

Anatomy / Pathology

The heart

1. The four interior of the heart

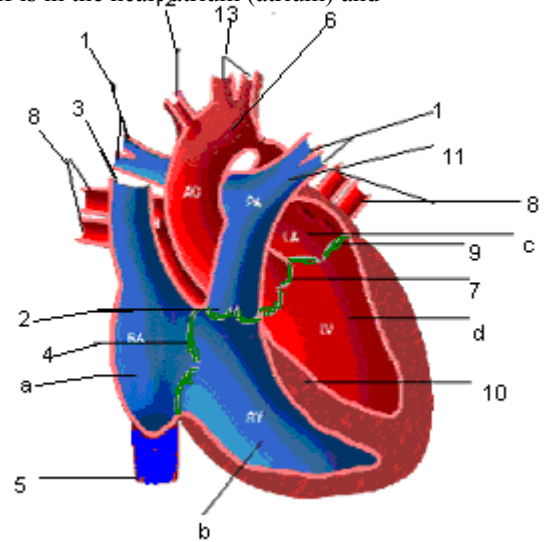
The heart is a muscle with four different interiors. It is divided into two halves of the heart,

• **Left Heart half**

• **Rights cardiac half**

The heart of the vaginal wall (septum) are completely separated. Each half is in the heart atrium (atrium) and chamber (ventricle) divides.

- A) right atrium (Atrium dextrum)
- B) right chamber (Ventriculus dexter)
- C) left atrial (sinistrum Atrium)
- D) left ventricle (Ventriculus sinister)
- 1) pulmonary and re li (artery pulmonales)
- 2) pulmonary
- 3) Upper Hohlvene (superior vena cava)
- 4) Trikuspidalklappe (3-zipflige sails flap)
- 5) lower Hohlvene (inferior vena cava)
- 6) main artery (aorta)
- 7) Aortenklappe
- 8) pulmonary vein and re li (Pulmonalvenen)
- 9) Mitralklappe (2-zipflige sails flap)
- 10) Heart vaginal wall (septum)
- 11) pulmonary artery (truncus pulmonalis)
- 12) head arteries
- 13) neck arteries



2. Which blood vessels and lead arise from cardiac atria and heart chambers?

- **right atrium (Artrium dextrum)**
 - upper Hohlvene (superior vena cava)
 - lower Hohlvene (inferior vena cava)
- **Rights Association (Ventriculus dexter)**
 - 2 pulmonary arteries right (A. pulmonalis dextra) and
 - 2 pulmonary arteries left (A. pulmonalis sinistra) arise from the
 - pulmonary artery (Truncus pulmonalis)
- **left atrium (Artrium sinister)**
 - 2 pulmonary veins left (venae pulmonales)
 - 2 pulmonary veins right (venae pulmonales)

left chamber (Ventriculus sinister)

- Large body artery (aorta)
- → arteries are the arteries from the heart of outgoing vessels
- capillary vessels → exchange between arteries and veins
- → veins are veins to the heart Leading the way Vessels

3. Where are the various flaps and how do you know?

The heart valves are located at the entrances and exits of the chamber (ventricle) to provide a directed flow of blood through the heart and prevent the return of blood.

Right in the heart are the

- Trikuspidalklappe (3 zipflige sails flap)
- Between right atrium and right chamber

- pulmonary (pocket flap)

At the outflow to train lung artery (between re. Chamber and pulmonary artery)

Links in the heart is

- Mitralklappe = Bikuspidalklappe (2 zipflige sails flap)

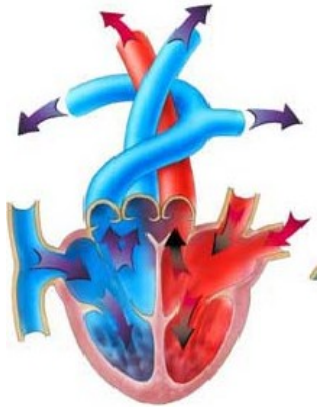
Between left atrium and left chamber

- Aortenklappe (pocket flap)

At the outflow to train aorta (between li. Chamber and aorta)

A function of heart valves

Each heart valve, blood can flow only in one direction pressing. If the pressure from the other side, it proposes to and obstruct the path, so make the healthy heart valves that the blood only in the direction of the physiological provided blood pumped to the river



4. Which tasks right atrium, right ventricle, left heart atrium, left ventricle?

About the lower and upper Hohlvene arrived Oxygen arm

blood in the right atrium (Atrium), and from there on the right chamber (ventricle) into the lungs. There, it was with oxygen and streams as oxygen-rich blood through the pulmonary veins and the left atrium, then into the left chamber and then through the aorta into the systemic circulation.

5. What layers is the heart wall constructed?

The heart wall is from the inside outwards divided into three layers:

- Endocardium = heart inner skin

dressed the entire interior of the heart, are the heart valves.

- myocardium = heart muscle layer

Between Endocardium and epicardium is the layer of the heart muscle, the myocardium

- epicardium = heart outer skin

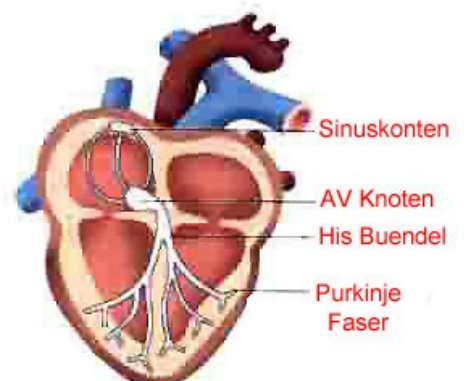
The epicardium is the inner sheet of the heart

The pericardium, the outer sheet of the heart

Between the two bags heart is fluid. The heart bag is the Connective tissue hull of the heart.

6. Describe the Excitation education and excitatory transmission system in the heart!

- excitation and arousal management system of the heart is for the rhythmic contractions of the heart muscles.
- The heart works automatically, which means he makes action potentials (excitement) without a cause from the outside.
- skeletal muscles through a nerve must be excited to be stated. The heart muscle has its own excitement Center, which means the heart muscle fibers can form electrical impulses and forward.



Excitation education and excitatory transmission system consists of:

- **sinus node (the natural pacemaker)**

- Sitting in the wall of the right atrium, near the mouth of the upper Hohlvene
- Consists of specialized cardiac muscle cells
- He aroused the atrial muscle
- Arousal without special control system passed in



- **Atrioventrikular node (AV node)**

- Lies at the heart vaginal wall (septum) between right
And right atrium chamber
 - Collect the electrical impulses
- Here is excitement Board delayed so that the time before the atria chambers contract



- **His `sche bundle**

- Runs in the bottom of the right chamber forecourt in the direction of separating wall
- There it is in



- **Chamber rights and left leg = Tawaraschenkel**

- Excitation of the chamber wall separating



- **Prurkinje fibers = Endabzweigungen the Chamber leg**

- Excitation is from here directly to the Chamber muscles
- Excitation with a high speed on the entire heart muscle distributed

7. The heart works on the all-or-nothing basis. What is the meaning of this statement?

Cardiac muscles are not against electrically isolated, so there is no limit to the excitement. An agitation always covered all the heart muscle cells. Attraction produced either equal or no contraction = All or Nothing principle

8. Why are the electrolytes, especially potassium and calcium, in the right concentration in the blood is vital for the heart?

For an undisturbed heart activity, it is important that the electrolytes in the blood are not too low and not too highly concentrated.

Calcium

Ca²⁺ ions are important for muscle contraction. While the action potential enter Ca-Kanäle a large quantity of calcium from the outside into the cell and uses the contraction mechanism in motion. It is therefore only to a muscle contraction, if enough Ca²⁺ is present.

Potassium

If too little potassium (hypokalemia) in the fluid surrounding the heart present, it is easier to arouse training and -ausbreitung. This can lead to cardiac arrhythmia with extrasystoles to ventricular fibrillation. Too much potassium in the blood (hyperkalemia) can be reversed to a paralysis of the heart to a standstill, a moderate increases hyperkalemia, however, the Erregungsbildung und-leitung.

9. What influence has the vegetative nervous system (sympathetic and Parasympathikus on the heart?

Sympathetic

- increasing the cardiac output = heart beats faster
- contraction force = enhances the strength of the heart muscle
- shock excitation frequency = line will be accelerated

Parasympathikus

- reduction of cardiac output = heart beats slower
- contraction force = reduces the strength of the heart muscle
- shock excitation frequency = line is slowed

Anatomy / Pathology

The heart

1. Describe the following cardiac investigations and the conclusions that the doctor drawn from the results.

A) = ECG electrocardiogram

Measurements of the electrical currents heart

Resting EKG / ECG Long-term (24Std.)

Stress ECG ("cycling")

Clarification: cardiac rhythm disorders, circulatory disorder

B) Ultrasonic

- Phonokardiogramm = representation of the heart sounds

Clarification: heart valve defects, Myokardiopathien (cardiac muscle disease)

- Echocardiogram = "Heart Echo" representation of the heart by ultrasound

- With additional function "Doppler" representation of the blood flows (Funktionsdiagnostik)

Under load (cycling) = Stress Echo

Clarification: change in the heart, for example, The size

TEE - (trans esophagus echo), ultrasound probe is swallowed by the esophagus can buy especially the left atrium (atrium) good judge.

Clarification: eg Narrowing the wreath Vessels

C) X-ray

"Chest" = assessment of cardiac size

Clarification: heart failure, heart rhythm disturbances, tachycardia (fast pulse)

D) NMR / MRI / MNR (slice procedures with the use of a magnetic field)

Identification of water and fat tissue, as a bright area

Hydrogen arm tissues, and schnellströmende blood units as a dark area

Clarification: edema, hemorrhage, necrosis

E) Cardiac catheterization

Introduction of a thin, with saline-filled hose from the arm vein directly from the heart.

Small-cardiac catheter = right heart catheterization

Access: venous

Hemodynamic measurements of the blood flow right

Pressure measurements in the pulmonary circulation

Large-heart catheterization = left heart catheter

Access: Arterial (Leistenarterie)

Hämodinamik measurements of blood flow left

Koronardiagnostik, Koronarangiographie

Clarification: eg Before heart OPs on heart defects, Gefäßverengungen, blood gas analysis

F) Koronarangiographie = X-ray examination

Contrast media is controlled by a catheter directly injected into the coronary arteries.

Representation of the coronary vessels in the form of a schnellenAufnahmeserie in several levels.

Clarification: acute Koronarinsuffizienz, Koronararterienembolie, heart attack, Rhythmusstörungen.

G) Myokardszintigraphie Lokale circulatory disorders are associated with the administration (injection) of radioactive substances.

2. Explain please stand PTCA! (Implementation and Target)

PTCA = percutane transluminal Coronar-angio-plastie

Imported instrumental method for expansion arteriosklerotisch delimited coronary artery using a balloon.

About the artery femoralis under X-ray control a management catheter in the left or right Koronararterie introduced and the first stenosis (narrowing), with contrast medium. After pled a Führungsdrahtes (a = wire mesh stent to Koronargefäße open to keep) for the correct placement of the balloon is in the area of the stenosis at the

end of the catheter balloon inflated located (balloon dilatation) This is the arteriosclerotic plaque in the blood vessels Pressed together what as a rule to a free blood flow.

3. What is a bypass? Weche forms do you know?

A bypass is

- A diversion or a bridging a pathologically altered blood vessel section, by implanting a piece of a (mostly body) vein or artery or a Kunststoffschlauches.

- In the vein **coronary artery bypass graft (ACVB)**, the patient one or more pieces of vein removed (mostly from the vena saphena magna, a blood vein from the inside of the company or thigh), and between the herznahen section of the aorta and the coronary artery distal (far away from) the narrow or obstruction.

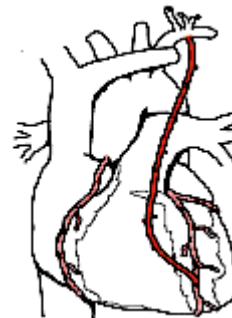
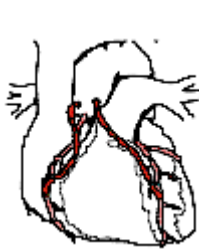
- Alternatively, behind the sternum oblique artery thoracica interna distal separated and behind the narrow gap of Koronararterie newly implanted (**Mammaria-Bypass**)

(A), aortokoronarer vein bypass

(B). Mammaria-koronarer Bypass

ACVB Vena saphena-magna Transplantat

Neueinplanzung der Arteria thoracica interna



5. How do supraventrikulären of ventricular extrasystoles?

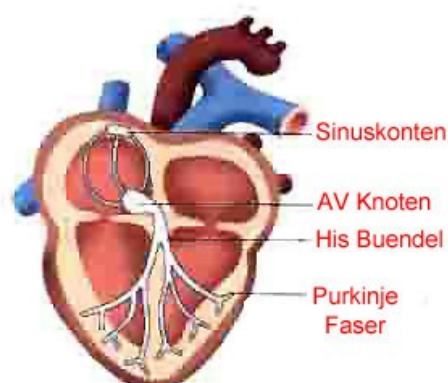
For premature heart beats occur outside the regular basic rhythm. After the place under – divorced man supraventricular and ventricular extrasystoles.

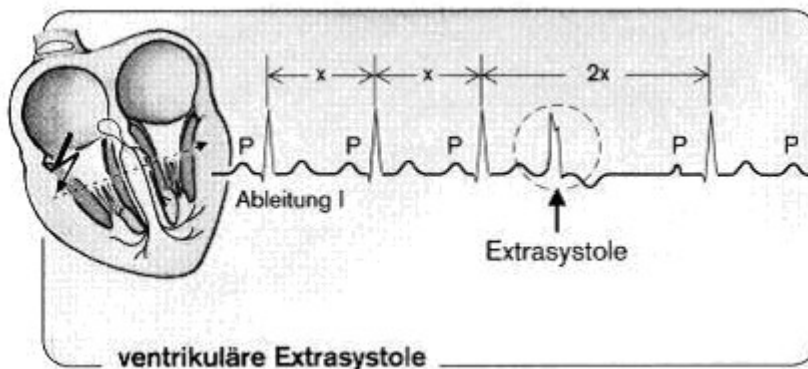
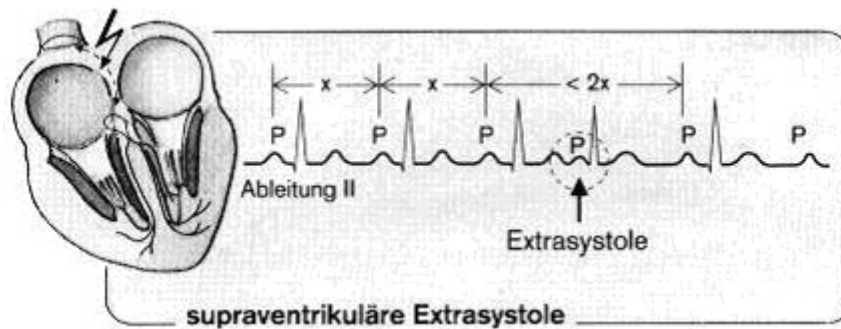
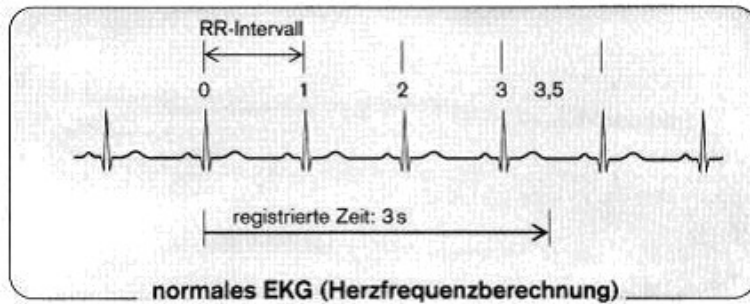
Supraventrikuläre extrasystole

Have originate above the His-Bündels in the sinus node, AV node or Vorhofmyokard (atrium) They come in healthy and sick at heart. One treatment is only for frequent occurrence directly after necessary, as the threat of Vorhofflatterns (250-300 beats / min.) Or atrial fibrillation (> 300 beats / min.).

Ventrikulären extrasystole

Can all parts of the Kammermyokards (ventricle) or the His-Bündel out. Repeat it often is often an organic Coronary heart disease such as heart disease, and it threatens a lebensgefährliches fibrillation. Treatment drugs or electric shocks.





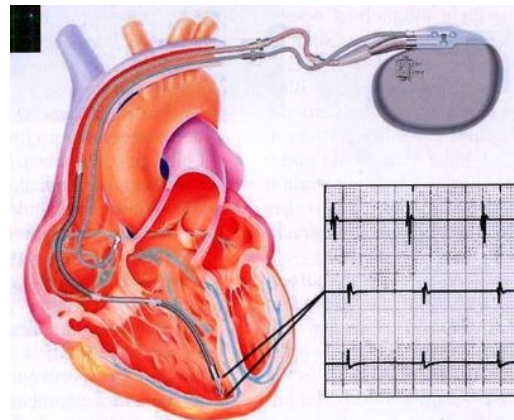
5. When a patient receives a heart pacemaker, and how does the device?

A pacemaker is in cardiac arrhythmia, when the sinus node is not working properly, and the redirection no longer works correctly. A pacemaker is a control center rhythmically repetitive functions, which ordered structures his rhythm aufzwingt.

Function:

Device features data and adjusts the heart rate

About the thin cable, the pacemaker-Aggregate ongoing information about the heart rhythm and then reviewed by comparison with its programmed data, whether the heart is too slow or too fast, and whether the function regularly or irregularly. Data on arrhythmias to be saved. For example, if The pacemaker to a slow heart rate determines he electrical signals from the electrodes to the heart and it will be to encourage faster beating. The battery, which provides the necessary energy, holds approximately 5-12 years, depending on the strain. Then an aggregate exchange.



Programming and customization through specialized doctor

All data that the pacemaker stores, by the physician with a special device to display. The device includes a magnetic head, on the skin over the pacemaker is located and where the desired data receives and forwards. Based on these data, the doctor then further treatment, and also the settings of the pacemaker exactly to the needs of the wearer wishes.

6. What is a heart failure? Borders please compensated by the congestive heart failure!

Heart failure is a heart muscle weakness = low cardiac output. The 1 Min.

From the Heart ausgetriebene blood volume is too low.

If there is supply problems of the heart, heart muscle cells die of lack of oxygen and the heart muscle is weakened.

Can the heart to supply the body required pumping capacity is no longer provide one speaks of a heart failure. Is the right side affected heart = right heart failure, the heart is the left side affected = left heart failure, it affects the whole global heart failure

Compensated heart failure

When compensated heart failure, the heart through various adjustment mechanisms, the performance still so far maintained that the ordinary stress of daily life only minor complaints.

Congestive heart failure

Dekompensiert is heart failure,

when the signs of heart failure even with light loads are. Due to the reduced pumping capacity of the heart, the oxygen content of blood from the tissues more exhausted than normal. This builds up in blood sauerstoffentladenes blaufarbiges hemoglobin. It creates a cyanosis (Bluish discoloration of the skin). The heart failure can be so strong that it shortness of breath (dyspnea) and water (edema) may occur.

7. What is the abbreviation CHD and what symptoms it is clear from the clinical picture?

From a **CHD** = Coronary heart disease (mismatch between oxygen demand of Myocards and oxygen supply) occurs when the coronary arteries in sediments have accumulated, and the vessel walls narrow. This

Herzkranzgefäßverengungen (Koronarstenosen), for example, Through blood metabolic disorders and smoking heavily promoted. It then flows less blood through the coronary arteries, and the oxygen supply to the heart muscle is worse. A tightness in the chest is therefore just as sick of this picture, such as a heart attack or sudden cardiac

- **Herzrythmus disorders**
- **Angina pectoris**
- **heart attack**
- **Herinsuffizienz**
- **Sudden cardiac**

8. Explain the causes, symptoms and treatment of angina pectoris! What danger arises for the patients in the clinical picture?

Angina pectoris (chest tightness)

Causes: atherosclerosis in the coronary arteries (calcification and Verfettung)

Symptoms:

Pain and a tightness in the chest, shortness of breath or a muffled pulling in the heart area, which are signs of angina pectoris. The pain can occur seconds to a few minutes. The symptoms are very varied and are often misinterpreted.

Therapy:

in case emergency measure = Nirtoglyzeringabe → leads within 2-5 minutes to the complaint, or -linderung (Important demarcation point for heart attack.

combat the risk factors
drug administration as

- **nitrates, lead by an enlargement of the coronary arteries to a better supply to the heart muscle with oxygen.**
- **Beta-receptor blocker, off the heart and save oxygen.**
- **calcium antagonists reduce the consumption of oxygen.**

When an angina pectoris noted, it is important that the factors leading to a narrowing of arteriosclerotic coronary arteries have led to treatments. Is this part of the treatment of neglected or overlooked, then the risk of a heart attack is not reduced.

9. One of the most common causes of death in Germany is a heart attack? How is he? Symptomatik? Therapy? Risk factors / complications?

Heart attack

In an acute heart attack a blood clot closes one Herzkranzarterie. Arteriosklerotische deposits (plaques) break. Through these cracks and breaks in the build-up there will be a process of blood platelets (platelet), a thrombus (blood clot). This process is nothing more than a repair mechanism that the closure of a wound expires. The process of blood clotting for internal and external wounds will be further described here. The thrombus can be solved and a clog coronary vessel. During a heart attack usually dies in muscle tissue (irreversible), which is behind the impermeable blood vessel is not long and with oxygen has been supplied.

Symptoms

Pain in the chest, arm, shoulder, neck, chin, back and abdomen. Tightness in the chest, nausea, vomiting, fear of death, pale face, cold sweat, respiratory, circulatory collapse

Therapy

Emergency measures Among the measures take effect immediately, nor in the ambulance, which will include:

- Transfer of Morphinpräparaten for pain relief
- transfer of oxygen through a nasal probe
- administration of nitrates

The drug therapy is based on the health situation of the individual concerned. In the hospital, the therapy began.

Beta-blocker

To slow the heart rate and the contraction speed. Thus, the demand of the heart muscle of oxygen is reduced and the heart can be better with the available oxygen paraphernalia.

ACE inhibitors

Inhibit substances that are normally used for the storage of water in body tissue and lead to vessel constriction, and so positive effect on the oxygen supply

Heparin

Reduce the growth of thrombus and prevents the formation of new clots.

Thrombolytics

Are drugs, which can dissolve thrombus active. This measure is crucial for the treatment of acute heart attack

Risk factors

They include Physical inactivity, high blood pressure, obesity, drinking coffee, smoking, diabetes, lipid metabolism disorders, and stress in the family occurring heart disease.

Complications

Heart rhythm, cardiogenic shock, Papillarmuskelabriss muscle of the heart valves holds), Herzruptur (Einriss wall of the heart), heart valve insufficiency, thrombosis, embolism.