

Physiology Team 436

Cardiovascular Block

Numbers File

(وَأَنَّ لَيْسَ لِلْإِنْسَانِ إِلَّا مَا سَعَى) صدق الله العظيم

Color Index:

Only females' slides

Only males' slides

Both female and male slides

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This work was done by students, so if there are any mistakes please inform us.

دعواتكم لنا بالتوفيق

Lecture #1: Contractile Mechanisms in Cardiac Muscle

Resting membrane potential	-90 mV (Female) -80—90 (Male)
Rapid depolarization	+20 mV
Partial repolarization	5-10 mV
Action potential plateau	0 mV
Absolute refractory period	0.25- 0.3 sec
Relative refractory period	0.05 sec
Duration of cardiac action potential	0.4 sec
Strong inhibition of Ca⁺⁺ at	pH 6.5
Maximal release of Ca⁺⁺ at	pH 7.4

Lecture #2: Cardiac Electrical Activity

Delay in the conduction of impulses in AV node	0.1 sec
Purkinje fibers transmit action potentials at a very high velocity	0.1-4.0 m/sec
Extracellular K⁺	4 mm/L
Extracellular NA⁺	140 mm/L
Extracellular CA⁺⁺	1.2 mm/L
Intracellular K⁺	140 mm/L
Intracellular NA⁺	10 mm/L
Intracellular CA⁺⁺	0.0001 mm/L
CV SA node	0.05 m/sec
CV Atria	0.3m/sec (intermodal pathway 1.0m/sec)
CV AV node	0.05m/sec
CV Bundle of His	1 m/sec
CV Purkinje system	4 m/sec
CV Ventricular muscle	1 m/sec

Lecture #3,4,5: Cardiac Cycles I,II and ECG

Cardiac cycle duration	0.8 sec When HR 72 bpm
Ventricular systole	0.3 sec
Ventricular diastole	0.5 sec
Atrial systole	0.1 sec
Atrial diastole	0.7 sec
EDV	110-130 ml
Stroke volume	70 mL/beat
ESV	40-60 ml
EF	60-65 % (Female) 65 % (Male)
Aorta Pressure pressure of blood go to the body	120/80mmHg
pulmonary trunk Pressure Pressure of blood go to the lung	25-30/4-12mmHg
pressure of Left atrium	2-10mmH
Pressure of Left ventricle	120/3-12mmHg
Pressure of Right atrium	2-8mmHg
Pressure of Right ventricle	25-30/2-8mmHg
Isovolumetric contraction	0.04 sec
Isovolumetric relaxation	0.04 sec

Cont.

Protodiastole	0.04 sec
In rapid ejection phase	75% of SV is ejected
In reduced ejection phase	25% of SV is ejected
Systolic Pressure	120 mmHg
Diastolic Pressure	80 mmHg
Pulse Pressure	120 mmHg – 80 mmHg = 40 mmHg
Mean Arterial Pressure	93 mmHg
SA node rate	60-100 b/min
SA node rate under vagal influence	70-80 bpm
AV- node discharges	40 –60 bpm
Purkinje fibers fires	20- 40 bpm
Speed of ECG	25mm/sec
Aortic v opens	LV exceeds 80 mmHg
Ascending limb	Aortic press =120 mmHg

Cont.

Voltage is measured on vertical Y-axis	0.1mV/mm
P- wave	D= 0.08 – 0.1 sec Precedes atrial contraction by 0.01 - 0.02 sec (Female) Amplitude ≤ 2.5mm D ≤ 0.12 sec (Male)
QRS complex	D ≤ 0.1 sec. Precedes ventricular contraction by 0.02 sec. Occurs after P-wave by 0.12-0.2 sec (Female) 0.08 – 0.10 sec (Male)
T- wave	0.27 sec.
P-R interval	0.16 sec (Female) 0.12–0.21 sec (Male)
PR segment	0.13 sec
Q-T interval	0.35–0.45sec (Female) 0.35 sec (Male)
S-T segment	0.3 – 0.32 sec

Lecture #6: Heart Sounds and Murmurs

S1	0.15 sec 25-35 Hz
S2	0.11-0.125 sec 50 Hz
S3	0.05 sec
S4	0.04 sec

Lecture #7: Arrhythmias

Heart Rate	60 bpm Normal (60-100)bpm
Tachycardia	HR > 100
Bradycardia	HR < 60
First degree of A-V block	P-R =0.2 sec (Female) P-R > 0.2 sec (Male)
Second degree of A-V block	P-R > 0.25 sec
Third degree of A-V block	A =100 bpm V=40 b/min (Female) V =57 bpm (Male)
Atrial flutter	HR = 200 – 350 bpm (Male) HR=250bpm (Female)
Atrial fibrillation	HR > 350

Lecture #8: Venous Return

CVP (central venous pressure)	< 8 cm H₂O (Female) 0 - 4 mmHg (Male)
MCP (mean circulatory pressure)	7 mm Hg
Venous return	5L
Veins are reservoirs and contain	70% (Female) 2/3 of blood (Male)
Venous pressure	0 – 10 mmHg

Lecture #9: Cardiac Output

Cardiac Output at rest	5 L/min.
Body's blood volume	5 to 5.5L
Cardiac Output in athletes	≥35L can't increase maximum HR beyond 200bpm - hence - SV increases to 175 ml
During <u>moderate</u> Exercise HR increases to SV increases to CO increases to	200% (140 bpm) 120% (85ml) 240% (12L)
During <u>sever</u> Exercise HR increases to SV increases to CO increases to	300% (200 bpm) 175% (125ml) 500% - 700% (25 -35L)

Lecture #10: Stroke Volume and Regulation of Heart Failure

Stroke volume	70 ml/beat
Ejection fraction	0.54

Lecture #11,12: Arterial Blood Pressure and its Regulation

BP	120 mmHg in aorta and drops to 0-2 mmHg in RA (Female) Physiological variations in BP Age: At birth: 50/30 Adult : 120/80 Old age: 170/90 (Male)
Systolic Aortic pressure	120 mmHg
Diastolic Aortic pressure	120 mmHg
Normal systolic arterial pressure	110 – 130 mmHg (Female) 90-140 (Male)
Normal diastolic arterial pressure	70 –85 mmHg (Female) 60-90 (Male)

Lecture #13: Shock

Hydrostatic Pressure	0 mmHg
Osmotic Pressure	3mmHg
NFP of Venous Blood	- 5 to -7 mmHg
Hydrostatic Pressure of Venous Blood	18-20 mmHg
NFP of Arterial Blood	+5 to +10 mmHg
Hydrostatic Pressure of Arterial Blood	30-35 mmHg
Colloid osmotic pressure	25 mmHg
Hypovolemic shock	Stage 1: 10 – 15% blood loss Stage 2: 20 – 40% blood loss Stage 3: >40% blood loss (Male) 15 - 25% blood loss (Female)

Lecture #14: Capillary Circulation

Outward Forces, Capillary blood pressure	30-35 to 10-15 mmHg
Outward Forces, Interstitial fluid pressure	0 mmHg
Outward Forces, Interstitial fluid colloidal osmotic pressure	3 mmHg
Inward Force, Plasma colloidal osmotic pressure	25- 28 mmHg
Filtration (arterial end)	20 ml fluid/ min
Reabsorption (venous end)	18ml fluid/ min

Lecture #15: Coronary Circulation

CBF	225-250 mL/min
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YOU ARE DONE!

اللهم إني استودعتك ما حفظت وما قرأت وما تعلمت فردّه لي وقت حاجتي
إليه، أنك على كل شيء قدير.

تفائل بالله خيراً، ف «كل متوقّع آت»

*Good luck our
DOCTORS!*

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