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SCHOOL OF MEDICINE
DEPARTMENT OF INTERNAL MEDICINE

DRUG MANAGEMENT OF PATIENT WITH HEART FAILURE AFTER CARDIAC PACING

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Introduction 1

- 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.

eurheartj.oxfordjournals.org/content/early/2016/06/08/eurheartj.ehw128

Introduction 2

- Treatment of HF includes interventions in lifestyle, drug therapy, cardiac resynchronization therapy (CRT), as well as cardiac surgery, with priority being given to the first two.
- Pacemakers are well-established therapies of severe bradyarrhythmias, and one of them is complete AV block.
- In patients with AV block and HF placing an electrode in the intraventricular septum can lead to CRT effect achievement.

Goal

- To overview management of the patient with heart failure and cardiac pacemaker, implanted due to AV block of III degree on the example of clinical case.

Our Patient

- Name: B.S.N.
- Gender: female.
- Age: 78 years old.
- Occupation: retired.
- Admitted to the hospital #5 on 26th of September 2017.

Complaints

- Oedema of the shins.
- Cough and dyspnea at minimal exertion, absent at rest.

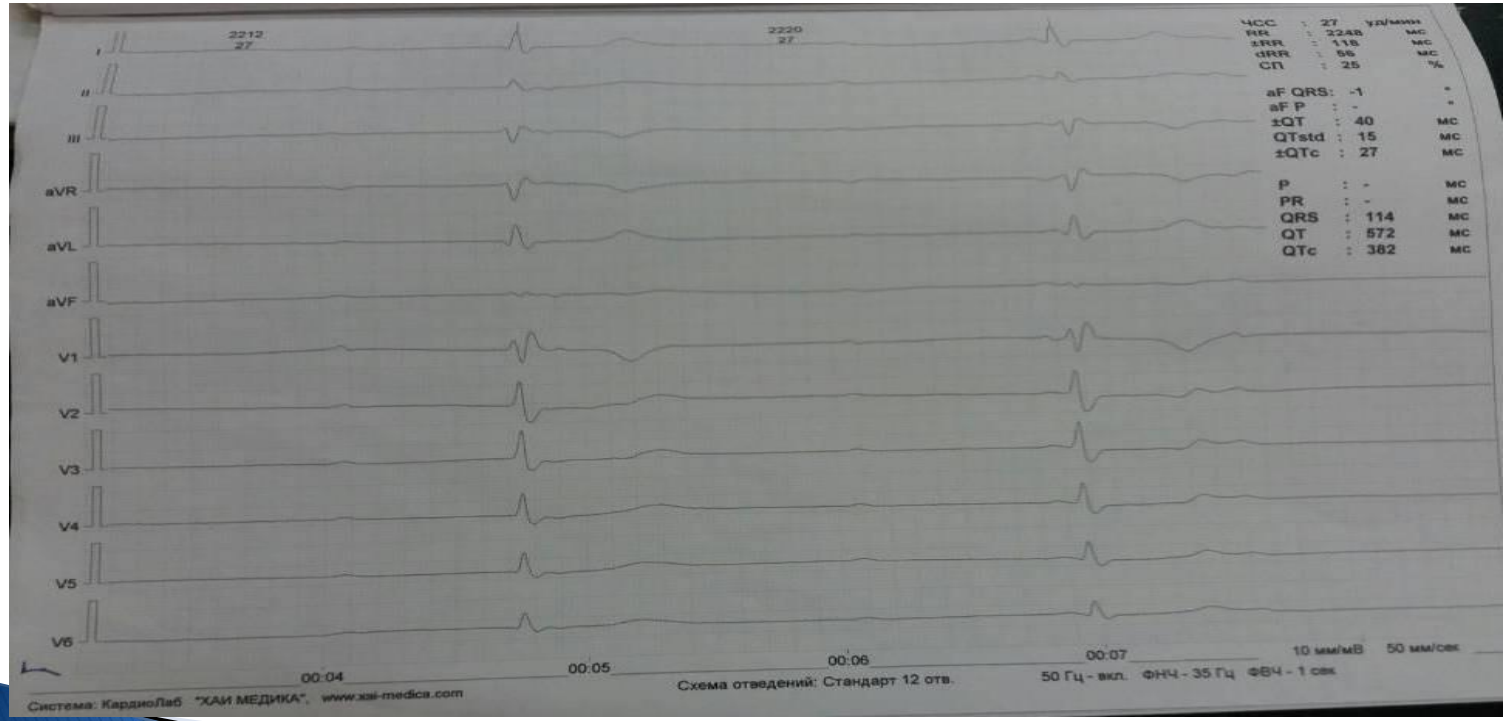
Anamnesis Morbi 1

- Arterial hypertension more than 10 years (max 200/100 mm Hg, adapted to 130-140/80 mm Hg) Patient took enalapril + hydrochlorothiazide 10mg/12.5 mg once a day.
- 2011 - myocardial infarction. The AV block of III^{d} 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).

Anamnesis Morbi 2

- 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.

ECG (23.08.17)



Conclusion:

AV block of 3^{d} degree with VR 27 bpm, AR 85 bpm.
QRS 114 msec
QT 572 msec
No signs of focal myocardial lesion.

Anamnesis Morbi 3

- 23.08.17 the cardiac pacemaker was implanted, in the DDDR pacing 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, 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 1

- Temperature 36,7^{o}C
- PS 78 bpm (both hands)
- BP 130/80 mm Hg (both hands)
- Respiratory rate 18 pm
- Height 166 cm
- Weight 82 kg
- BMI 29 kg/m2

Physical examination 2

- General condition:

  Her mood, orientation in space, posture and development are normal.
- Skin and mucous membranes:

  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.

Physical examination 3

- 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.

Physical examination 4

- 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. Pasternatsky's sign negative on both sides. Urination is normal.

Plan of survey

- CBC
- Urinalysis
- FPG (fasting plasma glucose)
- Liver function tests (LFT)
- Renal function tests (RFT)
- Lipid profile
- EchoCG
- ECG (12-lead)
- Chest X-ray

- Serum electrolyte levels
- B-type natriuretic peptide (BNP)
- N-terminal pro-B-type (NT-proBNP)
- Doppler flow ultrasonographic study

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Prescribed

Recommended

CBC (27.09.17)

Parameters	Result	Normal range
Hemoglobin	151	F 120 - 140 g/ l
Erythrocytes	5,29	F 3,9-4,7 T/ l
Hematocrit	45,0	35 – 47 5%
Leukocytes	6,2	4,0 – 9,0 g/L
ESR	4	F 2-15 mm/h
Stab neutrophils	1,1	1-6 %
Segmented neutrophils	47	47-72 %
Eosinophils	2,5	0,5-5,0%
Basophils	1,9	1-1,0 %
Lymphocytes	36	19-37%
Monocytes	8,9	3-11 %
Platels	261	180-320 g/L

Conclusion: increase of hemoglobin level, erythrocytosis.

Urinalysis (27.09.17)

Parameters	Result	Normal range
Specific gravity	1,030	1,001-1,040
Reaction	6,0	5,0-7,0
Protein	Not detected	0,033 g/ l
Glucose	Absent	Absent
Erythrocytes	0	0-2
Leucocytes	1-2	6-8

Conclusion: all parameters within the normal range.

Biochemical blood test (27.09.17)

Parameters	Result	Normal range
Total bilirubin	18, 6	2-20 µmol/l
AlAt	20,1	8-40 U/L
AsAt	27,5	8-38 U/L
Creatinine	81	60-123 µmol/l
Glucose	5, 8	4,2-6,1 µmol/l

Conclusion: all parameters within the normal range.

Lipid profile (27.09.17)

Parameters	Result	Normal range
Cholesterol	5,41	< 5.2 mmol/l
VLDL	0.65	< 1.0 mmol/l
LDL	2.98	< 3.5 mmol/l
HDL	1.77	> 0.9 mmol/l
Triglycerides	1.45	≤ 2.3 mmol/l

Conclusion: hypercholesterolemia, type I.

ECHOCARDIOGRAPHY(27.09.17)

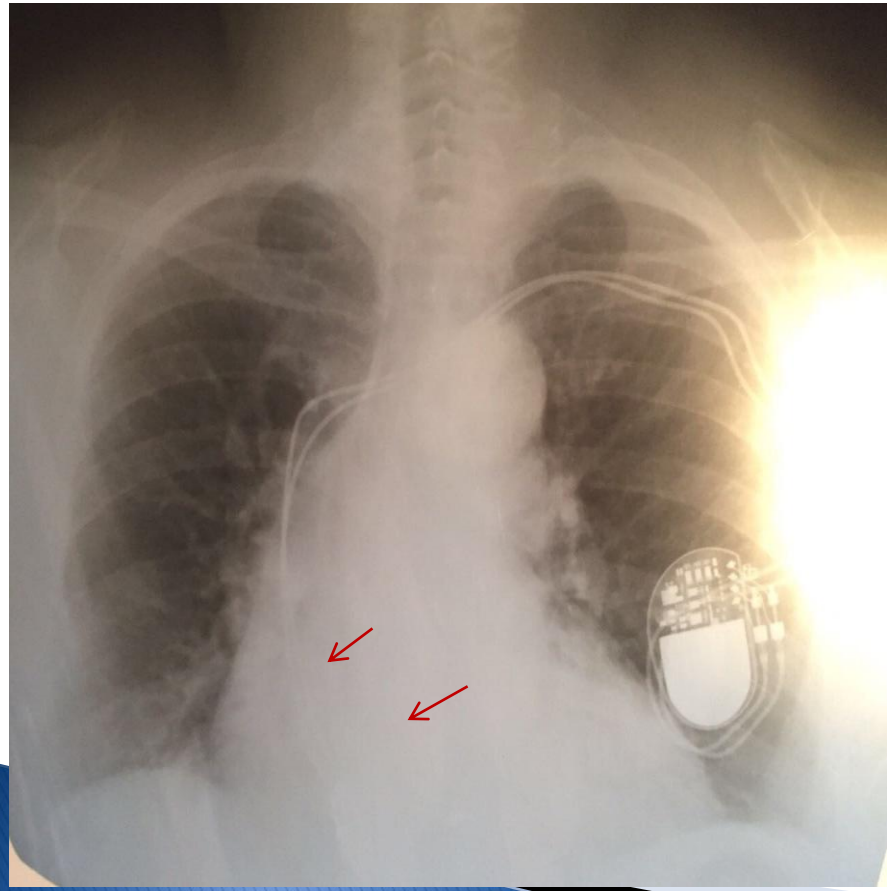
INDEX	RESULT	NORMAL
Aorta	31	20-37mm
Aortic valve	18	17-26mm
Mitral valve	31	26-35mm
Left atrium	33.0	To 38 mm
End Diastolic velocity	100	50-180 cm/s
End Systolic volume	50.0	35-55mm
Left Ventricle Wall	13.2	6-11mm
Ejection Fraction	48	55-78%
Left Ventricle amplitude	8,8	7-13mm
Intraventricular septum	12	6-11mm
Right atrial diameter	41	≤45mm
Right Ventricle diameter	24	9-26mm

Conclusion: atherosclerostic cardiosclerosis, aorta atherosclerosis, LV hypertrophy. Dyssynergic areas were not identified.

ECG (27.09.17)

Conclusion:
Pacemaker rhythm, bipolar stimulation of the ventricles
HR 89 bpm
QRS 144 msec
QT 364 msec

Chest X-Ray(27.09.17)



Conclusion: no pathological changes in the lungs. Pacemaker in left subcostal area, visible electrode in the right heart chambers.

Basic clinical syndromes

- Atherosclerosis (sclerotic changes of aorta and aortic valve).
- Arterial hypertension.
- Condition after the implantation of cardiac pacemaker (23.08.17) due to AV-block III degree with Adams-Stokes syndrome.
- Heart failure.
- Hypercholesterolemia, type I.
- Overweight.

Clinical diagnosis according to current classifications

- 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 treatment

- Clopidogrel 75 mg once a day
- Bisoprolol 2,5 mg in the morning
- Torasemide 2,5 mg in the morning
- Valsartan 40mg 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 № 2

Our recommendations 1

LIFESTYLE MODIFICATION

- 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

Our recommendations 2

PHARMACOLOGICAL TREATMENT

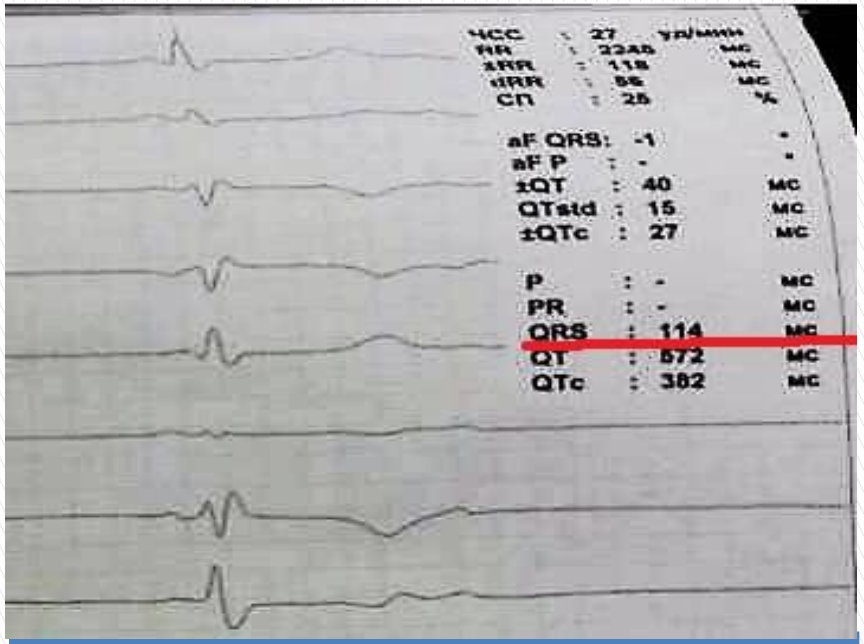
- Torasemide 2,5 mg in the morning (ones in 3 days)
- Bisoprolol 2,5 mg in the morning
- Rosuvastatin 5 mg in the evening
- Valsartan 40mg twice a day
- Acetylsalicylic acid 75 mg once a day in the evening

Follow-up

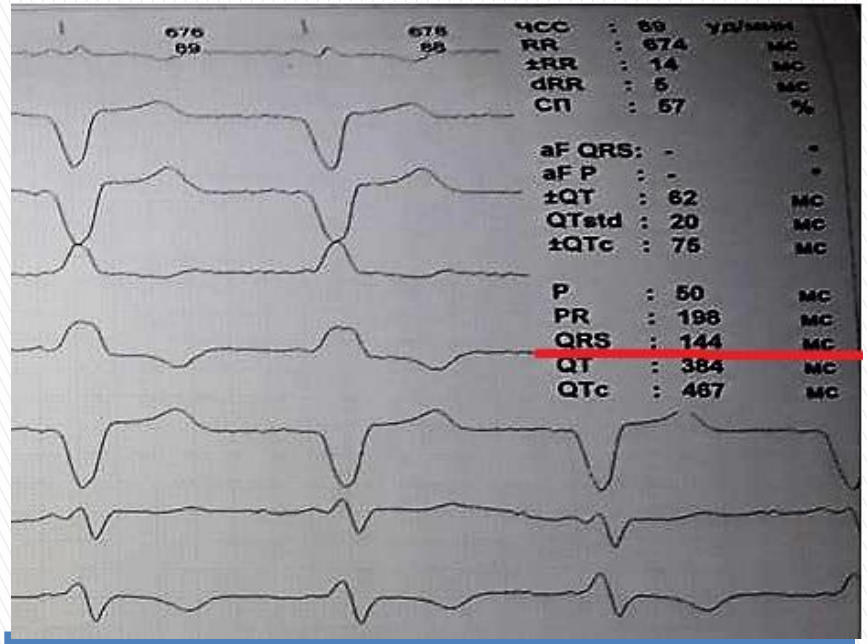
(two months later)

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

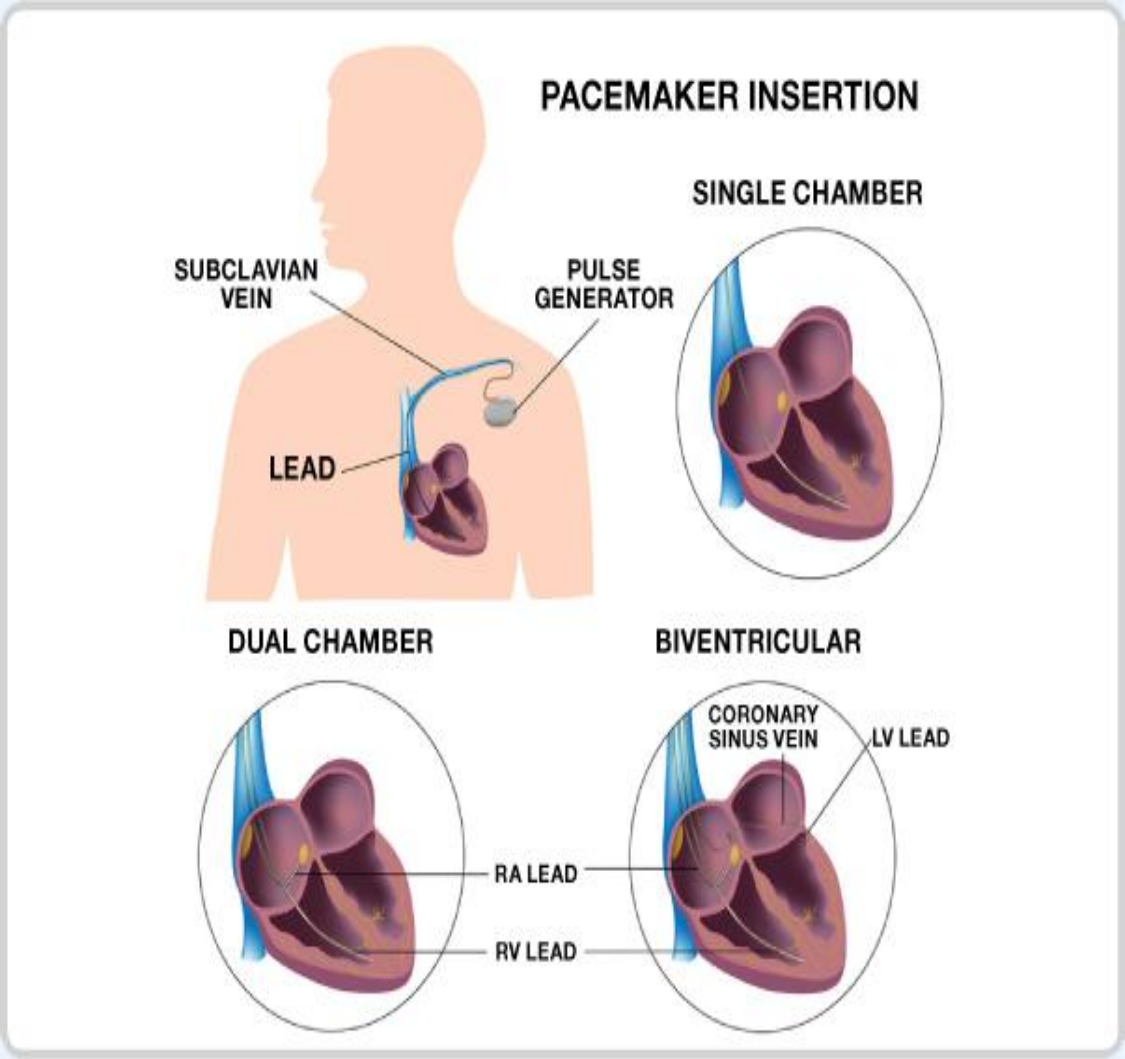
Important remark



ECG before pacing



ECG after pacing


PACEMAKER INSERTION
SINGLE CHAMBER
SUBCLAVIAN VEIN
PULSE GENERATOR
LEAD
DUAL CHAMBER
BIVENTRICULAR
CORONARY SINUS VEIN
LV LEAD
RA LEAD
RV LEAD

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

THANK YOU FOR ATTENTION!