

WEEK THREE:

Seminar Three: Cardiac Medications - Conduction and Contractility

Key Terms:

Preload/Venous Return:

- Load of blood going through the heart
- Blood returns from the vena-cava to the right side of the heart
- If there is a LARGE pre-load, it needs a lot of oxygen to pump to the lungs and peripheral circulation

After load/Systemic Circulation:

- Blood to the heart
- The tension/ stress developed by the left ventricle during ejecting
- Heart has a big after load when blood vessels are constricted
- So the muscle of the left ventricle has to work hard to overcome resistance

Coronary Arteries:

- Transport blood to the heart
- Two main stems originate from the aorta, supply blood to the heart tissue
- Blockage or narrowing in the coronary arteries → pt will develop ischemic chest pain

Ischemia:

- lack of blood supply

Inotropic:

- modifying the speed of contractions
- Positive= strengthens the force of the heart beat = pump more blood in fewer beats - lower HR, for congestive heart failure.
- Negative= weakens hearts contraptions + slows HR. For hypotension, congestive heart failure, arrhythmias and angina.

Agonist:

- binds to cell receptor to produce a biological response. causes an action

Antagonist:

- binds to receptor on the cell but nothing occurs. no cellular response

Autonomic Nervous System:

Autonomic NS		
	PNS	SNS
Role	Relaxes the body and inhibits many high energy functions	prepares the body for intense physical activity "Fight or flight"
Receptors	Muscarinic <ul style="list-style-type: none"> - found in brain, heart, smooth muscle - use G proteins instead of ions - When ACE binds, protein changes shape which allows is to phosphorylate various second messengers 	Beta 1 (cardias) Beta 2 (lungs) Alpha (peripheries) Nicotinic <ul style="list-style-type: none"> - Ace binds. ions flow - Acts as a channel for positively charged ions, mainly sodium - depolarises the cell - found at neuromuscular junctions - allows muscles to move - all excitatory receptors - found in sympathetic NS
Neurotransmitters	Acetylcholine (ACH)	Adrenaline Noradrenaline
Effects	<ul style="list-style-type: none"> - decreases HR - decreases BP - decreases RR - decreases airway diameter - Pupils constrict - Increase in salivation - bronchi restrict - Increase bile released in liver - bladder contracts 	<ul style="list-style-type: none"> - Increases HR - Increases BP - Increase RR - Increase airway diameter - pupils dilate - decrease salivation - decreases digestion - Bronchi dilate - decreases bile released in liver - bladder relaxes

Acute Coronary Syndrome	Congestive cardiac Failure
<ul style="list-style-type: none"> - Nitrates - Beta blockers - Calcium Channel Blockers - ACE-1/ AT-11 - Statins 	<ul style="list-style-type: none"> - Cardiac Glycosides - ACE-1
Anti-Arrhythmic's	Anticoagulants
<ul style="list-style-type: none"> - Cardiac glycosides - Beta Blockers - Calcium Channel Blockers 	<ul style="list-style-type: none"> - Antiplatelets - Heparins - Warfarin (Vitamin K Antagonist)

Cardiac Medications:

Beta Blockers: "olols"
<p>Indication:</p> <ul style="list-style-type: none"> - Hypertension - Angina - Myocardial infarction - Heart Failure - Tachy arrhythmias - Prevention of migraine
<p>Action:</p> <ul style="list-style-type: none"> - Reduce heart rate, BP and cardiac contractibility - Blocks the adrenoreceptors (in heart, smooth muscle) - Beta blockers work by blocking the effects of the hormone epinephrine, also known as adrenaline - Works by blocking the neurotransmitters norepinephrine and epinephrine from binding to receptors (b1, b2. b3) - In turn causes the effects of adrenaline (epinephrine) to be blocked. - This action allows the heart to relax and beat more slowly thereby reducing the amount of blood that the heart must pump. - Over time, this action improves the pumping mechanism of the heart
<p>Adverse Effects:</p> <ul style="list-style-type: none"> - Bradycardia - Hypotension - Bronchospasm - Alteration of glucose metabolism
<p>Nursing considerations:</p> <ul style="list-style-type: none"> - BP and HR should be taken before administration - must be slowly reduced when treatment is ceased - Makes the symptoms of Hypoglycaemia - can cause broncho restriction in asthma pts

Beta Blockers: "olols"

Examples:

- Atenolol
- Metoprolol
- Bisoprolol
- Suffix "OLOL"

Calcium Channel Blockers: "dipine"

Indication:

- Hypertension
- Arrhythmia
- Angina
- Coronary artery disease

Action:

- Blocks inward current of calcium into cardiac cells
- This reduces cardiac contractility, HR and cardiac conduction (calcium is critical for the conduction of the electrical signal that passes from muscle cell to muscle cell of the heart, and signals the cells to contract)
- Prevent calcium from entering cells of the heart and blood vessel walls
- Calcium channel blockers, also called calcium antagonists, relax and widen blood vessels (dilate) by affecting the muscle cells in the arterial walls
- Dilation of the arteries provides more oxygen-carrying blood to the heart
- Reduced demand for oxygen and increased delivery of oxygen prevents angina or heart pain
- Slow electrical conduction through the heart and thereby correct abnormal rapid heartbeats

Adverse Effects:

Vasodilatory Effects:

- Headaches
- Flushing
- Dizziness
- Hypotension

Nursing considerations:

- Monitor HR and BP, Postural Hypotension
- Monitor for S&S of peripheral or facial oedema

Examples:

- Amlodipine
- Clevidipine
- Suffix "dipine" (not always)