

Diagnosis difficulties in elderly patients with atrial fibrillation and complete atrioventricular block

I. V. Shop^{ID B,C,D}, Ye. O. Holubkina^{ID B,C,D}, T. M. Tykhonova^{ID A,D,F}, T. A. Deriyenko^{ID C,D},
O. V. Al-Trawneh^{ID *D,E}

V. N. Karazin Kharkiv National University, Ukraine

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The association of atrial fibrillation (AF) with complete atrioventricular block (CAVB) is a common clinical feature in elderly patients. It is characterized by the loss of specific symptoms of AF (palpitations, intermissions); in the first place may come CAVB symptoms: dizziness, Morgagni–Adams–Stokes (MAS) attacks.

Aim. The article objective is to illustrate the dynamic changes in the course of AF with the development of CAVB on the example of a clinical case and to discuss the difficulties in timely diagnosis and therapy correction.

Case presentation. A 75-year-old male was diagnosed with a rapid ventricular response form of AF. The onset of CAVB caused the transition from rapid ventricular response form of AF to slow ventricular response form, which was initially accompanied by a subjective improvement in the patient's condition. As the disease progressed, the patient's condition worsened due to the development of MAS attacks.

The elderly patients with a permanent form of AF require constant cardiac monitoring by an experienced specialist who has appropriate vigilance in management of patients with arrhythmias, awareness about possible concomitant conduction disorders.

This provides comprehensive cardiac support, including timely pacemaker implantation which gives more options for AF symptoms monitoring and heart rate control, has a positive modifying effect on drug therapy.

Conclusions. Changes in the clinical picture of AF after development of CAVB can lead to late diagnosis of CAVB, inadequate therapy and untimely pacemaker implantation, as a consequence, to progression of concomitant pathology and the development of life-threatening complications, as in our clinical case.

Key words:

atrial fibrillation, atrioventricular block, pacemaker, Morgagni–Adams–Stokes attacks.

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*E-mail:

elen.al.trawneh@gmail.com

Труднощі діагностики фібриляції передсердь і повної атріовентрикулярної блокади в пацієнтів старечого віку

I. В. Шоп, Є. О. Голубкіна, Т. М. Тихонова, Т. А. Дерієнко,
О. В. Аль-Травнех

Зв'язок фібриляції передсердь із повною атріовентрикулярною блокадою – поширена клінічна особливість у пацієнтів старечого віку. Клінічна картина характеризується втратою специфічних симптомів фібриляції передсердь (серцебиття, перебої в роботі серця); поряд із цим на перше місце можуть вийти симптоми повної атріовентрикулярної блокади, як-от запаморочення, слабкість, напади Морганьї–Адамса–Стокса.

Мета роботи – на прикладі клінічного випадку показати динамічні зміни у клінічному перебігу фібриляції передсердь, що виникають у зв'язку з розвитком повної атріовентрикулярної блокади, а також обговорити труднощі своєчасної діагностики та терапевтичної корекції в пацієнтів старечого віку з цією патологією.

Клінічний випадок. У чоловіка віком 75 років діагностували тахісistolічну форму фібриляції передсердь. Виникнення повної атріовентрикулярної блокади спричинило перехід від тахісistolічної форми фібриляції передсердь до брадисistolічної, що спочатку супроводжувалася суб'єктивним поліпшенням стану. З прогресуванням захворювання стан хворого погіршився, що передусім пов'язано з виникненням нападів Морганьї–Адамса–Стокса.

Хворі похилого віку з постійною формою фібриляції передсердь потребують постійного контролю серцевої діяльності в досвідченого спеціаліста, який має відповідну пильність у веденні пацієнтів з аритміями та обізнаність про можливі супутні порушення провідності.

Це забезпечує комплексну й адекватну підтримку серцевої діяльності, включаючи своєчасну імплантацію кардіостимулятора, а отже більше можливостей для моніторингу симптомів фібриляції передсердь і контролю частоти серцевих скорочень, має позитивний вплив на медикаментозну терапію.

Висновки. Зміни клінічної картини в пацієнтів похилого віку з фібриляцією передсердь після розвитку повної атріовентрикулярної блокади можуть призвести до її пізньої діагностики, неадекватної терапії та несвоєчасної імплантації кардіостимулятора, врешті до прогресування супутньої патології та розвитку ускладнень, що загрожують життю, як у наведеному клінічному випадку.

Ключові слова:

фібриляція передсердь, повна атріовентрикулярна блокада, кардіостимулятор, напади Морганьї–Адамса–Стокса.

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Ключевые слова:
фибрилляция предсердий, полная атриовентрикулярная блокада, кардиостимулятор, приступы Морганьи–Адамса–Стокса.

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Трудности диагностики фибрилляции предсердий и полной атриовентрикулярной блокады у пациентов старческого возраста

И. В. Шоп, Е. А. Голубкина, Т. М. Тихонова, Т. А. Дерненко, А. В. Аль-Травнех

Связь фибрилляции предсердий с полной атриовентрикулярной блокадой – распространённая клиническая особенность у пациентов старческого возраста. В этом случае клиническая картина характеризуется утратой специфических симптомов фибрилляции предсердий (сердцебиение, перебои в работе сердца); вместе с тем на первый план могут выходить симптомы полной атриовентрикулярной блокады: головокружение, слабость, приступы Морганьи–Адамса–Стокса.

Цель работы – на примере клинического случая показать динамические изменения в клиническом течении фибрилляции предсердий, возникающие в связи с развитием полной атриовентрикулярной блокады, а также обсудить трудности своевременной диагностики и терапевтической коррекции у пациентов старческого возраста с этой патологией.

Клинический случай. У мужчины 75 лет диагностирована тахисистолическая форма фибрилляции предсердий. Возникновение полной атриовентрикулярной блокады привело к переходу от тахисистолической формы фибрилляции предсердий к брадисистолической, что сначала сопровождалось субъективным улучшением состояния. По мере прогрессирования заболевания состояние больного ухудшилось, что прежде всего связано с возникновением приступов Морганьи–Адамса–Стокса.

Пациенты старческого возраста с постоянной формой фибрилляции предсердий нуждаются в постоянном контроле сердечной деятельности у опытного специалиста, который имеет соответствующую бдительность в ведении пациентов с аритмиями и осведомлённость о возможных сопутствующих нарушениях проводимости. Это обеспечивает комплексную и адекватную поддержку сердечной деятельности, включая своевременную имплантацию кардиостимулятора, следовательно даёт больше возможностей для мониторинга симптомов фибрилляции предсердий и контроля частоты сердечных сокращений, оказывает положительное влияние на медикаментозную терапию.

Выводы. Изменения клинической картины у пациентов старческого возраста с фибрилляцией предсердий после развития полной атриовентрикулярной блокады могут привести к её поздней диагностике, неадекватной терапии и несвоевременной имплантации кардиостимулятора, как следствие, к прогрессированию сопутствующей патологии и развитию осложнений.

Heart rhythm disturbances are frequent diagnostic finding in elderly patients. An increase in the incidence of atrial fibrillation (AF) with age has been proven by many studies [1–4]. According to the authors, the prevalence of AF in patients under 49 years old is 0.12–0.16 %, in the age group 60–70 years old – 3.7–4.2 %, and among patients older than 80 years old – 10–17 % [1].

Management of elderly patients with arrhythmias is a difficult task for a medical practitioner. AF in elderly patients is rarely an isolated disease, and most commonly presents as a component of pathological functional, electrophysiological and organic changes in the cardiovascular system [2,5]. The results of the large systematic review of studies considering AF published from 2005 to 2016 demonstrate that AF is associated with arterial hypertension (AH) (in 22–36 % of cases), coronary heart disease (in 14–32 % of cases), valvular heart disease (12–26 % of cases), cardiomyopathy (6–10 % of cases) [1].

In elderly, pathological processes of the cardiovascular system are characterized by degenerative changes in the cardiac conduction system with fibrous degeneration of pacemaker cells in the sinoatrial and atrioventricular nodes, damage to Purkinje fibers [2]. This leads to various conduction disturbances, such as: sick sinus syndrome, atrioventricular blockade (AVB) of varying degrees, etc. These conduction disorders are often masked by existing symptoms of AF, exacerbate the course of arrhythmia, leading to increased risk of dangerous cardiovascular complications such as thrombosis and thromboembolic events, exacerbation of heart failure (HF) and myocardial ischemia symptoms [6].

The Belgian scientist Liège Leon Frederic first obtained the phenomenon of coexistence of complete

atrioventricular block (CAVB) with AF experimentally in 1904. Among the possible causes of this condition there are: idiopathic fibrosis and sclerosis of the cardiac conduction pathways (up to 50 % of cases), coronary heart disease (up to 40 % of cases), uncontrolled intake of antiarrhythmic drugs (digoxin, diltiazem, metoprolol, propranolol, verapamil, etc.), prolonged course of AH, thyroid gland dysfunction, obstructive pulmonary disease, obstructive sleep apnea, valvular heart disease [10]. With the development of CAVB against the background of AF the conduction of excitation impulses from the atria to the ventricles is blocked with presence of chaotic contractions of separate muscle fibers within the atria. The ventricles are excited by the non-sinus pacemaker, located in the atrioventricular junction or in the conduction system of the ventricles. Electrocardiographic changes are characterized by the absence of P waves substituted by fibrillation waves (f-waves). Irregularly irregular pattern of the ventricular rhythm specific for the AF is changed to the regular rhythm with slow ventricular response, which is evidence of the AV block development. If AV node serves as non-sinus pacemaker the QRS complex width remains unchanged, but in case of the idioventricular rhythm the QRS complex becomes widened and deformed. Also ventricular extrasystoles may be observed.

Aim

The aim of this article is to analyze the development of CAVB in a patient with a permanent form of AF. The main clinical changes of AF pattern on the background of progression of cardiac conduction system degenerative lesions are described in the article. Comorbidity

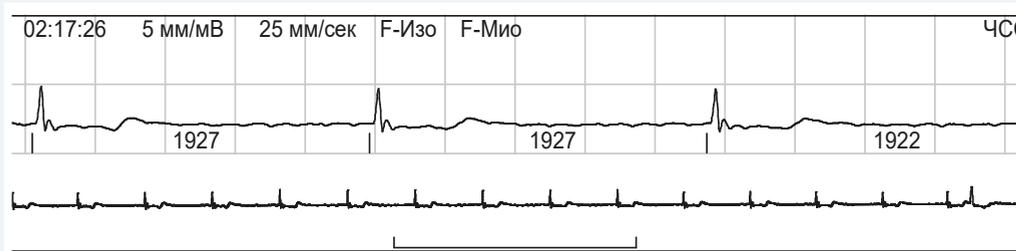


Fig. 1. Transient AV block of the 3rd degree on the background of AF.

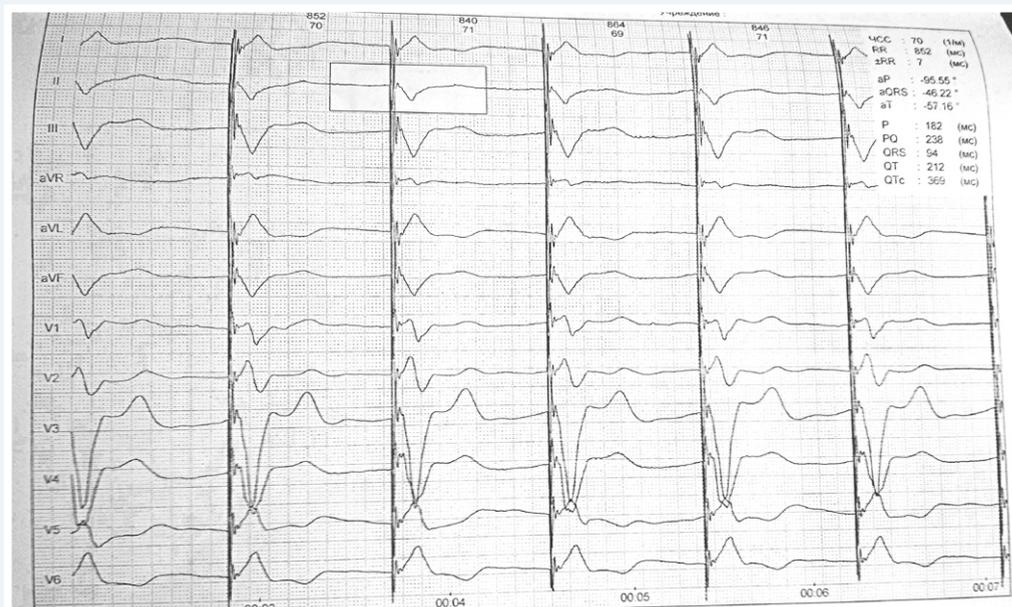


Fig. 2. Pacemaker rhythm (VVI regimen), left axis deviation (aFQRS = -46.2), HR – 70 bpm, QRS – 54 ms, QTc – 370 ms.

of somatic diseases in cardiology practice is one of the main prognostic factors that affect the outcome of the underlying disease. In this regard, an important task for a practicing physician is the choice of the management tactics for the elderly patients with comorbidities. This article discusses the issues of rational management of elderly patients, taking into account treatment guidelines and randomized clinical trials.

Clinical case

A 75-year-old male patient presented with complaints on feeling of retrosternal discomfort on physical exertion relieved by rest or nitroglycerine intake, periodical lower extremities edema, decreased workability. He has been suffering from AH for the last 20 years with maximum numbers of BP up to 160/100 mm Hg, controlled by the intake of valsartan. In 2010 he first reported symptoms of heart palpitations and intermissions during exercise, and after full work-up including electrocardiogram (ECG) recording and 24-hour Holter monitoring he was diagnosed with: Ischemic heart disease. Diffuse cardio-sclerosis. Combined acquired heart defect: mitral valve insufficiency I degree, aortic insufficiency I degree. Atrial fibrillation, permanent form; rapid ventricular response. Arterial Hypertension 2 grade, high cardiovascular risk. Hypertensive heart. Heart failure with preserved ejection fraction (HFpEF) (EF – 64 %), II Functional Class (FC).

After consultations about management strategy patient declined catheter ablation and agreed on pharmacological treatment. Medical management included the prescription of amiodarone 200 mg QD, valsartan 50 mg, aspirin 75 mg daily. The general condition of the patient has improved, intensity of palpitations and heart irregularities decreased, the heart rate was running at 60–70 bpm.

Subsequently the patient's condition remained stable; in 2016 he had significant improvement of his general condition – he reported absence of palpitations and intermissions, the patient's heart rate was detected at the level of 60 bpm and the diagnosis of permanent AF with slow ventricular response (SVR) was made. Due to these changes the dosage of amiodarone was decreased to 200 mg once in two days regimen. Dynamic observation of the patient after the transition of AF to the SVR variant was not carried out.

In November 2019 the patient started to notice progressive decrease in physical load tolerance, general weakness, and increased dyspnea. During previous year he had experienced decreased workability, weakness and tiredness. Since February 2019 periodically he had episodes of loss of consciousness without obvious cause. He was admitted to the clinic due to deterioration of his condition.

Objective examination data: general condition of moderate severity, height – 162 cm, weight – 76 kg, body mass index (BMI) = 29 kg/m². Skin was pale, there

were pitting edema of both shins. Lungs auscultation revealed vesicular breathing, no wheezing. Heart examination showed shift of the heart borders to the left on 2 cm on percussion, on auscultation heart sounds were rhythmic, muffled, accentuated S2 sound over aorta, decrescendo systolic murmur at the apex, diastolic murmur above the aorta, heart rate (HR) 40 bpm. Blood pressure (BP) *sin* – 140/80 mm Hg, *dext* – 140/85 mm Hg (on antihypertensive therapy), radial pulse was synchronous, rhythmic at 40 bpm. On palpation abdomen was painless; liver protruded for 1 cm from costal margin, painless; spleen was not palpable. Fist percussion was negative on both sides.

Further investigation showed: total cholesterol – 6.16 mmol/l, low density lipoprotein (LDL) – 3.87 mmol/l, very-low-density lipoprotein (VLDL) – 1.31 mmol/l, triglycerides – 2.69 mmol/l; level of electrolytes, liver function tests, kidney function tests, fasting plasma glucose were within the normal range. His ECG recording showed: left axis deviation, signs of AF (absent p waves, present f waves) with regular ventricular rhythm at rate of 60 bpm. Echocardiography: sclerotic changes in the walls of the aorta; signs of left ventricular hypertrophy (posterior wall thickness in diastole 1.13 (0.60–1.10 cm), the interventricular septum – 1.12 (0.60–1.10 cm)); increased size of the left atrial chamber (anterior-posterior left atrial size 4.5 (4.0 cm)); mitral regurgitation of II degree, aortic regurgitation I degree, ejection fraction – 54 % (55–65 % Teinholz). 24-hour Holter monitoring showed signs of transient AV block of the 3rd degree on the background of permanent AF (Fig. 1), with SVR, average daily heart rate 47 bpm and average night heart rate 38 bpm, maximum heart rate 85 bpm at 09:09 (during physical activity – “fast walking” according to the patient’s diary) and minimum heart rate 31 bpm at 02:17 (during sleep according to the patient’s diary).

The diagnosis was set: Ischemic heart disease. Diffuse cardiosclerosis. Combined acquired heart defect: mitral valve insufficiency II degree, aortic insufficiency I degree. Atrial fibrillation, permanent form; the 3rd degree AV block with Morgagni–Adam–Stokes syndrome (MAS) (2019). CHA₂DS₂-VASc – 4, HAS-BLED Score – 2. Arterial Hypertension 2 grade, high risk. Hypertensive heart. HFpEF II FC (EF – 54 %). Dyslipidemia IIb.

Considering the deterioration of the patient’s condition due to the presence of the 3rd degree AV block with MAS syndrome the patient was referred for the cardiac surgeon consult and subsequently implantation of permanent pacemaker (VVI mode – single chamber ventricular stimulator) with a HR of 70/min was performed.

Post-operative follow-up showed significant improvement of the patient’s condition with absence of episodes of dizziness and loss of consciousness. Drug therapy included: bisoprolol, ramipril, rosuvastatin, dabigatran. 1 year after surgery the general condition of the patient is stable – he is considered about periodical dyspnea and edema of lower extremities. His HR remains controlled at rate of 70 bpm, his condition is dynamically monitored with ECG (Fig. 2), echocardiography evaluation. His drug therapy includes: indapamide, bisoprolol, ramipril, rosuvastatin, dabigatran.

Discussion

AF in our patient developed against the background of acquired combined heart disease with lesions of the mitral and aortic valves, structural remodeling of the heart and comorbid pathology, such as arterial hypertension and heart failure. Given that AF is associated with a decrease in the quality of life, an increased risk of thromboembolic and hemodynamic complications, as well as an increase in mortality, the management of such patients requires constant dynamic monitoring [6].

The clinical manifestations of AF are heterogeneous, reflecting various pathophysiological disorders in cardiac activity. Most often AF is characterized by the presence of high and irregular ventricular contraction rate (VR), the so-called rapid ventricular response (RVR). This leads not only to a decrease in cardiac output and an insufficient filling of the ventricles, but also to an increase in the myocardial need for oxygen and ischemia. Thus, the control of HR is one of the most important tasks in the management of patients with AF, especially in cases where the need for cardioversion is not appropriate [5,7]. In such cases, the clinical improvement of the patient’s condition is achieved not by restoring the sinus rhythm, but by reducing the heart rate and associated symptoms. Levels of HR control in patients with AF remain the subject of active discussion: for example, according to the clinical recommendations of the AHA/ACC/HRS Guideline, HR control of <80 bpm is appropriate for patients with symptomatic AF, while the European Society of Cardiology guidelines define less stringent requirements for HR control: <110/min [5,7]. In the ORBIT-AF study performed in 2812 patients with a permanent form of AF by Benjamin A. Steinberg et al., the dependence of clinical manifestations of AF on the level of heart rate was analyzed. It was concluded that a higher level of HR in patients correlates with more severe symptoms of AF according to the EHRA classification [8]. The HR estimation is an important predictor of worsening of clinical condition, as well as the development of complications in patients with AF [8].

A significant reduction in heart rate in patients who have previously been diagnosed with tachyarrhythmias in the form of AF with RVR may indicate not only inadequate therapy and the development of side effects of drugs used for HR control (for example, beta-blockers), but also the development of a concomitant lesions of the heart conduction system [9]. With the development of these disorders and the localization of the substituting non-sinus pacemaker near the AV node, the level of VR becomes regular and correlates within 50–60 beats/min, which against the background of the RVR form of AF with its characteristic signs (feeling of palpitations, interruptions in cardiac activity, chest discomfort) may be considered by the patient, and even by the doctor, as a restored sinus rhythm as in our clinical case. In case of VR of 30–40 beats/min and less (the pacemaker is in the bundle of His, Purkinje fibers), the patient’s condition usually worsens due to circulatory failure (reduced cardiac output) and develops cerebral hypoxia, which is clinically manifested by dizziness, weakness, loss of consciousness. This condition is life-threatening in view of the increased risk of developing of asystole, the clinical manifestations of which can vary from dizziness to syncopal states, up to sudden

death. A decrease in medical awareness in identification of concomitant conduction disturbances in elderly patients with arrhythmias, the absence of subsequent dynamic monitoring of the patient's condition led to a progressive deterioration in his condition with the development of MAS syndrome and worsening manifestations of heart failure.

According to the recommendations of the European Association of Cardiology, presence of CAVB is an absolute indication for the pacemaker implantation. The presence of AV block in a patient against the background of the previous permanent form of AF is an indication for the installation of a single chamber ventricular stimulator (VVI) [10]. There is also evidence of the rationality of using implanted pacemakers or defibrillators with an atrial electrode, which allows continuous monitoring of atrial rhythm with the identification of episodes of rhythm with increased heart rate. Depending on the level of risk in the studied population, similar episodes are detected in 10–15 % of patients with implanted devices [11]. The implantation of pacemaker, in turn, has a modifying effect on the pharmacodynamics of drugs. Thus, with constant pacing for complete AV block, β -adrenergic blockers (BB) lose the decreasing effect on the frequency of ventricular contractions. Indication for the administration of BB in patients with pacemaker, in addition to coronary artery disease, AH, chronic heart failure, persistent AF is a need to suppress the pacemaker-associated conditions such as phenomenon of preexcitation and arrhythmias [12–15]. The use of statins in patients with constant pacing reduces the risk of AF [16]. Oral anticoagulant therapy for the prevention of thromboembolic complications is recommended for all men with AF having a total score of CHA₂DS₂-VASc ≥ 2 . The antithrombotic effect of dabigatran is linear dose-dependent and reversible, which allows it to be used in a fixed dose throughout the treatment and eliminates the need for routine laboratory control, distinguishing it from warfarin [17].

In the presented clinical case, the patient had several aggravating factors for the development of cardiac conduction system disorders: long-term AH (more than 20 years), combined mitral-aortic valvular heart disease, permanent AF, decompensated heart failure, uncontrolled intake of medications, including antiarrhythmic (Amiodarone). The disease manifested from AF with RVR with the transition to combined rhythm and conduction disorder (arrhythmia) with the development of life-threatening MAS attacks. During the period of imaginary clinical improvement, the necessary cardiological monitoring and drug correction of the patient's condition were not carried out. After the patient was diagnosed with CAVB in combination with AF and a specific surgical intervention – pacemaker implantation was performed, the patient's condition improved significantly. Supportive drug therapy was selected taking into account the performed cardiac surgery and presence of concomitant comorbidities of the patient. Thus, timely diagnosis of combined rhythm and conduction disorders can prevent a deterioration of the quality of life of patients, as well as the development of dangerous cardiovascular complications.

This clinical case demonstrates that after the diagnosis CAVB in combination with AF and a specific surgical intervention – pacemaker implantation, the

patient's condition improved significantly. Thus, timely diagnosis of combined rhythm and conduction disorders can prevent deterioration in the quality of life of patients, as well as the development of dangerous cardiovascular complications.

Conclusions

1. The issue of managing elderly patients in the presence of combined rhythm and conduction disturbances depends on a huge number of factors that determine the prognosis and quality of life of the patient. Untimely pacemaker implantation and inadequate complex drug therapy can lead to the development of life-threatening complications and progression of concomitant pathology.

2. Late diagnosis of the conduction disturbances in this patient was due to inappropriate timing of cardiac monitoring against the background of a false clinical improvement at the stage of a decrease in the HR after the onset of CAVB on the background of the permanent form of AF. This, in turn, contributed to the progression of heart failure and significantly worsened the patient's total prognosis.

3. Timely referral of the patient for consultation to a cardiologist who has sufficient alertness to manage a patient with arrhythmias should provide comprehensive cardiac treatment for the patient, including timely heart surgery.

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Information about authors:

Shop I. V., MD, PhD, Associate Professor of the Department of Internal Medicine, V. N. Karazin Kharkiv National University, Ukraine.

ORCID ID: [0000-0002-2027-3335](https://orcid.org/0000-0002-2027-3335)

Holubkina Ye. O., Assistant of the Department of Internal Medicine, V. N. Karazin Kharkiv National University, Ukraine.

ORCID ID: [0000-0002-2587-8894](https://orcid.org/0000-0002-2587-8894)

Tykhonova T. M., MD, PhD, DSc, Professor, Head of the Department of Internal Medicine, V. N. Karazin Kharkiv National University, Ukraine.

ORCID ID: [0000-0001-9196-9113](https://orcid.org/0000-0001-9196-9113)

Deriyenko T. A., MD, PhD, Associate Professor of the Department of Internal Medicine, V. N. Karazin Kharkiv National University, Ukraine.

ORCID ID: [0000-0002-2479-2896](https://orcid.org/0000-0002-2479-2896)

Al-Trawneh O. V., MD, PhD, Assistant of the Department of Internal Medicine, V. N. Karazin Kharkiv National University, Ukraine.

ORCID ID: [0000-0003-4049-6365](https://orcid.org/0000-0003-4049-6365)

Відомості про авторів:

Шоп І. В., канд. мед. наук, доцент каф. внутрішньої медицини, Харківський національний університет імені В. Н. Каразіна, Україна.

Голубкіна Є. О., асистент каф. внутрішньої медицини, Харківський національний університет імені В. Н. Каразіна, Україна.

Тихонова Т. М., д-р мед. наук, професор, зав. каф. внутрішньої медицини Харківський національний університет імені В. Н. Каразіна, Україна.

Дерієнко Т. А., канд. мед. наук, доцент каф. внутрішньої медицини, Харківський національний університет імені В. Н. Каразіна, Україна.

Аль-Травнех О. В., канд. мед. наук, асистент каф. внутрішньої медицини, Харківський національний університет імені В. Н. Каразіна, Україна.

Сведения об авторах:

Шоп И. В., канд. мед. наук, доцент каф. внутренней медицины, Харьковский национальный университет имени В. Н. Каразина, Украина.

Голубкина Е. О., ассистент каф. внутренней медицины, Харьковский национальный университет имени В. Н. Каразина, Украина.

Тихонова Т. М., д-р мед. наук, профессор, зав. каф. внутренней медицины Харьковский национальный университет имени В. Н. Каразина, Украина.

Дерієнко Т. А., канд. мед. наук, доцент каф. внутрішньої медицини, Харківський національний університет імені В. Н. Каразіна, Україна.

Аль-Травнех О. В., канд. мед. наук, асистент каф. внутрішньої медицини, Харківський національний університет імені В. Н. Каразіна, Україна.

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