ELECTRICAL ACTIVITY OF THE HEART

CONDUCTION SYSTEM IN THE HEART: p 701

Sinoatrial node (modified cardiac muscle) initiates impulse, transmitted via atria (in 50 msec) to
atrioventricular node sends to ventricles AV bundle via bundle of His, then bundle branches to Purkinje fibers

YouTube: http://www.youtube.com/watch?v=v3b-YhZmQu8

P 703

P wave depolarization of atria P-R: 0.16-0.18
QRS complex depolarization of ventricles QRS: 0.06-0.10
T wave ventricles repolarize Q-T: 0.31-0.41

Abnormal heart rates bradycardia: heart rate below 60 bpm
tachycardia: above 100 bpm

sustained even tachycardia flutter 200-300 bpm
uncoordinated tachycardia fibrillation circus movement, ectopic focus

Heart Block: failure of proper transmission fr SA to AV, part or complete
1° long P-R interval (>0.21 sec)
2° occasional P without a QRS
3° uncoordinated, P has no relation to QRS

Myocardial infarction (infarct: stuffed) Heart attack, death of myocardium.
Cardiac enzymes appear in blood as result of cell death:
LDH, SGOT, CPK, CK-MB

CARDIAC CYCLE: (p 707) systole highest pressure (LUBB), and diastole, relaxation, lowest pressure (DUBB)
Cardiac Output: stroke vol (75 mL) x rate (72 bpm) : 5.4 L/min pumped
Stroke volume 1) length of ventricular diastole (tachycardia decreases filling)
2) venous pressure

Starling's law of the heart: strength of contraction increases with increased stretching up to a point
Up to 30 L/min in trained athlete, difference = cardiac reserve (both rate & stroke volume can be altered)

REGULATION: These increase heart rate: adrenaline, heat, being female, Ca, low K or Na
p 711, 717: autonomic enervation of SA node: acetylcholine slows (vagus)
norepinephrine increases rate and force (from brain stem)

Baroreceptors: stretch receptors in aortic arch and carotid sinus detect BP, excite cardioinhibitory centers.
If vagal impulses are inhibited, rate increases (obliterate parasympathetic enervation: 100 bpm)

Heart diseases:
Heart attack: blood supply cut off to heart muscle, can lead to Myocardial infarction
Arteriosclerosis angina pectoris, avoid: proper exercise, stop smoking, reduce fat intake
British RR study: clerks 10.4 (% with arteriosclerosis?)
Switchers 6.7
Section hands 4.2 collateral circulation can develop
Rheumatic Fever most impt cause of death of child 5 to 19, associated with streptococcal infections
Heart Murmur either valvular insufficiency or stenosis (narrow) causes turbulence. Functional murmurs frequent in children following exercise, non-pathological.
aneurysm [upward, stretch] dilation of vessel, can lead to rupture can cause death.
Obesity increased load, fat deposits among heart muscles, mechanical interference with beating
Hypertension leads to heart failure, vascular accident in brain, kidney failure
Syphilis affects arteries to heart, may cause aneurysm.