

8. Thomas M. F. Treatment of community-acquired pneumonia in adults who require hospitalization. UpToDate, 2019.

REFERENCES

1. Gamache J., Harrington A., Kamangar N. Bacterial Pneumonia. Practice Essentials, Background, Pathophysiology, 2019.

2. Cilloniz C., Rodriguez-Hurtado D., Torres A. Characteristics and Management of Community-Acquired Pneumonia in the Era of Global Aging. Medical sciences (Basel, Switzerland). MDPI, 2018.

3. Chalmers J.D. The Modern Diagnostic Approach to Community-Acquired Pneumonia in Adults. Seminars in respiratory and critical care medicine. U. S. National Library of Medicine, 2016.

4. Balk R.A. Systemic inflammatory response syndrome (SIRS): where did it come from and is it still relevant today? Virulence. *Landes Bioscience*, 2014.

5. Sattar S.B.A., Sharma S. Bacterial Pneumonia. StatPearls U. S. National Library of Medicine, 2019.

6. Antonella F. Simonetti Management of community-acquired pneumonia in older adults. *Ther Adv Infect Dis* 2014 Feb; 2 (1): 3-16.

7. Lee M.S., Oh J.Y., Kang C.I. et al. Guideline for Antibiotic Use in Adults with Community-acquired Pneumonia. Infection & chemotherapy. *The Korean Society of Infectious Diseases and Korean Society for Chemotherapy*, 2018.

8. Thomas M.F. Treatment of community-acquired pneumonia in adults who require hospitalization. UpToDate, 2019.

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DRUG MANAGEMENT OF PATIENT WITH HEART FAILURE AND CARDIAC PACEMAKER

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МЕДИКАМЕНТОЗНАЯ ТЕРАПИЯ ПАЦИЕНТА С СЕРДЕЧНОЙ НЕДОСТАТОЧНОСТЬЮ И КАРДИОСТИМУЛЯТОРОМ

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Цель исследования — рассмотреть вопросы ведения пациента с сердечной недостаточностью и кардиостимулятором. Медикаментозная терапия пациента с сердечной недостаточностью и кардиостимулятором представлена в этой статье на примере клинического случая. Выход длительности интервала QRS за пределы нормального диапазона после установки кардиостимулятора показан как один из важных факторов, определяющих тактику лечения сердечной недостаточности.

Ключевые слова: сердечная недостаточность, кардиостимуляция, кардиальная ресинхронизирующая терапия, электрокардиография, медикаментозная терапия.

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The **aim** of the study: to consider the management of patients with heart failure (HF) and cardiac pacemaker. HF remains one of the most important problem areas of modern medicine and has a huge social significance due to the widespread, steadily progressing, prognostically unfavorable course and high economic losses. Treatment of HF includes interventions in lifestyle, drug therapy and one of the modern methods is cardiac resynchronization therapy. Pacemakers are well-established therapies of severe bradyarrhythmias, and one of them is complete atrioventricular block.

Our patient: The woman, 78 years old, with complaints of oedema of the shins, cough and dyspnea at minimal exertion, absent at rest. Anamnesis is remarkable significant for arterial hypertension, myocardial infarction (2011, 2014), AV block of IIIrd degree with Adams-Stokes syndrome. 23.08.17 the cardiac pacemaker was implanted, in the DDDR pacing mode. After implantation of cardiac pacemaker the symptoms were not completely controlled, and patient was hospitalized to the cardiology department to correct the treatment, EF=48%.

Conclusion. Cardiac pacemaker in the presence of possible solutions to the problem of arrhythmias and HF it does not cancel, but modifies the medical support of patients. To prolong patient's life, it's very important to establish a timely diagnosis and prescribe appropriate therapy.

Key words: heart failure, cardiac pacing, cardiac resynchronization therapy, electrocardiography, drug management.



Introduction

Heart Failure (HF) is a clinical syndrome characterized by typical symptoms (e. g. breathlessness, ankle swelling and fatigue) that may be accompanied by signs (e. g. elevated jugular venous pressure, pulmonary crackles and peripheral oedema) caused by a structural and/or functional cardiac abnormality, resulting in a reduced cardiac output and/or elevated intracardiac pressures at rest or during stress [1].

HF is a common cause of high mortality of patients all over the world. About 2% of adults in developed countries suffer from HF. More often, these working-age patients with a left ventricular (LV) ejection fraction less than 40% [2]. Among these patients, about 5% need emergency hospitalization due to the progression of severity of HF due to various rhythm disturbances [3; 4].

Myocardial dyssynchrony is a complex pathological process. Lengthening the QT interval delays systole and leads to an increase in LV diastolic pressure compare the pressure in the atrium. As a result, mitral regurgitation development, the stroke volume and systolic blood pressure decrease, which contributes to the pathological LV remodeling [4].

Treatment of HF includes interventions in lifestyle, drug therapy and one of the modern methods is CRT [5]. Pacemakers are well-established therapies of severe bradyarrhythmias, and one of them is complete AV block, about what a pacemaker was installed in this patient. Multiple large-scale clinical trials have shown that CRT modifies ventricular electromechanical delay, induces improvements in ventricular structure and function, leads to better exercise tolerance and quality of life, and reduces mortality and hospitalization rates [6–8]. In patients with AV block and HF placing an electrode in the intraventricular septum can lead to CRT effect achievement [9; 10].

Clinical Case

The patient B. S. N., a woman, 78 years old, was admitted to the Kharkiv Railway Clinical Hospital № 1 of Brence of “HC” JSC “Ukrzaliznytsia” cardiology department in September 2017 with complaints of oedema of the shins, cough and dyspnea at minimal exertion, absent at rest.

History of Disease

Arterial hypertension more than 10 years (max 200/100 mm Hg, adapted to 130–140/80 mm Hg). Patient took enalapril + hydrochlorothiazide 10 mg/12.5 mg once a day.

2011 — Myocardial infarction. The AV block of III degree with Adams-Stokes Syndrome was diagnosed but patient refused the cardiac pacemaker implantation. According to the patient, she took “a bunch of pills” every day, which she cannot remember the name of (the record is not available).

2014 — Second myocardial infarction (the record is not available).

Summer 2017 — worsening of the disease, with complaints of dry cough and shortness of breath, worsened by exertion, legs oedema, frequent fainting. 23.08.17 the cardiac pacemaker was implanted, in the dual-chamber, rate-modulated pacing (DDDR) mode, pacing threshold: 1st electrode — 0.5 V, 2nd — 0.6 V. The first electrode was set in the interventricular septum, the second — in the anterolateral wall of the right atrium. DDDR is a dual-chamber pacemaker means the pacemaker is pacing electric activity in the atrium and the ventricle and it is sensing activity in each of them.

After implantation of cardiac pacemaker the symptoms were not completely controlled, and patient was hospitalized to the cardiology department to correct the treatment.

Anamnesis Vitae

Denies malaria, tuberculosis, diabetes mellitus and dermatovenerologic diseases. 1956 — Hepatitis A. Patient has no allergies and no reactions to drugs and medication. Denies smoking, alcohol intake and drug addiction. Family history is significant for cardiovascular diseases. Meningioma of the left parietal region.

Physical Examination

General condition is satisfactory, consciousness is clear, emotionally stable, optimistic mood. Height=166 cm, Weight=82 kg, BMI=29 kg/m². Skin, subcutaneous fat tissue, nails, mucous membranes, tongue are normal. Musculoskeletal system examination unremarkable. Peripheral lymph nodes are not palpable. The thyroid is not palpable. Oedema of lower third of both shins. Respiratory System: pulmonary percussion — normal, auscultation — weakened vesicular breathing, no adventitious sounds. Cardiovascular system: heart borders extended to the left on 1, 5 cm of mid clavicular line, HR=78 bpm, regular, no pulse deficiency, heart sounds are muted, accent of the II tone above the aorta. Gastrointestinal system: abdomen is soft, painless, symmetrical, no discrepancies of the abdominal muscles. No visible peristalsis, liver edge is



smooth, painless, palpated at the costal arch, spleen and pancreas are not palpable; stool is normal. Urinary system: kidneys are not palpable. Tapping sign is negative on both sides. Urination is normal.

Results of Laboratory and Instrumental Diagnosis

Complete blood count (27.09.17): Hemoglobin 151 g/l, Erythrocytes 5,29 T/l, Hematocrit 45.0%, Leukocytes 6.2 g/L, ESR 4 mm/h, Stab neutrophils 1.1%, Segmented neutrophils 47%, Eosinophils 2.5%, Basophils 1.9%, Lymphocytes 36%, Monocytes 8.9%, Platelets 261 g/L. Conclusion: increase of hemoglobin level, erythrocytosis.

Urinalysis (27.09.17): Reaction 6.0, Protein Not detected, Glucose Absent, Erythrocytes 0, Leucocytes 1–2. Conclusion: all parameters within the normal range.

Biochemical analysis (27.09.17): Total bilirubin 18.6 $\mu\text{mol/l}$, AlAt 20.1 U/L, AsAt 27.5 U/L, Creatinine 81 mmol/l, Glucose 5.8 $\mu\text{mol/l}$. Conclusion: all parameters within the normal range.

Fasting glucose test (27.09.17): normal.

Blood lipid spectrum (27.09.17): Cholesterol 5.41 mmol/l, VLDL 0.65 mmol/l, LDL 2.98 mmol/l, HDL 1.77 mmol/l, Triglycerides 1.45 mmol/l. Conclusion: hypercholesterolemia, type I.

Echocardiography (27.09.17): Aorta 31 mm, Aortic valve 18 mm, Mitral valve 31 mm, Left atrium 33.0 mm, End Diastolic velocity 100 cm/s, End Systolic volume 100 mm, Left Ventricle Wall 13.2 mm, Ejection Fraction 48%, Left Ventricle amplitude 8.8 mm, Intraventricular septum 12 mm, Right atrial diameter 41 mm, Right Ventricle diameter 24 mm. Conclusion: atherosclerotic cardiosclerosis, aorta atherosclerosis, LV hypertrophy. Dyssynergic areas were not identified.

Electrocardiography (ECG) (23.08.17): AV block of 3rd degree with VR 27 bpm, AR 85 bpm, QRS 114 msec, QT 572 msec. No signs of focal myocardial lesion.

Electrocardiography (ECG) (27.09.17): Pacemaker rhythm, bipolar stimulation of the ventricles HR 89 bpm, QRS 144 msec, QT364 msec.

Chest X-Ray (27.09.17): no pathological changes in the lungs. Pacemaker in left subcostal area, visible electrode in the right heart chambers.

Recommendations for Further Examination

- Serum electrolyte levels
- B-type natriuretic peptide (BNP)

- N-terminal pro-B-type (NT-proBNP)
- Doppler flow ultrasonographic study.

Clinical Diagnosis

Ischemic heart disease. Atherosclerotic and post infarction (2011, 2014) cardiosclerosis. Aorta atherosclerosis. Heart failure with reduced ejection fraction (48%), III FC, stage C. Arterial hypertension, III stage, hypertensive heart (LVH), 3 degree. CVD risk very high. Permanent pacemaker (23.08.17) due to AV-block III degree with Adams-Stokes syndrome. Hypercholesterolemia, type I. Overweight.

Hospital's Medical Treatment

Clopidogrel 75 mg once a day, bisoprolol 2.5 mg in the morning, torasemide 2.5 mg in the morning, valsartan 40 mg twice a day, rosuvastatin 5 mg in the evening, meldonium 5.0 ml IV № 10, pentoxifylline 5.0 ml + 100.0 ml saline IV infusion N 2.

Recommendations

According to the Guidelines for the diagnosis and treatment of acute and chronic heart failure [1], the following recommendations was applicable for our patient after hospital treatment:

Lifestyle modification include DASH diet — a diet rich in fruits, vegetables, low fat or nonfat dairy, includes mostly whole grains, lean meats, fish and poultry, nuts and beans. Daily aerobic activity — 25 to 30 minutes walking at a fast pace.

Pharmacological treatment: torasemide 2.5 mg in the morning (ones in 3 days), bisoprolol 2.5 mg in the morning, ramipril 5 mg once a day, rosuvastatin 5 mg in the evening, acetylsalicylic acid 75 mg once a day in the evening.

Follow-Up (Two Months Later)

Patient takes medication regularly. Patient's condition is much better: no oedema, no cough, exercise tolerance increased.

Conclusion

Precept "festina lente" is important in all medical practice, and in interventional cardiology — in the first place.

Cardiac pacemaker in the presence of possible solutions to the problem of arrhythmias and HF it does not cancel, but modifies the medical support of patients. According to the recommendations of patients with acquired atrioventricular block 2, Mobitz II, advanced AV block 2 degree, complete AV block, which are not due to physiological (parasympathicotonia) or transient caus-



es, regardless of the presence of symptoms. In all other cases of AV-conduction disorders in the absence of comorbid conditions associated with the progression of the conduction disorder, implantation of permanent PM is indicated only in the presence of symptoms caused by bradycardia [5].

Patients with LV EF 36–50% and AV block requiring installation of a permanent PM, in which the estimated proportion of contractions imposed by the stimulator exceeds 40%, implantation of PM using the techniques of more physiological activation of the ventricles (stimulation of the His bundle, resynchronization therapy, etc.). This approach is associated with a lower risk of CHF progression than standard right ventricular stimulation [5].

In this clinical case, the patient was implanted the DDDR pacing mode. Also, after implantation of cardiac pacemaker the symptoms were not completely controlled. The result of the treatment led to the worsening of HF. Using the example of a clinical case, the question of the benefits of choosing resynchronization therapy in patients with CHF reviewed and the need for constant outpatient monitoring and timely examination and correction of heart failure treatment was shown.

Pacemaker implantation requires not only more frequent monitoring of the parameters of pacemaker, but also adequate drug therapy, especially in patients with an extended QRS interval.

To prolong patient's life, it's very important to establish a timely diagnosis and prescribe appropriate therapy.

Ключові слова: серцева недостатність, кардіостимуляція, кардіальна ресинхронізуюча терапія, електрокардіографія, медикаментозна терапія.

ЛІТЕРАТУРА

1. ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure: The Task Force for the diagnosis and treatment of acute and chronic heart failure of the European Society of Cardiology (ESC) Developed with the special contribution of the Heart Failure Association (HFA) of the ESC / P. Ponikowski, A. A. Voors, S. D. Anker et al. *Eur. Heart. J.* 2016. Vol. 37 (27). P. 2129–2200.
2. Investigation of a novel algorithm for synchronized left-ventricular pacing and ambulatory optimization of cardiac resynchronization therapy: results of the adaptive CRT trial / D. O. Martin, B. Lemke, D. Bimie et al. *Heart Rhythm.* 2012. Vol. 9. P. 1807–1814.
3. Liang Y., Pan W., Su Y., Ge J. Meta-analysis of randomized controlled trials comparing isolated left ventricular and biventricular pacing in patients with chronic

heart failure. *Am. J. Cardiol.* 2011. Vol. 108. P. 1160–1165.

4. A randomized pilot study of optimization of cardiac resynchronization therapy in sinus rhythm patients using a peak endocardial acceleration sensor vs. standart methods / P. Ritter, P. P. Delnoy, L. Padeletti et al. *Europace.* 2012. Vol. 14. P. 1324–1333.

5. ACC/AHA/HRS Guideline on the Evaluation and Management of Patients with Bradycardia and Cardiac Conduction Delay / M. Fred, F. M. Kusumoto, H. Mark et al. *J. Am. College of Cardiology.* 2018. Vol. 10. P. 1016–1044.

6. REVERSE (Resynchronization reverses Remodeling in Systolic left ventricular dysfunction) Study Group. Randomized trial of cardiac resynchronization in mildly symptomatic heart failure patients and in asymptomatic patients with left ventricular dysfunction and previous heart failure symptoms / C. Linde, W. T. Abraham, M. R. Gold et al. *J. Am. Coll. Cardiol.* 2008. Vol. 52. P. 1834–1843.

7. MIRACLE Study Group. Multicenter InSync Randomized Clinical Evaluation. Cardiac resynchronization in chronic heart failure / W. T. Abraham, W. G. Fisher, A. L. Smith et al. *N. Engl. J. Med.* 2002. Vol. 346. P. 1845–1853.

8. Cardiac Resynchronization-Heart Failure (CARE-HF) Study Investigators. The effect of cardiac resynchronization on morbidity and mortality in heart failure / J. G. Cleland, J. C. Daubert, E. Erdmann et al. *N. Engl. J. Med.* 2005. Vol. 352. P. 1539–1549.

9. Effect of biventricular pacing on ventricular repolarization and functional indices in patients with heart failure: lack of association with arrhythmic events / P. Dilaveris, G. Giannopoulos, A. Synetos et al. *Europace.* 2009. Vol. 11 (6). P. 741-750.

10. Effect of QRS morphology on clinical event reduction with cardiac resynchronization therapy: meta-analysis of randomized controlled trials / I. Sipahi, J. C. Chou, M. Hyden et al. *Am. Heart. J.* 2012. Vol. 163. P. 260–267.

REFERENCES

1. Ponikowski P., Voors A.A., Anker S.D. et al. ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure: The Task Force for the diagnosis and treatment of acute and chronic heart failure of the European Society of Cardiology (ESC) Developed with the special contribution of the Heart Failure Association (HFA) of the ESC. *Eur. Heart. J.* 2016; 37 (27): 2129-2200.
2. Martin D.O., Lemke B., Bimie D. et al. Investigation of a novel algorithm for synchronized left-ventricular pacing and ambulatory optimization of cardiac resynchronization therapy: results of the adaptive CRT trial. *Heart Rhythm.* 2012; 9: 1807-1814.
3. Liang Y., Pan W., Su Y., Ge J. Meta-analysis of randomized controlled trials comparing isolated left ventricular and biventricular pacing in patients with chronic heart failure. *Am. J. Cardiol.* 2011; 108: 1160-1165.
4. Ritter P., Delnoy P.P., Padeletti L. et al. A randomized pilot study of optimization of cardiac resynchronization therapy in sinus rhythm patients using a peak endocardial acceleration sensor vs. standart methods. *Europace.* 2012; 14: 1324-1333.
5. Fred M., Kusumoto F.M., Mark H. et al. ACC/AHA/HRS Guideline on the Evaluation and Management of Patients with Bradycardia and Cardiac Conduction Delay. *J. Am. College of Cardiology* 2018; 10: 1016-1044.



6. Linde C., Abraham W.T., Gold M.R. et al. REVERSE (Resynchronization reverses Remodeling in Systolic left ventricular dysfunction) Study Group. Randomized trial of cardiac resynchronization in mildly symptomatic heart failure patients and in asymptomatic patients with left ventricular dysfunction and previous heart failure symptoms. *J. Am. Coll. Cardiol.* 2008; 52: 1834-1843.

7. Abraham W.T., Fisher W.G., Smith A.L. et al. MIRACLE Study Group. Multicenter InSync Randomized Clinical Evaluation. Cardiac resynchronization in chronic heart failure. *N. Engl. J. Med.* 2002; 346: 1845-1853.

8. Cleland J.G., Daubert J.C., Erdmann E. et al. Cardiac Resynchronization-Heart Failure (CARE-HF) Study Investigators. The effect of cardiac resynchronization on morbidity

and mortality in heart failure. *N. Engl. J. Med.* 2005; 352: 1539-1549.

9. Dilaveris P., Giannopoulos G., Synetos A. et al. Effect of biventricular pacing on ventricular repolarization and functional indices in patients with heart failure: lack of association with arrhythmic events. *Europace.* 2009; 11 (6): 741-750.

10. Sipahi I., Chou J.C., Hyden M. et al. Effect of QRS morphology on clinical event reduction with cardiac resynchronization therapy: meta-analysis of randomized controlled trials. *Am. Heart. J.* 2012; 163: 260-267.

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СТРУКТУРНІ ЗМІНИ ГОЛОВНОГО МОЗКУ У ПАЦІЄНТІВ З РАННІМ РОЗСІЯНИМ СКЛЕРОЗОМ

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СТРУКТУРНЫЕ ИЗМЕНЕНИЯ ГОЛОВНОГО МОЗГА У ПАЦИЕНТОВ С РАННИМ РАССЕЯНЫМ СКЛЕРОЗОМ

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Цель работы — оценить объем атрофии головного мозга у пациентов с ранним рассеянным склерозом (РС) по сравнению с контрольной группой здоровых лиц. Исследование включало 25 пациентов с ранним РС и 29 здоровых людей (соотношение 1 : 1,16). У пациентов с ранним РС среднее время от клинически изолированного синдрома составило (11,71±1,80) мес. Средний возраст пациентов с ранним РС — (32,90±8,64) лет, в группе контроля — (36,70±2,39) лет. В обеих группах преобладали женщины: в группе раннего РС было 19 (76 %) женщин, в группе контроля — 18 (62 %). На этапе раннего РС атрофические изменения происходят преимущественно в сером веществе головного мозга. Наиболее чувствительными являются индексы срединных структур головного мозга, ширина боковых и III желудочка, а также желудочковый темпоральный индекс.

Ключевые слова: ранний рассеянный склероз, атрофия, структурные изменения.

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STRUCTURAL CHANGES IN THE BRAIN IN PATIENTS WITH EARLY MULTIPLE SCLEROSIS

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Objective. Multiple sclerosis (MS) is a progressive chronic disease that affects young adults and causes long-term medical and economic costs. One of the factors for the prognosis of MS is the atrophy of white and gray matter of the brain. Studies have shown that atrophic changes in the brain are already present in patients at the stage of a clinically isolated syndrome. Data about structural changes in early MS are limited.

The **purpose** of the work was to evaluate the amount of brain atrophy in patients with early multiple sclerosis compared with the control group of healthy individuals.

Materials and methods. An observational, transverse, controlled study of patients with early MS was performed. To evaluate atrophic processes, 23 linear parameters were measured for each patient and healthy volunteers, and 14 indices for each MRI were calculated.

Results. The study included 25 patients with early PC and 29 healthy controls (ratio 1 : 1.16). In patients with early MS, the mean time from clinically isolated syndrome was (11.71±1.80) months. The average age of patients with early PC was (32.90±8.64) years; in the control group — (36.70±2.39) years. In both groups, women were prevalent: 19 (76%) women in the early PC, 18 (62%) in the control group. The total score on the EDSS scale at the time of the early PC was (2.91±0.80) points.

Conclusions. Atrophic changes in the brain are present at an early stage of multiple sclerosis. Atrophic changes occur predominantly in the gray matter of the brain. The most sensitive are the indices of the median structures of the brain, the width of the lateral and the third ventricle, as well as the ventricular temporal index.

Key words: early multiple sclerosis, atrophy, structural changes.

