# Reference information for the accredited person

***How should I introduce myself to a patient and why is this necessary?***

Example:

"Hello, my name is ___, I am a sixth-year medical student/local therapist/..." (voice of your choice)

The patient has the right to know the names and titles of those who care for him.

***Information about upcoming manipulations***

Example:

"Today I will need to examine your cardiovascular system. Examine the pulse in various arteries, including the femoral ones, which are located in the groin area, measure your blood pressure, listen to the heart and lungs. Do you agree to this?" (you can voice it however you want)

Being informed, the patient feels calmer and more confident, and is more willing to be involved in the process.

***Do I need to say anything during the examination?***

During the examination itself, before each manipulation it is worth warning the patient:

"Now I will examine your hands. Please do it like this..."

and also comment on the results:

"Pulse is symmetrical, rhythmic, of good filling and normal tension"

Try to always be in contact with the patient, this will help create a trusting and calm atmosphere.

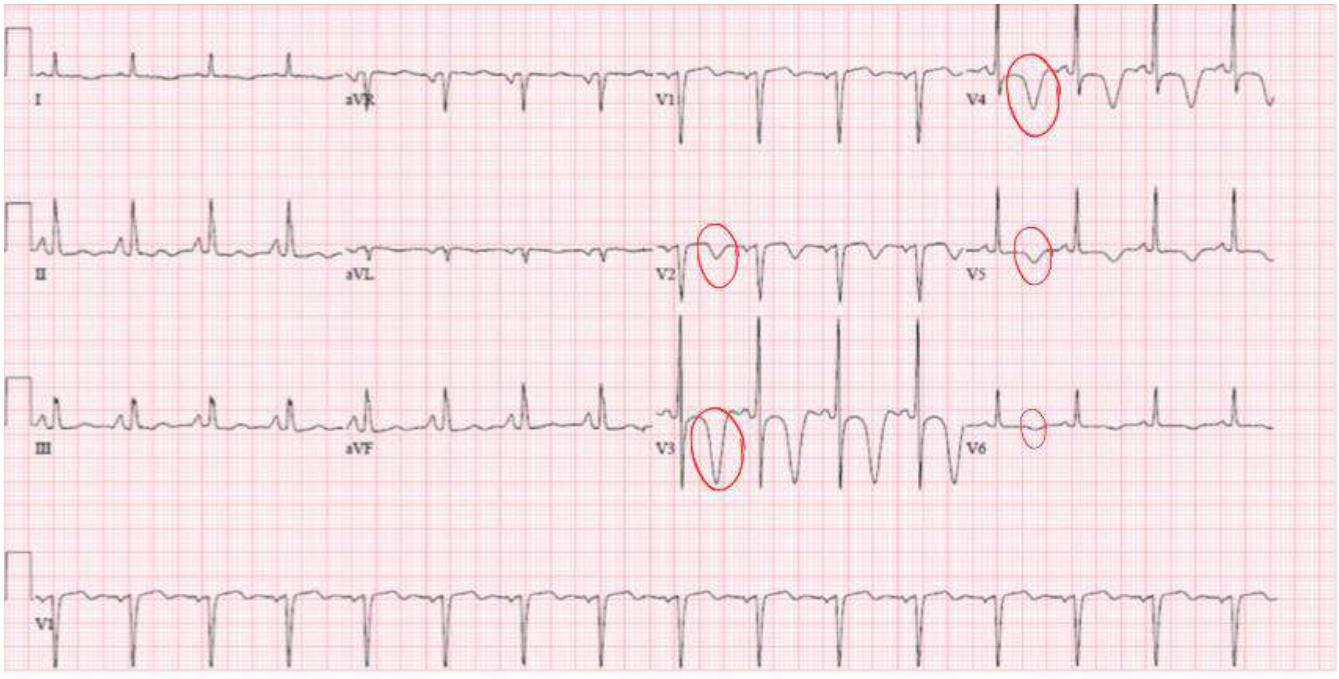
***Why should the head of the couch be at a 45° angle?***

- This is a common position for patient comfort and care.
- Promotes expansion of the chest and lungs and is beneficial for patients with cardiac, respiratory or neurological problems.
- This angle is generally best for locating the jugular veins.

***Why should I stand to the patient's right?***

This simplifies and makes certain parts of the examination more accurate, such as assessing jugular venous distension and apex beat.

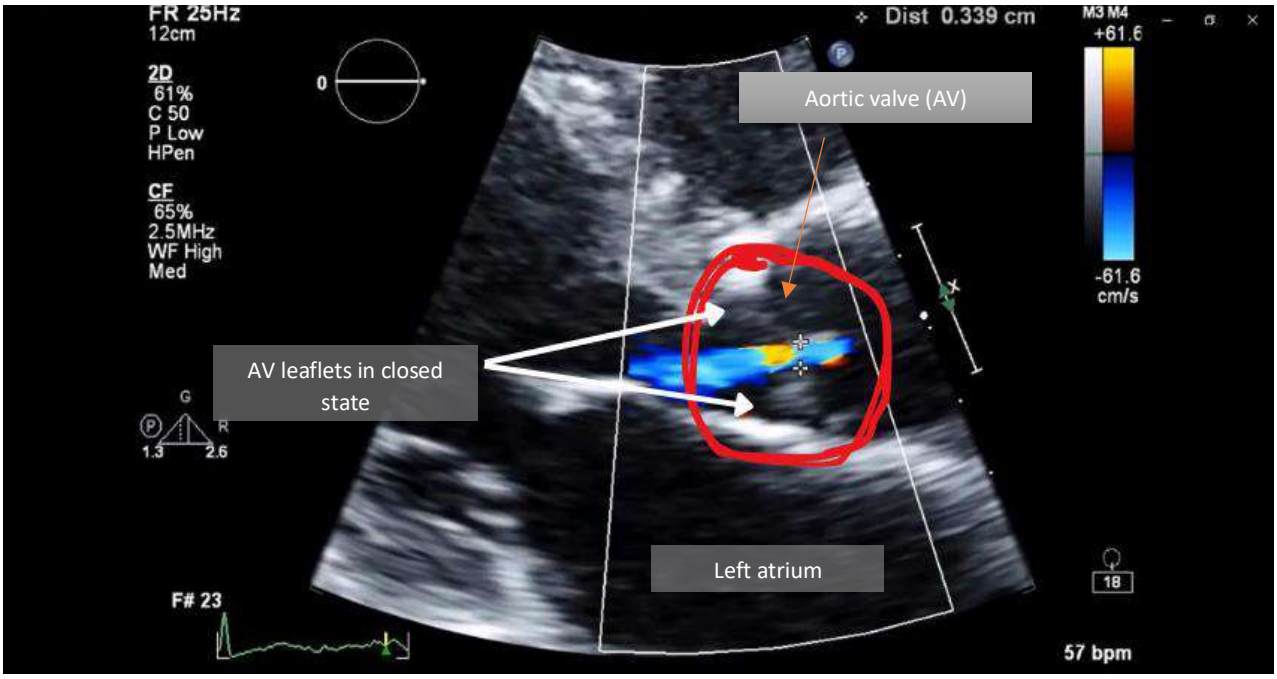
## Case 1. Takayasu arteritis




**T wave inversions from V2 to V6**

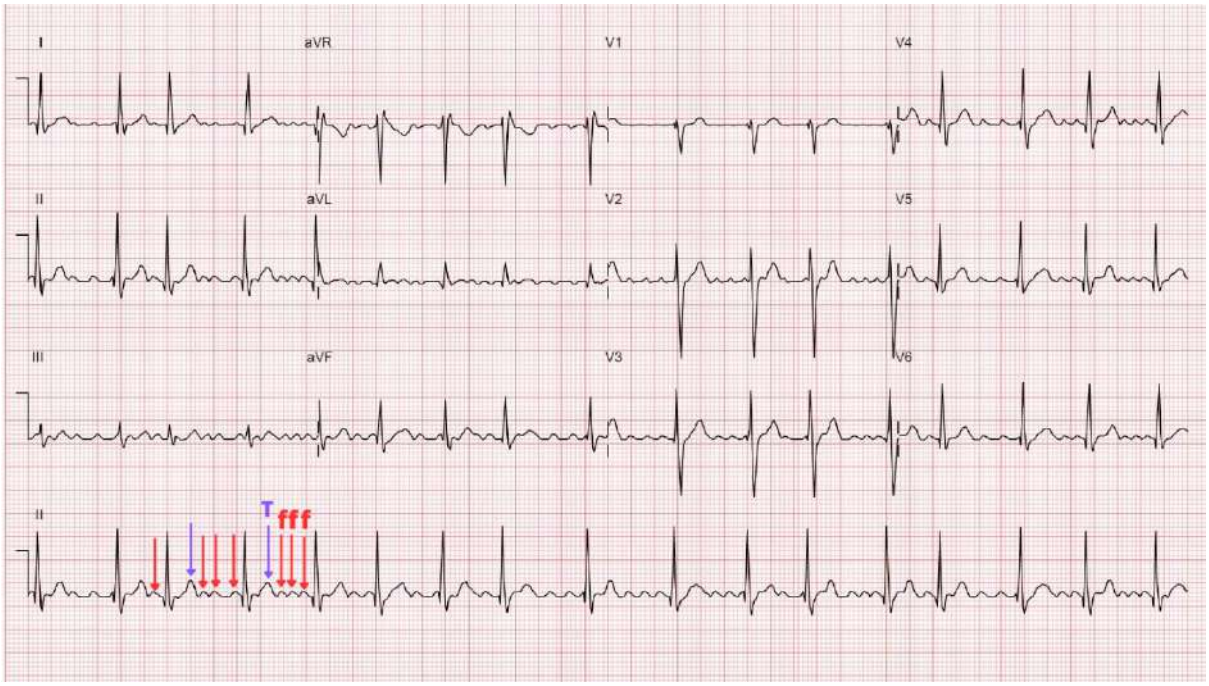
Inverted T waves are associated with myocardial ischemia. But the inversion of a T wave is not specific for ischemia, and the inversion itself does not correlate with a specific prognosis. T wave inversions in the right chest leads may be caused by right ventricular overload (e.g., acute or chronic pulmonary embolism) and in the left chest leads by left ventricular overload. Diffusely inverted T waves are seen during the evolving phase of pericarditis or myocarditis.

Cardiac manifestations of Takayasu arteritis include hypertension and involvement of the cardiac valves, myocardium and coronary arteries.



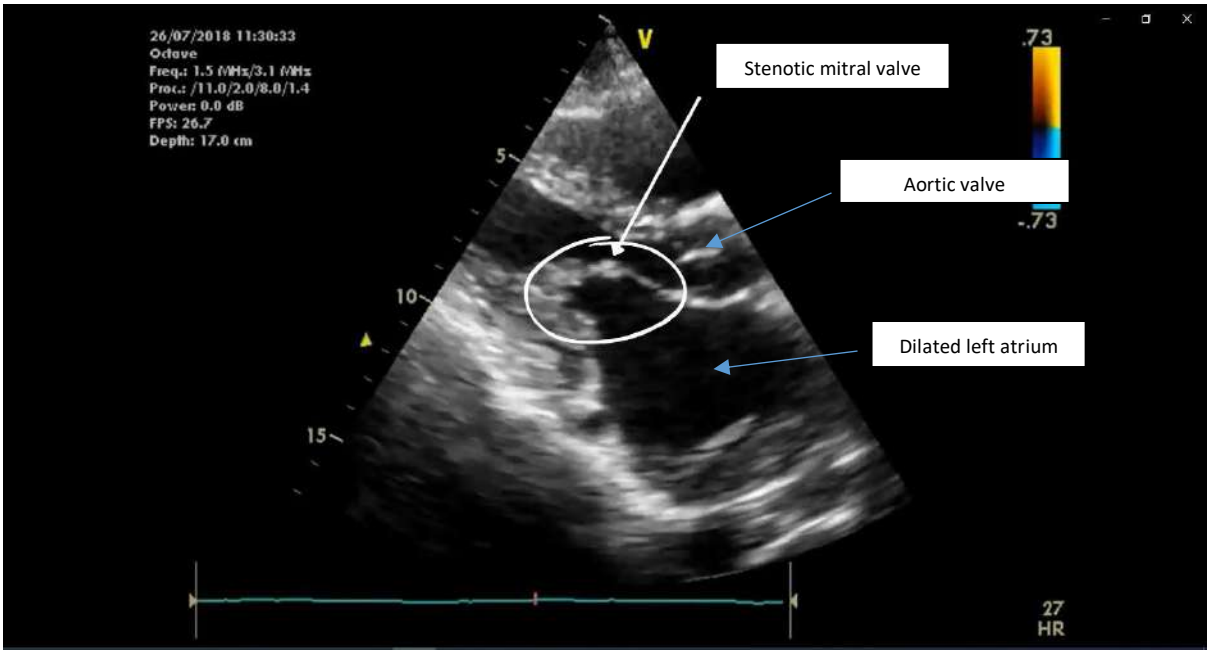

**Mild aortic regurgitation** - slight flow of blood through the aortic valve back into the left ventricle during diastole, due to non-closure of the valve leaflets

## Case 2. Mitral stenosis with atrial fibrillation

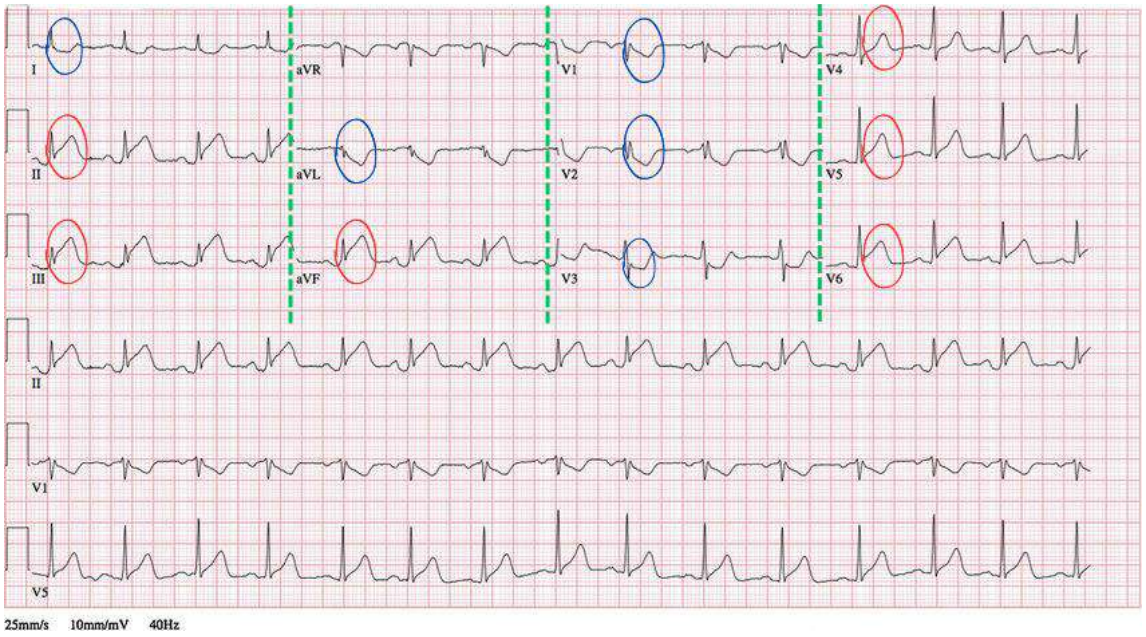



**f waves** – fibrillation waves. May look like P waves, but they are not. Fibrillation waves, unlike flutter waves (F), are different in size and not similar to each other.

The rhythm during fibrillation is irregular (R-R distances are not the same) – arrhythmia (**atrial fibrillation**).



## Case 3. Acute mitral regurgitation with myocardial infarction of the inferior wall of the LV



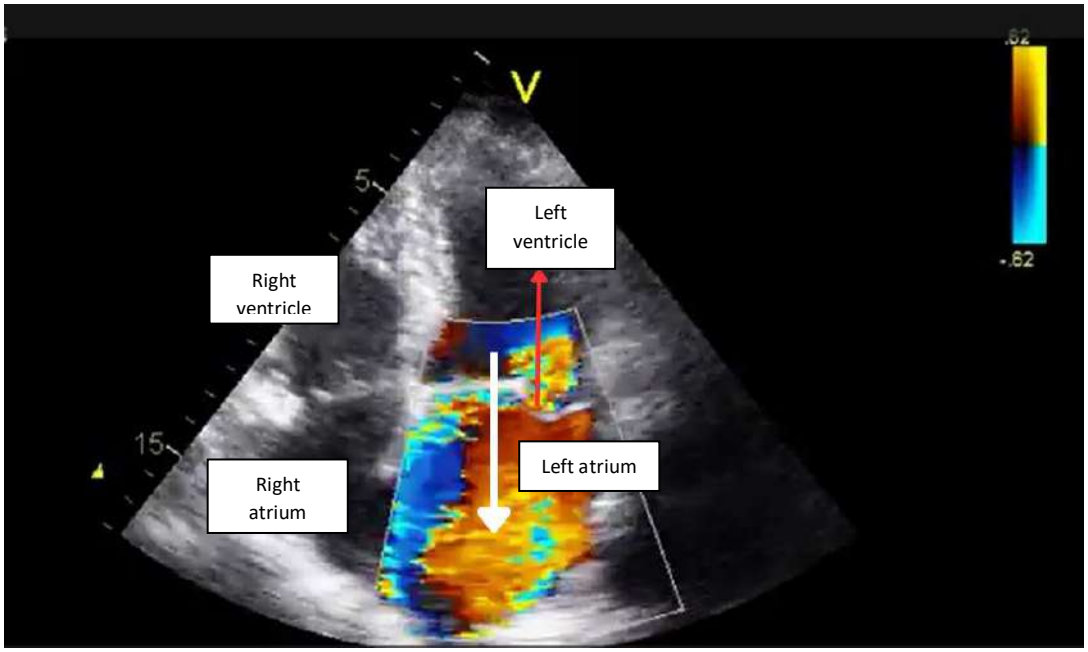

II, III, aVF, V4, V5, V6 leads – ST segment elevation

I, aVL, V1, V2, V3 – reciprocal changes (downward-sloping ST segment depression)

- ST-segment elevation usually indicates a total blockage of the involved coronary artery and that the heart muscle is currently dying.
- Non-STEMI (STEMI = ST-elevation Myocardial Infarction) heart attacks usually involve an artery with partial blockage, which usually does not cause as much heart muscle damage.

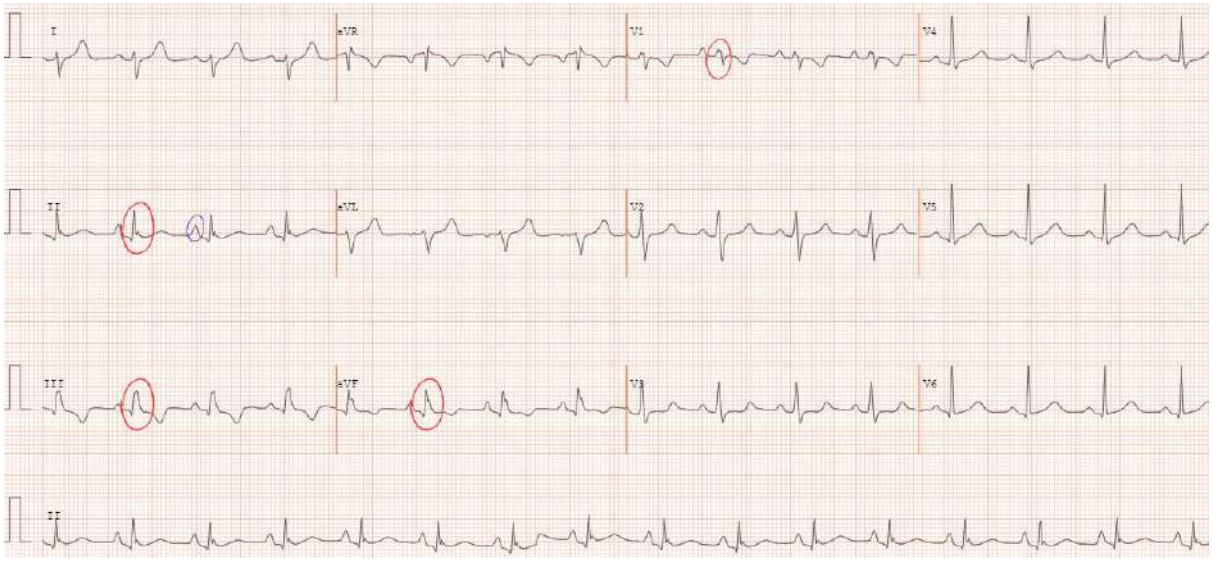
Other pathologies that can cause ST-segment elevations include: myocarditis, pericarditis, stress cardiomyopathy (Takotsubo), benign early repolarization, Acute vasospasm, spontaneous coronary artery dissection, left bundle branch block, various channelopathies, and electrolyte abnormalities.

- Reciprocal change has a morphology that resembles “upside down” ST elevation and is seen in leads electrically opposite to the site of infarction.




**Mitral regurgitation** - blood returns to the left atrium during systole (white arrow). Flow should only be towards the ventricle (red arrow)

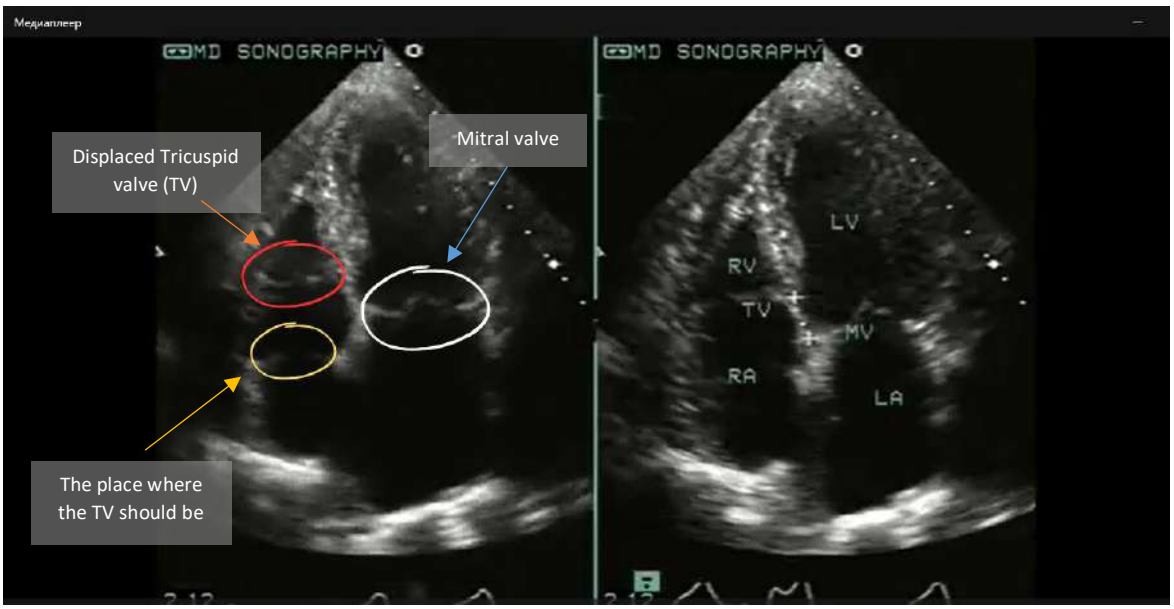
## Case 4. Ebstein's anomaly



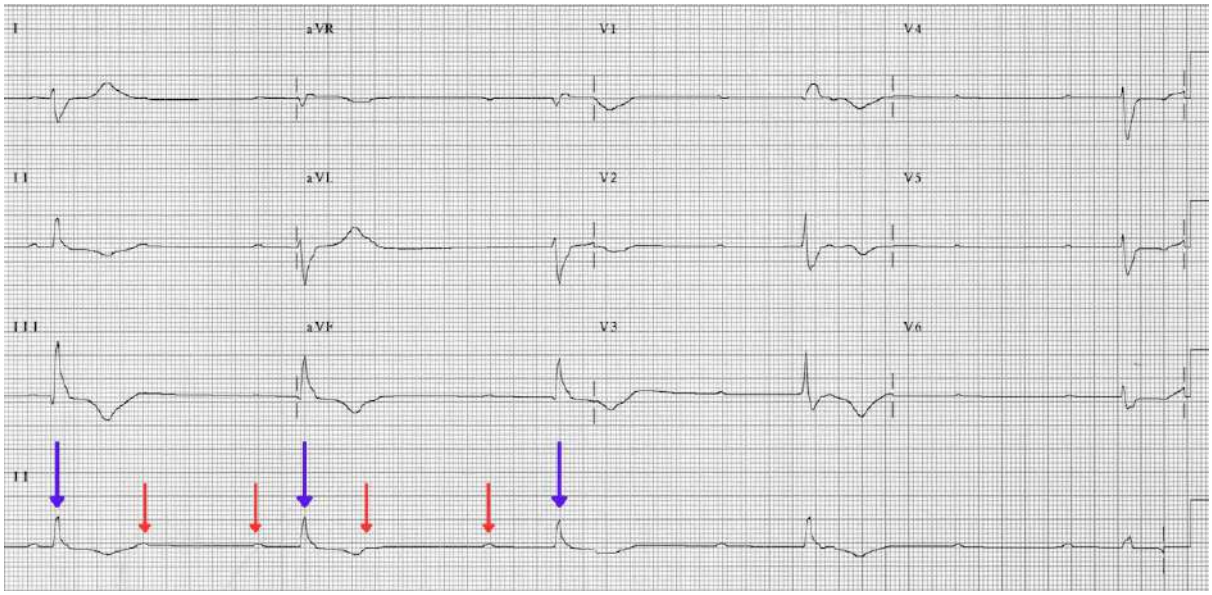
Right axis deviation, bifurcated R waves in II, III, aVF and V1, indicating QRS fragmentation

Pointed P waves indicate an abnormality of the right atrium (P-pulmonale; enlarged)

- Fragmented QRS occurs in Ebstein's anomaly due to abnormal conduction in the "atrialized" right ventricle. Part of the right ventricle is “atrialized” due to distal displacement of the septum and posterior leaflets of the tricuspid valve. They are also more prone to atrial arrhythmias due to enlargement of the right atrium.

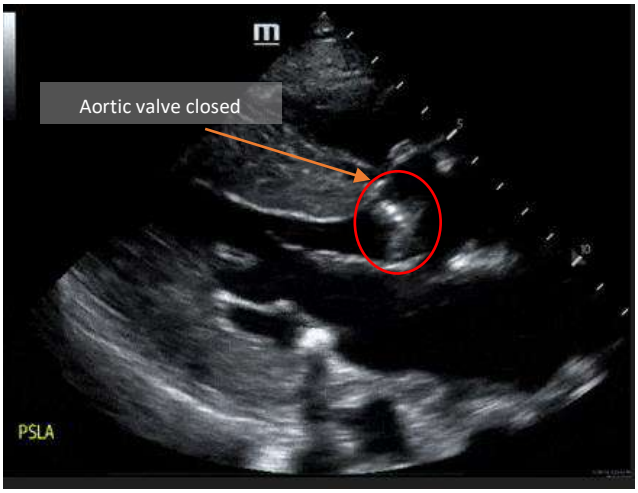


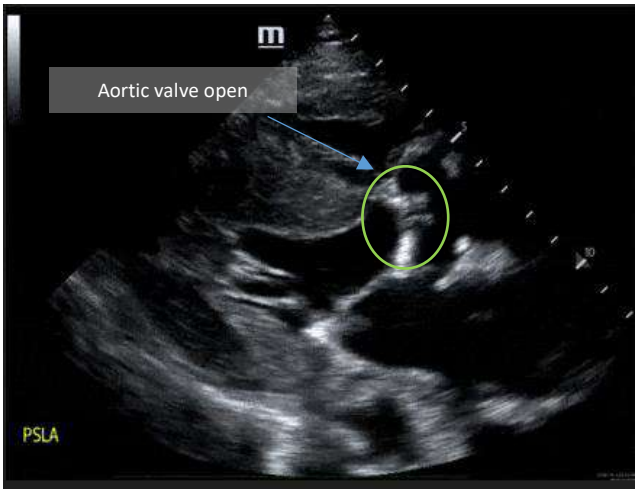
## Case 5. Aortic stenosis with AV block




**III degree AV block (complete).** The main sign of complete block is AV dissociation (the atrial rhythm (P waves) does not correspond to the ventricular rhythm (QRS)).

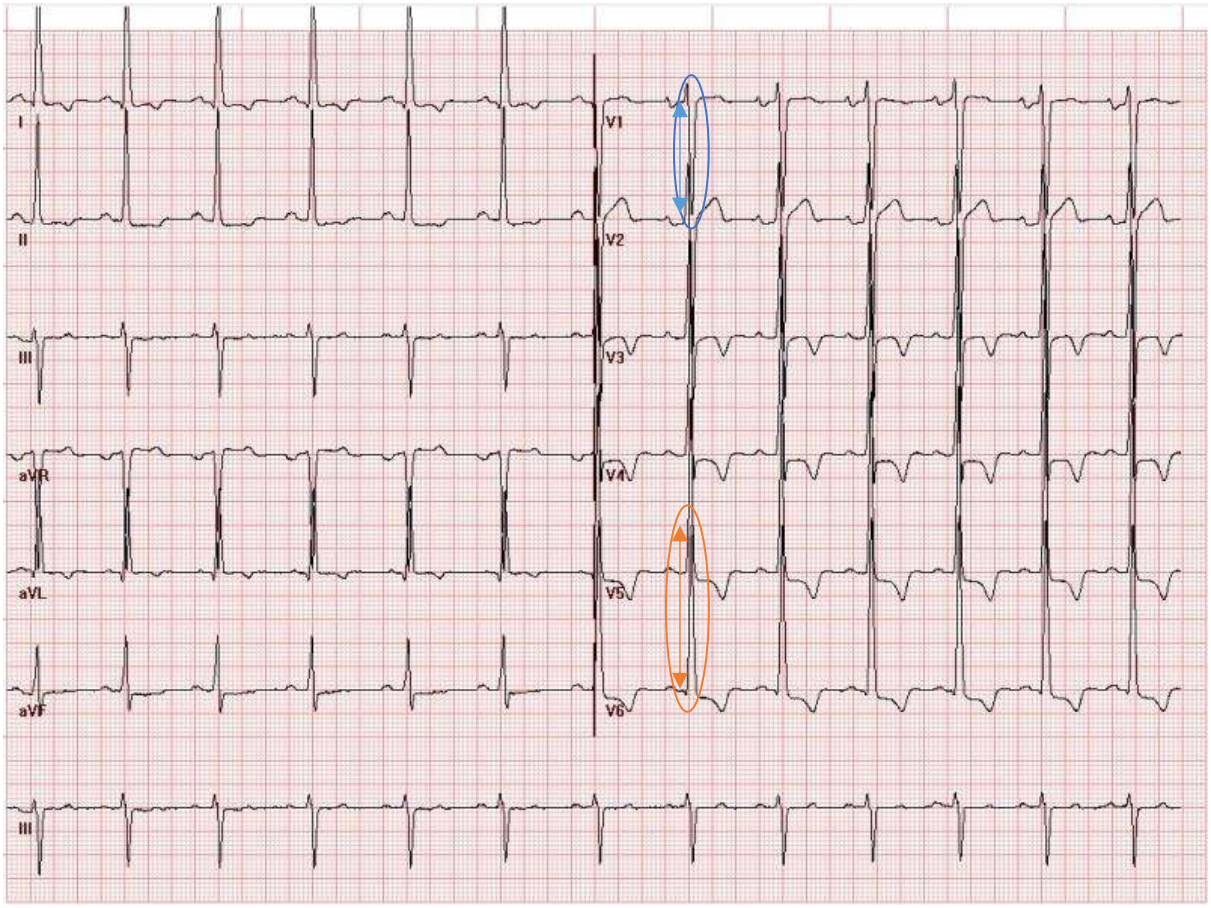
Third-degree AV block indicates a complete loss of communication between the atria and the ventricles. Without appropriate conduction through the AV node, the SA node cannot act to control the heart rate, and cardiac output can be diminished secondary to loss of coordination of the atria and the ventricles.



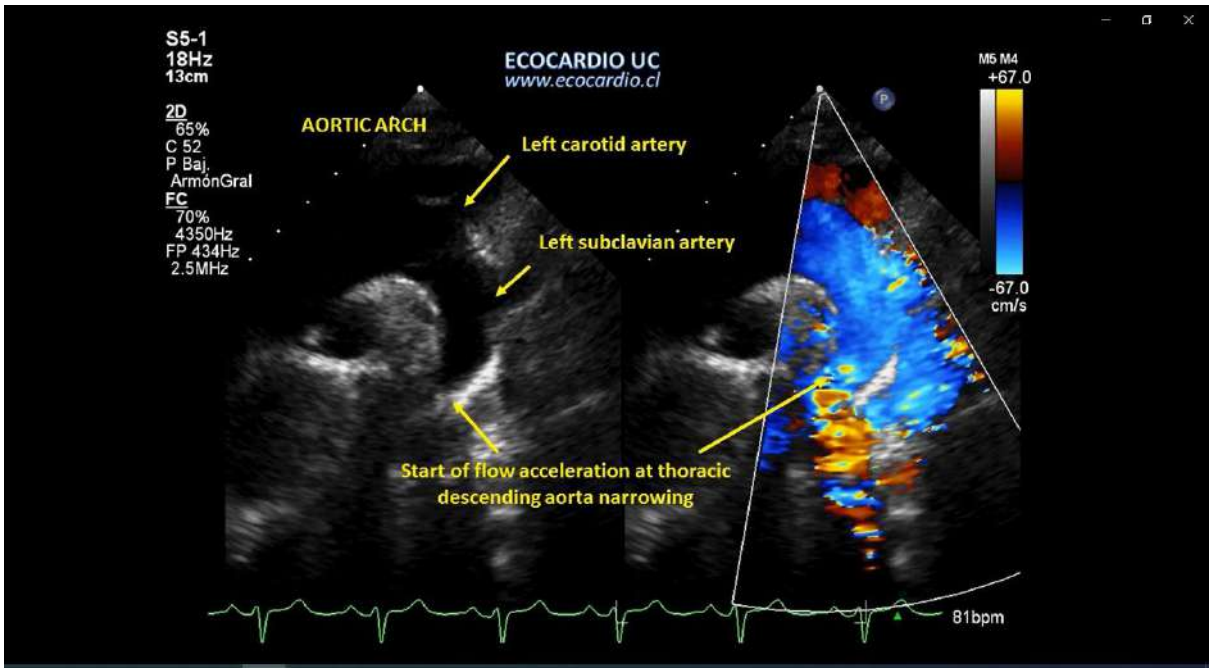

The ends of the aortic valve are thickened with calcification, one of the valve leaflets is motionless. The opening of the aortic valve is limited. In this regard, stenotic blood flow is observed in color Doppler echocardiography.

## Case 6. Coarctation of the aorta

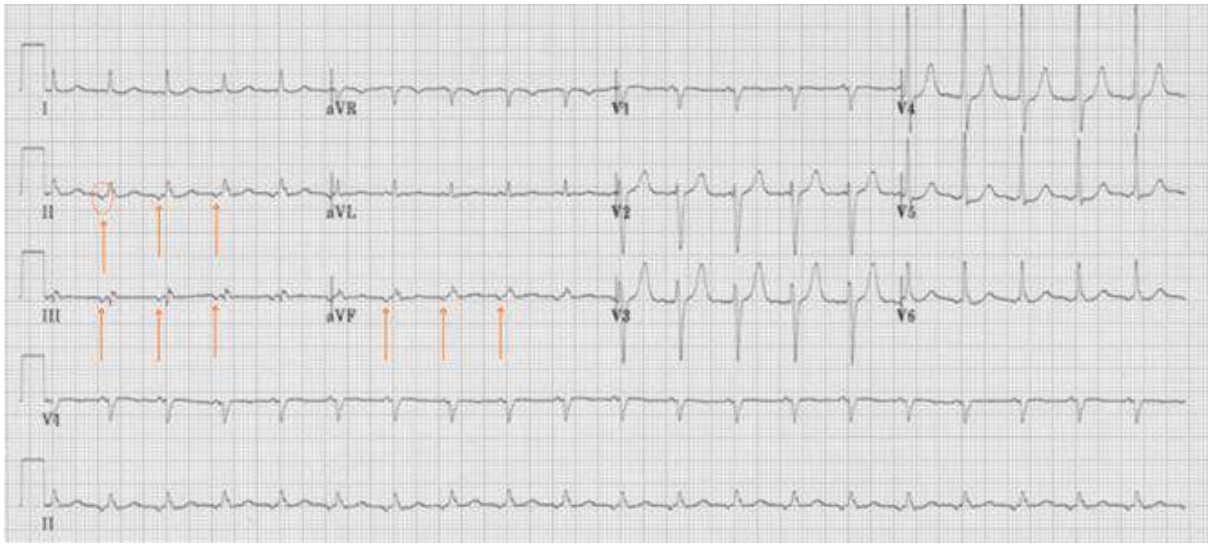



Left axis deviation (RI > RII > RIII)

Left ventricular hypertrophy: (R V6 + S V1) > 35 mm



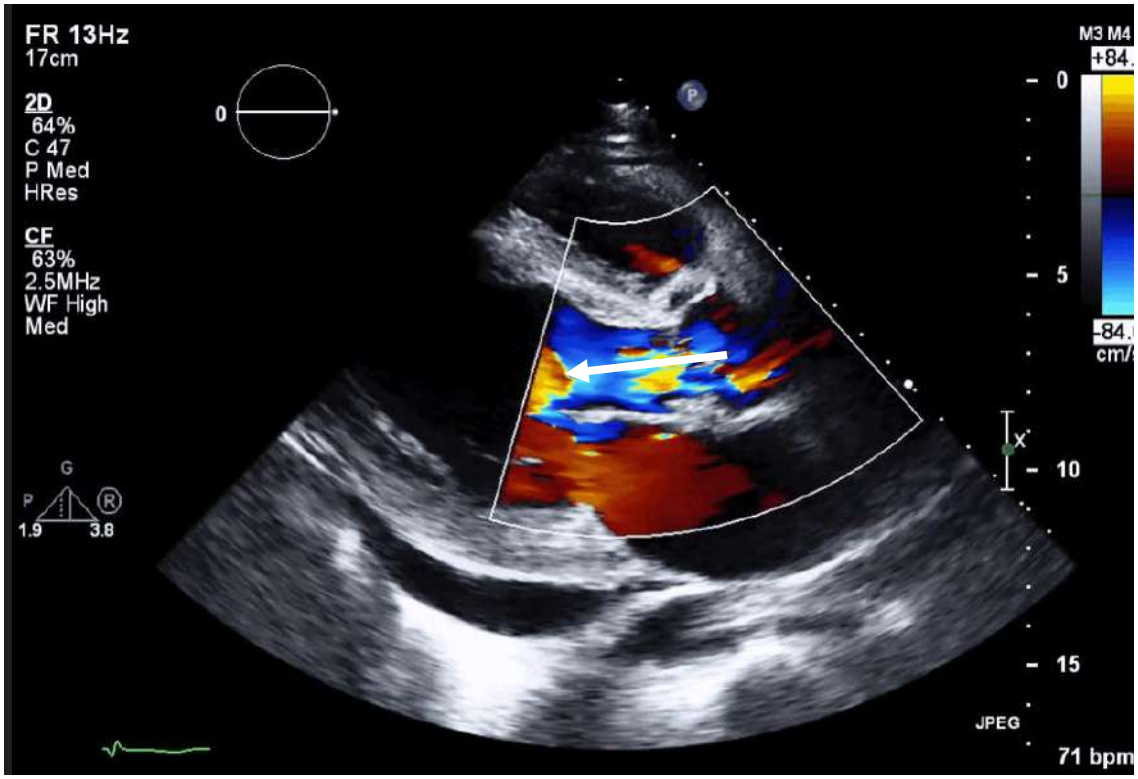
## Case 7. Aortic insufficiency




In II, III aVF leads the P waves are negative – non-sinus rhythm

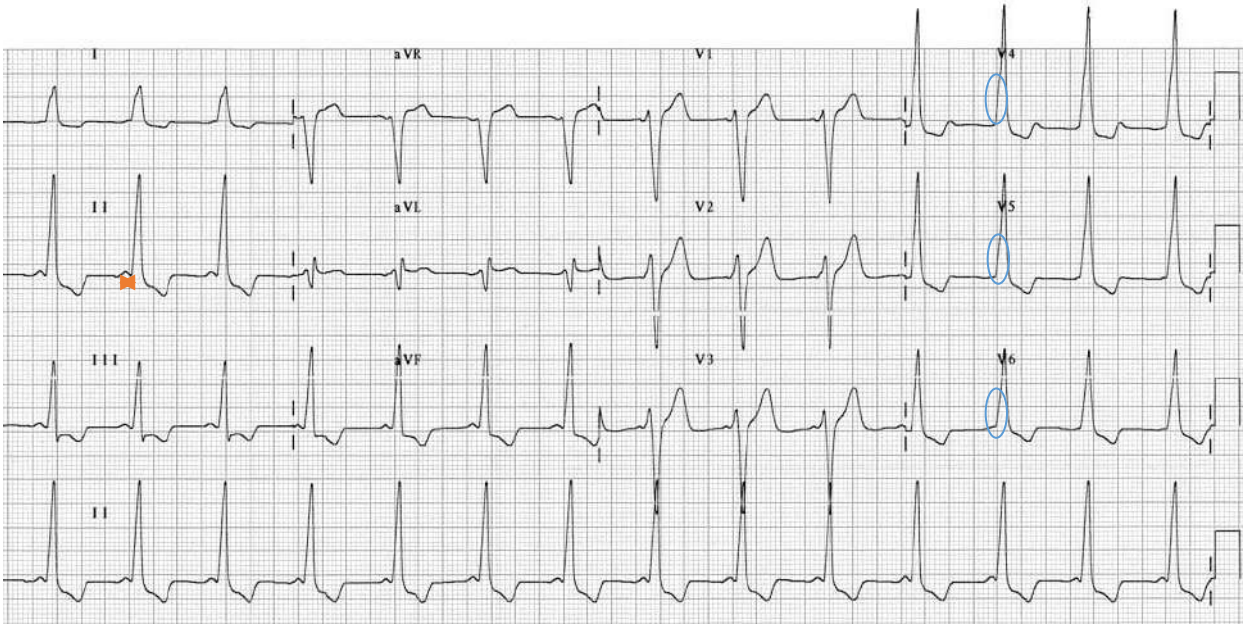
1. The QRS is not widened - the rhythm is not ventricular. Means it's supraventricular
2. The P wave comes before QRS (the atria depolarize before the AV-node and the ventricles = impulses arise from atrium)
3. Tachycardia is observed. But it's not sinus tachycardia, since the rhythm is not sinus.

Result = **Atrial/Supraventricular tachycardia (very fast impulses arising from the atria)**

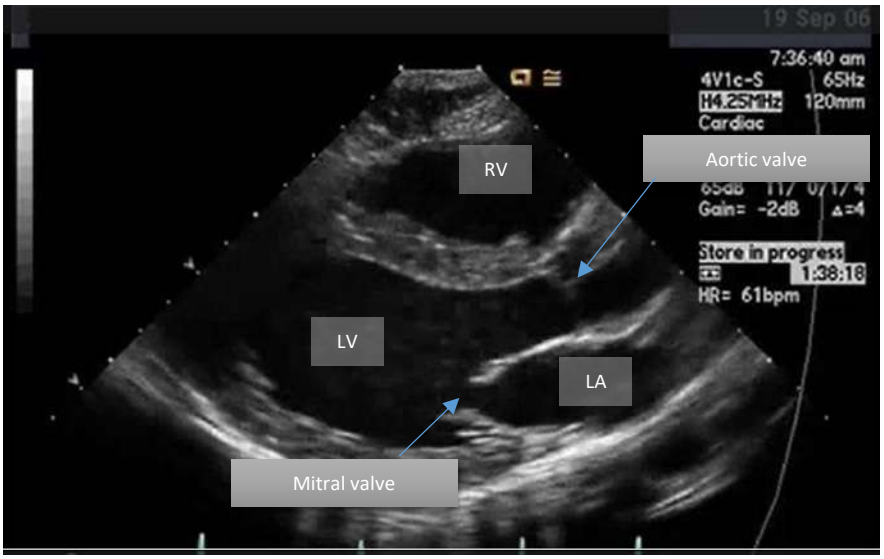


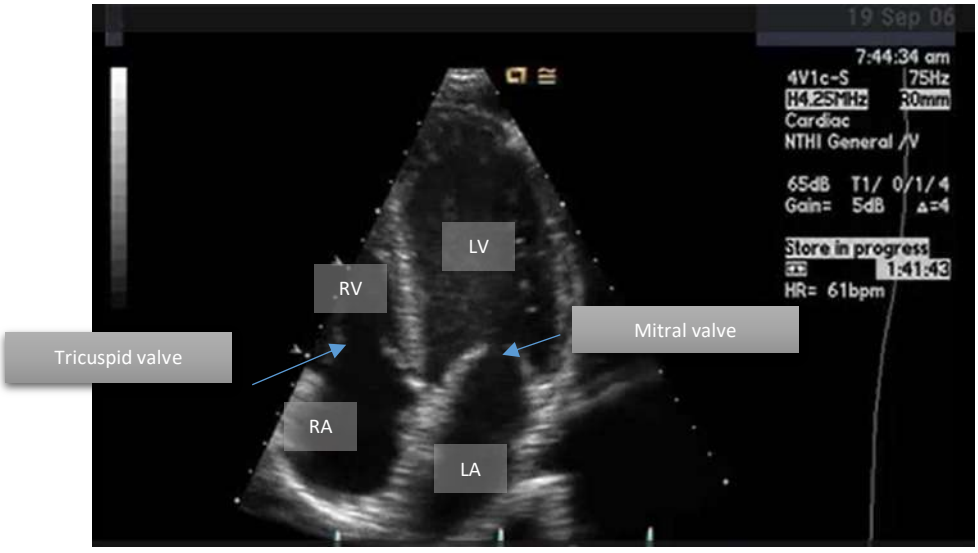

Reverse return of blood to the LV during diastole. Non-closure of the aortic valve leaflets

## Case 8. Wolff-Parkinson-White syndrome (WPW)




PR interval shortening, Delta wave



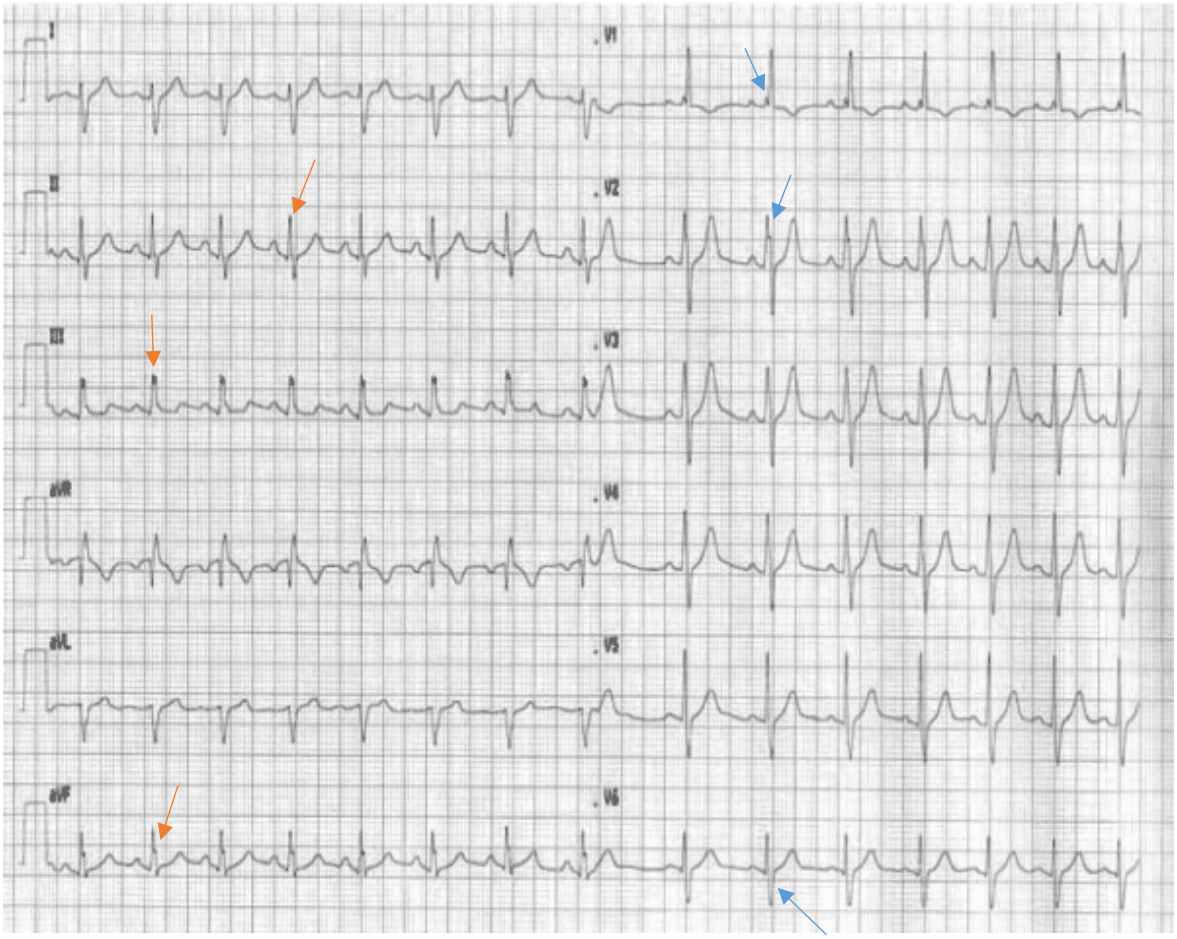

RA – Right atrium

LA – Left atrium

RV – Right ventricle

LV – Left ventricle

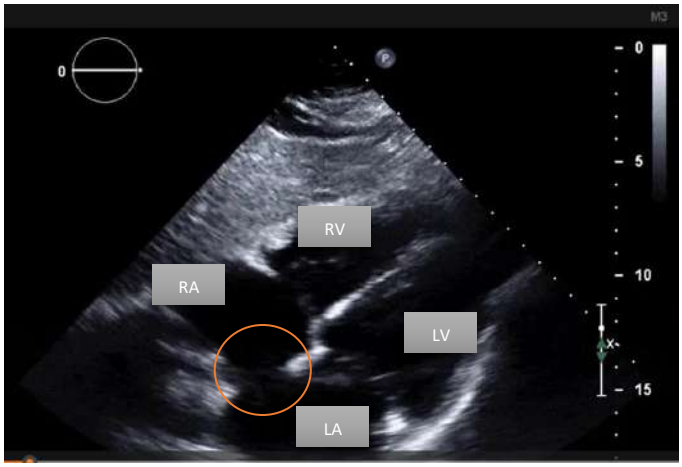
## Case 9. Atrial septal defect

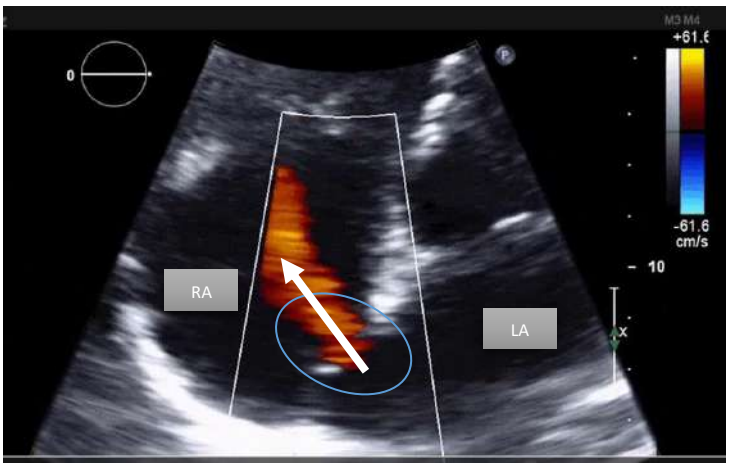


ECG characteristics of a secondary atrial septal defect (Ostium secundum) (the most common variant):

- Right axis deviation R III > R II > R I
- Notched R waves in inferior leads (II, III, aVF) **(Crochetage sign)**
- Incomplete right bundle branch block (IRBBB)

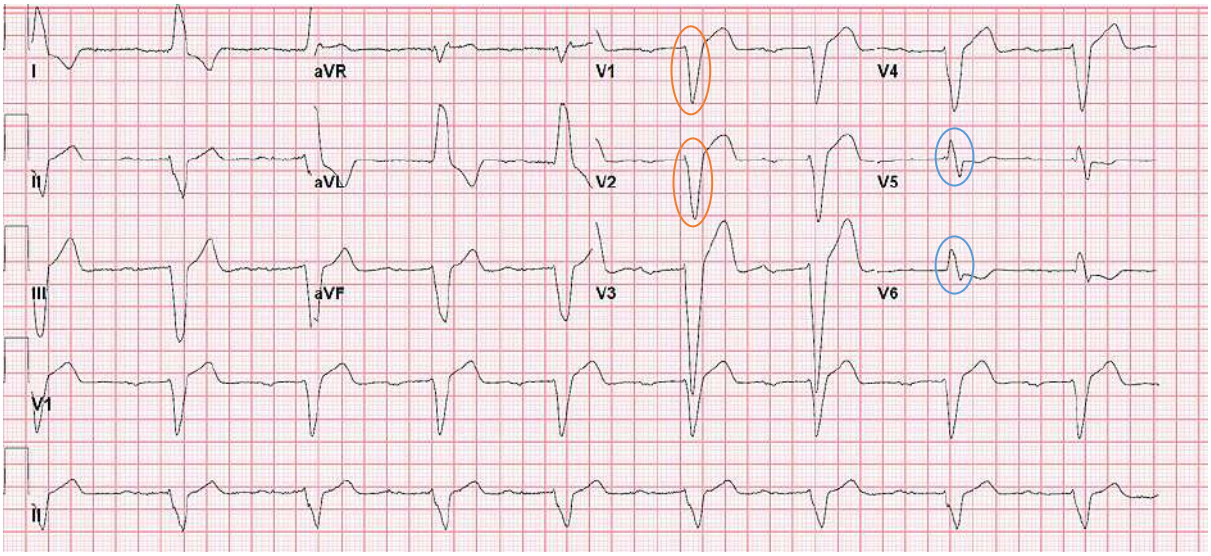
  Morphology similar to complete right bundle branch block, including rSR' in V1, but QRS width < 120 ms; therefore it is considered incomplete.



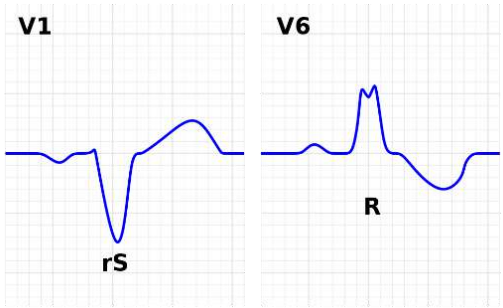

Orange circle is the **defect**, blood is thrown from the LA into the RA

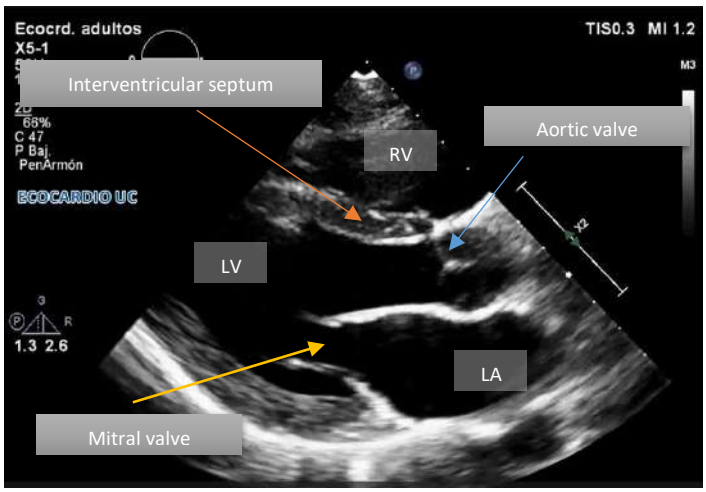
## Case 10. Ventricular septal defect with Eisenmenger syndrome

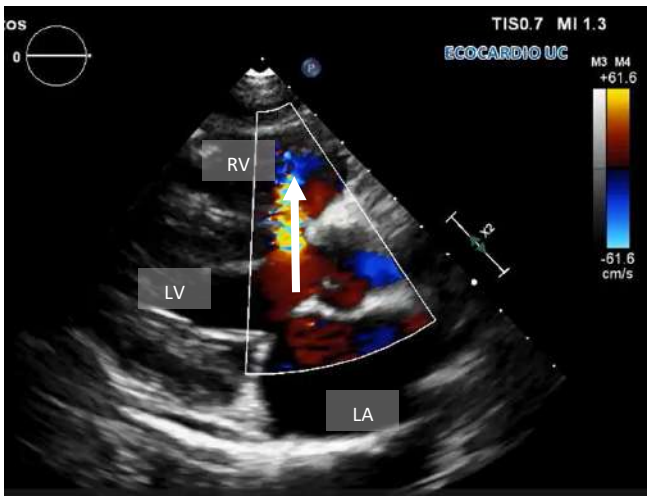



Left axis deviation R I > R II > R III

Complete left bundle branch block (LBBB): Wide QRS, jagged R in V6 and V5, deep and wide S in V1 and V2




Backflow of blood from the LV to the RV due to a defect. With the development of Eisenmenger syndrome (a long-term complication of congenital heart disease), reflux occurs from right to left, due to a compensatory hypertrophied right ventricle.

## Hand Examination: What Can I See?

- **Color:** Pallor indicates poor peripheral perfusion (eg, congestive heart failure), and cyanosis may indicate hypoxemia.

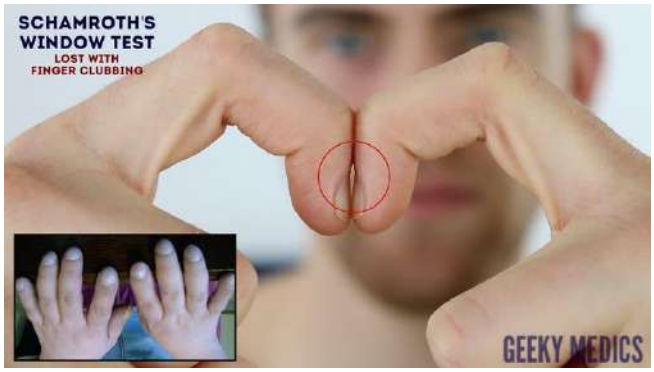


- **Xanthomas:** Yellow deposits rich in cholesterol that are often found on the palms, wrist and elbow tendons. Xanthomas are associated with hyperlipidemia (usually familial hypercholesterolemia), another important risk factor for cardiovascular disease (eg, coronary artery disease, hypertension).



- **Arachnodactyly ("spider fingers"):** The fingers and toes are abnormally long and thin compared to the palm and ball of the foot. Arachnodactyly is a feature of Marfan syndrome, which is associated with mitral/aortic valve prolapse and aortic dissection.

- **Finger clubbing and Schamroth's window test**

Signs associated with endocarditis:

**Splinter hemorrhages** are small blood clots under the nails


**Janeway lesions** - an immunoinflammatory reaction in the form of red spots or painful ecchymoses on the soles and palms that rise above the level of the skin


**Osler's nodes** are painful, reddish, tense formations the size of a pea, located in the skin and subcutaneous tissue on the palms, fingers, and soles.


Temperature:

In healthy people, hands should be symmetrically warm, indicating adequate perfusion.

**Cold hands** may indicate poor peripheral perfusion (eg, congestive heart failure, acute coronary syndrome).

**Cold and sweaty/sticky hands** are commonly associated with acute coronary syndrome.


- When palpating the carotid arteries, ensure that the patient is in a safe position on the bed, as there is a risk of reflex bradycardia when palpating the carotid artery (which could potentially cause a syncopal episode)
- Don't press too hard

## Aortic valve insufficiency. What symptoms may I notice?

**Quincke's symptom** ("capillary pulse", "precapillary pulse") - alternating redness (in systole) and blanching (in diastole) of the nail bed at the base of the nail with sufficiently intense pressure on its tip. In a healthy person, with such pressure the pale color of the nail bed remains both in systole and diastole.

**Corrigan's sign** (Increased pulsation of the carotid arteries, "carotid dance"), as well as visible pulsation in the area of all superficially located large arteries (brachial, radial, temporal, femoral, artery of the dorsum of the foot, etc.).

**De Musset's sign** - rhythmic head nodding in accordance with the phases of the cardiac cycle (systole and diastole).

**Landolfi's sign** - pulsation of the pupils in the form of their narrowing and dilation.

**Müller's sign** is pulsation of the soft palate.

# Palpation of the precordial area

## Apex beat (Apical impulse)

Palpate the apex beat with your fingers placed horizontally on the chest

In healthy people, it is usually located in the **5th intercostal space along the midclavicular line**

Displacement of the apical impulse may occur due to **ventricular enlargement**


## Parasternal heave

If present, you should feel the base of your **palm rise with each systole**

Place your palm **parallel to the left edge of the sternum (fingers vertical)** to palpate the heave

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## Additional vibrations (palpable murmurs)

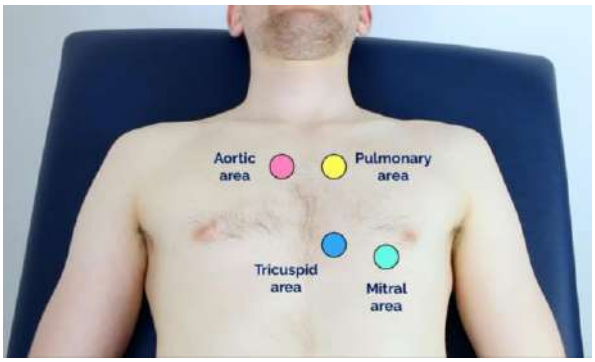
Palpable vibration caused by **turbulent blood flow through the heart valve** (palpable murmur)

You should evaluate the pulsation of **each of the heart valves** in turn

To do this, place your hand horizontally on the chest wall, **placing your palm on the valve being assessed**

## Location of heart valves:

- Mitral valve: 5th intercostal space at the midclavicular line
- Tricuspid valve: 4th-5th intercostal space at the lower left edge of the sternum
- Pulmonary valve: 2nd intercostal space at the left edge of the sternum
- Aortic valve: 2nd intercostal space at the right edge of the sternum




## Auscultation of the heart

First, **palpate the carotid pulse** while auscultating the valve to determine the first sound (S1)

It should coincide with the pulse

Subsequently, continue to check the pulse to determine what kind of murmur it is

(systolic - matches; diastolic - does not match)

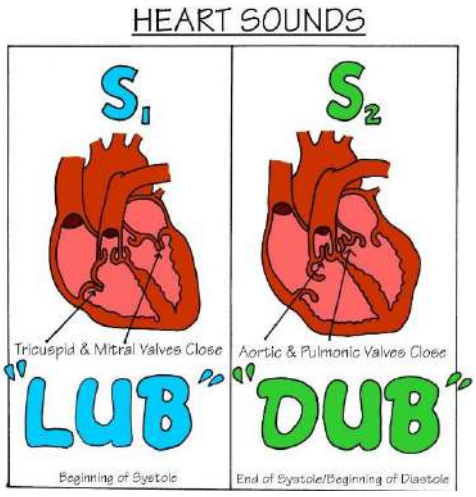

## Normal heart sounds

**First heart sound (S1)**

- Closure of mitral M1 and tricuspid T1 (atrioventricular valves)
- Beginning of ventricular systole
- Louder – at the apex and lower left border of the sternum

**Second heart sound (S2)**

- Closure of aortic A2 and pulmonary P2 (semilunar valves)
- End of ventricular systole
- Louder – on base




## Extra heart sounds (gallop rhythms)

**Third heart sound (S3)**
**"ventricular gallop"**

- Occurs at the beginning of diastole, with passive filling of the LV (volume overload)
- The LV is distended, the mitral valve opens during diastole, blood falls into the LV and "hits" the walls. This is what we hear
- May be a sign of systolic congestive heart failure

**Fourth heart sound (S4)**
**"atrial gallop"**

- Occurs at the end of diastole, with active filling of the LV
- The LV is hypertrophied, inelastic, simulated mitral stenosis occurs, the LA contracts and tries to pass blood flow into the LV (this gallop is produced by the sound of blood being forced into a stiff or hypertrophic ventricle). This is what we hear
- May be a sign of diastolic congestive heart failure

## Additional heart sounds

1. **Opening snap** - due to forced opening of the mitral valve in mitral stenosis
2. **Systolic ejection click** - due to rapid opening of stenotic A2 or P2
3. **Systolic non-ejection click** - due to rapid opening of M1 or T1 in mitral valve prolapse
4. **Pericardial friction rub** - superficial scratching sound. Occurs at any time in the cardiac cycle. Sign of pericarditis

## Heart murmurs

Table 2: Pitches and quality of heart murmurs

| Shape | Image | Associated murmurs |
|---|---|---|
| **Crescendo**—gradually increases to a peak intensity |  | Subaortic stenosis<br>Pulmonic stenosis<br>Ventricular septal defect |
| **Decrescendo**—gradually tapers off from an initial peak |  | Subaortic stenosis<br>Pulmonic stenosis |
| **Diamond, or crescendo-decrescendo**—builds up to a peak intensity and then tapers off |  | Subaortic stenosis<br>Pulmonic stenosis<br>Ventricular septal defect |
| **Plateau**—equal in intensity throughout |  | Mitral or tricuspid regurgitation |

**Systolic** – heard during systole. On which valve we hear better is where the problem arises during systole

**Diastolic** – heard during diastole. On which valve we hear better is where the problem arises during diastole

**Murmur irradiation**