Atrial fibrillation as a frequent reason for calls by Emergency Medical Teams

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Summary

Introduction
Atrial fibrillation is the most common supraventricular arrhythmia which is also a frequent cause of calls by Emergency Medical Services Teams.
The purpose of the work was presentation of the conduct of the Medical Rescue Teams in about patients with atrial fibrillation.
Research methodology
The study included an 86-year-old woman who was called by the Medical Rescue Team due to increasing weakness accompanied by chest pain and dyspnoea. At the patient after a thorough medical history and physical examination, the first episode of atrial fibrillation was found. An individual case study method was used. The study was conducted on the basis of a medical rescue cardthose.
Conclusions
There is no one size fits all regimen for the management of patients with atrial fibrillation. There are algorithms that facilitate the implementation of appropriate treatment. The rescue operation must always be tailored to the individualthe patient's health status and modified as necessary. Thanks to this procedure, paramedics minimize the chances of making a mistake and improve the patient's health.

Key words: atrial fibrillation, arrhythmia, Syndrome Medical Rescue, emergency procedures

Admission

Atrial fibrillation (AF) is the most common supraventricular tachyarrhythmia; characterized by fast (350-700 / min), uncoordinated activity of the atria leading to haemodynamic loss of their contraction, which is accompanied by an irregular ventricular rhythm [1].

On AF is the most common arrhythmia in adults in the world. Currently, its incidence is estimated at 2 - 4%. A 2-3-fold increase in the number of patients with this arrhythmia is predicted. This is due to the increasing life expectancy and the search for silent AF. This arrhythmia is associated with higher morbidity and mortality, which puts a burden on the patient, social health and the healthcare system at the same time [2]. As the world's population ages Atrial fibrillation is projected to affect 6-12 million people in the US by 2050 and 17.9 million in Europe by 2060 [3].

The risk of developing AF depends on age, genetic and / or clinical background. Aging is the main factor in the occurrence of AF, while cardiovascular diseases such as hypertension, ischemic heart disease, coronary artery disease or the presence of non-cardiac diseases such as diabetes, thyroid disease, obesity, CKD also increase the likelihood of this arrhythmia. The presence of risk factors resulting from lifestyle, such as obesity, smoking, alcohol abuse should be detected as soon as possible, because early intervention and lifestyle modification reduces the occurrence of AF [2]. Interestingly, blood group 0 may be a factor reducing the susceptibility to the development of AF and its consequences [4].

Atrial fibrillation is a complex disturbance of the heart rhythm, characterized by both abnormal spontaneous beats in ecotopic foci and the presence of numerous interrelated Re-entry loops covering both atria [5].

Atrial fibrillation, especially early onset, has a strong componenthereditary, which is independent of the accompanying conditions in the cardiovascular system. Some young patients with AF have hereditary cardiomyopathies or channelopathies dependent on the mutations that cause the disease. These monogenic diseases are also associated with the risk of sudden death [6].

One of the pathomechanisms leading to the development of arrhythmias is structural reconstruction. It causes electrical distraction between the bundles of fibersmuscle and local heterogeneity of conduction, which favors precurrent awakenings (*re-entry*) and maintaining the arrhythmia. The recurrent wave circulates through the atrium and, engulfing fibers with a shorter refractory period, causes them to depolarize prematurely. Uncoordinated activation of the atria with a rate of 350 - 700 / min causesloss of the hemodynamic effect of contraction of the atria, which lead to a specific tremor. The short refractory period and the lack of its adaptation to changes in heart rate contribute to the continued persistence of atrial fibrillation [6].

According to the concept of Haissaguerrea et al., The cause of an attack of atrial fibrillation is the presence of ectopic foci, which in 90% of cases are located in the pulmonary veins [7].

A big problem in detecting early atrial fibrillation is the so-called silent atrial fibrillation, ie one that the patient does not feel and is unaware of the disease [4].

The incidence of silent AF, or rather our ability to identify it, depends on the method and time of monitoring, the frequency of repeated ECG recording and the characteristics of the studied population. In the group of people> 75 years of age, using typical 24-hour Holter records, Camm et al. Estimated the incidence of silent AF at 10.5%. On the other hand, an analysis of the Framingham Heart Study data showed thatthat in as many as 40% of patients with paroxysmal atrial fibrillation, episodes of asymptomatic arrhythmia were also recorded (data were obtained on the basis of ECG examinations performed twice a year).

Deif et al., However, it seems that short-term standard 12-lead ECG recordings using event recorders or even standard 24-hour Holter recordings may be an insufficient tool for proper diagnosis of silent AF [8].

In patients with asymptomatic arrhythmia, a stroke may be the first manifestation of atrial fibrillation. In the Warsaw Stroke Register carried out in the years 1991 - 1992, in the group of patients with stroke diagnosed for the first time, AF occurred in 26% of patients. Niewada et al. In the hospital registry carried out in 2001–2002 showed that every third patient with ischemic stroke suffered from AF [9].

A patient with atrial fibrillation may have different symptoms or no symptoms at all. Ailments resulting from the reduced cardiac output consist of a feeling of shortness of breath, general fatigue and poor physical efficiency. In the presence of ischemic heart disease, coronary pains may occur, as well as a feeling of heart palpitations, dizziness or in some cases even loss of consciousness [10].

There are cases in which the first symptom of the disease is pulmonary edema, unstable angina, transient ischemia, or the previously mentioned stroke or arterial embolism [11].

The gold standard in the diagnosis of atrial fibrillation is the ECG. The irregular heart rhythm during auscultation of the heart with simultaneous checking of the pulse on the radius may be indicative of the diagnosis, but the final diagnosis cannot be made only on the basis of arrhythmias in physical examination [4].

Negative ECG recordings do not rule out the diagnosis of AF because it may be paroxysmal [3].

Atrial fibrillation on an EKG can have different images. The diagnosis depends closely on the mechanism of atrial fibrillation. Typically, ECG AF is characterized by:
· Absence of P.
· Non-measurable various-shape flicker wave (f wave) with a frequency> 350 / min - it is best seen in lead V1.
· With total irregular rhythm of QRS complexes, QRS complexes usually narrow but may be widened, e.g. when there is an additional conduction pathway (Fig. 1).
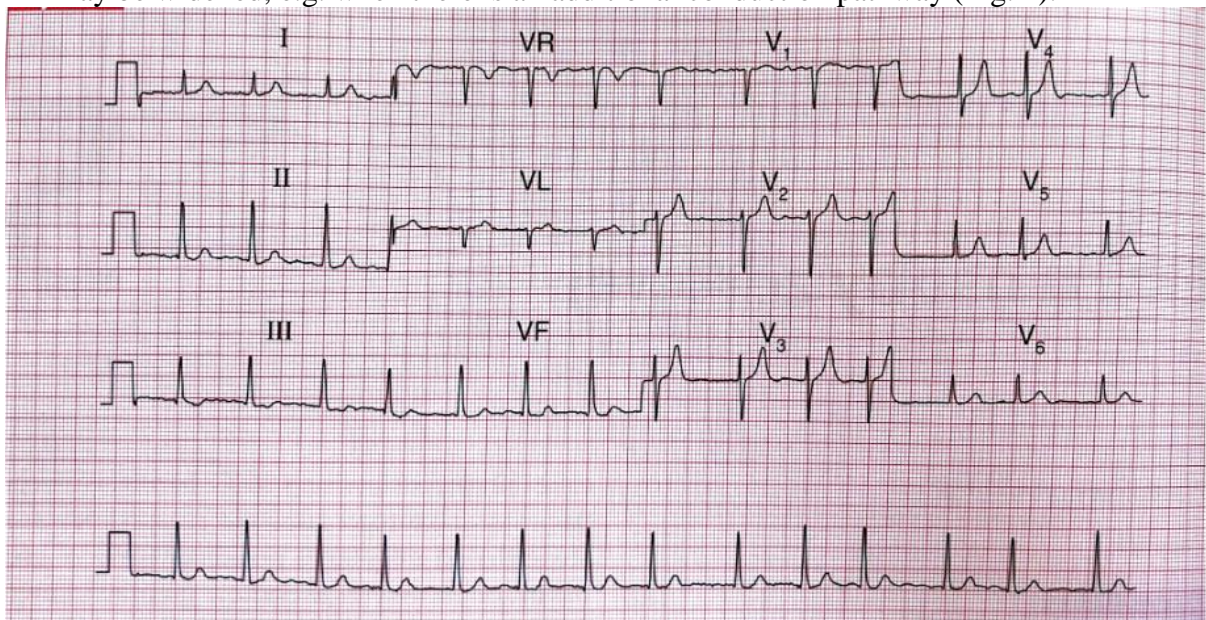

Dig. 1. *Cardiogram with a record of typical atrial fibrillation*
Source: [12]

Different ones are distinguished depending on the duration of the arrhythmia and the occurrence and intensity of symptoms forms of atrial fibrillation (Table I).

Table I Atrial fibrillation (AF) classification

Character AF	Definition
AF recognized for the first time	Previously undiagnosed AF, regardless of duration of arrhythmia and the presence and severity of symptoms associated with AF.
Paroxysmal AF	AF lasting up to 7 days, in most cases resolving to 48 hours. AF episodes cardioverted for up to 7 days.
Persistent AF	AF lasting more than 7 days. AF intermittent with electrical and pharmacological cardioversion after 7 days.
Persistent long-lasting AF	Continuous AF>= 1 year, when determined to choose a rhythm control strategy.
Permanent "Accepted"	AF has been accepted as a heart rhythm by the patient and the physician.

Source: [13]

There are five AF characters. Persistent atrial fibrillation is the most severe form.

Objective of the work

The aim of the study was to present the rescue procedure for patients with atrial fibrillation, which is a frequent reason for calls by Emergency Medical Teams.

Material and method

The study included an 86-year-old woman who was called by the Medical Rescue Team due to increasing weakness accompanied by chest pain and dyspnoea. After a thorough medical history and physical examination, the patient was diagnosed with the first episode of atrial fibrillation. An individual case study method was used. The study was conducted on the basis of a medical rescue card.

A case report

Basic Team Medical Rescue was prescribed to an 86-year-old female patient with dyspnea and chest pain. At the scene, paramedics found the patient and her daughter.

In the physical examination, the patient complains of persistent pressure-like chest pain lasting for several days and "feeling of uneven heartbeat". Moreover, the patient experiences fatigue and deterioration of exercise tolerance. On the day of the call, the patient's condition deteriorated significantly. Pain in the chest worsened and increasing dyspnea appeared. These symptoms were so disturbing that the daughter decided to call an ambulance. The patient is treated chronically due to arterial hypertension. She takes medications regularly. The patient denies any drug allergies. There have never been any side effects after taking any medications. Last meal around 17:00. The patient denies the occurrence of similar symptoms earlier, the present symptoms occurred for the first time.

The rescuers began the ABCDE study. The patient will be found in any position, sitting on the chair. Conscious, in logical contact, adequately answering questions. Autopsychically and allopsychically oriented. In the GCS Scale, the patient received 15 points. The general condition of the patientwas assessed as average. The patient's skin was pink, dry, reddened on the face, temperature 36.8 ° C. Subcutaneous tissue excessively developed.

The patient was breathing on her own, her respiration rate was about 28 / min, saturation - 86%, after oxygen was administered through an oxygen mask with a flow of 6l / min, the saturation increased to 95%. Auscultation over the pulmonary fields bilateral crepitus. The heart action is irregular, with a frequency of about 70 / min with a loss of pulse in the radial artery. Clear heart sounds with correct accentuation, no audible loud additional murmurs. The blood pressure was 205/104 mm Hg. Intravenous puncture was obtained and 40 mg of Furosemide iv and 12.5 mg of Captopril sl were administered. After administration of the drug, blood pressure was 200/100 mm Hg.

A 12-lead ECG was performed, the result of which allowed for an accurate assessment of the rhythm.

Dig. 2 *Patient's electrocardiogram taken at the emergency site*

Then the blood glucose level was tested with a result of 186 mg%. On physical examination, the abdomen is arched above the horizontal chest, no visible skin changes. Palpationally, the abdominal cavity is painless, soft, without any noticeable pathological resistance, the liver and spleen are not palpable, peristalsis is alive. The patient's medical documentation was prepared.

in the ABCDE study:

A - clear, not at risk at the time of examination.

B - 28 / min, auscultation over the pulmonary fields bilateral crackling, correctly arched chest, rises symmetrically, SpO2 - 86%, after oxygen administration through an oxygen mask with a flow of 6l / min increased to 95%.

C. - jugular veins normal, irregular heart rate 70 / min., RR 200/100 mmHg, pink skin, erythema on the face, normal temperature. Visible swelling in the ankle area.

D - AVPU (A), blood glucose 186 mg%, pupils equal and reactive.

E. - belly soft, painless on palpation, no peritoneal symptoms.

Atrial fibrillation was diagnosed after 12-stage ECG analysis and a thorough medical history and physical examination. Due to the patient's health condition and the first episode of AF occurrence, it was decided to urgently transfer herthe patient to a nearby hospital for further diagnosis. Oxygen therapy was continued during the transport. The patient was monitored. 0.9% NaCl 500ml iv was connected

During transport, the patient's condition was stable and she was handed over to the doctor on duty at the Hospital Emergency Department .

Discussion

The emergency management of a patient with cardiac arrhythmias should begin with a thorough medical history of the patient. A collection scheme is provided for ease of rescue SAMPLE interview, which in patients with suspected arrhythmias should be supplemented with the necessary information that will help to correctly identify the type of arrhythmia and facilitate the implementation of appropriate management.

S-symptoms: Please ask carefully about reported ailments. When pain is present, it is important to ask about the nature, aggravating or alleviating factors, and the circumstances of its occurrence. In case of arrhythmia, we should ask about the exact time of occurrence whether the arrhythmia has been felt for some time orappeared on the day of the emergency medical service call and what were the symptoms.

A-allergies: Does the patient have any allergy to food, pollen, animal hair. Here, it is also worth asking about any allergies to drugs, the drug should be noted on the card.

M-medykamenty: We ask if the patient is taking any medications and in what dose. One should inquire about recently taken periodic medications, e.g. antibiotics. It is also worth asking women if they use oral hormonal contraception and women in the eye agefor possible menopausal hormone therapy. In case of arrhythmia, we should ask if the patient is taking antiarrhythmic or anticoagulant drugs.

P- Past illness: We ask about the patient's medical history, chronic and past diseases. Please we should pay attention to the presence of WPW syndromes because AF, which can be caused by VF, is the most significant arrhythmia in pre-excited patients [14].

L- last meal: the time of the last meal and fluids consumed.

E- what happened. We ask for possible the circumstances of the event (Table II).

Table II *Examination of the patient according to the ABCDE scheme*

A (Airway) airway patency	...sessment of patency ...necessary, opening and securing the respiratory tract ...nsideration of possible damage spinal cord (stabilization of the cervical ...ne, Sellick maneuver during endotracheal intubation)
B (Breathing) breath assessment	...mber of breaths (adult resting 12-20 / min) ...eathing quality (fast, slow, shallow, etc.) ...eathing effort(e.g. recruiting accessory respiratory muscles, orthopedic ...sition), symmetry of respiratory movements ...piratory track ...lse oximetry (SpO2: 95% -98-100%) ...onometry (EtCO2: 35-45mmHg ...scultatory phenomena of the lungs: - respiratory sounds (alveolar, ...ckling, rattling, whistling sounds) - percussion sounds (overt, overly ...ert, muffled) ...coloration of the skin (cyanosis)
C. (Circulation) assessment of circulation	...alitative and quantitative assessment of heart rate (60-100 / min at rest) ...lor, humidity, skin temperature ...pillary recurrence (CRT <2sec) ...aluation of the jugular veins (for cardiovascular dysfunction), ...'K (120 / 80mmHg) ...art sounds ...eeding ...scular access ...'G (3 or 12 lead)

D (Disability) neurological assessment	VPU ...ood glucose determination ...pil assessment ...CS ...o-i orientation assessment autopsychic ...essment of muscle strength, symmetry ...erview
E. (Exposure) watching an undressed patient	...eing and assessing the properly undressed rash patient, determining body ...nperature ...llecting the SAMPLE interview (it should be collected as soon as possible)

Source: Prepared on the basis of [15]

An important aspect of the personal and physical examination is qualifying the patient as haemodynamically unstable or haemodynamically stable, it is an important element because from that it will be further management of the patient was very important. Important in the treatment strategy for atrial fibrillation is, in addition to assessing the impact of this arrhythmia on the patient's haemodynamic status, the duration of AF, the presence of anticoagulant therapy, current complications and other comorbidities [16].

Disturbing symptoms that the paramedic must pay attention to during the examination are the presence of signs of shock in the patient, such as pale, cold, sweaty skin, disturbance of consciousness, low blood pressure. When collecting an interview, the exact do not inquire about episodes of syncope and loss of consciousness. If the patient does not mention chest pain indicative of ischemia, ask if such symptoms have occurred. During the physical examination, attention should be paid to ascendinge symptoms of right and left ventricular failure [17].

Symptoms of right ventricular failure such as jugular veins overflow, hepatomegaly, abdominal enlargement, edema on the lower limbs [18].
Patients with left ventricular heart failure may report symptoms related to dyspnea (often exertional, sensitivity 89%), orthopneic (specificity 89%), paroxysmal nocturnal dyspnoea [19] or manifest symptoms pulmonary edema. The above-mentioned symptoms and signs are disturbing symptoms, evidence of haemodynamic instability.

According to According to the guidelines of the Resuscitation Council, disturbing symptoms are an indication for electrical cardioversion. Similarly, do a cardioversion immediately it is recommended in patients with AF in the course of pre-excitation syndrome with a fast ventricular rhythm [20].
The recommended first dose of energy in two-phase defibrillators is 120–150 J, in the absence of an effect, the energy should be increased. If the sinus rhythm is not restored, triggering an impulse is repeated up to 3 times [20].

In the case of AF of duration > 48 h before performing electrical cardioversion, it is necessary to document the therapeutic INR value in the 3 weeks preceding cardioversion. After successful cardioversion, the patient should receive anticoagulants for the next 4 weeks, after this period, the indications for long-term OAC treatment should be considered. An important contraindication is the presence of a thrombus in the left atrial appendix, which becomes dangerous after restoration of sinus rhythm and a gradual improvement in left atrial contractility. embolic material [20]. In patients with an episode of AF lasting more than 48 hours, cardioversion (both electrical and pharmacological) should not be used.

Recently, the "fast track" option for patients not taking anticoagulant drugs has become an alternative option. It happened thanks to the introduction of new anticoagulants NOAC (*new oral anticoagulants*).

In contrastdifferent from classic VKAs, they do not require INR control.

In this option, a TEE test is performed and, in the absence of a thrombus, one of these drugs is started and then electric cardioversion is performed. Naturally, after cardioversion, the anticoagulant is continued. This extremely effective path can beused with a transesophageal probe (TEE) and appropriate experience in performing this test. The presence of a thrombus precludes the possibility of electrical cardioversion and then a pharmacological strategy of controlling the ventricular rate is used [21].

In patients who are asymptomatic worrying, there is a possibility of introducing pharmacotherapy. Currently, two strategies are recommended for the management of patients with AF: therapy to maintain the sinus rhythm, and acceptance of AF and treatment to control the ventricular rate. The current recommendations make the choice of strategy dependent on the severity of symptoms associated with AF assessed according to the EHRA scale and factors that may affect the effectiveness of maintaining the sinus rhythm (patient's age, duration of arrhythmia, comorbidities, size of the left atrium) [22].

Table III Classification of symptoms related to atrial fibrillation according to the modified EHRA scale

Grade	Description
I	no symptoms
II	mild symptoms - normal daily activities are not restricted
III	symptoms heavy - normal daily activities are limited
IV	disabling symptoms - normal daily activity is not possible at all

Source: [1]

Among the preparations used for the pharmacological restoration of sinus rhythm in the case of AF, we can distinguish: propafenone, amiodarone, flecainide, ibutilide and vernakalant. It should be remembered that antiarrhythmic drugs also carry a risk of proarrhythmia (ventricular arrhythmias, atrioventricular block, sinus arrest), therefore patients during the administration of the drug and in the period immediately after its administration require continuous ECG monitoring and medical supervision [20].

Paramedics have amiodarone in the ambulances. The guidelines recommend giving amiodarone (300 mg intravenously over 20–60 minutes, followed by an infusion of 900 mg over 24 hours). According to the ESC recommendations, amiodarone is recommended for the treatment of paroxysmal atrial fibrillation in patients with heart failure and ischemic heart disease. It should also be remembered that amiodarone slows down the heart rate by about 10–12 bpm, especially after intravenous administration [23].

Another possible treatment option in a patient with AF is rate control, with b-blockers and diltiazem being the drugs of choice. Digoxin and amiodarone can be used in patients with heart failure [17].

According to the guidelines of the European Society of Cardiology (ESC, *European Society of Cardiology*) of 2016 on the treatment of atrial fibrillation, the overarching goal should be to keep the ventricular rate below 110 / min at rest - it has not been proven that further lowering the rate in patients who tolerate these values well is of greater benefit, also in those with heart failure [24].

Atrial fibrillation is an arrhythmia in which diagnosis is synonymous with the need to make a decision to start anticoagulation treatment. This is due to the proven increased risk of thromboembolic complications in this type of arrhythmia.

To assess the risk and determine the indications for treatment with according to the guidelines of the European Society of Cardiology, the CHA2DS2-VASc scale is used for antithrombotic risk. Obtaining even one point on this scale entitles us to start anticoagulant treatment [22].

Table IV *CHA2DS2-VASc scale for risk assessment ischemic stroke in patients with non-valvular atrial fibrillation*

The risk factor	Points
symptoms of heart failure or a decrease in left ventricular ejection fraction	1
arterial hypertension (a)	1
age ≥75 years	2
Diabetes (b)	1
a history of stroke or TIA or other thromboembolic event	2
vascular disease (c)	1
age 65–74 years	1
female gender (d)	1

(and) resting blood pressure> 140/90 mm Hg in ≥2 measurements taken on different occasions or used antihypertensive treatment
(b) fasting glucose> 125 mg / dl (7 mmol / l) or use of oral anti-diabetic drugs and / or insulin
(c) a history of myocardial infarction, atherosclerotic disease of the peripheral arteries, atherosclerotic plaque in the aorta
(d) Increases the risk of accidentin the presence of ≥1 other risk factor.
Source: [1]

Anticoagulant therapy, in addition to the benefits of reducing the risk of stroke and thromboembolic complications, also poses a risk of bleeding. The HAS-BLED scale is recommended to be used to assess the risk of bleeding in the population of patients with AF. This risk is considered high if the patient obtains at least 3 or more points [22].

Table V *HAS-BLAD scale*

RISK FACTORS	PUNCTATION
Hypertension, SBP>160 mm Hg	1
Abnormal liver function - chronic diseases or bilirubin>2 ULT and AT>3 ULT or kidney - dialysis, state after kidney transplantation, creatinine concentration ≥ 200 mmol / l	1 or 2
Stroke	1
Bleeding - history of or predisposing factors, e.g. anemia	1
Labile INR	1
Age>65 years old	1
Alcohol or drugs - antiplatelet agents, NSAIDs	1 or 2

Source: [1]

Patients with AF and high thromboembolic risk are taking VKA-antagonists of vitamin K or NOAC- new oral anticoagulants.

Medicines from the group of vitamin K antagonists (VKA, vitaminK antagonists were introduced into therapy over 70 years ago, and until recently were the only oral anticoagulants available. The main indications for their use include primary prophylaxis and treatment of thromboembolic complications within the systemvenous and arterial. In clinical practice, VKAs are most often used in patients with atrial fibrillation, with valvular disease, with artificial heart valves, vascular prostheses, and in the treatment and prevention of recurrence of venous thromboembolism.

They are highly effective and are used by millions of patients all over the world (0.8–2% of the population), including VKA therapy requires monitoring using the international normalized ratio (INR). Haemorrhagic complications are the most common side effects of VKA treatment. The most dangerous of these is hemorrhagic stroke [25].

In 2009, a new class of drugs was introduced to therapy, which for the first time was a viable alternative to VKA in the indications for the prevention of embolic complications in non-valvular AF and the treatment of patients with deep vein thrombosis (DVT) and pulmonary embolism (PE). The new generation of oral anticoagulants, originally referred to as NOAC (novel oral anticoagulants), or new oral anticoagulants, are now represented by four substances, namely dabigatran, rivaroxaban, apixaban and edoxaban. It should be emphasized that the use of NOAC does not require routine blood clotting monitoring [26].

Summary

Atrial fibrillation is the most common arrhythmia and the incidence of this arrhythmia is increasing year by year. Therefore, it is impossible not to come across this onearrhythmia in the daily work of a paramedic, Atrial fibrillation in emergency practice has many faces. An important aspect is the ability to quickly recognize this arrhythmia by carefully taking a history, examining the patient and performing a 12 abortion ECG, qualifying the patient to a hemodynamically stable or unstable group, and undertaking one of the 3 management strategies: pharmacological cardioversion, electrical cardioversion or heart rhythm control. In practice, amiodarone is one of the antiarrhythmic and heart rate-lowering drugs that a paramedic can use. In the event of difficulties with taking therapeutic measures, the patient can always be teletransmitted and consult a cardiologist,

It should be realized that patients with AF are often taking anticoagulants, the most common side effect of which is bleeding and the most serious side effect which can occur is CNS bleeding. In patients who report gastrointestinal, bleeding during micturition or spontaneous large ecchymoses, it is worth asking if they are taking anticoagulant drugs. Another a type of visits by emergency medical teams are trauma patients, they are often the elderly, after head and neck injuries of the femur, who are on anticoagulant treatment, in the course of AF, who may experience increased bleeding. During emergency visits, decisions are often made to administer drugs by the intramuscular route. In patients taking NOAC or VKA, it is not recommended to inject them because they can cause difficult to heal hematomas.

There is no one size fits all regimen for the management of patients with atrial fibrillation. There are algorithms that facilitate the implementation of appropriate treatment and patient management. The rescue action must always be tailored to the individual health condition of the patient and modified as necessary. Thanks to this procedure, paramedics minimize the chances of making a mistake and improve the patient's health.

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