

## CAUSES OF SYNCOPE

Syncope has many causes, several of which are clinically obvious and require no imaging. When imaging is performed, it is usually of the chest or vascular tree (to document cardiovascular causes), or brain (to document neurologic causes).

Syncope	Goroll & Mulley	Porter	Labus & Kowalak	Kasper	Gomella	Total	Collected Cases
Aortic stenosis	x	x	x	x	x	5	
Dysrhythmia	x	x	x	x	x	5	
Orthostatic hypotension	x	x	x	x	x	5	
Drugs	x	x		x	x	4	
Hypertrophic cardiomyopathy	x	x		x	x	4	
TIA or stroke	x		x	x	x	4	
Vasovagal reaction	x	x		x	x	4	
Anxiety/hyperventilation		x		x	x	3	
Cardiac tamponade		x		x	x	3	
Carotid sinus hypersensitivity	x	x		x		3	
Hypoxemia			x	x	x	3	1
Myocardial infarction		x		x	x	3	
Myxoma – left atrium	x			x	x	3	
Pulmonary embolism	x	x		x		3	1
Anemia		x		x		2	
Deconditioning		x		x		2	
Diabetes	x				x	2	
Hypoglycemia		x			x	2	
Pregnancy		x			x	2	
Neurodegenerative disease	x				x	2	
Anaphylaxis		x				1	
Anomalous coronary artery origin	x					1	
Aortic arch syndrome			x			1	
Mitral stenosis		x				1	
Postmicturition	x					1	
Post-prandial	x					1	
Posttussive	x					1	
Prosthetic heart valve dysfunction		x				1	
Psychiatric	x					1	
Stress	x					1	
Subclavian steal syndrome	x				x	1	
Tension pneumothorax		x				1	
Pacemaker malfunction					x	1	
Pulmonary hypertension					x	1	
Aortic dissection					x	1	
Brain tumor							4
Asbestosis							1

Cause	Clinical Features	Imaging Findings
<b>CARDIOVASCULAR</b>		
Aortic stenosis	Classic triad: chest pain, heart failure, and syncope.	Echo: reduced cusp motion, > 50 mmHg gradient across the valve. CXR, CT, Echo: calcified aortic valve, left atrial distension, concentric LVH
Hypertrophic cardiomyopathy	Chest pain, dyspnea, fatigue, palpitations.	Echo, MR, CT: diffusely thickened ventricular wall
Cardiac tamponade	Chest pain, dyspnea, tachypnea, palpitations	CXR: cardiomegaly; Echo, CT: pericardial effusion with compression of heart chambers, IVC distension
Myocardial infarction	Chest pain, nausea/vomiting	Secondary findings of pulmonary edema (air-space filling, effusions, pulmonary vascular distension).
Myxoma – left atrium	Dyspnea (worse when upright), dizziness, chest pain	Echo, CT, MR: Left atrial distension, filling defect/mass of the left atrium
Anomalous coronary artery origin	Chest pain, dyspnea, and fatigue	Coronary angiography and CTA: direct visualization of coronary artery from the pulmonary artery
Aortic arch syndrome	Transient ischemic attacks, dyspnea, numbness in arm.	Narrowing of the aorta.
Mitral stenosis	Dyspnea, chest pain, palpitations	Enlarged left atrium, dilated pulmonary vessels, abnormal morphology of leaflets with increased pressure gradient across the valve
Prosthetic heart valve dysfunction	Chest pain, palpitations, dyspnea, heart failure.	Secondary findings of pulmonary edema; abnormal position or motion of valve
Subclavian steal syndrome	Neurologic deficit from ischemic changes (usually vertebrobasilar).	Left proximal subclavian artery stenosis with retrograde flow in the ipsilateral vertebral artery.
Pulmonary embolism	Shortness of breath, chest pain, cough, tachycardia, diaphoresis.	Filling defects in the pulmonary arteries; peripheral wedge shaped consolidation from infarction, pleural effusion.
Pulmonary hypertension	Dyspnea, fatigue, chest pain, tachycardia.	Dilated proximal pulmonary arteries with pruning of distal pulmonary arteries.
Aortic dissection	Chest pain, dyspnea	Intimal flap with true and false lumen; widening of mediastinum, mediastinal hematoma, or hemothorax with rupture.
<b>NEUROLOGIC</b>		
TIA or stroke	Headache, neurologic deficit in distribution of ischemic/infarcted tissue.	Carotid US: causative stenosis or ulcer; CT swelling and hypodensity, dense artery sign from intraluminal clot; MR restricted diffusion followed by decreased SI on T1 and increased SI on T2.
Neurodegenerative disease	Dementia; movement disorders.	Focal or generalized atrophy; decreased SI on T1WI and increased SI on T2WI in regions of focal abnormality.

<b>CONDITIONS WITH NO IMAGING FINDINGS ON BRAIN MR</b>
Dysrhythmia, orthostatic hypotension, drugs, vasovagal reaction, anxiety/hyperventilation, carotid sinus hypersensitivity, hypoxemia, anemia, deconditioning, diabetes, hypoglycemia, anaphylaxis, post-micturition, post-prandial, post-tussive, psychiatric, stress, and pacemaker malfunction.
<b>ABBREVIATIONS</b>
CBC = complete blood count; CT = computed tomography; CTA = CT angiography; ESR = erythrocyte sedimentation rate; LVH = left ventricular hypertrophy; MR = magnetic resonance; SI = signal intensity; XR = radiography; US = ultrasound

## REFERENCES

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