

**V.N.KARAZIN KHARKIV NATIONAL UNIVERSITY
INTERNAL MEDICINE DEPARTMENT**

**Performed:
student of V course**

gr. 525 Baseel Jamal Robin Sharif

**HEART FAILURE AFTER VALVE
REPLACEMENT**

“BETTER LATER THAN NEVER”

Scientific advisers: ass.prof Liuta E.A.

Head of department: prof. Yabluchansky M.I.



DEFINITION

Chronic heart failure (CHF) is an abnormality of cardiac structure or function leading to failure of the heart to deliver oxygen at a rate commensurate with the requirements of the metabolizing tissues, despite normal filling pressures (or only at the expense of increased filling pressures)

EPIDEMIOLOGY

- Approximately 1–2% of the adult population in developed countries has HF, with the prevalence rising to $\geq 10\%$ among persons 70 years of age or older
- Heart failure accounts for 34% of cardiovascular-related deaths
- Approximately 670,000 new cases of heart failure are diagnosed each year
- About 277,000 deaths are caused by heart failure each year
- Heart failure is the most frequent cause of hospitalization in patients older than 65 years, with an annual incidence of 10 per 1,000
- Rehospitalization rates during the 6 months following discharge are as much as 50%

MITRAL VALVE DISEASE AND HEART FAILURE 1

- Mitral valve disease and heart failure often occur together. In some cases, mitral valve disease leads to heart failure symptoms, while in other cases, heart failure results in mitral valve dysfunction.
- The author of a 2008 review article in the journal "Circulation" notes that mitral regurgitation, or insufficiency, associated with heart failure is linked to a worse prognosis than heart failure alone.

MITRAL VALVE DISEASE AND HEART FAILURE 1

- Because mitral valve disease symptoms and heart failure symptoms often overlap, it can be tough to determine which came first
- Even so, mitral valve disease that is diagnosed early can generally be managed to prevent symptoms from progressing
- The American College of Cardiology recommends that people who develop heart failure symptoms from mitral stenosis undergo surgery or a procedure called valvuloplasty to open up the narrowed valve
- **In cases of severe mitral insufficiency, surgical repair of the mitral valve is recommended before heart failure develops**
- People with severe mitral insufficiency who already have heart failure may also benefit from surgery, but the risk of complications is higher

OUR PATIENT

Patient I.L.V.

- 70 years old
- pensioner, worked as a salesman
- city resident
- Date of admission: 10 – October – 2015

COMPLAINTS

- Fatigue
- Dyspnea (paroxysmal nocturnal dyspnea (PND))
- Tachycardia
- Palpitation
- Nocturia
- Dizziness

ANAMNESIS MORBI 1.1

- These symptoms bother the patient more than 10 years
- In 2012 complaints (symptoms) were worsened, because of this, the patient admitted to Institution of general and urgent surgery V.T. Zaycev NAMS of Ukraine. After lab-tests and instrumental examination the diagnosis was: *Combined mitral valve disease with predominance of insufficiency.*

ANAMNESIS MORBI 1.2

Results of echocardiography before surgery(04.10.2012):

Conclusion: Combined mitral valve disease with predominance of insufficiency (MV Hg 3+), S of MV= 2,8 cm². Dilatation of left atrium (4,3x5,2mm) and left ventricle. Pulmonary hypertension (Hg 40mm). EF=77%

09.10.2012 the patient underwent mitral valve replacement with mechanical prosthesis St. Jude Medical No. 27. The patient has taken all drugs that were prescribed after the surgery.

- This hospitalization is after increasing in data complaints

ANAMNESIS VITAE

- *There was rheumatic fever attack in childhood. She had felt pain in the joints of lower extremities and got a temperature after sore throat. She don't remember which treatment had got. Heart murmur had detected in the survey in adulthood.*
- Other infections, injuries, tuberculosis, sexually transmitted diseases were denied
- Hereditary diseases are not identified
- Allergological history is not burdened

OBJECTIVE STATUS 1

- General condition-moderate grave, Conciseness - clear, posture - active, body position - sitting on the chair
- Patient can orientate herself in place, time, her personality
- Height – 158 sm, weight – 63 kg, BMI – 25,2
- **Skin and mucosae are pale pink, with redness on the nose**
- Thyroid: no pathological changes
- Skeleto – muscular system - deformity of the chest after sternotomy
- BR – 22-24 /min
- Lung percussion: **intermediate below scapula angles from both sides**
- Lung auscultation: **decreased vesicular breathing, wheezes inferial parts both sides**
- Borders of the heart: **left border – outside of midclavicular left line on 2 cm**

OBJECTIVE STATUS 2

- Heart auscultation: rhythmic, heart tones – muffled, tone of mechanical valve, accentuated S2 over pulmonary artery
- Pulse – rhythmic, 64 bts/min
- BP 100 / 70 mm Hg
- Abdomen: normal size, symmetric
- Liver: liver margin is 1,5 cm below right rib cage
- Spleen: normal
- Pasternatsky symptom – negative from both sides
- Edemas: absent
- Varicose vein disease of lower extremities – absent
- Stool: normal, everyday, dark color

PRELIMINARY DIAGNOSIS OF ADMISSION WARD PHYSICIAN

*Mitral valve replacement with mechanical prosthesis
(09/10/2012) about combined mitral valve disease
with predominance of insufficiency.*

Heart failure Stage C, Class III by NYHA

PLAN OF SURVEY IN THE HOSPITAL

- Clinical blood test (CBT) and urine analysis
- Kidneys and liver function tests
- Electrolytes
- Lipid profile
- INR - international normalized ratio
- Rheumatic factor, antistreptolysin O
- Electrocardiography(ECG)
- Chest X-ray
- Echocardiography with doppler

RISK FACTORS

- **Coronary Artery Disease**
- **Age**
- **Obesity**
- **Tnt-chronic Kidney Disease**
- **Cigarette Smoking**
- **Diabetes Mellitus**
- **High Cholesterol**
- **African Descent**

CLINICAL BLOOD TEST

10/10/2015

| index | results | |
|--------------|---------|---------------------------|
| hemoglobin | 140 | 120-150 g/l |
| erythrocytes | 4.72 | 3.9-4.7 *10 ¹² |
| Color index | 0.94 | 0.85-1.15 |
| hematocrit | 42 % | 36-42% |
| thrombocytes | 250 | 160-320 g/l |
| leukocsytes | 8.4 | 4.0-9.0 g/l |
| band | 3 | 1-6 % |
| segmented | 70 | 47-72 % |
| eosinophils | 3 | 0.5-5 % |
| basophils | 0 | 0-1.0 % |
| lymphocytes | 19 | 19-37 % |
| monocytes | 5 | 3-11 % |
| ESR | 9 | 2- 15 mm/h |

Conclusion: Normal BC

URINE ANALYSIS 10/10/15

| Index | Result | Normal range |
|-------------------------|-------------|--------------|
| Amount | 140 | |
| color | Yellow | Light yellow |
| transparency | Transparent | Transparent |
| Ontos.plotnost | 1.017 | 1.001-1.040 |
| Reaction (pH) | 7 | 5.0-7.0 |
| Protein(g/l) | Not found | To 0.033 g/l |
| Glucose (mmol/l) | Not found | - |
| leukocytes | 4 | 6-8 |
| Transitional epithelium | Not found | |
| Bacteria | Not found | |

Conclusion: Normal urine test

BIOCHEMISTRY TEST DATA from 10/10/15

| Tests | Result | Normal range |
|--------------------------|--|------------------|
| Creatinine (CKD-EPI GFR) | 104 (47 ml/min/1,73m²) | 53-97 mcmol/l |
| Urea | 6.0 | 4.2-8.3 mcmol/l |
| K | 4.7 | 3.5-5 mEq/L |
| Na | 143 | 136-145 mEq/L |
| Ca | 10.2 | 9-10.5 mg/dL |
| INR | 2.225 | 2-3 |
| Rheumatic factor | 8.01 | To 14 ME/ml |
| Antistreptolysin O | 40 | To 200 IU/ml |
| AST | 21 | 5-40 U/l |
| ALT | 16 | 5-40 U/l |
| Total bilirubin | 10.2 | 3,4—17,1 mcmol/l |

Conclusion: **The increased creatinine and decreased glomerular filtration rate (CKD-EPI GFR) that complies with chronic kidney failure stage 3**

LIPID PROFILE 12/10/2015

| Total cholesterol | 7,3 | 3,1-5,2 MMOL/L |
|-------------------|-------------|------------------|
| LDL-cholesterol | 4,33 | < 3,9 MMOL/L |
| HDL-cholesterol | 1,96 | > 1,42 MMOL/L |
| Triglycerides | 0,74 | 0,14-1,82 MMOL/L |

Conclusion: **Hypercholesterolemia IIa type**

ELECTROCARDIOGRAPHY

Пациент : 70 лет Пол : Женский Дата : 10/10/2015
Стандарт ЭКГ Код : 10/10/2015 Врач :
Учебное учреждение: ХГП №24, отделение кафедры внутрен.мед.мед.факультета



Лаборатория: КардиоЛаб "ХАИ МЕДИКА", тел. +380 57 7199188, 7190478
Схема отведений: Стандарт 12 отв. 50 Гц - вкл. ФНЧ - 70 Гц ФВЧ - 3 сек

Conclusion: Regular sinus rhythm with heart rate 59/min. Deviation of electric axis to the left. Left ventricular hypertrophy.

CHEST X-RAY 12/10/15 #2480



In the lower parts of lungs can be seen **decreasing** due to infiltration. In the inferior regions can be seen focal areas of infiltration. The increase in blood supply to the lungs. Diaphragm's cupulas are flattened. Heart borders are increased both sides.

Conclusion:

Hypoventilation of the lungs. Pulmonary congestion. Pulmonary hypertension.

HEART ULTRASOUND 13/10/2015

Mechanical prosthesis of mitral valve.

S of MV= 4,0 cm². Dilatation of left atrium (4,0x4,4mm) and left ventricle.

Pulmonary hypertension (Hg 37mm). EF=76%

Conclusion: Status after mitral valve replacement (prosthetic valve) (2012). The prosthesis is functioning correctly.

SYNDROMES

- Prosthetic valve
- Congestive heart failure
- Hyperlipidemia (atherosclerosis)
- Chronic renal failure

TYPES OF PROSTHETIC HEART VALVES

- **Biologic**

Stented

- Porcine xenograft
- Pericardial xenograft

Stentless

- Porcine xenograft
- Pericardial xenograft
- Homograft (allograft)
- Autograft

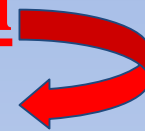
Percutaneous

- **Mechanical**

- Bileaflet**

- Single tilting disc

- Caged-ball



SCORE RISK OF STROKE/TIA/SYSTEMIC EMBOLISM

1.1

CHADS₂ → CHA₂DS₂VASc

| CHADS2 Risk | Score |
|---------------|-------|
| CHF | 1 |
| Hypertension | 1 |
| Age > 75 | 1 |
| Diabetes | 1 |
| Stroke or TIA | 2 |

| CHA2DS2-VASc Risk | Score |
|----------------------------|-------|
| CHF or LVEF ≤ 40% | 1 |
| Hypertension | 1 |
| Age ≥ 75 | 2 |
| Diabetes | 1 |
| Stroke/TIA/Thromboembolism | 2 |
| Vascular Disease | 1 |
| Age 65 - 74 | 1 |
| Female | 1 |

From ESC AF Guidelines
<http://escardio.org/guidelines-surveys/esc-guidelines/GuidelinesDocuments/guidelines-afib-FT.pdf>

SCORE RISK OF STROKE/TIA/SYSTEMIC EMBOLISM

1.2

Our patient get – 3 points

Stroke risk was 4.8% per year in >90,000 patients (the Swedish Atrial Fibrillation Cohort Study) and 6.7% risk of stroke/TIA/systemic embolism.

Score 2 or greater is "moderate-high" risk and should otherwise be an anticoagulation candidate. Oral anticoagulant, with well controlled Vitamin K Antagonist (VKA, e.g. warfarin with time in therapeutic range >70%), or a Non-VKA Oral Anticoagulant (NOAC, e.g. dabigatran, rivaroxaban, edoxaban or apixaban)

HAS-BLED RISK SCORE

Clinical characteristics comprising the HAS-BLED bleeding risk score

| Letter | Clinical characteristic ^a | Points awarded |
|--------|--|------------------|
| H | Hypertension | 1 |
| A | Abnormal renal and liver function (1 point each) | 1 or 2 |
| S | Stroke | 1 |
| B | Bleeding | 1 |
| L | Labile INRs | 1 |
| E | Elderly (e.g. age >65 years) | 1 |
| D | Drugs or alcohol (1 point each) | 1 or 2 |
| | | Maximum 9 points |

Our patient get 3 points - risk was 5.8% in one validation study and 3.72 bleeds per 100 patient-years in another validation study. Alternatives to anticoagulation should be considered: Patient is at high risk for major bleeding.

ANTICOAGULATION THERAPY FOR PROSTHETIC VALVES 1.1

Class I

1. Anticoagulation with a VKA and international normalized ratio (INR) monitoring is recommended in patients with a mechanical prosthetic valve. (Level of Evidence: A)
2. Anticoagulation with a VKA to achieve an INR of 2.5 is recommended in patients with a mechanical AVR (bileaflet or current-generation single tilting disc) and no risk factors for thromboembolism. (Level of Evidence: B)
3. Anticoagulation with a VKA is indicated to achieve an INR of 3.0 in patients with a mechanical AVR and additional risk factors for thromboembolic events (AF, previous thromboembolism, LV dysfunction, or hypercoagulable conditions) or an older-generation mechanical AVR (such as ball-in-cage). (Level of Evidence: B)

ANTICOAGULATION THERAPY FOR PROSTHETIC VALVES 1.2

4. Anticoagulation with a VKA is indicated to achieve an INR of 3.0 in patients with a mechanical MVR. (Level of Evidence: B)
5. Aspirin 75 mg to 100 mg daily is recommended in addition to anticoagulation with a VKA in patients with a mechanical valve prosthesis. (Level of Evidence: A)

RESULTS OF INTERNATIONAL NORMALIZED RATIO (INR) FOR MECHANICAL PROSTHESES



| Prosthesis thrombogenicity ^a | Patient-related risk factors ^b | |
|---|---|----------------------|
| | No risk factor | Risk factor ≥ 1 |
| Low | 2.5 | 3.0 |
| Medium | 3.0 | 3.5 |
| High | 3.5 | 4.0 |

^aProsthesis thrombogenicity: Low = Carbomedics, Medtronic Hall, St Jude Medical, ON-X; Medium = other bileaflet valves; High = Lillehei-Kaster, Omniscience, Starr-Edwards, Bjork-Shiley and other tilting-disc valves.

^bPatient-related risk factors: mitral or tricuspid valve replacement; previous thromboembolism; atrial fibrillation; mitral stenosis of any degree; left ventricular ejection fraction <35%.

APPROACH TO HF DIAGNOSTICS

Criteria 1 and 2 should be fulfilled in all cases

1. Symptoms of heart failure (at rest or during exercise)

2. Objective evidence of cardiac dysfunction
(at rest)

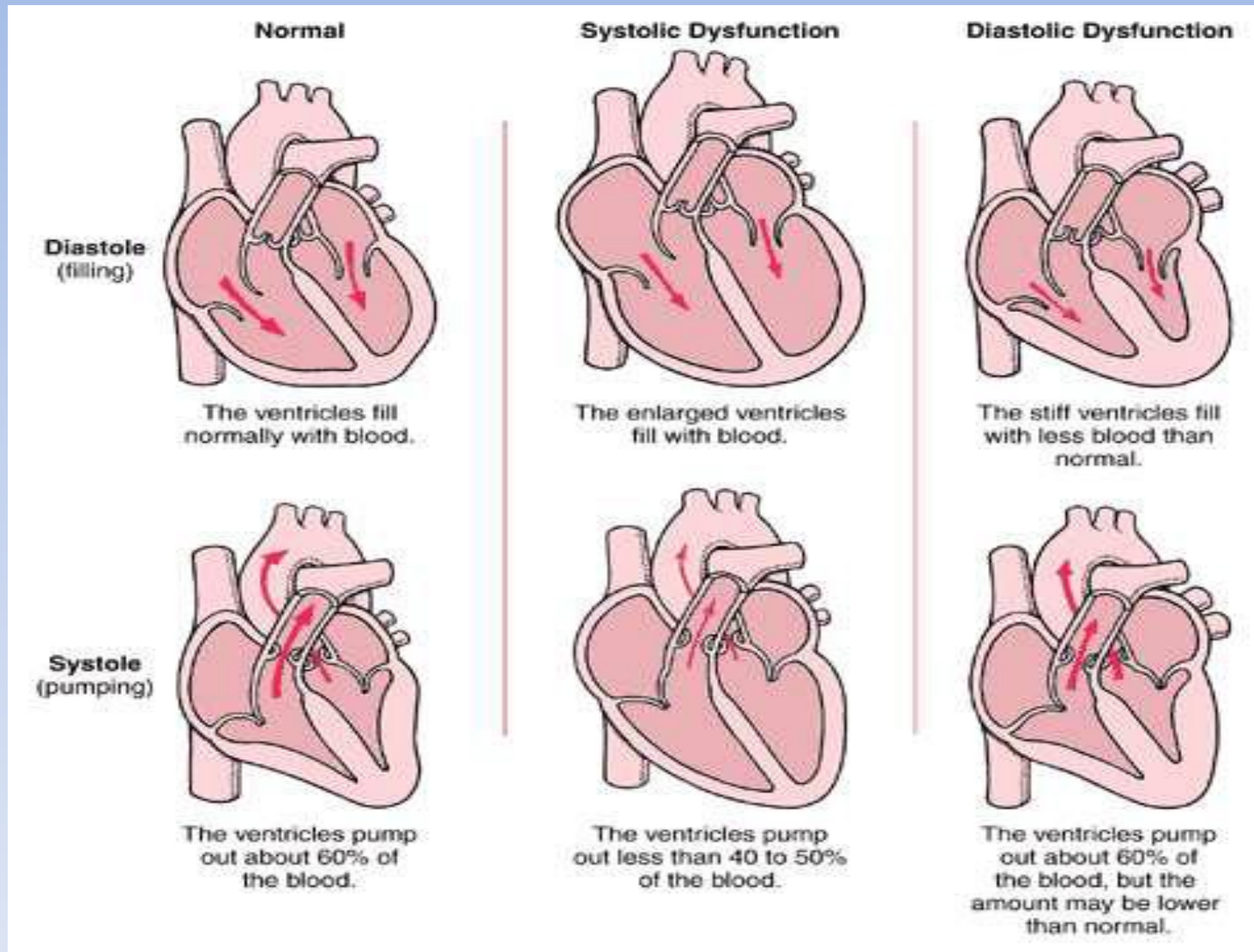
(in cases where the diagnosis is in doubt)

3. Response to treatment directed towards heart failure

TYPES OF HEART FAILURE

- Systolic (or squeezing) heart failure
 - Decreased pumping function of the heart,
- Diastolic (or relaxation) heart failure
 - The heart does not fill with blood properly

TYPES OF HEART FAILURE



FUNCTIONAL CLASSIFICATION

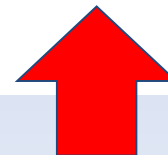
Heart failure may also be categorized according to how the heart is functioning and how severe the symptoms are.

The New York Heart Association Functional Classification includes 4 classes of heart failure:

FUNCTIONAL CLASSES OF HEART FAILURE

NEW YORK HEART ASSOCIATION (NYHA) CLASSES'

| NYHA class I | NYHA class II | NYHA class III | NYHA class IV |
|--|---|--|---|
| <ul style="list-style-type: none">• No limitation on physical activity• No overt symptoms | <ul style="list-style-type: none">• Slight limitation on physical activities• Comfortable at rest, but ordinary physical activity causes symptoms of heart failure | <ul style="list-style-type: none">• Marked limitation on physical activities• Comfortable at rest, but less than ordinary activity causes symptoms of heart failure | <ul style="list-style-type: none">• Inability to carry on any activity without symptoms• Presence of symptoms even at rest |



STAGES OF HEART FAILURE

| | Stage | Patient Description |
|---|---|---|
| A | High risk for developing heart failure (HF) | <ul style="list-style-type: none">• Hypertension• CAD• Diabetes mellitus• Family history of cardiomyopathy |
| B | Asymptomatic HF | <ul style="list-style-type: none">• Previous MI• LV systolic dysfunction• Asymptomatic valvular disease |
| C | Symptomatic HF | <ul style="list-style-type: none">• Known structural heart disease• Shortness of breath and fatigue• Reduced exercise tolerance |
| D | Refractory end-stage HF | <ul style="list-style-type: none">• Marked symptoms at rest despite maximal medical therapy (eg, those who are recurrently hospitalized or cannot be safely discharged from the hospital without specialized interventions) |

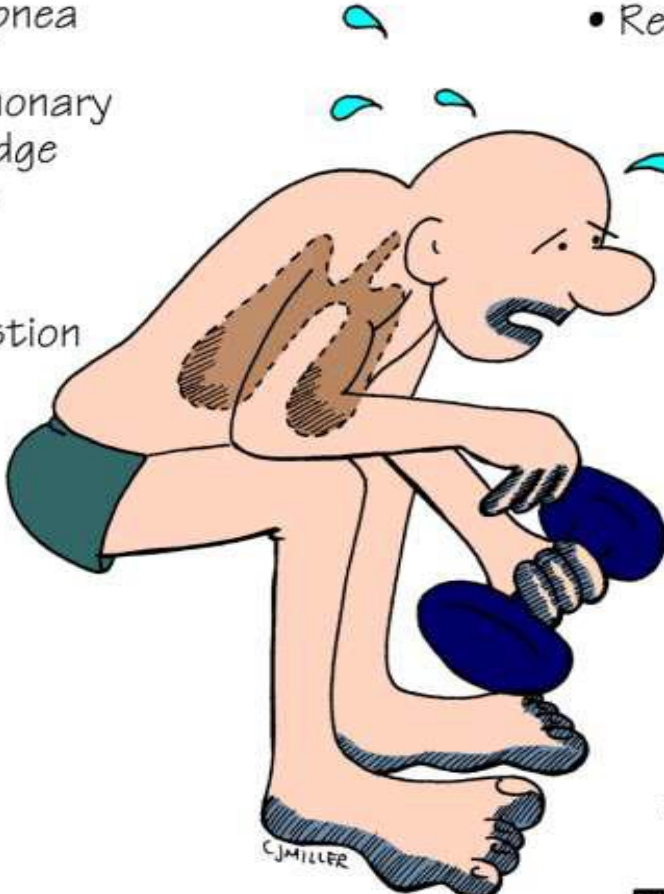
SYMPTOMS ACCORDING TO THE SIDE OF THE HEART FAILURE 1.1

Heart failure may be categorized according to which side of the heart is affected. Such categories include:

- **Left-sided failure** or forward failure that leads to congestion in the lungs
- Backward failure or right sided failure leading to excess fluid accumulation in the body
- Failure of both sides or biventricular failure

SYMPTOMS ACCORDING TO THE SIDE OF THE HEART FAILURE 1.2

LEFT SIDED FAILURE

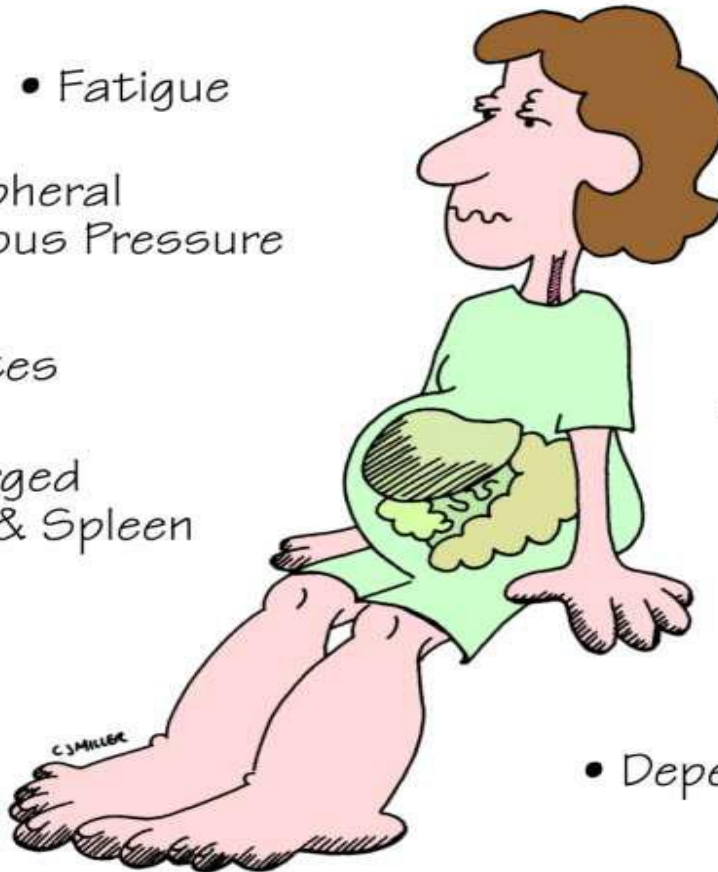
- 
- Paroxysmal Nocturnal Dyspnea
 - Elevated Pulmonary Capillary Wedge Pressure
 - Pulmonary Congestion
 - Cough
 - Crackles
 - Wheezes
 - Blood-Tinged Sputum
 - Tachypnea
 - Restlessness
 - Confusion
 - Orthopnea
 - Tachycardia
 - Exertional Dyspnea
 - Fatigue
 - Cyanosis

SYMPTOMS ACCORDING TO THE SIDE OF THE HEART FAILURE 1.3

RIGHT SIDED FAILURE

(Cor Pulmonale)

- Fatigue
- ↑ Peripheral Venous Pressure
- Ascites
- Enlarged Liver & Spleen
- May be secondary to chronic pulmonary problems
- Distended Jugular Veins
- Anorexia & Complaints of GI Distress
- Swelling in Hands & Fingers
- Dependent Edema



TREATMENT OF HEART FAILURE

Nowadays the quality and length of life are the most important in treatment of the patients.

Treatments include lifestyle and pharmacological modalities, and occasionally various forms of device therapy and rarely cardiac transplantation.

Treatment focuses on improving the symptoms and preventing the progression of the disease. Reversible causes of the heart failure also need to be addressed (e.g. [infection](#), [alcohol](#) ingestion, anemia, [thyrotoxicosis](#), [arrhythmia](#), hypertension).

TREATMENT.

LIFESTYLE MODIFICATIONS

Dietary sodium and fluid restrictions should be implemented in all patients with congestive heart failure. Limiting patients to 2 g/day of dietary sodium and 2 L/day of fluid will lessen congestion and decrease the need for diuretics.

- 2-g Sodium diet
- Monitoring weight daily
- 2-L Fluid restriction
- Monitoring blood pressure
- Medications
- Smoking cessation
- Light aerobic exercise
- Knowing whom to call
- Achieving ideal weight
- Follow-up visits

TREATMENT OF HEART FAILURE

Heart Failure Treatment Algorithm

ASSESSMENT

Baseline Evaluation

Historical & Physical
Lab tests
Diagnostic tests
Noninvasive hemodynamic test

Current Visit Evaluation

Historical & Physical
Lab tests
Diagnostic tests
Noninvasive hemodynamic test

**Always consider evidence-based therapies:*

1. ACE inhibitors or angiotensin II receptor blocker
2. Beta blocker
3. Aldosterone antagonist
4. Cardiac glycoside

HEMODYNAMIC PROFILE

Low Perfusion / Congestion

Lower SI / CI
Higher TFI
Higher SVRI

Normal Perfusion / Congestion

Higher SI / CI
Higher TFI
Higher SVRI?

Low perfusion / No congestion

Lower SI / CI
Lower TFI
Higher SVRI

Normal perfusion / No congestion

Higher SI / CI
Lower TFI
Higher SVRI?

PREDICTED SHORT TERM RISK

High Risk

Moderate Risk

Moderate Risk

Low Risk

THERAPY OPTIONS*

1. Increase or add diuretic
2. High afterload?
Increase or add vasodilating agent
3. Consider shorter follow-up interval

1. Increase or add diuretic
2. High afterload?
Increase or add vasodilating agent

1. High afterload?
Increase or add vasodilating agent

Hemodynamic findings do not suggest need for changes to therapy.

PHARMACOLOGICAL TREATMENT OF HEART FAILURE

| Recommendations | Class ^a | Level ^b | Ref ^c |
|---|--------------------|--------------------|------------------|
| An ACE inhibitor is recommended, in addition to a beta-blocker, for all patients with an EF \leq 40% to reduce the risk of HF hospitalization and the risk of premature death. | I | A | 87-91 |
| A beta-blocker is recommended, in addition to an ACE inhibitor (or ARB if ACE inhibitor not tolerated), for all patients with an EF \leq 40% to reduce the risk of HF hospitalization and the risk of premature death. | I | A | 92-98 |
| An MRA is recommended for all patients with persisting symptoms (NYHA class II-IV) and an EF \leq 35%, despite treatment with an ACE inhibitor (or an ARB if an ACE inhibitor is not tolerated) and a beta-blocker, to reduce the risk of HF hospitalization and the risk of premature death. | I | A | 99, 100 |

TREATMENTS WITH LESS-CERTAIN BENEFITS IN PATIENTS WITH SYMPTOMATIC SYSTOLIC HF

| Recommendations | Class ^a | Level ^b | Ref ^c |
|--|--------------------|--------------------|------------------|
| ARB | | | |
| Recommended to reduce the risk of HF hospitalization and the risk of premature death in patients with an EF \leq 40% and unable to tolerate an ACE inhibitor because of cough (patients should also receive a beta-blocker and an MRA). | I | A | 108, 109 |
| Recommended to reduce the risk of HF hospitalization in patients with an EF \leq 40% and persisting symptoms (NYHA class II–IV) despite treatment with an ACE inhibitor and a beta-blocker who are unable to tolerate an MRA. ^d | I | A | 110, 111 |
| Ivabradine | | | |
| Should be considered to reduce the risk of HF hospitalization in patients in sinus rhythm with an EF \leq 35%, a heart rate remaining \geq 70 b.p.m., and persisting symptoms (NYHA class II–IV) despite treatment with an evidence-based dose of beta-blocker (or maximum tolerated dose below that), ACE inhibitor (or ARB), and an MRA (or ARB). ^e | IIa | B | 112 |
| May be considered to reduce the risk of HF hospitalization in patients in sinus rhythm with an EF \leq 35% and a heart rate \geq 70 b.p.m. who are unable to tolerate a beta-blocker. Patients should also receive an ACE inhibitor (or ARB) and an MRA (or ARB). ^e | IIb | C | - |

TREATMENT OF HEART FAILURE

| | Starting dose (mg) | Target dose (mg) |
|------------------------------|--------------------|------------------|
| ACE inhibitor | | |
| Captopril ^a | 6.25 t.i.d. | 50 t.i.d. |
| Enalapril | 2.5 b.i.d. | 10–20 b.i.d. |
| Lisinopril ^b | 2.5–5.0 o.d. | 20–35 o.d. |
| Ramipril | 2.5 o.d. | 5 b.i.d. |
| Trandolapril ^a | 0.5 o.d. | 4 o.d. |
| Beta-blocker | | |
| Bisoprolol | 1.25 o.d. | 10 o.d. |
| Carvedilol | 3.125 b.i.d. | 25–50 b.i.d. |
| Metoprolol succinate (CR/XL) | 12.5/25 o.d. | 200 o.d. |
| Nebivolol ^f | 1.25 o.d. | 10 o.d. |
| ARB | | |
| Candesartan | 4 or 8 o.d. | 32 o.d. |
| Valsartan | 40 b.i.d. | 160 b.i.d. |
| Losartan ^{b,c} | 50 o.d. | 150 o.d. |
| MRA | | |
| Eplerenone | 25 o.d. | 50 o.d. |
| Spirolactone | 25 o.d. | 25–50 o.d. |

TREATMENT OF HEART FAILURE:DIURETICS

| Diuretics | Initial dose (mg) | | Usual daily dose (mg) | |
|--|-------------------|---------------|-----------------------|---------------|
| Loop diuretics^a | | | | |
| Furosemide | 20–40 | | 40–240 | |
| Bumetanide | 0.5–1.0 | | 1–5 | |
| Torsemide | 5–10 | | 10–20 | |
| Thiazides^b | | | | |
| Bendroflumethiazide | 2.5 | | 2.5–10 | |
| Hydrochlorothiazide | 25 | | 12.5–100 | |
| Metolazone | 2.5 | | 2.5–10 | |
| Indapamide ^c | 2.5 | | 2.5–5 | |
| Potassium-sparing diuretics^d | | | | |
| | +ACEi/ ARB | –ACEi/ ARB | +ACEi/ ARB | –ACEi/ ARB |
| Spirolactone/ eplerenone | 12.5–25 | 50 | 50 | 100–200 |
| Amiloride | 2.5 | 5 | 5–10 | 10–20 |
| Triamterene | 25 | 50 | 100 | 200 |

FREDRICKSON CLASSIFICATION OF THE HYPERLIPIDEMIA

Fredrickson Classification of the Hyperlipidemias

| Phenotype | Lipoprotein(s) elevated | Serum cholesterol concentration | Serum triglyceride concentration | Relative frequency, % |
|-----------|-------------------------|---------------------------------|----------------------------------|-----------------------|
| I | Chylomicrons | Normal to ↑ | ↑↑↑↑↑ | <1 |
| → IIa | LDL | ↑↑ | Normal | 10 |
| IIb | LDL and VLDL | ↑↑ | ↑↑ | 40 |
| III | IDL | ↑↑ | ↑↑↑↑ | <1 |
| IV | VLDL | Normal to ↑ | ↑↑ | 45 |
| V | VLDL and chylomicrons | ↑ to ↑↑ | ↑↑↑↑↑ | 5 |

TREATMENT OF ATHEROSCLEROSIS

If patient have high cholesterol that cannot be controlled by diet and exercise, medication may be necessary. The best medicine to lower cholesterol is a statin, also known as a HMG-CoA reductase inhibitor. Statins block an enzyme called HMG-CoA reductase, which controls the production of cholesterol in the liver. Examples include:

- [Lovastatin](#) ([Mevacor](#))
- [Simvastatin](#) ([Zocor](#))
- [Pravastatin](#) ([Pravachol](#))
- [Fluvastatin](#) ([Lescol](#))

DEFINITION OF CHRONIC KIDNEY DISEASE

Table 2. Definition of Chronic Kidney Disease


Criteria

1. Kidney damage for ≥ 3 months, as defined by structural or functional abnormalities of the kidney, with or without decreased GFR, manifest by *either*:
 - Pathological abnormalities; or
 - Markers of kidney damage, including abnormalities in the composition of the blood or urine, or abnormalities in imaging tests
2. GFR < 60 mL/min/1.73 m² for ≥ 3 months, with or without kidney damage

Abbreviation: GFR, glomerular filtration rate

STAGES OF CHRONIC KIDNEY DISEASE

Stages of Chronic Kidney Disease of all Types

| Stage | Qualitative Description | Renal Function (mL/min/1.73 m ²) |
|---|--------------------------|--|
| 1 | Kidney damage-normal GFR | ≥90 |
| 2 | Kidney damage-mild ↓ GFR | 60-89 |
|  3 | Moderate ↓ GFR | 30-59 |
| 4 | Severe ↓ GFR | 15-29 |
| 5 | End-stage renal disease | <15 (or dialysis) |

COMPLETE DIAGNOSIS OF OUR PATIENT IS:

Main: Mechanical prosthesis of mitral valve bileaflet type (09/10/2012) about combined mitral valve disease with predominance of insufficiency.

Complications: Congestive heart failure with preserved left ventricular pump function (ejection fraction = 76%), III C functional class by NYHA. Chronic kidney failure Stage 3.

Concomitant disease: Atherosclerosis.
Hyperlipidemia IIa type.

LIST OF MEDICATIONS PRESCRIBED FOR OUR PATIENT IN HOSPITAL:

- *Warfarin 5 mg 1 time/day*
- *Spironolactone 25 mg 1 time/day*
- *Ramipril 2.5 mg 1 time/day*
- *Bisoprolol 2.5 mg 1 time/day*
- *Torasemide 10 mg 1 time/day*
- *Atorvastatin 40 mg 1 time/day*

TREATMENT

HF after valve surgery should lead to a search for prosthetic-related complications, deterioration of repair, LV dysfunction or progression of another valve disease. Non-valvular related causes such as CAD, hypertension or sustained arrhythmias should also be considered. The management of patients with HF should follow the relevant guidelines.

CONCLUSION

The patient has the progression of heart failure due to the formation of acquired heart disease. The prosthetic valve has contributed to the stabilization stage and class of heart failure, but due to late surgical treatment regression of current heart failure became impossible.