

DH 255
Lecture 1

GENERAL REVIEW

Math: fractions, simple algebra, scientific notation

https://www.youtube.com/watch?v=BHFxe7_sE6c
<https://www.youtube.com/watch?v=13XzepN03KQ>
<https://www.youtube.com/watch?v=UADVIDjdaVg>

Chemistry: diffusion, simple equilibrium ($HA = H^+ + A^-$)

<https://www.youtube.com/watch?v=15fk7HPmo5g>

Physiology

Organ systems

Cardiovascular system (CV)

Central Nervous System (CNS)

Respiratory System

Kidney structure and function

https://www.youtube.com/watch?v=_1gd03h3te8&t=503s
<https://www.youtube.com/watch?v=44B0ms3XPKU&t=86s>
https://www.youtube.com/watch?v=hc1YtXc_84A
<https://www.youtube.com/watch?v=Ioir82UA9x4>

Disease states

Diabetes

<https://www.youtube.com/watch?v=JAjZv41iUJU>
<https://www.youtube.com/watch?v=yCecGz67t9U>
<https://www.youtube.com/watch?v=ZQarJkJGY1E>
<https://www.youtube.com/watch?v=ITCF8y7e1Bw>
<https://www.youtube.com/watch?v=9CKihqqIokI>

CV disease

HEAD and NECK ANATOMY REVIEW

Foramina

Cranial nn and foramina

Superior orbital fissure

Foramen Rotundum

Foramen Ovale

*Greater palatine foramen

*Incisive foramen

*Infraorbital foramen

*Posterior superior alveolar foramen

*Mandibular foramen

*Mental foramen

Cranial Structures / Landmarks

Trigeminal depression (Meckle's cavity)

Pterygoid fossa

Pterygopalatine fossa

Medial and lateral pterygoid plates

Ramus –

anterior border

Angle

Sigmoid notch (mandibular notch)

***Coronoid notch**

Coronoid process

Condyle

lingula

mylohyoid ridge

Muscles

Temporalis

Masseter

Medial pterygoid

Lateral pterygoid

mylohyoid

Vessels

neurovascular bundle

“How do local anesthetics work?” (What is the mechanism of action of local anesthetics?)

- Sensory nerve at rest
- Nerve impulse propagation
- Interruption or “block” of nerve impulse propagation

NEUROPHYSIOLOGY (· sensory nerve at rest)

Neuron Structure
Sensory

Motor

Axon Structure

Membrane Structure

Impulse Conduction (· nerve impulse propagation)

Resting State

Membrane permeability

Ion concentrations

Na⁺ pump

Excitation

Depolarization

Firing threshold

Repolarization

Absolute refractory period

Relative refractory period

Impulse Spread/Propagation

Unmyelinated

Myelinated

Saltatory conduction

Nodes of Ranvier

Mode & Site of Action of Local Anesthetics (· interruption or “block” of nerve impulse propagation)
Na⁺ channel

Anesthetic Molecules

Structure

Ester

Amide

Properties

Weak base

Solubility

Dissociation/Action

Kinetics

Concentration gradient/diffusion

Barriers to diffusion (see pg. 19, fig. 1-19)

lipid solubility

protein binding ability

***vasodilation**

PHARMACOLOGY OF LOCAL ANESTHETICS

Kinetics (“ADME”)

Absorption

GI Tract

Topical

Injection

Distribution

Metabolism

Esters

Amides

Excretion

Systemic Action

CNS

1. anticonvulsive
2. excitatory
3. depression
4. convulsive

Cardiovascular System

Heart

Peripheral vasculature

Respiratory system

Drug Interactions

CNS depressants

Common metabolic pathways

Malignant Hyperthermia

PHARMACOLOGY OF VASOCONSTRICTORS

Structure

Catechols

Catecholamines

Natural

epinehrine

norepinephrine

dopamine

Synthetic

isoproterenol

levonordefrin

Why are vasoconstrictors added to local anesthetic solutions?

Pharmacology of specific agents

1. epinephrine (Adrenaline)

Systemic action

Cardiovascular system

heart

peripheral vasculature*

CNS

Respiratory system

Uptake/"deactivation"

Adrenergic nn.

Bloodstream

Dosage

Healthy = **0.2 mg.** per appointment

CI III or IV = **0.04 mg.** per appointment

2. levonordefrin (Neo-Cobefrin)

Systemic action

Cardiovascular system

heart

peripheral vasculature

CNS

Respiratory system

Uptake / "deactivation"

Dosage: All patients = **1.0 mg.** per appointment

Medical Status/Contraindications of Vasoconstrictors

1. More Significant CV disease
 - hypertension
 - post MI
 - angina
 - dysrhythmia
2. Non-cardiovascular diseases
 - uncontrolled hyperthyroid
 - uncontrolled diabetes
 - bisulfite allergy
3. Patient taking certain medications (drug interaction)
 - MAO inhibitors
 - tricyclic antidepressants

ARMAMENTARIUM

A. Syringe

Types

Non-disposable

Disposable

“Safety syringes”

Parts

thumb ring

finger bar

finger grip

piston / harpoon

barrel

needle adapter

B. Needle

Parts

bevel

shank

hub

metal

plastic

syringe penetrating end

Length

Gauge

C. Cartridge

Parts

glass tube

stopper

aluminum cap

diaphragm

label

DOCUMENTATION

A. Treatment Plan (Cypress College protocol)

B. Chart entry

1. injection(s) administered (include Left or Right, if appropriate)
2. needle (gauge and length)
3. amount of local anesthetic used (#cartridges, volume (ml), weight (mg.))
4. local anesthetic agent and concentration (vasoconstrictor and concentration, if used)
5. patient's reactions

6. Examples:

1. Rt. IA, Rt. LB, 25-L, 1 cart. (36mg.) (1.8ml) lidocaine 2% epi 1:100,000
profound anesthesia, procedure well tolerated, no adverse reaction

2. see textbook page 167, Step 19

3. computer entry

Laboratory Session 1

Armamentarium

1. basic set-up (include "retrieval instrument" – hemostadt or cotton pliers)
2. topical anesthetic
3. 2 X 2 gauze, cotton roll(s)

Have fun! - and begin establishing three habits:

1. establish some type of **hand rest/fulcrum/stabilization** (essential for injections on "real people")
2. **ASPIRATE** (in two planes) **prior** to injecting
3. **Rate** of injection! (ideal = 2 minutes per cartridge, mimimum = 1 minute per cartridge)

Next Week's Injections

supraperiosteal (infiltration)

- used for single-tooth anesthesia in maxilla and very localized soft tissue anesthesia in maxilla and mandible

MSA (middle superior alveolar) NB

- MSA nerve exists in 28% of population (about 1 in 4 people)

region anesthetized:
needle length:
needle gauge:
volume of anesthetic:
depth of penetration: