Pericardium · sinuses

Ni Fibrous, parietal layers: phrenic nn. (C3–C5); visceral: pain-insensitive

Aa Pericardiacophrenic aa. (internal thoracic a.)

Vv Pericardiacophrenic vv. to brachiocephalic or internal thoracic vv.

C Tamponade: cavity fluid compresses the heart · Pericardial pain refers to the shoulder (C4)

Fibrous pericardium At Central tendon; sternopericardial ligg. F Anchors the heart; prevents sudden overdilation

Serous pericardium L Parietal lines the fibrous sac; visceral = epicardium F Serous fluid: frictionless gliding

Transverse pericardial sinus P Posterior to aorta and pulmonary trunk, anterior to SVC and atria No Clamp route in bypass surgery

Oblique pericardial sinus P Posterior to the left atrium, among pulmonary vv. and IVC

ANT External heart · surfaces, borders

Ni Cardiac plexus (sympathetic T1–T4, vagus)

Aa Right and left coronary aa. from the ascending aorta

Vv Cardiac vv. to coronary sinus, then right atrium

B Right: right atrium; left: left ventricle, left auricle · Inferior: right ventricle; superior: atria, great vessels

Apex of the heart Fo Left ventricle; left 5th intercostal space, midclavicular line

Base of the heart Fo Mainly left atrium; faces posteriorly, toward the oesophagus

Sternocostal surface Fo Mainly right ventricle

Diaphragmatic surface Fo Both ventricles, mainly left; on the central tendon

Surface sulci

Ni Coronary plexuses run with the arteries

Aa Coronary aa. and main branches lie in the sulci

Vv Coronary sinus: posterior coronary sulcus

Coronary sulcus C Right coronary a., circumflex branch, coronary sinus, small cardiac v.

Anterior interventricular sulcus C Anterior interventricular branch, great cardiac v.

Posterior interventricular sulcus C Posterior interventricular branch, middle cardiac v.

Crux of the heart P Meeting of coronary, interatrial, posterior interventricular sulci

SUP Great vessels · roots

Ni Left recurrent laryngeal n. hooks the arch at the ligamentum arteriosum

Aa Arch: brachiocephalic trunk, left common carotid, left subclavian aa.

Vv SVC, IVC to right atrium; four pulmonary vv. to left atrium

Ascending aorta C From the left ventricle, right of the pulmonary trunk B Right and left coronary aa. only

Pulmonary trunk C From the conus arteriosus; divides in the arch concavity

Ligamentum arteriosum At Left pulmonary a. origin to arch concavity; ductus remnant

Superior vena cava C Into the superior right atrium; azygos v. joins it

Pulmonary veins C Two each side, valveless, into the left atrium

LAT Right atrium

Ni Sinuatrial node in its wall (cardiac plexus input)

Aa Right coronary a. (atrial, sinuatrial nodal branches)

Vv Receives SVC, IVC, coronary sinus, anterior cardiac vv.

T Smooth sinus of venae cavae, rough pectinate part; crista between

Crista terminalis P Ridge from SVC to IVC; matches terminal sulcus F Atrial contraction; fast conduction from sinuatrial node

Pectinate muscles P Anterior wall and right auricle F Atrial contraction; strengthen the thin auricular wall

Fossa ovalis P Interatrial septum; limbus is its margin C Patent foramen ovale: interatrial shunt

Opening of the coronary sinus P Between IVC opening and right atrioventricular orifice

Triangle of Koch B Coronary sinus opening, tendon of Todaro, septal cusp; AV node

ANT Right ventricle

Ni Right bundle branch in the septomarginal trabecula

Aa Right coronary a.; anterior part from the left coronary

Vv Anterior cardiac vv. to right atrium; small cardiac v.

Conus arteriosus P Smooth outflow funnel to the pulmonary valve

Supraventricular crest P Separates rough inflow from the smooth conus F Deflects inflow into the cavity, outflow into the conus

Septomarginal trabecula At Septum to anterior papillary muscle F Right bundle branch shortcut to anterior papillary muscle

Papillary muscles of right ventricle P Anterior (largest), posterior, septal F Tense chordae in systole: no tricuspid eversion

POST Left atrium · left ventricle

Ni Left bundle branch, subendocardial, left side of the septum

Aa Left coronary a. (circumflex, anterior interventricular)

Vv Great cardiac v., posterior v. of left ventricle, oblique v.

C Enlarged left atrium indents the oesophagus (barium swallow)

Left atrium P Most posterior chamber; four pulmonary v. openings R Oesophagus posterior, across the oblique sinus

Left auricle P Left of the pulmonary trunk; its only pectinate muscles

Left ventricle W 2–3 times as thick as the right P Anterior, posterior papillary muscles F Pumps blood into the aorta · Papillary muscles tense chordae: no mitral eversion

POST Left atrium · left ventricle (cont.)

Aortic vestibule — P Smooth outflow part to the aortic valve

Interventricular septum — P Thick muscular; thin membranous near the aortic valve — C Ventricular septal defect: mostly membranous

Atrioventricular valves

Ni Cardiac plexus only

Aa Papillary muscles: coronary a. of their ventricle · Left posterior papillary muscle: often single supply, ruptures more

Vv Cusps nearly avascular; papillary muscles to cardiac vv.

Au Tricuspid: left sternal border; mitral: apex (both 5th intercostal space)

Tricuspid valve — P Anterior, posterior and septal cusps — F Stops backflow from right ventricle to right atrium (systole)

Mitral valve — P Anterior (next to aortic orifice), posterior cusps — F Stops backflow from left ventricle to left atrium (systole)

Chordae tendineae — At Papillary muscle tips to the cusp edges — F Hold cusps closed: no eversion into the atrium

SUP Semilunar valves · aortic sinuses

Ni Cardiac plexus only

Aa Coronary aa. open in right and left aortic sinuses

Vv Cusps nearly avascular; aortic root to cardiac vv.

Au Aortic: right 2nd intercostal space; pulmonary: left 2nd

Aortic valve — P Right, left, posterior (non-coronary) cusps; nodules, lunules — F Stops backflow from aorta to left ventricle (diastole)

Aortic sinuses — C Right and left coronary aa. open in their sinuses — F Diastolic backflow closes cusps and fills coronary aa.

Pulmonary valve — P Anterior, right, left cusps; top of conus — F Stops backflow from pulmonary trunk to right ventricle (diastole)

LAT Right coronary artery

Ni Coronary plexus

Aa From the right aortic sinus, into the right coronary sulcus · Right dominance (about 2/3): gives posterior interventricular branch

Vv Small cardiac v. with it; middle cardiac v. with posterior branch

S Right atrium, right ventricle, both nodes (usually)

Right coronary artery — C Between right auricle and pulmonary trunk; coronary sulcus to crux

Sinuatrial nodal branch — C Early branch to SVC opening and sinuatrial node (about 60%)

Right marginal branch — C Along the inferior border toward the apex

Posterior interventricular branch — C In posterior interventricular sulcus; septal branches

MED Left coronary artery

Ni Coronary plexus

Aa From the left aortic sinus, between pulmonary trunk and left auricle

Vv Great cardiac v. with anterior interventricular, circumflex branches

C Anterior interventricular branch: most often occluded

Left coronary artery — B Anterior interventricular and circumflex branches

Anterior interventricular branch — C In the anterior interventricular sulcus to the apex — B Diagonal and anterior septal branches

Circumflex branch — C In the left coronary sulcus around the left border — B Left marginal branch

POST Cardiac veins · coronary sinus

Ni No named nerves

Aa Veins follow the coronary branches

Vv Most to coronary sinus; anterior, smallest cardiac vv. open directly · Lymph: tracheobronchial and brachiocephalic nodes

Coronary sinus — P Posterior coronary sulcus; opens into the right atrium

Great cardiac vein — C Anterior interventricular sulcus, then left coronary sulcus

Middle cardiac vein — C Posterior interventricular sulcus to the sinus

Small cardiac vein — C With right marginal branch, then right coronary sulcus

Anterior cardiac veins — C Cross the coronary sulcus into the right atrium

Conducting system

Ni Sympathetic and vagal fibres reach both nodes

Aa Nodes: usually right coronary a.; bundle branches: septal branches

Vv Drains to the coronary sinus

Or SA node (pacemaker), AV node (delay), bundle, branches, Purkinje (spread)

Sinuatrial node — P Superior crista terminalis at the SVC opening — F Pacemaker: sets the heart rate (about 70/min)

Atrioventricular node — P Interatrial septum, apex of triangle of Koch — F Delays impulse: atria empty before ventricles contract

Atrioventricular bundle — C Right fibrous trigone to membranous septum; divides — F Only conduction route across the fibrous skeleton

Right bundle branch — C Septomarginal trabecula to the anterior papillary muscle

DEEP Cardiac plexus

Ni Sympathetic: cervical, T1–T4 cardiac nn.; vagal cardiac branches

Aa Lies on the arch and pulmonary arteries

Vv No veins of note

Ff Sympathetic: faster rate, stronger beat, more coronary flow · Vagus: slower rate, weaker beat

C Pain afferents run with sympathetic fibres to T1–T4: left arm

Superficial part of cardiac plexus — P Inferior to the arch, anterior to right pulmonary a.

Deep part of cardiac plexus — P Between the arch and the tracheal bifurcation