): Median (Q1–Q3)	180 (120; 240)	
Adherence to antiarrhythmic drugs	55 (96.4%)	
Adherence to anticoagulant therapy	50 (87.7%)	

The participants had a mean age of 61.82 ± 10.91 years, with a predominance of male patients (73.7%). Hypertension, type 2 diabetes mellitus, and heart failure were presented in 57.9%, 14.0%, and 12.3% of patients, respectively. Most patients exhibited paroxysmal atrial fibrillation (70.1%), while persistent or long-standing persistent AF accounted for 29.9%. Ablation was predominantly performed within the first year after AF onset (64.9%). Post-procedure, treatment adherence remained high, with 96.4% of patients adhering to antiarrhythmic therapy and 87.7% to anticoagulant therapy.

Table 2. Complications following radiofrequency catheter ablation for atrial fibrillation (n = 57)

Complications		n	%
Early complications (within 24 hours post-procedure)	Vascular injury (arteriovenous fistula, pseudoaneurysm at the access site...)	1	1.7
	Bleeding, hematoma at the access site	2	3.5
	Infection	0	0
	Cardiac tamponade	2	3.5
	New-onset thromboembolism (stroke, …)	0	0
Late complications	Pulmonary vein stenosis/thrombosis	0	0
	Esophageal injury (esophagitis, fistula, abscess)	0	0

No late complications, including pulmonary vein stenosis/thrombosis or esophageal injury (such as fistula or abscess), were observed during follow-up. Early complications within the first 24 hours included two cases of access-site hematoma, two cases of cardiac tamponade, and one case of pseudoaneurysm. No mortality was reported.

Table 3. Clinical symptoms of patients before and 3 months after RF ablation (n = 57)

Clinical symptoms	Before RF ablation (n, %)	3 months after RF ablation (n, %)	p-value
Syncope or near-syncope	1 (1.7%)	0 (0%)	> 0.05
Palpitations	33 (57.8)	14 (24.5%)	< 0.05
Chest pain	5 (8.7%)	2 (3.5%)	> 0.05
Shortness of breath, dyspnea	3 (5.2%)	0 (0%)	> 0.05
Dizziness, lightheadedness	9 (15.7%)	2 (3.5%)	> 0.05
Fatigue	5 (8.7%)	1 (1.7%)	> 0.05
Asymptomatic	1 (1.7%)	38 (66.7%)	< 0.05

The most frequent clinical symptoms before ablation were palpitations (57.8%) and dizziness/lightheadedness (15.7%). A small proportion of patients experienced syncope/near-syncope or were asymptomatic (1.7% each). At the 3-month follow-up, there was a markedly reduction in the prevalence of all symptoms. Specifically, the reduction in palpitations and the increase in asymptomatic cases were statistically significant ($p < 0.05$).

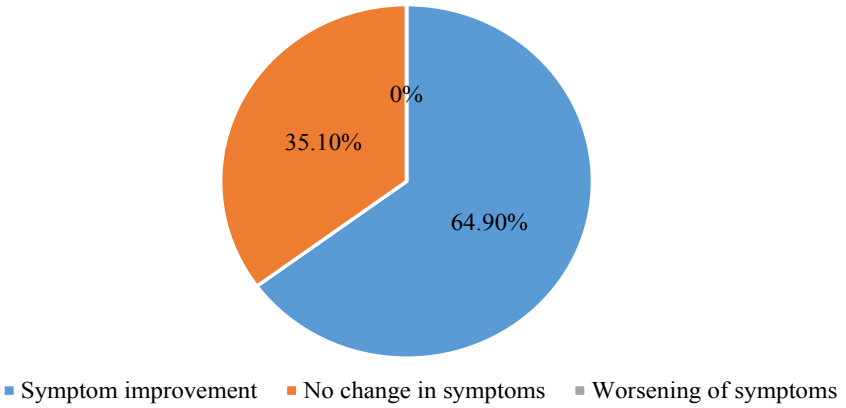

Figure 1. Proportion of patients by level of symptom improvement at 3 months after ablation

Three months after ablation, the majority of patients (64.9%) reported an improvement in clinical symptoms, while 35.1% reported no change. No cases of symptom worsening were observed.

Table 4. Quality of life in AF patients before and 3 months after RF ablation (n = 57)

Quality of life domain	Before RF ablation	3 months after RF ablation	p-value
AFEQT overall score	34.86 ± 19.30	69.00 ± 6.79	0.005
Symptoms	26.35 ± 9.17	62.43 ± 15.95	0.002
Daily Activities	44.05 ± 21.47	79.85 ± 8.77	0.01
Treatment Concern	34.73 ± 21.70	64.80 ± 11.06	0.02
Treatment Satisfaction	19.10 ± 1.63	63.05 ± 6.57	0.004

The AFEQT overall score significantly improved from 34.86 ± 19.30 before ablation to 69.00 ± 6.79 at the 3-month follow-up ($p < 0.05$). All AFEQT subscales, including symptoms, daily activities, treatment concern, and treatment satisfaction, demonstrated significant improvement at 3 months post-ablation ($p < 0.05$).

Table 5. Changes in QoL of AF patients 3 months after Radiofrequency (RF) ablation across clinical subgroups (n = 57)

Subgroup	AFEQT overall score before RF ablation	AFEQT overall score 3 months after RF ablation	p-value
Gender			
Male (n = 42)	31.51 ± 5.78	70.45 ± 12.56	0.03
Female (n = 15)	22.53 ± 16.89	55.12 ± 26.68	0.18
Age			
≥ 60 years old (n = 31)	31.50 ± 19.58	66.22 ± 1.99	0.04
< 60 years old (n = 26)	41.65 ± 14.22	54.26 ± 12.11	0.18

Subgroup	AFEQT overall score before RF ablation	AFEQT overall score 3 months after RF ablation	p-value
Heart failure status			
Heart failure (n = 7)	32.51 ± 11.18	41.50 ± 12.68	0.16
No heart failure (n = 50)	41.07 ± 12.50	70.23 ± 19.06	0.04
Atrial fibrillation classification			
Paroxysmal atrial fibrillation (n = 40)	30.01 ± 5.56	66.07 ± 5.90	0.01
Persistent/long-standing persistent atrial fibrillation (n = 17)	43.12 ± 7.90	59.56 ± 15.90	0.12
Time since atrial fibrillation onset			
≤ 1 year (n = 37)	34.17±11.89	69.34 ± 19.27	0.006
>1 year (n = 20)	32.17±10.45	53.45 ± 6.90	0.04
Treatment adherence			
Adherence to prescribed therapy (n = 50)	22.78 ± 5.89	73.89 ± 7.09	0.001
Non-adherent (n = 7)	38.90 ± 17.34	50.90 ± 20.98	0.06
Procedure complications			
With complications (n = 5)	28.19 ± 7.23	67.12 ± 18.11	0.001
Without complications (n = 52)	32.46 ± 11.59	63.49 ± 9.63	0.01

The AFEQT overall score demonstrated statistically significant improvement at the 3-month follow-up among male patients, those aged 60 years or older, patients without heart failure, those with paroxysmal AF, and those adherent to prescribed therapy ($p < 0.05$). Significant improvements were also observed in both subgroups stratified by time since AF diagnosis (≤ 1 year and > 1 year) and by the presence or absence of procedural complications ($p < 0.05$).

DISCUSSION

Radiofrequency catheter ablation (RFCA) is a modern and effective treatment for atrial fibrillation (AF), aiming to reduce AF recurrence, alleviate symptoms, and improve patients' quality of life (QoL) [6]. However, the early post-ablation period (typically 1–3 months) is characterized by atrial electrical remodeling and inflammatory responses, which increase the risk of recurrent AF episodes [10]. Early recurrence may negatively affect QoL and undermine patient confidence and adherence to treatment. Our study of 57 AF patients with indications for RFCA provides valuable insights into changes in clinical symptoms

and QoL both before and shortly after the procedure. These findings can support healthcare professionals in developing tailored health education strategies and providing appropriate treatment guidance.

Clinical characteristics and quality of life of patients before RF ablation: The mean age of the study population was 61.82 ± 10.91 years, with a male predominance (73.7%). The prevalence of hypertension, type 2 diabetes mellitus, and heart failure was 57.9%, 14.0%, and 12.3%, respectively. Paroxysmal AF accounted for 70.1% of cases, while persistent or long-standing persistent AF accounted for 29.9%. These characteristics are consistent with the findings of Chew et al. (2020) [11], who conducted a meta-analysis of 4,950 AF patients undergoing RF ablation. Their analysis showed patient ages ranging from 57 to 65 years, a male predominance (61–78%), paroxysmal AF in most cases (>60%), and preserved left ventricular ejection fraction (51–63%). These findings reflect the typical clinical profile of patients selected for RFCA, who are middle-aged, predominantly male, and have fewer severe comorbidities. The high proportion of paroxysmal AF patients in this study is in line with clinical evidence suggesting that RFCA is more effective in this subgroup compared with those with persistent AF [12].

The most common clinical symptoms among AF patients undergoing ablation in our study were palpitations (57.8%), dizziness/lightheadedness (15.7%), and chest pain (8.7%). The 2020 European Society of Cardiology (ESC) guidelines for the diagnosis and managing AF state that its clinical presentation varies widely, from being asymptomatic to presenting with acute and sudden symptoms such as syncope, acute heart failure, or hemodynamic instability, to symptoms during stable hemodynamics, such as palpitations, chest pressure/discomfort, dyspnea, or fatigue [8]. Silent AF, though asymptomatic, can still impose a substantial disease burden by increasing the risk of heart failure and thromboembolic events due to delayed detection and treatment. This underscores the need for AF screening in high-risk patients, even those with vague or absent symptoms, using continuous ECG monitoring devices like Holter monitors, implantable loop recorders for extended monitoring, and consumer electronic devices such as smartphones and smartwatches to enhance arrhythmia detection.

The incidence of early complications in our study was low. Notably, there were two cases of cardiac tamponade with hemodynamic compromise during the procedure (3.5%) and two cases of vascular access site bleeding/hematoma (3.5%). No mortality or late complications were observed. A 2021 study by Paul Nordin et al., involving 5,414 AF patients post-ablation, reported complications in 108 patients (2%), with the majority occurring during or within the first 6 hours after the procedure. The most frequent complications were cardiac tamponade with hemodynamic compromise and vascular access site complications [13]. Consequently, some centers in Europe and the United States have adopted same-day discharge protocols for selected AF patients immediately after ablation [13]. The study also indicated a higher risk of complications in patients with a BMI ≥ 30 kg/m², structural heart disease, and those undergoing cryoablation compared to those treated with RFCA [13].

Before ablation, QoL in AF patients, assessed using the AFEQT questionnaire, was low (34.86 ± 19.30 on a 0–100 scale).

Scores were consistently low across all four domains: symptoms, daily activities, treatment concerns, and treatment satisfaction. This underscores the profound impact of AF on all aspects of life, leading to functional decline, psychological distress, anxiety, and reduced treatment motivation. According to the 2020 ESC statistics, more than 60% of AF patients reported a reduced QoL compared to the pre-diagnosis period [8]. Moreover, AF is associated with multiple cardiovascular complications, such as heart failure, stroke, thromboembolism, hospitalization, and increased cardiovascular mortality. Dorian et al. (2000) also found a significant reduction in QoL among 152 AF patients assessed with the SF-36 questionnaire, with scores for physical functioning, social functioning, mental health, and general health 24%, 23%, 16%, and 30% lower, respectively, compared to healthy controls [14]. While the SF-36 is less commonly used in clinical practice due to its complexity, the AFEQT has demonstrated higher sensitivity and specificity, making it a more suitable tool for assessing QoL in AF patients [15].

Clinical characteristics and quality of life of patients 3 months after ablation: Following the procedure, the clinical symptoms of the study population improved significantly, with a marked reduction in all recorded symptoms, such as palpitations, chest tightness/discomfort, and dyspnea. The number of asymptomatic patients at the 3-month follow-up increased significantly ($p < 0.05$). Multiple studies have indicated a high incidence of AF episodes within the first 3 months post-ablation, a period referred to as the "blanking period". During this time, the occurrence of AF episodes does not constitute treatment failure [10]. More than 60% of patients experienced early AF recurrence within the first 3 months post-ablation but remained free of recurrent episodes from 3 months to over 12 months of follow-up [10]. The high likelihood of AF recurrence during this initial period is attributed to the electrical reconnection of isolated pulmonary veins, inflammatory responses in the myocardial tissue following radiofrequency energy delivery, or the delayed effects of ablation. In some cases, antiarrhythmic drugs may induce an imbalance in the autonomic nervous system [10, 16]. The literature has documented that approximately 15% of patients reported no improvement-or even worsening-of clinical symptoms immediately after ablation due to this phenomenon [10]. Nevertheless, understanding these underlying mechanisms enables healthcare professionals to reassure and encourage patients to adhere to monitoring, treatment, and lifestyle modifications, thereby improving long-term prognosis and treatment efficacy after ablation.

Our study demonstrated a significant improvement in QoL of AF patients at the 3-month follow-up compared to the pre-procedure baseline. This finding is consistent with both international and domestic research. For instance, Mark and colleagues in the CABANA trial demonstrated that catheter ablation was superior to medical therapy in improving QoL across various measures, including the AFEQT questionnaire [17]. Similarly, a study by Nguyen Lan Viet et al. at the National Institute of Cardiology in Vietnam reported significant improvements in symptoms and QoL following AF ablation in both the short and long term [18]. This consistency can be explained by the direct mechanism of the procedure - electrical isolation of the pulmonary veins, a well-established source of AF triggers. By addressing this

mechanism, the procedure reduces clinical symptoms (palpitations, fatigue, dyspnea), which are key determinants of reduced QoL in AF patients. Improvements were observed across all four AFEQT domains, including symptoms, physical functioning, treatment concern, and treatment satisfaction. Therefore, despite the short-term follow-up and the recognized high risk of AF episodes during the blanking period, RFCA provides significant and comprehensive improvements in QoL across all assessed domains, which patients often perceive as the most objective and meaningful indicator of treatment success.

The most pronounced improvement in QoL at the 3-month follow-up was observed among male patients, those aged ≥ 60 years, patients with paroxysmal AF, those without heart failure, and those who adhered to treatment. This finding is consistent with the study by Weerasooriya et al., which evaluated 100 AF patients post-ablation and reported arrhythmia-free survival rates of 40%, 37%, and 29% at the 1-, 2-, and 5-year follow-ups, respectively [19]. The study also found that persistent AF was associated with a higher recurrence rate compared with paroxysmal AF (HR: 1.9; 95% CI) [19]. This can be explained by the more advanced atrial substrate in patients with persistent AF, which undergoes greater remodeling and fibrosis, making ablation less effective in achieving and maintaining long-term sinus rhythm, and therefore yielding fewer QoL benefits. The substantial difference in AFEQT scores between adherent and non-adherent patients indicates that improvements in QoL depend not only on the ablation procedure itself but also on close follow-up, patient adherence, and lifestyle modification [20]. This underscores the crucial role of nurses in providing health education, counseling, and psychological support to promote medication adherence and facilitate effective collaboration between patients and physicians, ultimately ensuring optimal treatment outcomes. The interval from AF diagnosis to ablation (before or after one year) and the occurrence of periprocedural complications did not significantly affect QoL improvement at three months. This may be attributable to the mild nature of complications observed in our study, which were promptly managed during hospitalization, and did not lead to long-term sequelae. While several studies have demonstrated that early ablation (within one year of diagnosis) enhances long-term efficacy [21], our short-term follow-up may not have been sufficient to reveal this difference.

Despite these strengths, our study has limitations, including a relatively small sample size, a short follow-up duration, and the inability to comprehensively evaluate all factors influencing QoL in AF patients. Future studies with larger cohorts and extended follow-up are warranted to address these gaps.

CONCLUSION

After radiofrequency ablation, patients exhibited significant improvements in clinical symptoms and quality of life, with statistically significant results at the 3-month follow-up ($p < 0.05$). These improvements were particularly pronounced among male patients, those aged ≥ 60 years, those without heart failure, those with paroxysmal AF, and those with high treatment adherence. Strengthening counseling, mental health support, and motivating patients for self-monitoring, lifestyle modifications, and adherence to treatment is essential to maximize the efficacy of the procedure and reduce the burden of AF.

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