A

Acute Coronary Syndrome

- Term used to describe a constellation of symptoms resulting from acute myocardial ischemia.
- Two major groups: (1) ST elevation myocardial infarct (STEMI) and (2) non-ST elevation myocardial infarction (NSTEMI and unstable angina).
- Treatments: (1) STEMI, reperfusion therapy; (2) NSTEMI, not treated with thrombolysis.

Adenosine

- Vasodilator agent used in myocardial stress perfusion.
- Most commonly used stress agent due to its ultrashort half-life (<10 s).
- Dose: 140 μg/kg/min for 3–6 min.
- Caffeine or other methylxanthines should be avoided for 24 h before the administration.

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- Contraindications: (1) high-grade AV block; (2) asthma or COPD; (3) sinus bradycardia; (4) systemic hypotension (BP < 90 mmHg); (5) severe carotid stenosis.
- Side effects: transient heart block, transient hypotension, transient tachycardia, bronchospasm.
- Antagonist: aminophylline, 50–100 mg over 1 min, injection can be repeated up to 250 mg total dose.
- See also "Perfusion imaging, myocardial".

ALARA

- Procedures that utilize ionizing radiation should be performed according to the As Low As Reasonably Achievable (ALARA) principles, and physicians prescribing and performing cardiac imaging should be very confidential with the radiation dose delivered and strategies able to minimize radiation dose exposure.

Alcohol Septal Ablation

- HCM treatment in patients with severe LVOT dynamic obstruction consisting in the injection of alcohol into the septal perforator arteries to induce localized infarct of the hypertrophied segment.
- Complications: AV block and increased risk of ventricular arrhythmias.

Amyloidosis, Cardiac

- *Characteristics*: (1) deposition of amyloid protein in any organ; (2) hereditary or acquired; (3) cardiac involvement frequent in primary AL amyloid including myeloma and

lymphoma; rare in AA amyloid secondary to chronic infection.
- *MR*: (1) LV concentric hypertrophy, heart failure (restrictive pattern with atrial dilatation followed by systolic dysfunction); (2) LE, subendocardial ring pattern or diffuse transmural pattern, involves both ventricles; (3) in late enhancement, can be difficult to suppress the myocardial signal due to extensive amyloid deposition.
- *Differential diagnosis*: hypertrophic cardiomyopathy, Anderson–Fabry disease, hypertensive hypertrophy.
- *Tips and tricks*: Amyloidosis is associated with renal failure; look for renal morphological alteration using coronal single-shot turbo spin-echo sequence with large FoV.

Anderson–Fabry Disease

- *Characteristics*: X-linked lysosomal storage disease for the lack of alpha-galactosidase A.
- *MR*: (1) LV concentric hypertrophy; (2) intramural LE (inferolateral wall); (3) valvular thickening (aortic and mitral); (4) conduction abnormalities.
- *Differential diagnosis*: hypertrophic cardiomyopathy, amyloidosis, sarcoidosis, hypertensive hypertrophy.

Angina

- Chest pain caused by myocardial ischemia.
- Causes: coronary stenosis, tachycardia, anemia, aortic stenosis, left ventricular hypertrophy, syndrome X, coronary artery spasm.
- Classification: (1) stable angina, pain occurring after constant level of exercise; (2) unstable angina, pain on minor exercise or at rest which is of new onset or a worsening angina.

Angiosarcoma

- Most common primary cardiac malignant tumor.
- Two forms: (1) focal, usually in the right atrium; (2) diffuse, with pericardial infiltration.
- *MR*: heterogeneous intracardiac mass with extensive myocardial infiltration.

Aorta, Thoracic

- Aortic values should be normalized for patient BSA.
- A diameter >40 mm for ascending aorta is considered dilated.
- Ascending aorta should be less than twice the diameter of the descending.
- *CT*/*MR*: To accurately evaluate ascending aorta and aortic annulus dimensions, use cardiac gating.

Aortic Aneurysm, Thoracic

- Surgical repair should be considered in (1) asymptomatic patients with ascending aorta or aortic sinus diameter >5.5 cm, (2) patients with Marfan syndrome or other genetically mediated disorders (vascular Ehlers–Danlos syndrome,

Table 1 Normal adult thoracic aorta diameters

Thoracic aorta diameters	
	Range (cm)
Root female	3.50–3.72
Root male	3.63–3.91
Ascending female, male	2.68
Mid-descending female	2.45–2.64
Mid-descending male	2.39–2.98

Turner's syndrome, bicuspid aortic valve, or familial thoracic aortic aneurysm and dissection) with ascending aorta or aortic sinus diameter >4.0 or 5.0 cm depending on the condition, (3) patients with a growth rate of more than 0.5 cm/year in an aorta that is less than 5.5 cm, and (4) patients undergoing aortic valve repair or replacement and who have an ascending aorta or aortic root >4.5 cm should be considered for concomitant repair of the aortic root or replacement of the ascending aorta.

- Impending signs of rupture: (1) Maximal diameter, the most important factor to predict likelihood of aneurysmal rupture; of patients suffering for aneurysms >5 cm, an aneurysmal rupture within 5 years has a likelihood of 25–41 %; a 5–7 cm and >7 cm sized aneurysms have annual risks of rupture of 6–11 % and 20 %; (2) expansion rate, if higher than 1 cm/6 months, might be a reasonable criterion of impending rupture, and an enlargement rate of 10 mm or more per year is also considered as an indication for surgical repair; (3) hyperdense aortic wall crescent, appreciated on unenhanced CT and represents an internal dissection of blood into the peripheral thrombus or into aneurysm wall; (4) infected aneurysm, more prone to rupture (rate of 53–75 % at surgical repair); (5) thrombus and calcification, thick circumferential thrombus has a protective value against rupture, and a focal discontinuity in circumferential wall calcifications is more commonly observed in unstable or ruptured aneurysms.

Aortic Arch, Cervical

- Congenital variant in which the aortic arch course is higher than normal and lies behind the left clavicle.
- Clinical consequences if central venous cannulation is required.

Aortic Arch, Right Sided

- Congenital variant with the thoracic aorta lying on the right side (0.5 % of population).
- Abdominal aorta usually normal.
- No clinical consequences.

Aortic Bleb

- Focal transverse outpouching of the aortic wall.
- Impending sign of aneurysm rupture.
- *CT*: use multiplanar reconstruction and volume rendering algorithm to detect aortic bleb.

Aortic Bovine Arch

- The left common carotid artery has a common origin with the innominate artery.
- A similar but less common variant occurs when the left common carotid artery originates directly from the innominate artery rather than as a common trunk.
- No clinical consequences.

Aortic Coarctation

- Narrowing of the aorta just distal to the left subclavian artery due to ductus arteriosus abnormalities and remnants.
- Isolated or in combination with other anomalies (bicuspid aortic valve, VSD, mitral disease, intracranial aneurysms, Turner's syndrome, Shone's syndrome).
- Discrete or segmental.

- Poststenotic dilatation of the proximal descending aorta.
- Always look at the transverse arch caliber (exclude hypoplasia) and branches, particularly the position of the left subclavian artery related to the site of coarctation.
- 50 % patients with bicuspid aortic valve.
- Aortic coarctation and bicuspid aortic valve are considered by many authors as a diffuse aortopathy.
- In native severe coarctation the amount of flow at the level of minimum caliber is very low and there might be no pressure gradient. This is in keeping with dominant collateral flow.
- Maximum gradient >20 mmHg indicates need for surgical treatment.
- *Postsurgical complications*: (1) isthmic aneurysms; (2) recoarctation, maximum gradient >20 mmHg; (3) endocarditis; (4) bicuspid aortic valve: ascending aorta dilatation; (5) intracranial arterial aneurysms; (6) coronary artery disease.
- *MR*: (1) Use black blood imaging on the arch ("candle stick" view), particularly for stents; (2) "diastolic tail" is a sign of coarctation with competent aortic valve and good elastance of the thoracic aorta; (3) flow of the descending aorta at the diaphragm in through plane with "diastolic tail"; the aortic valve must be competent; (4) peak velocity measured with a through-plane flow immediately after the site of maximum stenosis; (5) quantification of collaterals by measuring flow volume of descending aorta at the level of coarctation and at the diaphragm. In normal subject a flow reduction is observed due to orthodromic outflow in intercostal arteries. In coarctation there is a flow increment for the presence of retrograde inflow from the intercostal arteries; (6) reporting: site, morphology, extension, gradient, collaterals, LV function and dimensions (hypertrophy), mitro-aortic disease.
- *CT*: can be useful in postsurgical evaluation, stent, and coronary assessment.
- *Differential diagnosis*: (1) pseudocoarctation, tortuous aorta without stenosis; (2) hypoplastic aortic arch, with or without coarctation.

Aortic Dissection

- Stanford classification: (1) Type A: involves the ascending aorta and/or aortic arch and possibly the descending aorta. The tear can originate in the ascending aorta, in the aortic arch, or in the descending aorta. Requires primary surgical treatment because ascending aortic dissections often involve the aortic valve; (2) type B: involves the descending aorta or the arch (distal to right brachiocephalic artery origin), without involvement of the ascending aorta. Medically as initial treatment with surgery reserved for any complications.
- *CT*: It is a fast noninvasive test that will give an accurate three-dimensional view of the aorta.
- *MR*: Time-consuming procedure with inferior spatial resolution. Second-line technique. Useful in postsurgical follow-up.

Aortic Valve

- Normal annulus area: 2 cm^2 in adults, varying from 2.5 to 4.0 cm^2.
- *CT*: Planimetry is best achieved in axial MIP reformatted image during midsystole (approximately 20 % of the R-R interval or 50–100 ms from the R-wave peak depending on heart rate) to minimize artifacts.
- *MR*: (1) LVOT (oblique axial) and LVIT/OT (oblique coronal) views; (2) short axis through aortic valve cusps, perpendicular to both the precedent views and at the level of the tips; (3) planimetry is achieved in an imaging plane through the valve tips in systole and acquiring multiple thin (4–5 mm) slices parallel to the valve orifice.

Aortic Valve, Bicuspid

- The most common congenital cardiac defect (1–2 % of population).
- Two types: (1) two morphological and functional cusps and (2) three cusps, two of which are fused to a single aberrant one with the development of a raphe.
- Association with aortic coarctation, PDA, and coronary artery anomalies.
- Dilatation of sinus of Valsalva and ascending aorta.
- *CT*: Can be difficult to differentiate the two types, because at diastole the raphe can be mistaken as a normal commissure. Reconstructions during systole are required.
- *MR*: Permits to visualize the aortic valve morphology in axial image in systole. For quantification velocity mapping in systole shows the forward flow and peak velocity.

Aortic Valve, Regurgitation

- Causes: (1) valvular (the cusps are thickened and shortened); (2) secondary to dilatation of the aortic annulus; (3) secondary to aortic dissection.
- *CT*: (1) Coronal MIP reformatted image obtained during diastole; (2) malcoaptation of the cusps is well visualized during mid- to end diastole; (3) measure the regurgitant orifice.
- *MR*: (1) Jet is best visualized in the coronal or oblique coronal plane on cine imaging; (2) ensure that the image slice is at the magnet isocenter to minimize quantification errors.
- *Quantitative Flow Measurements*
  - Through-plane velocity mapping above the valvular plane, best if between the coronary ostia and the aortic valve; in order to ensure that the velocity vectors for the majority

flow are through plane in this image, it is best to use two perpendicular images through the ascending aorta and prescribe the oblique axial plane perpendicular to both.
- In isolated aortic regurgitation, set a through-plane velocity window of ±1.5 m/s; if significant aortic stenosis is present a dual velocity window may be necessary, with a high systolic setting of ±5 m/s, changing to ±1.5 m/s for the diastolic frames.
- Flow stream measurements are more precise when the aortic root is not dilated and is immobile, for example, after surgery.
- To estimate the velocity precisely, excursion height and lumen diameter should be measured, because of the underestimation of aortic regurgitation related to a combination of the movement of the aortic valve and elastic expansion of the aortic sinuses and root (aortic wall distensibility).
- Regurgitant volume is the amount of retrograde diastolic flow and is measured in ml/beat.
- Regurgitant fraction (%): aortic retrograde flow (ml/beat)/aortic forward flow (ml/beat) × 100.
- If flow quantification cannot be performed, regurgitant volume could be assessed with LV and RV stroke volume (LVSV–RVSV), but this is less direct and relies on the lack of any other valve regurgitation or shunt.
- An approximate assessment of the severity of aortic regurgitation can also be obtained by the visualization of the signal void of the regurgitant jet on cine imaging, but this method is subject to many potential errors and is not recommended for accurate evaluation:
    - Grade 1: signal loss close to the valve.
    - Grade 2: signal loss extending into the proximal chamber.
    - Grade 3: signal loss filling the whole of the proximal chamber.
    - Grade 4: signal loss in the receiving chamber throughout the relevant half of the cardiac cycle.

Table 2 Degree of aortic valve regurgitation

Aortic valve regurgitation		
Degree	Regurgitation fraction (%)	Regurgitation volume (ml/beat)
Mild	<30	<30
Moderate	30–49	30–59
Severe	≥50	≥60

Aortic Valve, Stenosis

- Three types of aortic stenosis: (1) valvular (congenital or acquired), (2) subvalvular (fibrous membrane or muscular hypertrophy), and (3) supravalvular.
- Patients are usually asymptomatic until the stenosis reduces the aortic valve area to 1 cm^2.
- Evaluation of leaflet morphology, thickening, and calcifications.
- *CT*: (1) Coronal MIP reformatted image obtained during systole; (2) restriction of the aortic valve orifice; (3) thickening and calcification of the aortic valve cusps, calcification is associated with the severity of stenosis and it can be quantified; (4) decreased excursion of the valve cusps.
- *MR*: (1) direct jet visualization; (2) stenotic jet could be not parallel to the LV outflow tract; (3) late enhancement can be present in severe long-standing stenosis as patchy mid-wall enhancement, usually in conjunction with significant left ventricular hypertrophy.
- *Quantitative Flow Measurement*
  - For a flow quantification, in-plane velocity mapping in the outflow tract is used usually just distal to the valve tips; adapt velocity encoding to actual velocity using the lowest velocity without aliasing.
  - Through-plane velocity mapping in a plane perpendicular to the direction of flow, at the identified location of peak velocity.
  - For a flow quantification in-plane velocity mapping in the outflow tract, manually adjust the velocity window.

Table 3 Degree of aortic valve stenosis

Aortic valve stenosis			
Degree	Area (cm^2)	Mean gradient (mmHg)	Jet velocity (m/s)
Mild	1.5	<25	<3.0
Moderate	1.0–1.5	25–40	3.0–4.0
Severe	<1.0	>40	>4.0

Aortitis

- Broad category of infectious or noninfectious conditions in which there is abnormal inflammation of the aortic wall.
- Classification: (1) Noninfectious aortitis occurs in large-vessel vasculitis such as Takayasu arteritis and giant cell arteritis; aortic involvement is also seen in other rheumatic disorders such as rheumatoid arthritis, seronegative spondyloarthropathies, Reiter syndrome, Behcet disease, SLE, radiation-induced aortitis, and some idiopathic conditions; (2) infectious aortitis may be secondary to tuberculosis, syphilis, or infection with Salmonella or other bacterial or viral pathogens.
- *CT/MR*: Multimodality imaging approach is often required for the evaluation of both the aortic wall and aortic lumen, as well as for the surveillance of disease activity and treatment planning. PET imaging can be useful in the presence of equivocal findings.
- *Differential diagnosis*: Aortic intramural hematoma, aortic dissection.
- See also "Takayasu arteritis".

Apex, Ventricular

- Apical scar and akinesia after surgical intervention.
- Postsurgical apical false aneurysm.

- Thickness left ventricular apex in basal study: (1) apical thrombus post-myocardial infarction; (2) apical hypertrophic cardiomyopathy.
- *MR*: Perform EG and LE acquisitions to differentiate the two forms.

Arrhythmia

- *MR*: (1) Use fast sequence reducing number of acquisitions; (2) in patient with severe arrhythmia, a real-time acquisition can be used to evaluate ventricular volumes.
- *CT*: (1) Prospective gating technique allows to study patients with mild arrhythmia because data is rejected if the R-R interval exceeds a certain tolerance. In contrast the scan time is increased. Inject more medium contrast in arrhythmic patient when using prospecting gating.
- Antiarrhythmic medication administration is mandatory prior the exam.
- Arrhythmia can influence the accuracy of ventricular volumes.

Arrhythmogenic Right Ventricular Cardiomyopathy

- Genetic cardiomyopathy characterized by fibrofatty replacement of the right ventricular myocardium.
- In the early stage of pathology structural replacement may be absent or confined to a localized region of the RV, generally the inflow tract, outflow tract, and apex of the right ventricle (triangle of dysplasia).
- Patients could present symptomatic arrhythmias and right ventricle morphological abnormalities.
- Diffuse disease may result in biventricular heart failure, whereas ventricular arrhythmias may or may not be present.

- Fibrofatty infiltration: Specific histology findings of this pathology are fibrofatty replacement of myocardium of right ventricle in sub-tricuspid portion, outflow tract, and apex.
- *MR*: (1) Sensitivity and specificity of magnetic resonance to discover myocardial fibrofatty infiltration in ARVC between 22 and 100 %; (2) BB images are usually used for evaluation of fibrofatty infiltration; (3) signs of ARVC include focal hypokinesis, akinesis, and dyskinesis; (4) LE: useful for the evaluation of fibrofatty infiltration. It is frequently observed in anterobasal region and right ventricular outflow tract. LE usually seen only in advanced disease.
- Ventricular function: Majority of patients (75 %) compatible with diagnosis of ARVC present various degree of right ventricle enlargement and dysfunction.
- Diffuse LV involvement: consider alternative diagnosis (e.g., sarcoidosis).
- Pitfalls: dyskinetic area near moderator band could be normal.
- *Differential diagnosis*: dilated cardiomyopathies, sarcoidosis, valvular or congenital disease responsible for RV dilatation.
- The diagnosis is not made with CMR alone!
- ARVD Task Force Criteria: definite diagnosis, 2 major OR 1 major + 2 minor; borderline, 1 major + 1 minor OR 3 minor; possible, 1 major OR 2 minor.

Table 4 ARVD Task Force Criteria

2010 ARVD Task Force Criteria	
1. *Global/regional dysfunction/structural alterations*	
Major	Regional RV akinesia or dyskinesia or dyssynchronous RV contraction *and* one of the following: Ratio of RV EDV/BSA ≥110 mL/m^2 (male) or ≥100 mL/m^2 (female) or RV ejection fraction ≤40 %
Minor	Regional RV akinesia or dyskinesia or dyssynchronous RV contraction *and* one of the following: Ratio of RV EDV/BSA ≥100 to <110 mL/m^2 (male) or ≥90 to <100 mL/m^2 (female) or RV ejection fraction >40 to ≤45 %

Table 4 (continued)

2010 ARVD Task Force Criteria	
2. *Tissue characterization*	
Major	Residual myocytes <60 % by morphometric analysis (or <50 % if estimated), w/fibrosis replacement of the RV free wall in ≥1 sample, w/ or w/o fatty replacement of tissue on endomyocardial biopsy
Minor	Residual myocytes 60–75 % by morphometric analysis (or 50–60 % if estimated), w/fibrosis replacement of the RV free wall in ≥1 sample, w/ or w/o fatty replacement of tissue on endomyocardial biopsy
3. *Repolarization abnormalities*	
Major	TWI (V_1, V_2, V_3) or beyond; >14 years; in the absence of complete RBBB QRS ≥120 ms
Minor	TWI in V_1 and V_2 or beyond; >14 years; in the absence of complete RBBB or in V_4, V_5, or V_6 TWI in V_1–V_4; >14 years; in the presence of complete RBBB
4. *Depolarization/conduction abnormalities*	
Major	Epsilon wave in right precordial leads (V_1–V_3)
Minor	LP by SAECG in ≥1 of 3 parameters in the absence of QRS duration ≥110 ms on ECG Filtered QRS duration ≥114 ms Duration of terminal QRS < 40 μV (LAS duration) ≥38 ms RMS voltage of terminal 40 ms ≤20 μV TAD of QRS ≥55 ms measured from nadir of S wave to end of QRS in the absence of RBBB
5. *Arrhythmias*	
Major	NSVT or sustained VT
Minor	NSVT or sustained VT or RV outflow configuration, LBI axis or of unknown axis >500 ventricular extrasystoles per 24 h (Holter)
6. *Family history*	
Major	ARVC confirmed in FDR who meets TFC ARVC confirmed pathologically at autopsy or surgery in FDR Pathogenic mutation
Minor	History of ARVC in FDR in whom is not possible to determine if it meets TFC Premature SD (<35 years) due to suspected ARVC/D in FDR ARVC confirmed pathologically or by current TCF in second-degree relative

Artifacts, Magnetic Resonance

- To reduce artifacts due to metallic objects or device: (1) Put a saturation band on the ferromagnetic object which causes the artifact; (2) use the shimming; (3) gradient-echo sequences are more prone to artifacts, use spin echo; (4) in LE imaging use spoiled gradient-echo sequences which are less prone to susceptibility artifacts than balanced gradient-echo sequences with magnetization recovery.

Assiste Device, Left Ventricular

- Left ventricular assist device (LVAD) is an automatic pump which helps cardiac function in patient with severe heart failure waiting for transplantation (artificial heart).
- They are also used in patients with a potentially reversible cause of heart failure.
- CT can be performed with good results.
- MR cannot be performed.

Atrial Fibrillation

- Most common cardiac arrhythmia (0.5–1 %).
- Loss of atrial coordinated contraction with atrial dilatation.
- Irregular ventricular rate and absence of P waves.
- Ventricular rate depends on AV nodal function.
- Atrial trigger pints arise near the pulmonary vein (PV) orifice.
- Therapy: catheter ablation, two ways—(1) electrical isolation between LA and each PV (risk, 3 % pulmonary stenosis) and

(2) anatomical isolation which creates an ablation line isolating not only the PV but the LA adjacent tissue (no risk of pulmonary stenosis).
- *CT/MR*: (1) Angiographic evaluation of pulmonary veins (anomalous vessel); (2) images fusion with electrophysiology data to obtain morpho-functional map.
- New MR sequences can evaluate atrial fibrosis post-ablation therapy to assess complete/incomplete arrhythmogenic foci isolation.

Atrial Isomerism

- Right isomerism: two right-sided atria.
- Left isomerism: two left-sided atria.
- Usually associated with abdominal organ anomalies (e.g., azygos continuation).

Atrial Septal Aneurysm

- Intact atrial septum with significant movement of membranous septum at least 15 mm from diastole to systole.

Atrial Septal Defect

- Interatrial communication.
- Type: (1) Ostium secundum (fossa ovalis), most common; (2) ostium primum (anterior fossa ovalis) occurs at the atrioventricular level, often involves AV valves (mitral valve cleft), and might be associated to atrioventricular septal defect

(AVSD); (3) sinus venosus (adjacent to superior/inferior vena cava) can be associated with anomalous pulmonary vein drainage; (4) coronary sinus, the defect is in the wall of the coronary sinus.

- Increased pulmonary flow which can cause pulmonary hypertension. Only 10 % of ASD evolves into pulmonary angiopathy.
- Eisenmenger's syndrome in long-standing defects.
- Later ASD closure (after II decade of life) reverses remodeling of right ventricle.
- Restrictive ASD: usually small defect with pressure gradient between the atria. In case of restrictive ASD, there is an increase of RVSV and PA flow with no RV dilatation.
- Unrestrictive ASD: The defect is larger than mitral valve annulus. The amount of shunt in case of unrestrictive ASD is mainly related to the ventricular diastolic function.
- ASD should be closed if >1 cm^2 or 1/3 of the length of the septum.
- Qp/Qs >2 indicates a large shunt.
- *MR*: (1) Not recommended for the diagnosis of small ASD. (2) It is used to visualize dimensions and rims for larger ASD when TOE is contraindicated. (3) MR useful to assess ASD dimension, rim, and flow quantification especially if a percutaneous closure device is used. (4) Useful in post-treatment follow-up to assess device position and residual defects. *Tips and tricks*: (1) Reduce slice thickness on phase contrast (5–6 mm) for flow quantification when measuring ASD/VSD; (2) short axis evaluation on atrial chambers.
- Percutaneous closure device positioning: at least 0.5–1 cm rim surrounding the defect should be present.
- Reporting: (1) site, size, number of defects; (2) degree of shunt (Qp/Qs and phase contrast); (3) atrial dimension; (4) anomalous pulmonary vein drainage.
- See also "Qp/Qs" and "Ventricular septal defect".

Atrial Situs Inversus

- Right atrium in the left thorax and left atrium in the right.
- Normally associated with situs inversus.
- See also "Heterotaxic syndrome".

Atrioventricular Block

- Disease at atrioventricular node (nodal) or His–Purkinje system (infranodal).
- Causes: fibrosis, ischemia, hypertension, cardiomyopathies, myocarditis, infiltrative disease, cardiac surgery.
- First-degree block: PR interval >200 ms.
- Second-degree block: (1) Mobitz 1, PR interval prolong until a P wave is notconducted; (1) Mobitz 2, fixed P to QRS (2:1, 3:1 or 4:1).
- Third-degree block: no conduction, dissociation between P and QRS complex.

Atrium, Left

- Atrial dimensions should be indexed by BSA.
- Age and gender have no significant influence on atrial dimensions.

Table 5 Left atrium values

Left atrium values				
	Normal	Mild dilated	Moderately dilated	Severely dilated
Diameter (mm)	28–40	41–46	47–52	>52
Major Axis (mm)	41–61	62–67	68–76	>77
Area (cm^2)	<20	20–30	30–40	>40

Atypical Chest Pain

- Chest pain in the absence of typical characteristic of myocardial ischemia.
- *Differential diagnosis*: (1) acute coronary syndrome; (2) acute aortic syndrome (dissection, aneurysm rupture, intramural hematoma); (3) pulmonary embolism; (4) pneumothorax; (5) other thoracic diseases (esophageal rupture, tumors).
- *CT*: coronary CT for triple rule out (coronary, aorta, pulmonary arteries).
- *MR*: not used in routine practice.

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