Medical Emergencies Update 2016

Steven W. Beadnell, DMD
September 19, 2016

Respiratory Emergencies

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Respiratory Emergencies

Asthma

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Medical Emergencies Update (Part 2) 2016

Asthma

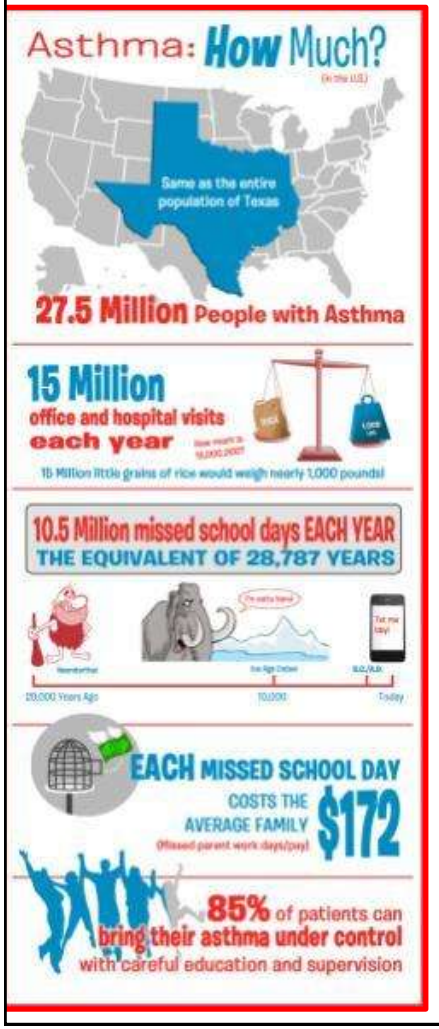
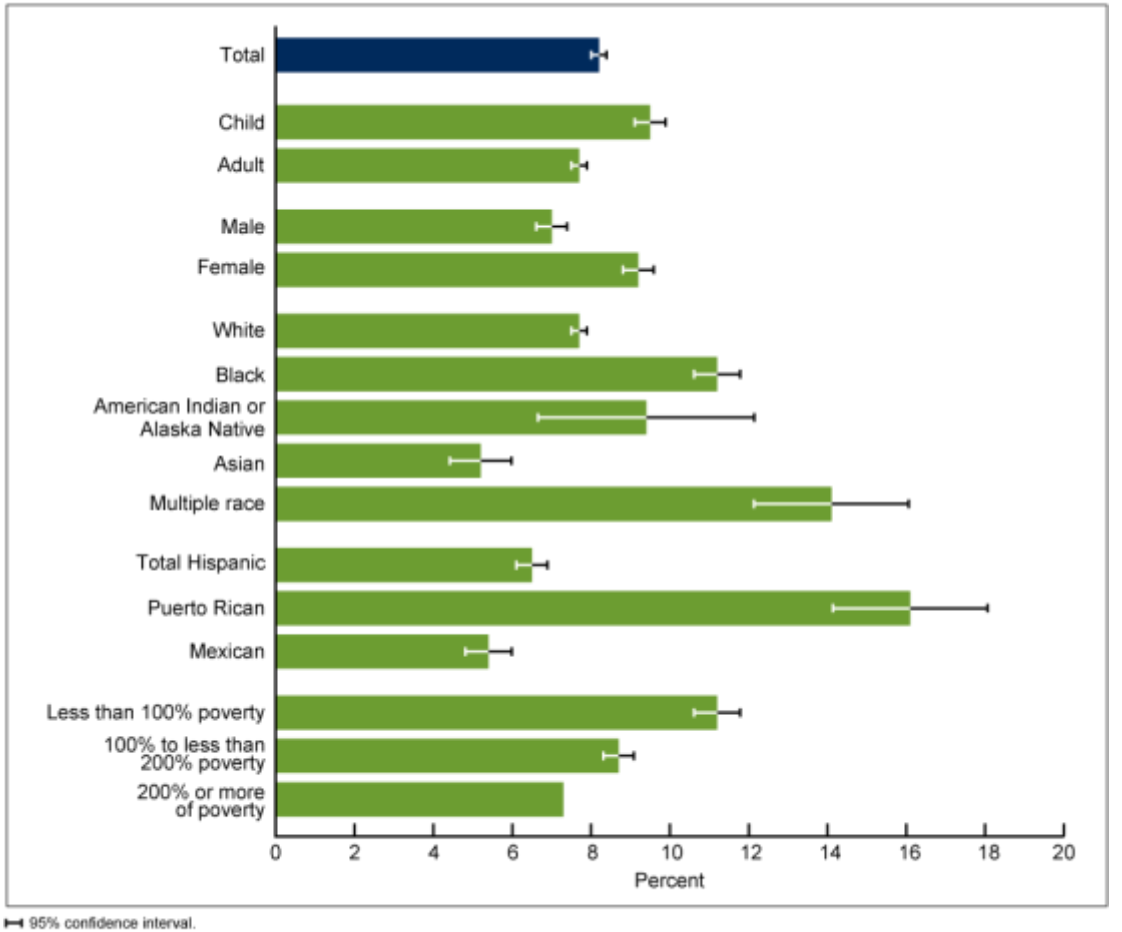


Figure 2. Asthma prevalence, by selected demographic characteristics: United States, average annual 2008–2010



95% confidence interval.

NOTES: Asthma prevalence refers to percentage of people who have ever been diagnosed with asthma and still have asthma. Access data table for Figure 2 at: http://www.cdc.gov/nchs/data/databriefs/db94_tables.pdf#2.

SOURCES: CDC/NCHS, Health Data Interactive and National Health Interview Survey.

Asthma - Pathophysiology

Hyperactivity of tracheobronchial tree

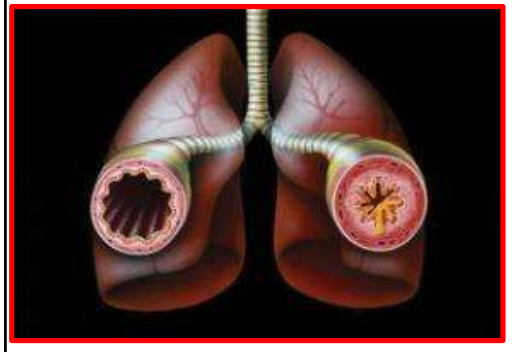
↓

Bronchial smooth muscle contraction

Bronchial wall edema

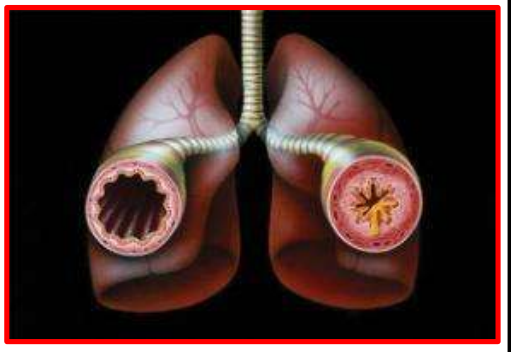
Mucus hypersecretion

↓



Narrowed airways

↓



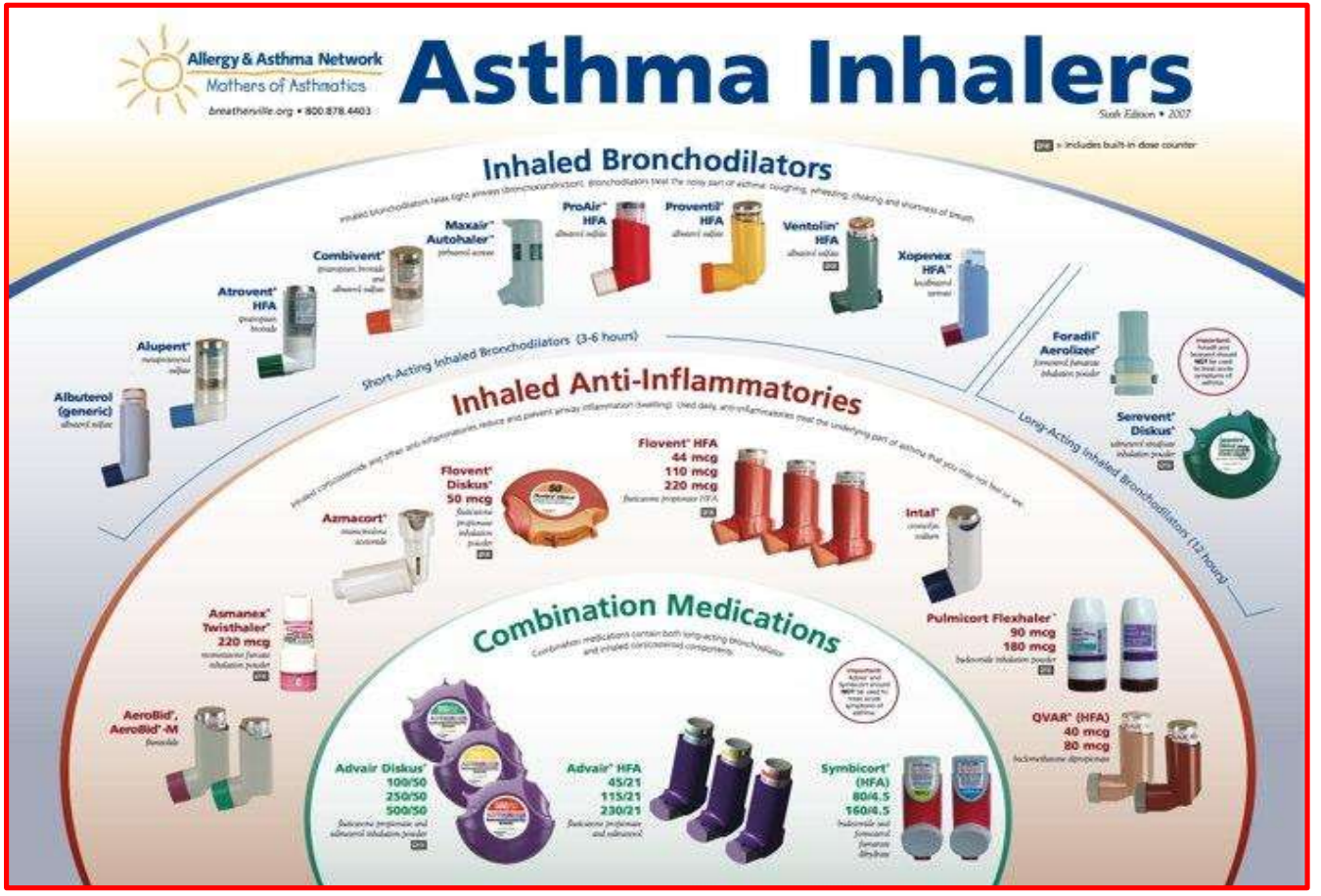
Wheezing

Shortness of breath

Coughing

Asthma

Medical Management of Asthma



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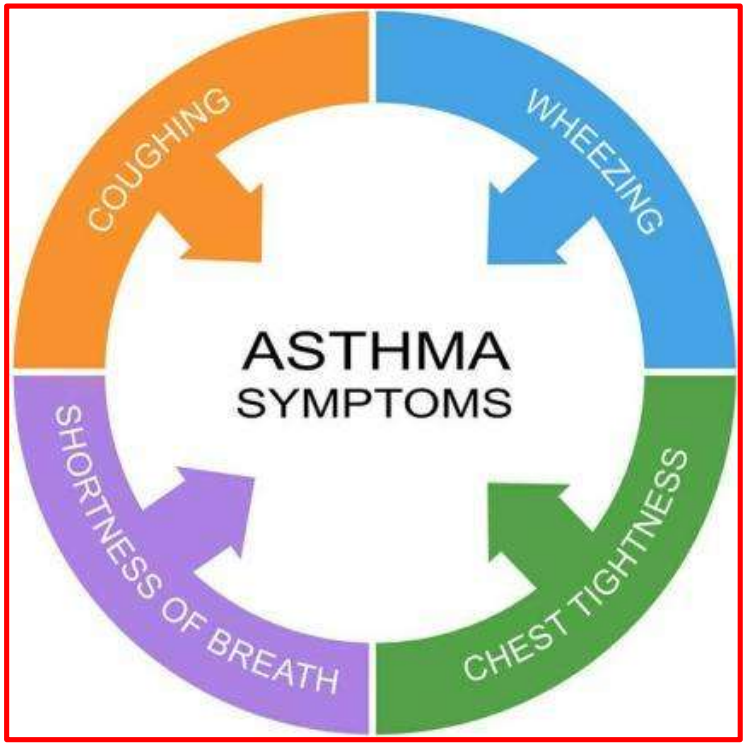
Asthma - Signs & Symptoms

- Chest congestion/tightness
- Cough, wheezing, SOB
- Anxiety or agitation
- Increased respiratory rate
- Increased heart rate
- Pt wants to sit or stand up
- Use of accessory muscles



Asthma

Indicators of a Severe Attack

- SaO_2 (pulse oximeter) is below 91%
- Bronchodilator doesn't improve Sx after two treatments
- Patient has difficulty speaking
  - Sentences < phrases < words < mute
- Patient is struggling for air

Asthma Management

Position patient comfortably (upright)

↓

C - A – B –BLS as needed

↓

Administer bronchodilator via inhalation
(Alubuterol inhaler)

(Episode terminates)

↓

Complete dental treatment

↓

Discharge patient

(Episode continues)

↓

Administer oxygen, call EMS

↓

Epinephrine 0.3mg SQ or IM

↓

Discharge or hospital

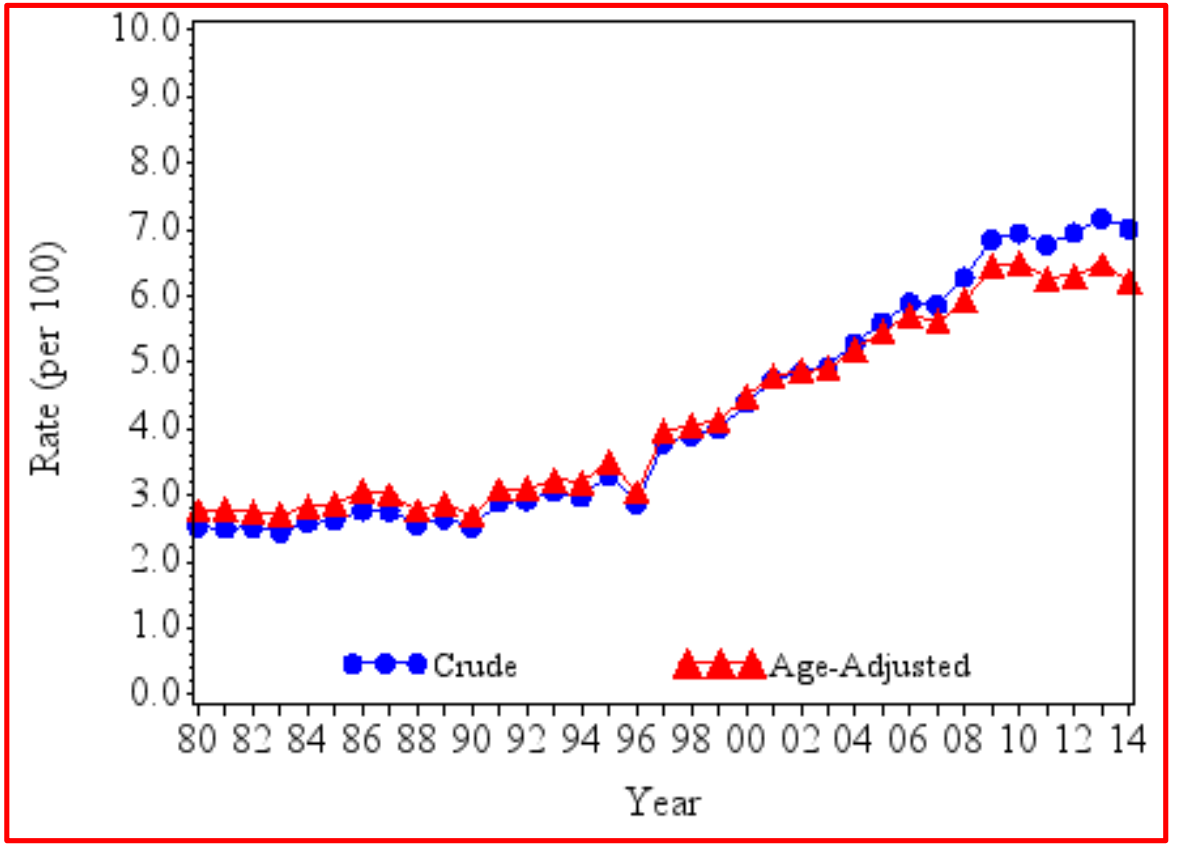
Altered Consciousness

Altered Consciousness

Diabetic Emergencies

(Insulin Shock)

U.S. Incidence of Diabetes



Source: Centers for Disease Control and Prevention (CDC), National Center for Health Statistics

Diabetes Classification

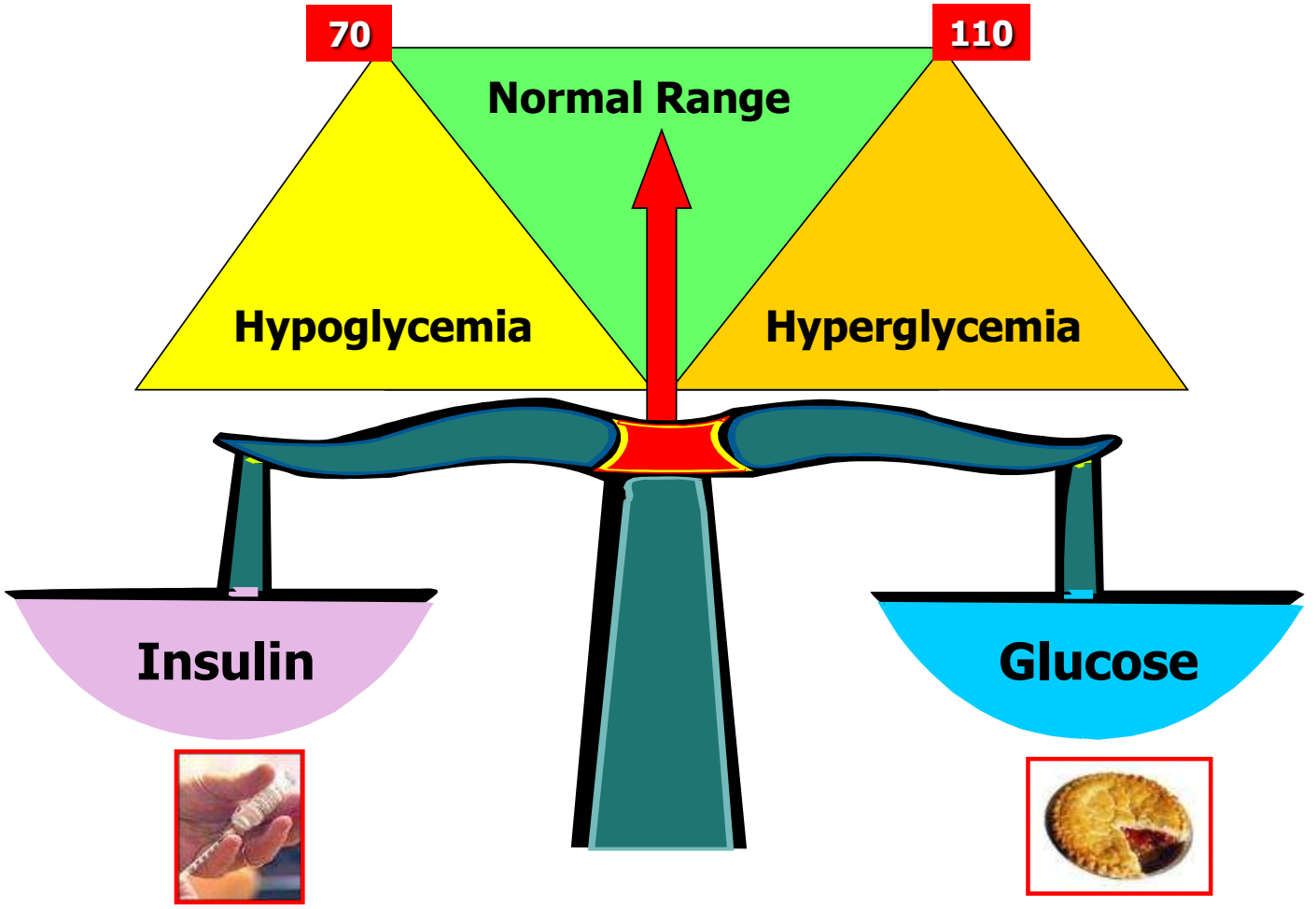
- **Type 1**
  - **Absolute insulin deficiency, usually autoimmune process – 8%**

Type 2

Insulin resistant with relative deficiency – 90%

- **Gestational Diabetes Mellitus**
  - **Abnormal glucose tolerance during pregnancy**
- **DM associated with other conditions**
  - **Pancreatic disease, drug-induced, etc.**

Diabetic Emergencies

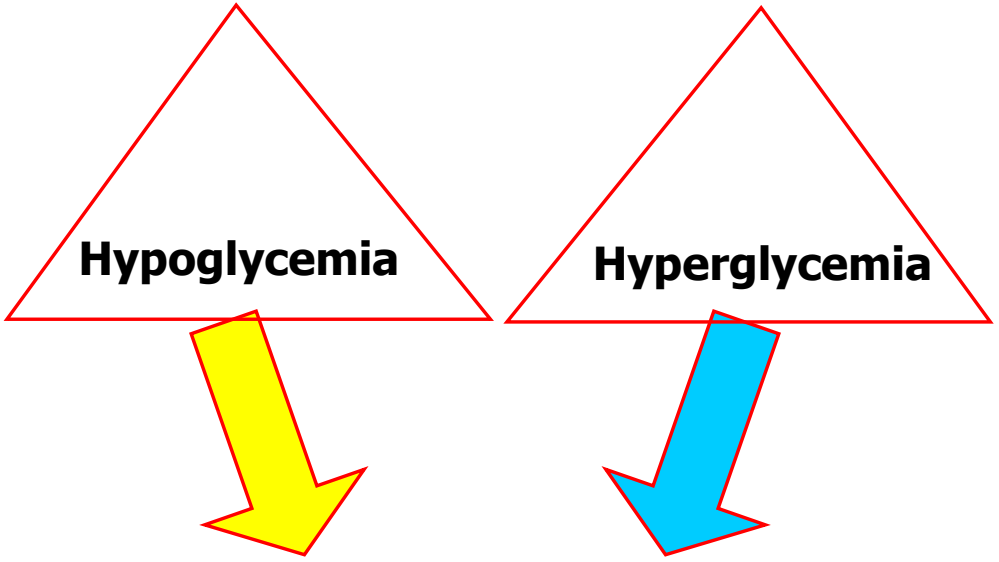


Diabetic Emergencies

Dental Management to Avoid Problems

- Morning appointments are best
- Confirm took insulin and ate usual meal
- What is their CBG – Check with glucometer
  - CBG < 70mg/dL or > 200mg/dL, defer Tx
- Major goal => "KEEP 'EM SWEET"

Diabetic Emergencies



Altered Consciousness

Diabetic Emergencies

Diabetic Ketoacidosis

Lack of Insulin - - Hyperglycemia

↓

Glycogenolysis

Gluconeogenesis

Ketogenesis

↓

Ketoacidosis

↓

Coma

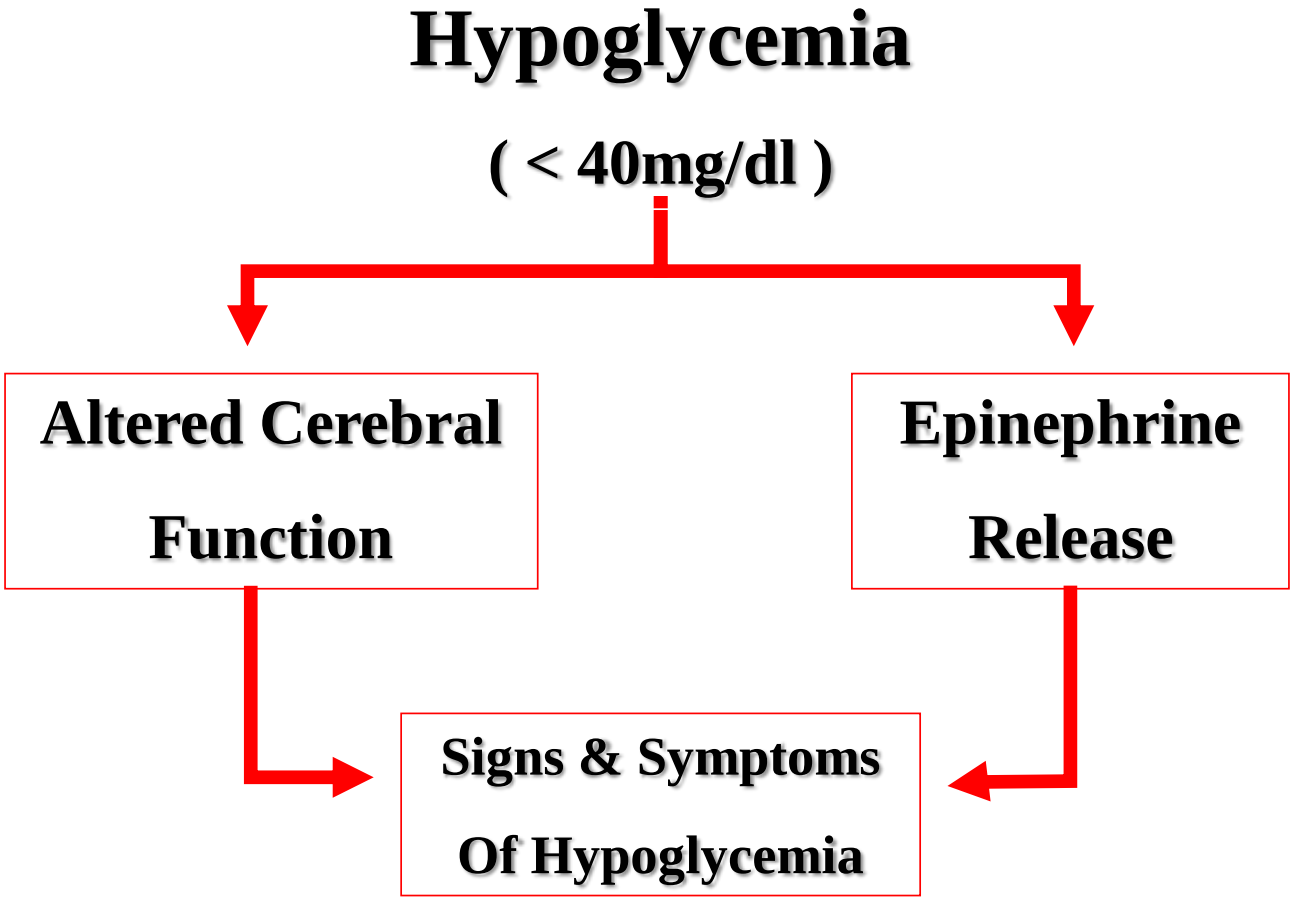
Diabetic Emergencies

Diabetic patients who behave in a bizarre manner or exhibit altered level of consciousness should be managed as if they are

HYPOGLYCEMIC

until proven otherwise.

Insulin Shock

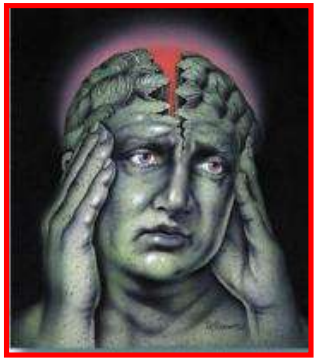


Insulin Shock

Hypoglycemia – Early manifestations

- Diminished cerebral function
  - Alteration of mood
  - Lack of spontaneity

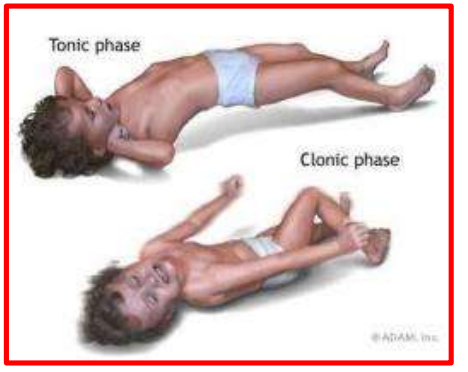
- Weakness, dizziness
- Pale, moist skin
- Headache



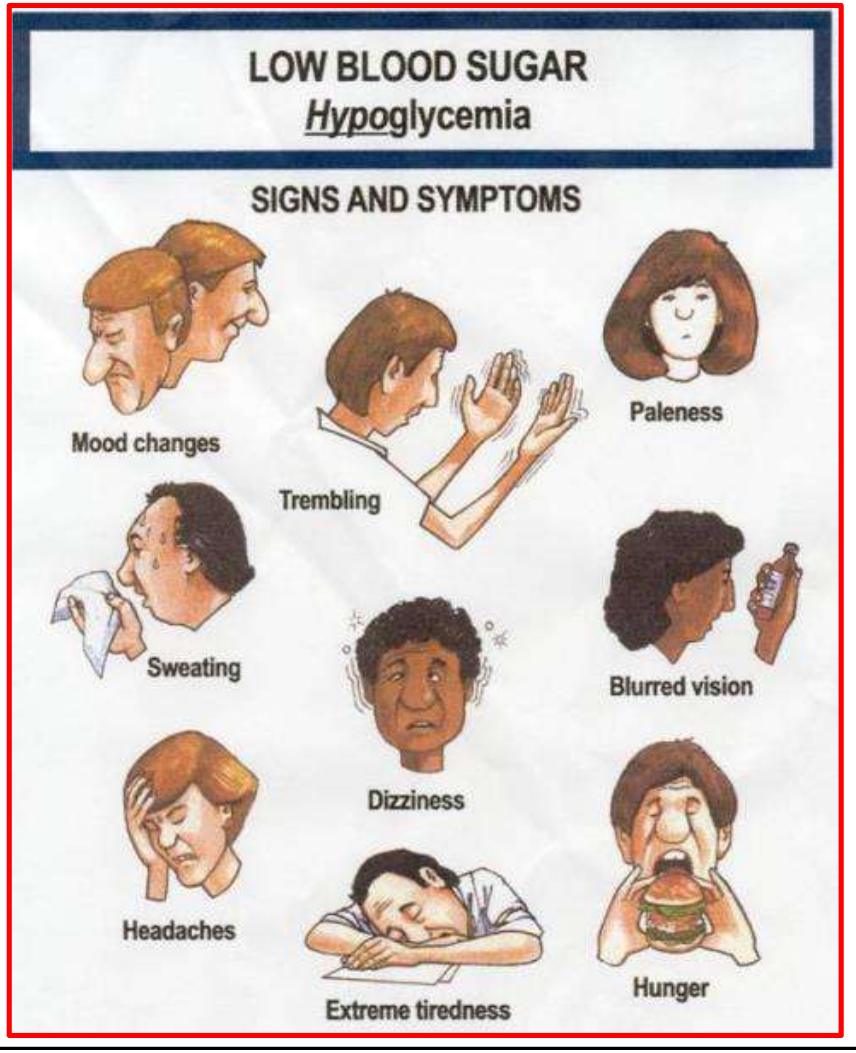
Insulin Shock

Hypoglycemia – Late manifestations

- Sweating
- Tachycardia
- Hypotension
- Anxiety
- Seizure activity
- Unconsciousness



Hypoglycemia Signs & Symptoms



Insulin Shock - Management

* * Conscious Patient * *

Position patient comfortably

C - A – B – BLS as needed

Administer oral carbohydrate (InstaGlucose)

(Episode terminates)

Observe one hour

Discharge patient, escort?

(Episode continues)

Activate EMS

Glucagon 1mg IM or IV

Dextrose 50% 50ml IV

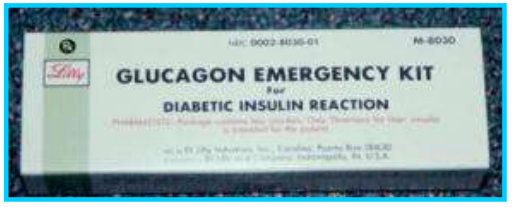
Discharge or hospital ?

Insulin Shock - Management

* * Unconscious Patient * *

Position patient supine, legs elevated

C – A – B – BLS as needed



Activate EMS - ASAP

<u>Parenteral Carbohydrates</u>

Dextrose 50% 50ml IV

Glucagon 1mg IM or IV

(Epinephrine 0.5mg SQ or IM)

Oral carbohydrates after recovers

Discharge or transport to hospital

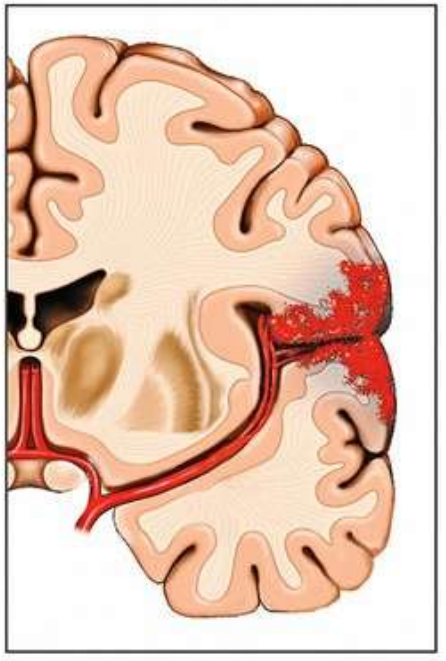
Altered Consciousness

Cerebrovascular Accident

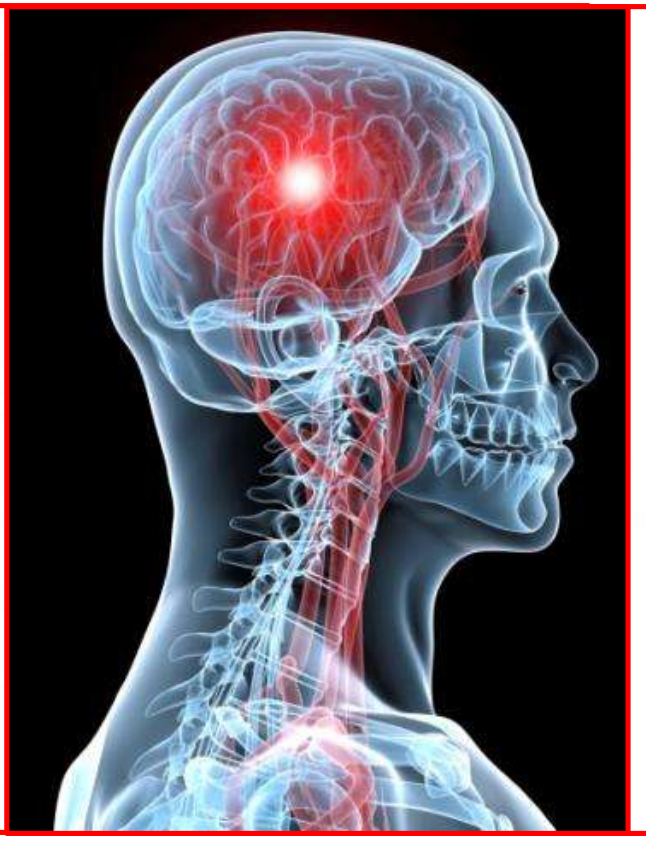
Cerebrovascular Accident

CVA Classification

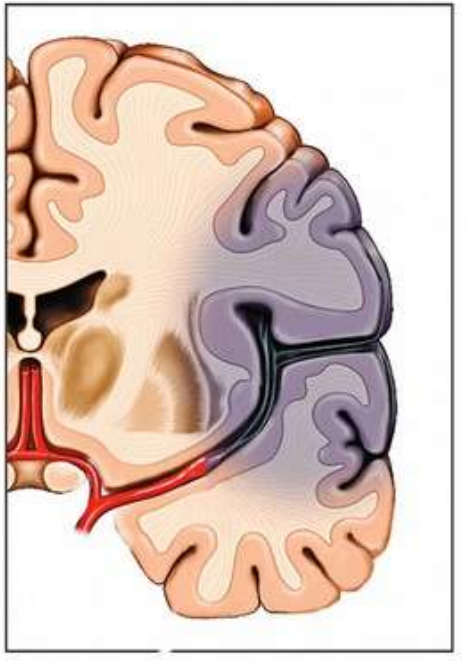
Hemorrhagic Stroke



Hemorrhage/blood leaks into brain tissue



Ischemic Stroke



Clot stops blood supply to an area of the brain

Cerebrovascular Accident

CVA Classification

Transient Ischemic Attack (TIA)

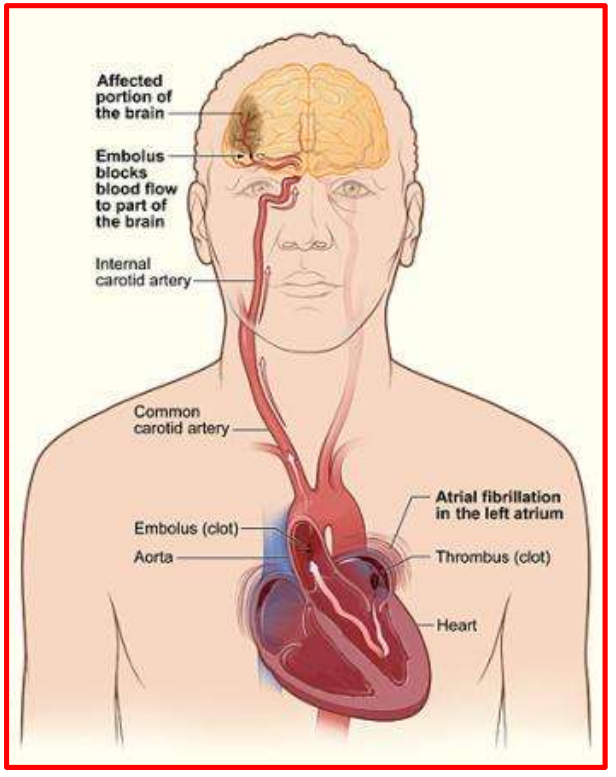
- Focal ischemic neurologic deficits that last < 24 hrs, usually resolve in 2 - 10 minutes
- Indicates cerebrovascular disease

"Angina of the Brain"

Cerebrovascular Accident

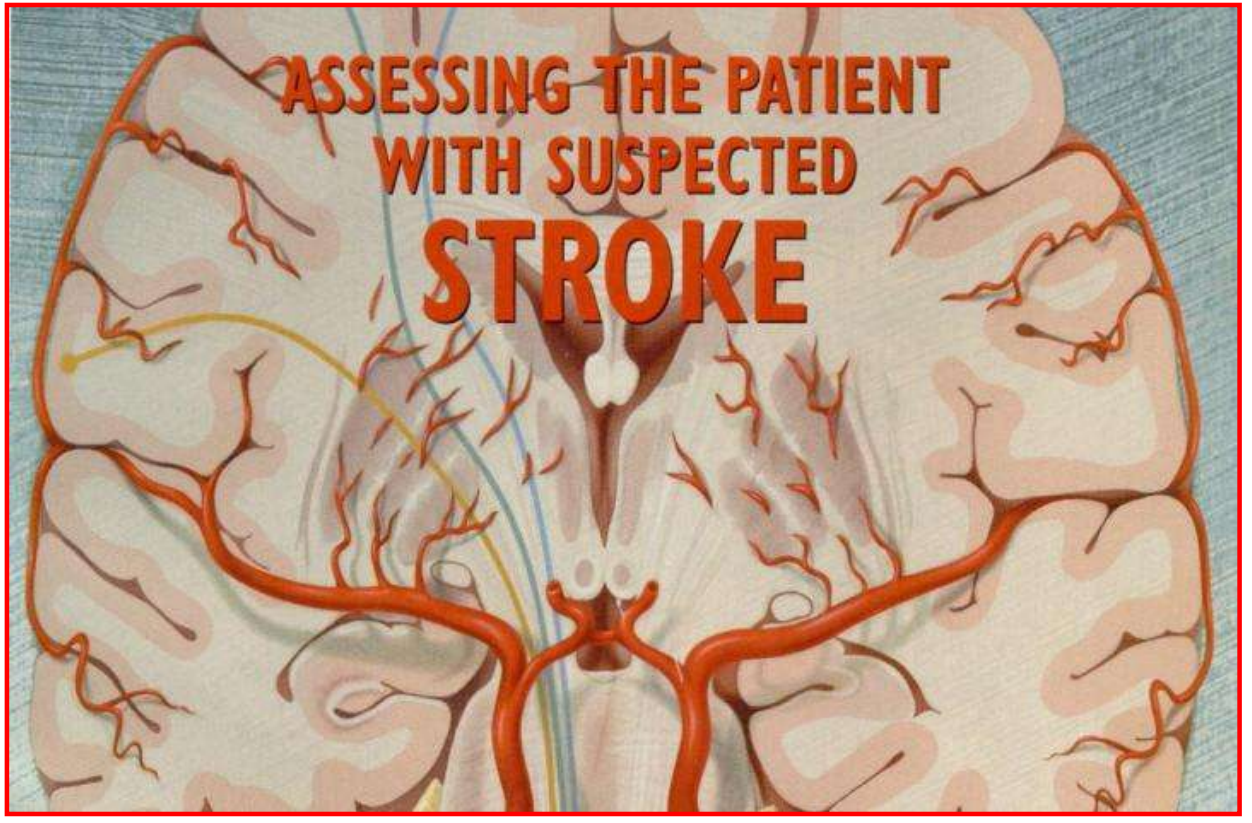
Associated Risk Factors

- Hypertension
- Atrial Fibrillation
- Abnormal heart valve
- Smoking
- Elevated lipids
- Prior TIAs



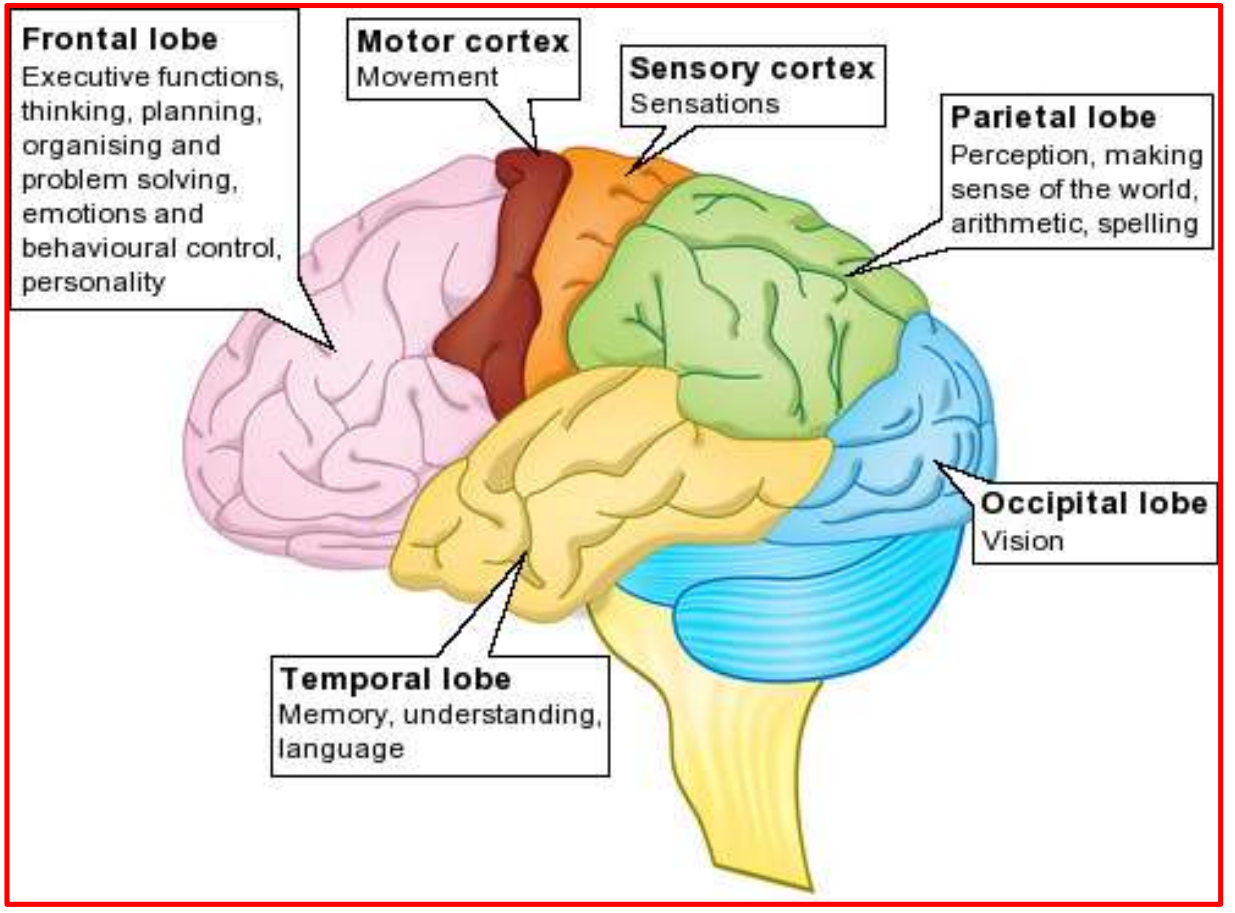
Cerebrovascular Accident

CVA or TIA Diagnostic Clues



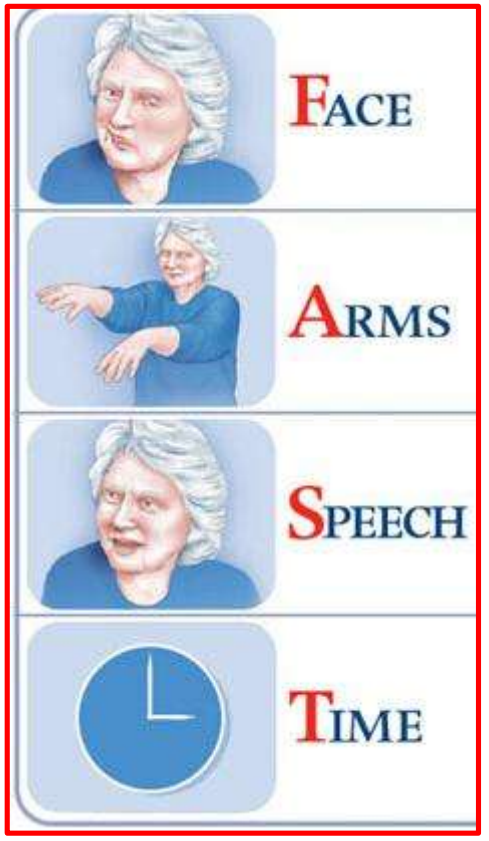
Cerebrovascular Accident

CVA or TIA Diagnostic Clues



Cerebrovascular Accident

CVA or TIA Diagnostic Clues



- Hypertension, BP > 140/90
- Altered consciousness
- Hemiparesis, hemiparalysis
- Headache, blurred vision
- Asymmetry of face or pupils
- Incontinence
- Aphasia, slurring words

Cerebrovascular Accident

CVA or TIA Diagnostic Clues

Face

Smile - is one side drooping?

Arms

Raise both arms - is one side weak?

Speech

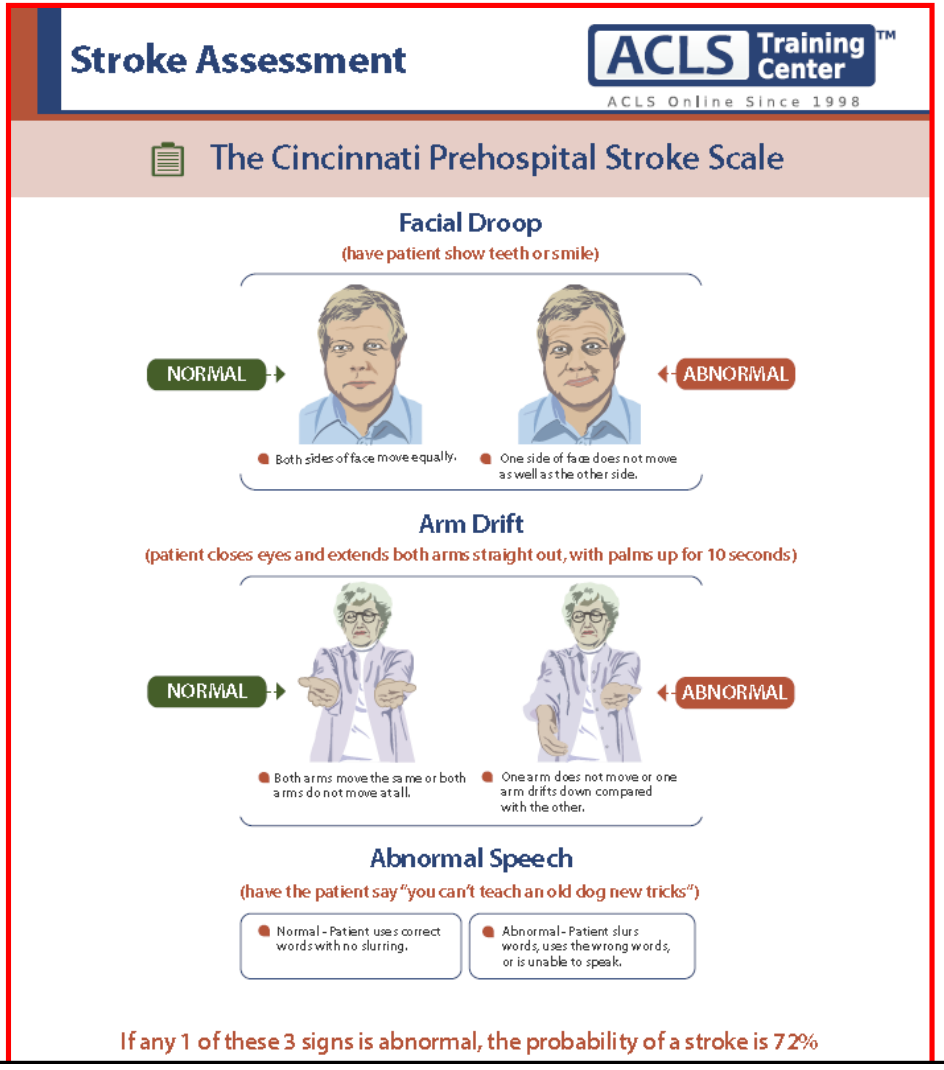
Speak - unable to? Words jumbled, slurred?

Time

Act fast and call 911

Time lost may mean brain lost.

Cerebrovascular Accident



CVA or TIA Management

Position patient comfortably

↓

C – A – B – BLS as needed

↓

Monitor vital signs

Activate EMS

↓

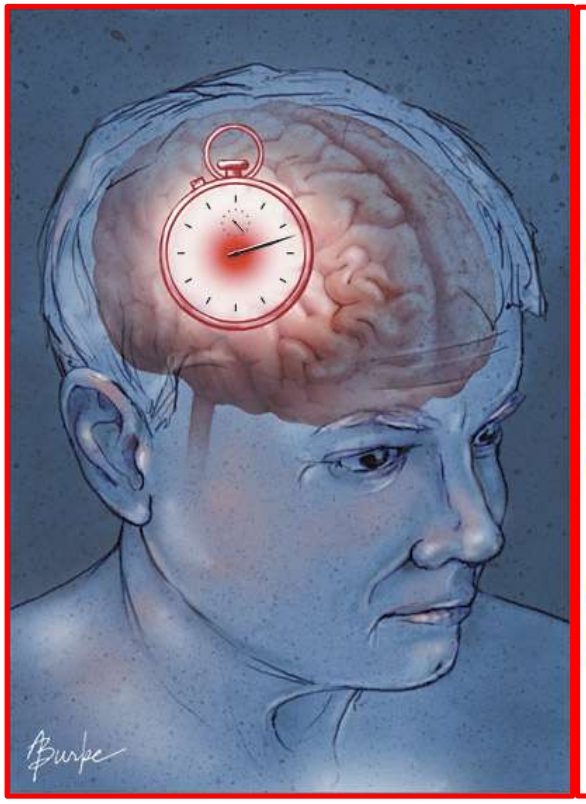
Administer oxygen

Elevate head if BP elevated

↓

ASA Stroke Protocols

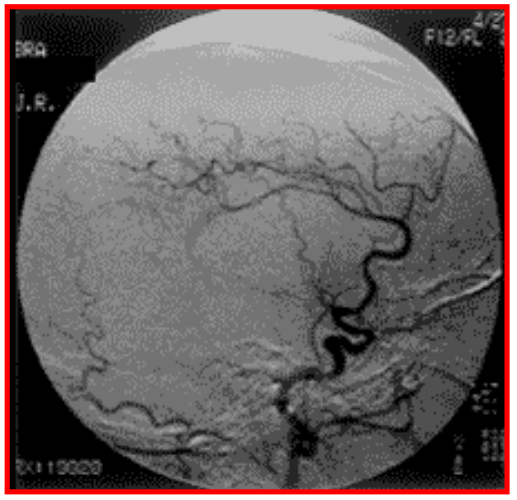
CVA or TIA Management

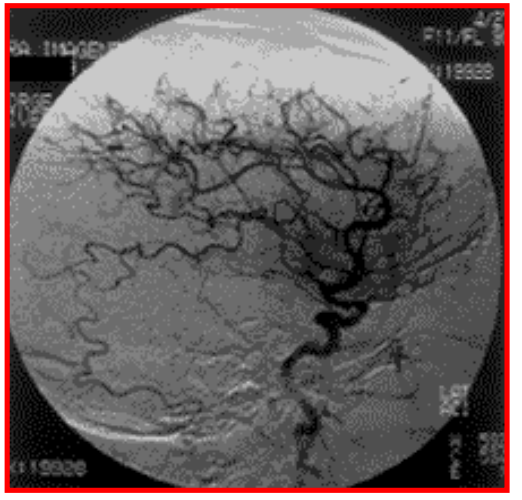


- Perform initial clinical evaluation (within 10 minutes of arrival)
- Notify the stroke team (within 15 minutes of arrival)
- Initiate a CT or MR scan (within 25 minutes of arrival)
- **Scan interpreted (within 45 minutes of arrival)**

Start IV rt-PA immediately after scan interpretation

CVA or TIA Management





Altered Consciousness

Seizures

Seizures

Classifying Epilepsy and Seizures

Seizure types:

Partial

Simple

Consciousness is maintained

Complex

Consciousness is lost or impaired

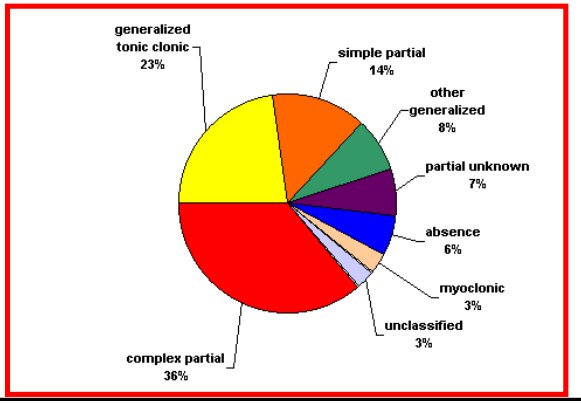
Generalized

Absence

Altered awareness

Convulsive

Characterized by muscle contractions with or without loss of consciousness



Seizures

Classifying Epilepsy and Seizures

Seizures

What do you do when you have your seizure?

Seizures

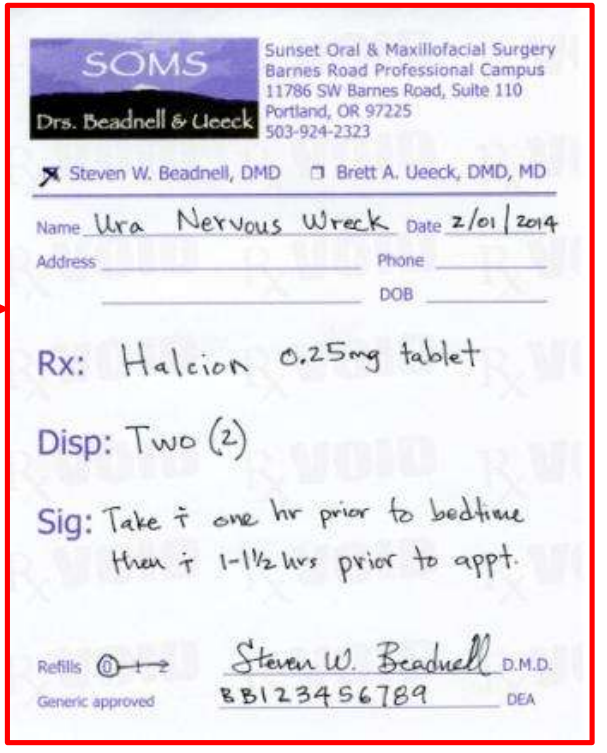
Questions to ask patient

- **How frequent are seizures? Last?**
- **What precipitates seizures?**
- **What type of seizure activity?**
- **How long do seizures last?**
- **How are you after seizure?**
- **What medications do you take?**

Seizures

Common triggering factors

- Flashing lights
- Fatigue, missed meal
- Emotional stress
- Alcohol ingestion
- Physical stress
- Hypoglycemia



SOMS
Drs. Beadnell & Ueeck

Sunset Oral & Maxillofacial Surgery
Barnes Road Professional Campus
11786 SW Barnes Road, Suite 110
Portland, OR 97225
503-924-2323

Steven W. Beadnell, DMD Brett A. Ueeck, DMD, MD

Name Ura Nervous Wreck Date 2/01/2014
Address Phone
DOB

Rx: Halcion 0.25mg tablet

Disp: Two (2)

Sig: Take ½ one hr prior to bedtime
then ½ 1-1½ hrs prior to appt.

Refills 0 1 2
Generic approved

Steven W. Beadnell D.M.D.
BB123456789 DEA

Seizures

Possible causes in dental office

- **Epilepsy**
- **Local anes overdose**
- **Hyperventilation**
- **CVA (stroke)**
- **Hypoglycemia**
- **Syncope (hypoxia)**

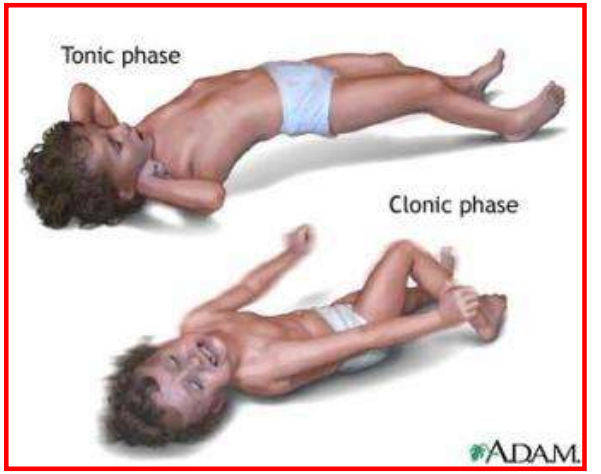
Grand Mal Seizures

- Prodromol Phase
  - Change in mood
  - Aura – related to senses

- Preictal Phase
  - Falls to floor
  - Epileptic cry

Grand Mal Seizures

- Ictal Phase
  - Tonic – sustained contractions
  - Clonic – alternate flexor / extensor



- Postictal Phase
  - Muscle flaccidity
  - Incontinence
  - Slowly regains consciousness

Grand Mal Management

Ictal Phase

Position supine, legs slightly elevated

Activate EMS if new onset

C - A – B – BLS as needed

*** Protect from injury ***

Administer oxygen

Monitor vital signs

Grand Mal Management

Postictal Phase

Keep supine, legs slightly elevated

C - A – B – BLS as needed

Monitor vital signs

Reassure patient, permit recovery

Discharge patient

To hospital | To home | To physician

Cardiac Emergencies

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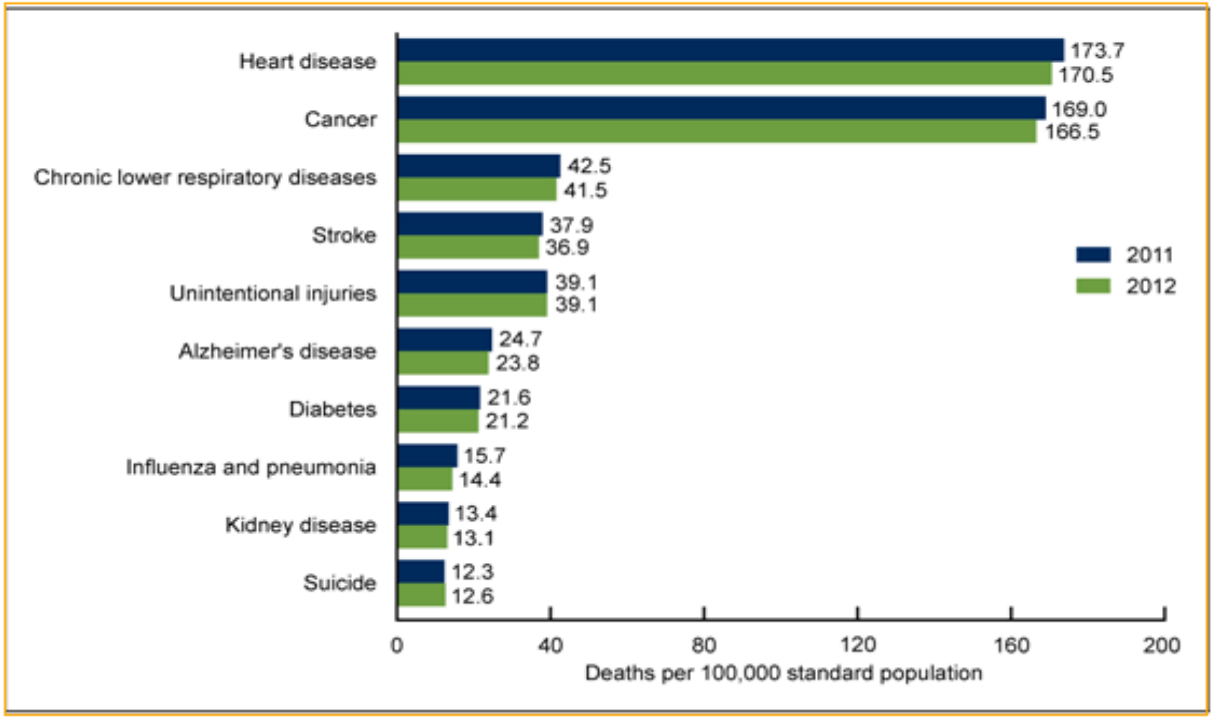
September 19, 2016

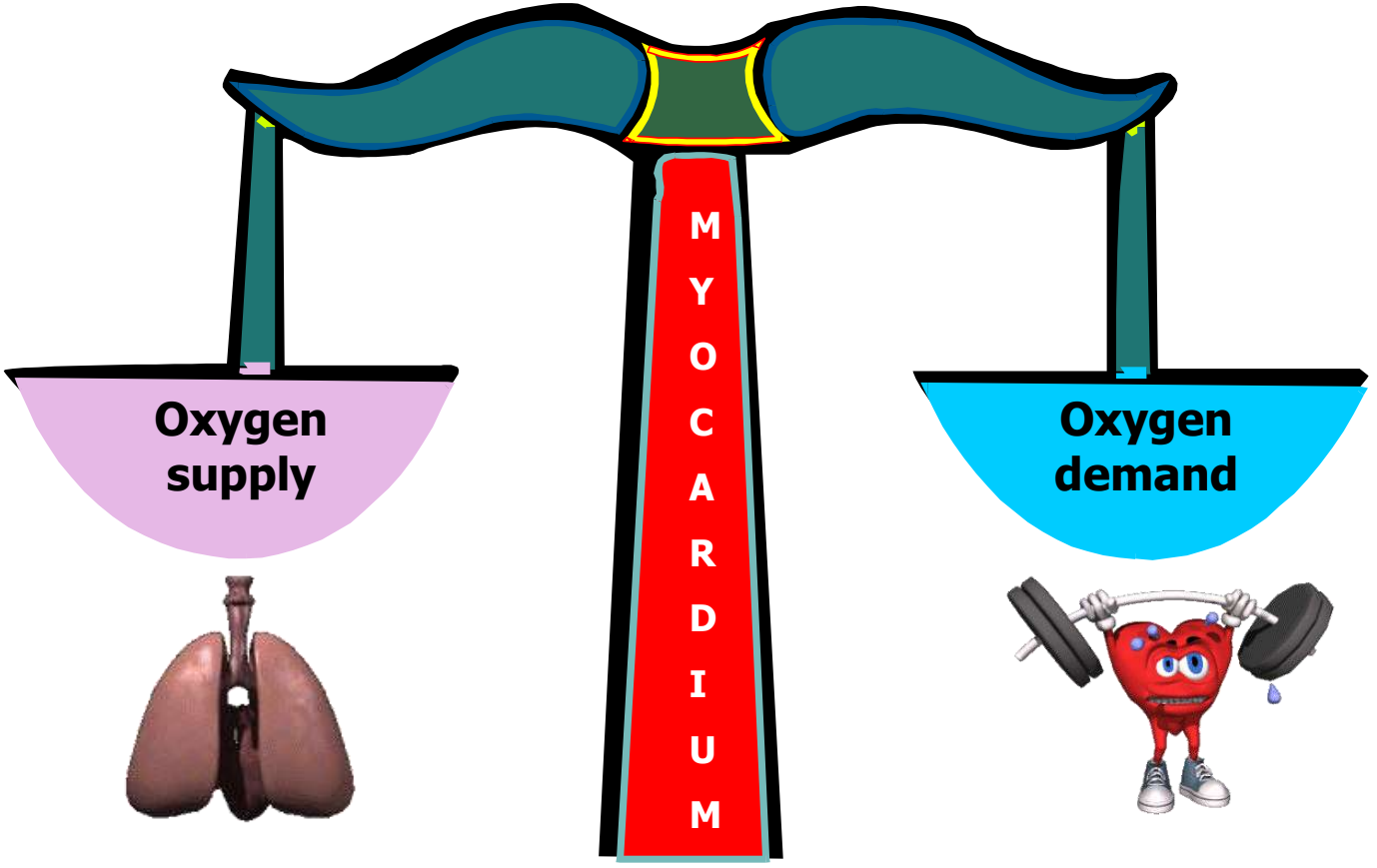
U.S. Causes of Death 2012

Figure 3. Age-adjusted death rates for the 10 leading causes of death in 2012: United States, 2011–2012

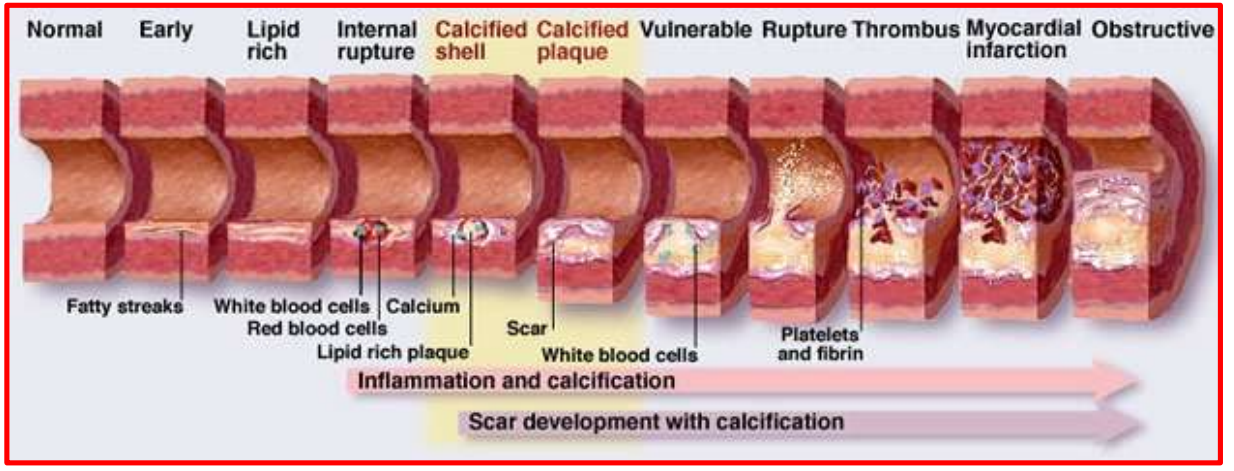


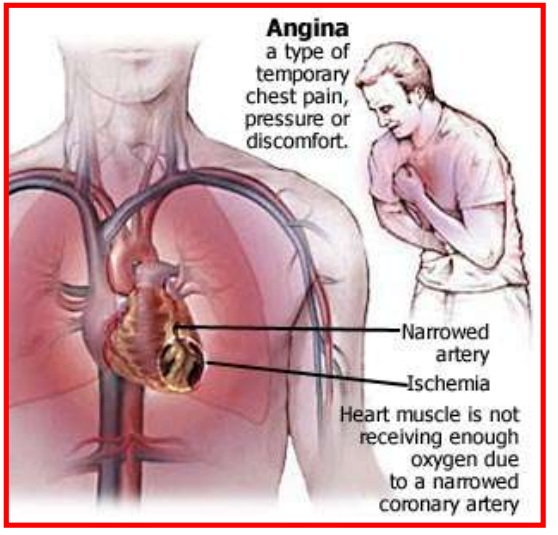
Source: CDC/NCHS, National Statistics System, Mortality

Ischemic Heart Disease



Ischemic Heart Disease





Chest Pain

Acute Coronary Syndrome

- Unstable Angina
- Myocardial Infarction

Cardiac Emergencies

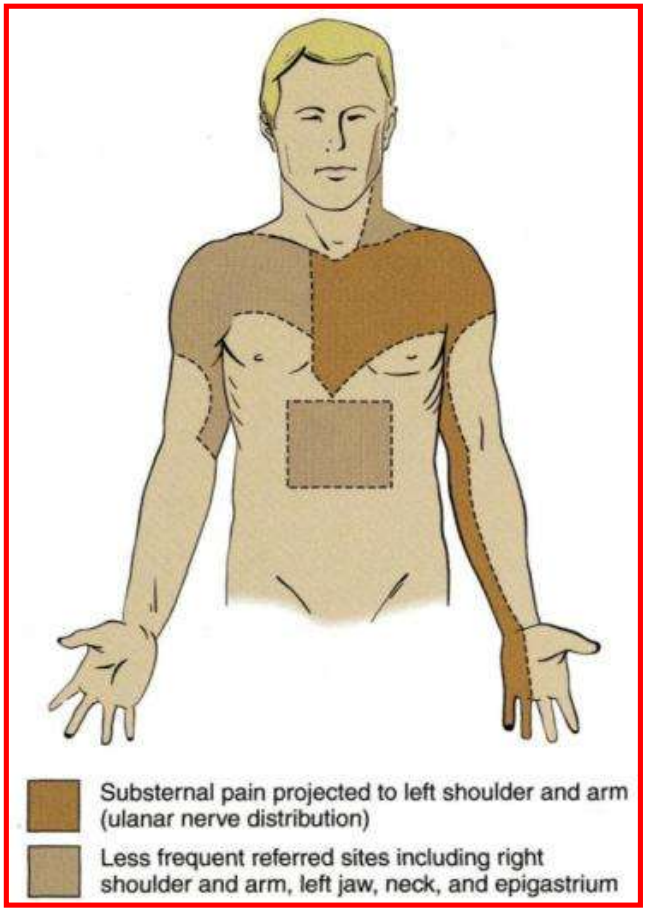
Angina Pectoris

Steven W. Beadnell, DMD
September 19, 2016

Angina Pectoris

Clinical manifestations

- Substernal, squeezing / burning pain
  - "Heavy weight", "Indigestion"
- Sudden onset with exertion or emotion
- Radiates to shoulder, face, left arm
- Subsides with rest or nitroglycerin



Angina Pectoris

Precipitating Factors

- Physical activity
- Hot, humid room
- Cold weather
- Large meals
- Emotional stress
- Caffeine ingestion
- Fever, anemia
- Cigarette smoking
- Smog
- High altitudes

Angina Pectoris

Anxiety, fear, pain

↓

Release of catecholamines (EPI)

↓

Increases BP, heart rate, contraction

↓

Increases myocardial oxygen demand

↓

Myocardial ischemia

↓

Chest Pain

Angina Pectoris Management

Is this your typical angina?

- Location
- Radiation
- Severity of pain
- Other symptoms
- Response to NTG

Angina Pectoris Management

Position patient comfortably (upright)

BLS as needed, CHECK vital signs

History of angina pectoris ? Typical Symptoms ?

YES

NO

Activate EMS

Nitroglycerin 0.4mg SL

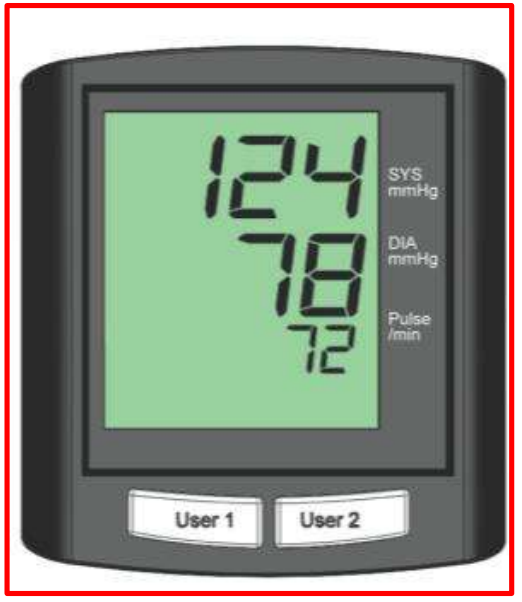
Administer oxygen, monitor VS

Repeat NTG q3-5' , Total 3 doses

Discharge ← Pain Resolves → Hospital

If no response in 3 doses, Tx as MI

Nitroglycerin Contraindication

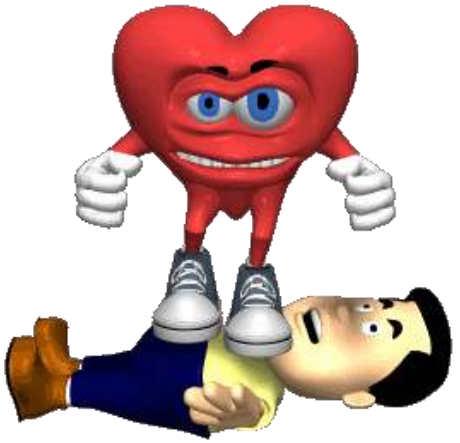


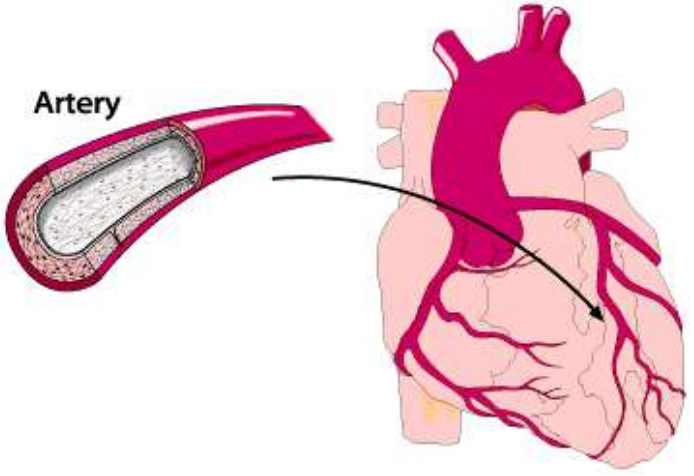
Nitroglycerin is contraindicated in patients with hypotension (SBP < 90 mmHg), significant bradycardia (< 50 BPM), right ventricular (RV MI) infarction, or those who have recently taken a phosphodiesterase inhibitor such as Viagra, Cialis or Levitra.

Nitroglycerin Contraindication

Cardiac Emergencies

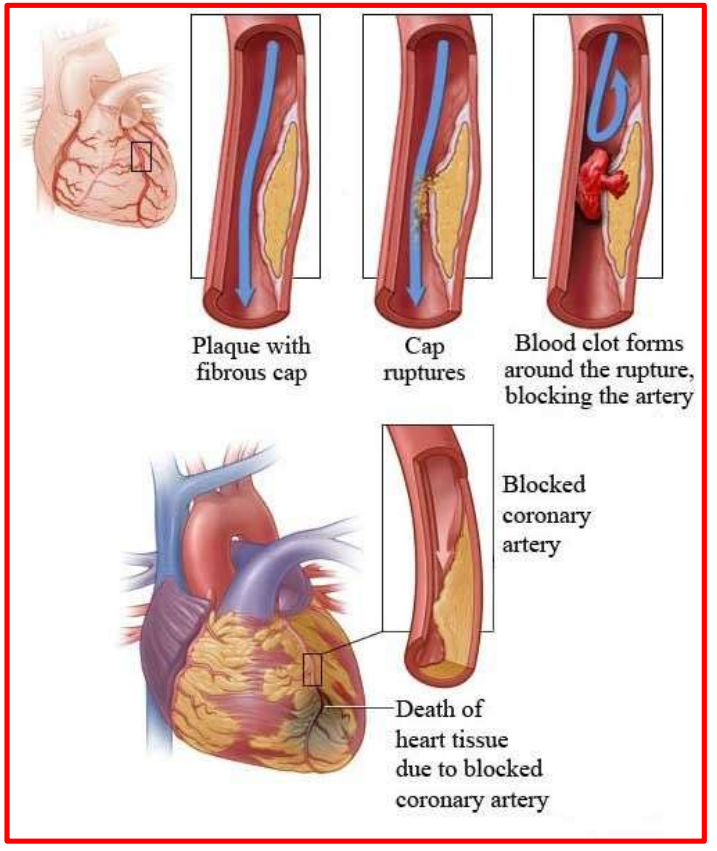
Myocardial Infarction





Myocardial Infarction

Etiology of Myocardial Infarction



Myocardial Infarction

Clinical manifestations

- Retrosternal severe pain
  - "Crushing", "choking"
- Usually > 30 minutes
- Radiates as angina
- N/V, palpitations, SOB
- "Impending doom"

From: **Symptom Presentation of Women With Acute Coronary Syndromes: Myth vs Reality**
Arch Intern Med. 2007;167(22):2405-2413. doi:10.1001/archinte.167.22.2405

Table 1. Acute Coronary Syndrome Presentation Without Chest Pain or Discomfort According to Sex—Summary of Studies From Large Cohorts

	Study Characteristic							Proportion Without Chest Pain, %		
Source	Study Description	Patient Population	Study Years	Sample Size	Mean Age, y	Age Adjusted	Race Adjusted	Men	Women	All
Brieger et al,[37] 2004	GRACE Registry	ACS	1999-2002	20 881	65.8	Yes	No	7.3	10.6	8.4
Canto et al,[8] 2000	National MI Registry	MI	1994-1998	434 877	69.3	Yes	Yes	28.6	38.6	32.7
Canto et al,[38] 2002	Alabama UA Registry	UA	1993-1999	4167	72.3	Yes	Yes	50.2	53.0	51.7
Culi et al,[39] 2002	CCUs Croatia	MI	1990-1995	1996	58.8	Yes	No	12.4	20.3	14.8
Dorsch et al,[7] 2001	United Kingdom	MI	1995	2096	70.6	Yes	No	17.6	24.6	20.1
Goldberg et al,[40] 1998	Worcester MI Study	MI	1986-1988	1360	67.7	Yes	No	18.0	23.0	20.0
Milner et al,[41] 2004	Worcester MI Study	MI	1997-1999	2073	70.2	Yes	No	30.9	45.8	37.3
Roger et al,[42] 2000	Olmsted County, Minnesota	UA	1985-1992	2271	63.0	Yes	No	25.0	19.0	22.0
Stern et al,[43] 2004	26 Hospitals, CCU, Israel	ACS	2000	2113	64.9	Yes	No	18.7	29.7	21.7
Cumulative	...	...	...	...	...	...	...	27.4 (76 036 of 276 933)	37.5 (73 003 of 194 797)	31.6 (149 039 of 471 730)

Abbreviations: ACS, acute coronary syndrome; CCU, coronary care unit; MI, myocardial infarction; UA, unstable angina.

Acute Coronary Syndrome Presentation Without Chest Pain or Discomfort According to Sex—Summary of Studies From Large Cohorts

Call 9–1–1 if You Feel Any of These Symptoms of a Heart Attack

Your chest hurts or feels squeezed.

One or both arms, your back, or stomach may hurt.

You may feel pain in the neck or jaw.

You feel like you can't breathe.

You may feel light-headed or break out in a cold sweat.

You may feel sick to your stomach.

Myocardial Infarction

Assume MI, not angina, if:

- New onset chest pain
- Change in previous angina pain
  - More severe, different location
- Pain unrelieved by rest or NTG

Myocardial Infarction Management

Position comfortably

↓

BLS, oxygen, NTG X 3 doses as in angina

↓

**** If no response or if pain resolves, but returns ****

↓

Activate EMS

↓

Administer fibrinolytics (ASA)

23% mortality reduction

ISIS-2 study

↓

Monitor vital signs

↓

Manage pain - narcotics
Morphine 2-15mg IV q15 minutes
Nitrous oxide is option

↓

Transport to hospital - - ACLS

Myocardial Infarction Management

Time is Muscle

Cardiac Emergencies

Cardiac Arrest

Steven W. Beadnell, DMD
September 19, 2016

Cardiac Arrest

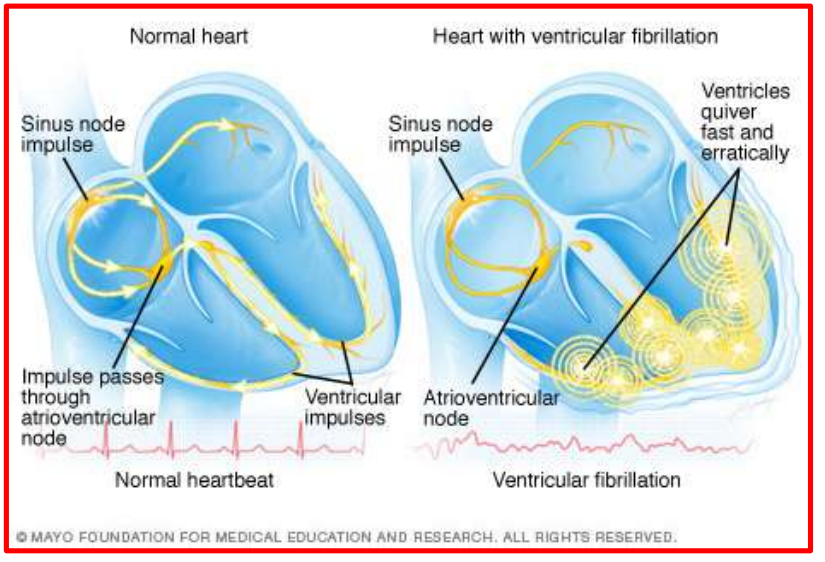
Possible causes

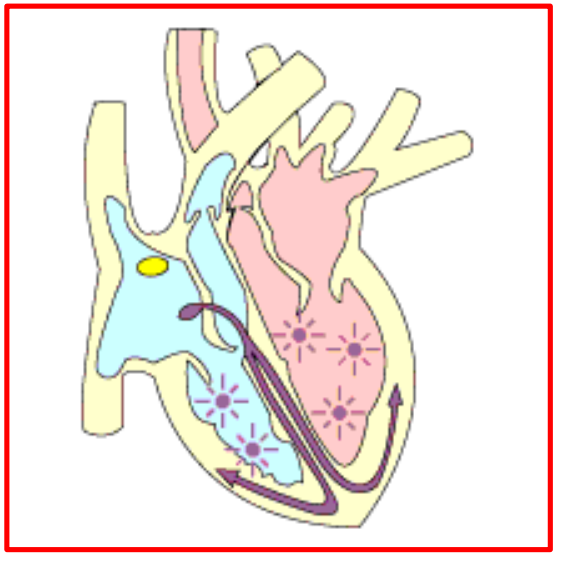
- Myocardial infarction
- Sudden cardiac death
- Airway obstruction
- Drug overdose reaction
- Anaphylaxis
- Seizure disorder
- Acute adrenal insufficiency

Cardiac Arrest

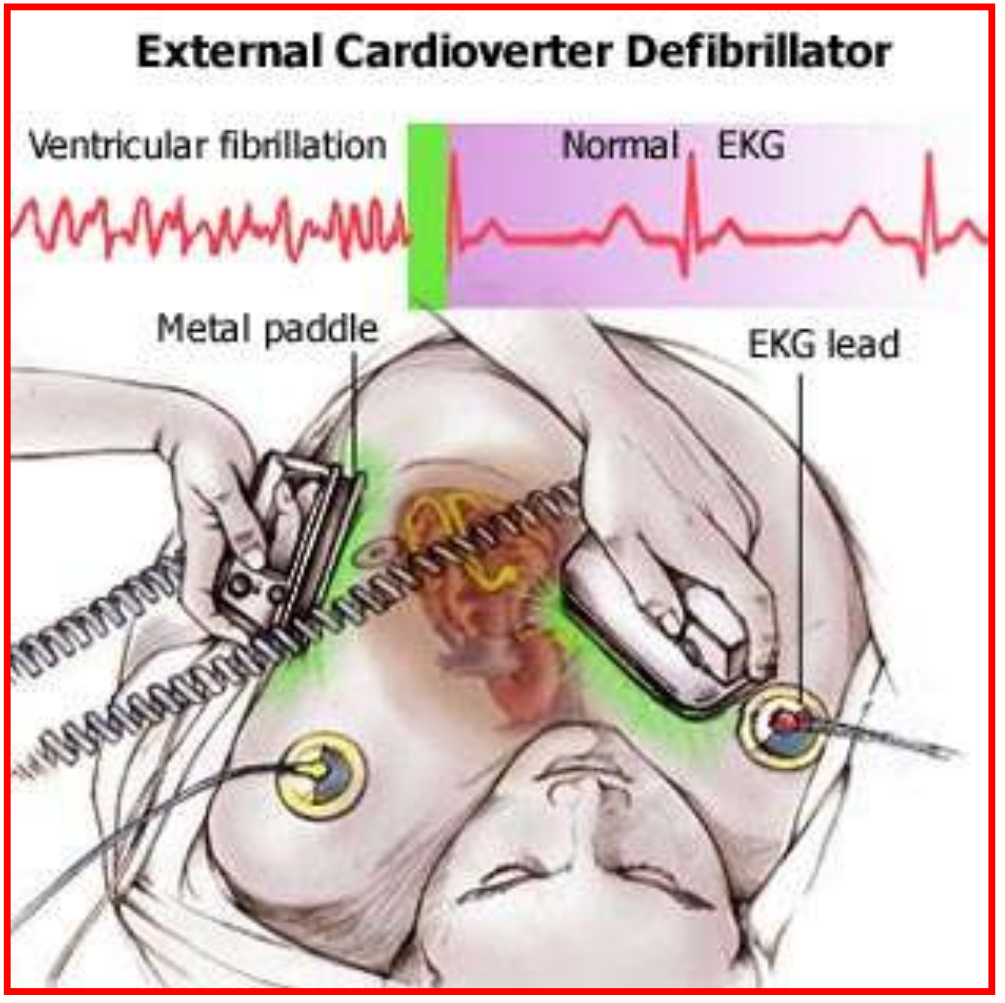
Ventricular Fibrillation

About 90% of cardiac arrests





Cardiac Arrest



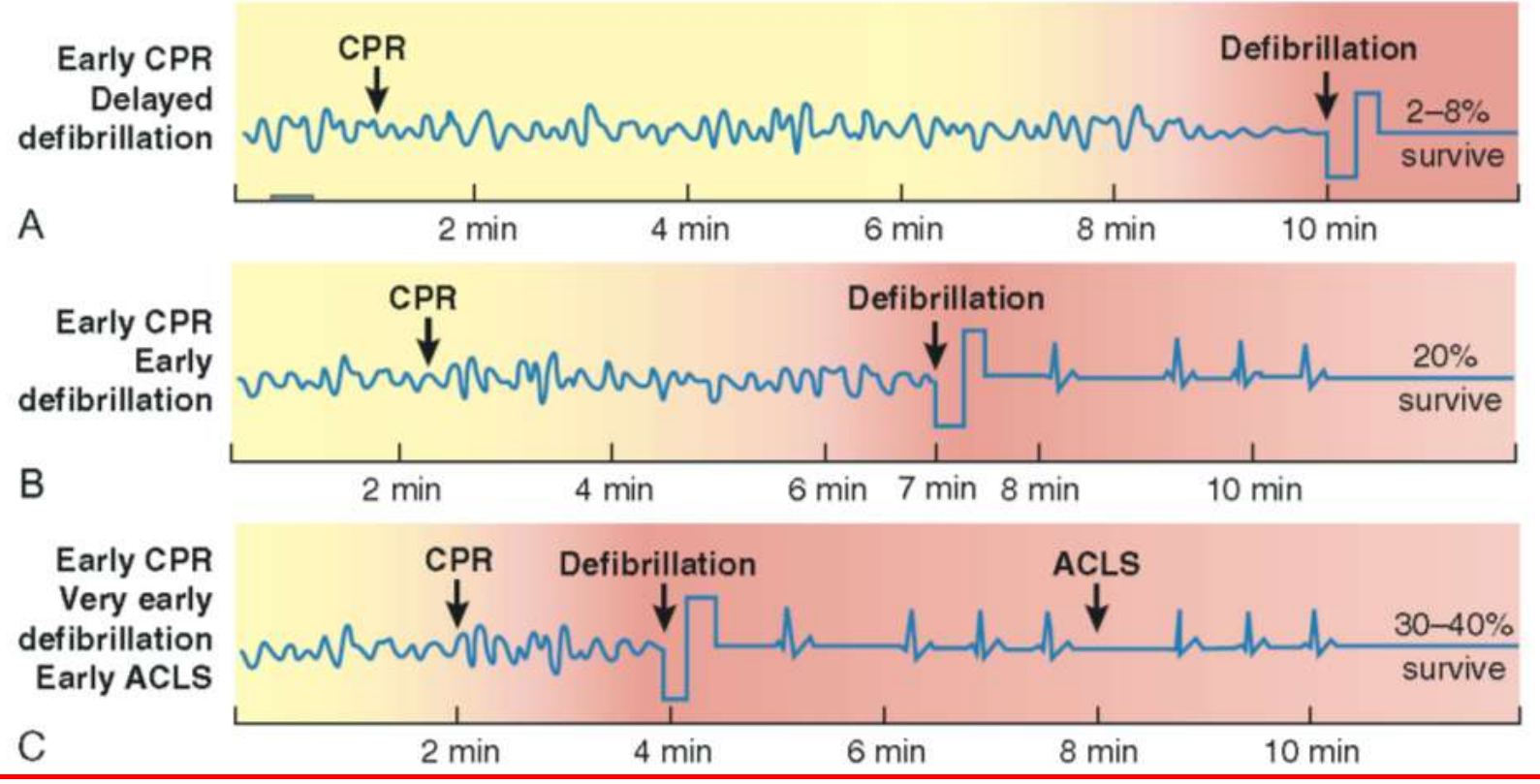
Efficacy of Defibrillation

Conversion of Ventricular Fibrillation to normal rhythm

Time in Ventricular Fibrillation	Success of Defibrillation
Less than one minute	90%
One to two minutes	80%
Each add'l minute	Decreases 10%

Efficacy of Defibrillation

Conversion of Ventricular Fibrillation to normal rhythm



Source: American Heart Association

Automated External Defibrillator

AED Instructions

Instructions for operation – two steps

Step one

- ✓ **Patient is unconscious**
- ✓ **Patient is not breathing**
- ✓ **Patient is pulseless**

Step two

- ✓ **Apply defibrillator pads**
- ✓ **Follow verbal instructions**

BLS – The Primary Survey

First C – A – B - D

- Circulation
  - Give chest compressions
- Airway
  - Open the airway
- Breathing
  - Provide positive-pressure ventilation
- Defibrillation
  - Shock ventricular fibrillation

Drug-Related Emergencies

Allergic Reactions

Allergic Reactions

Common Dental Allergens

- Antibiotics
  - Penicillin
  - Cephalosporins
  - Tetracyclines
- Analgesics
  - Aspirin-compounds
  - Nonsteroidals
- Opioids
  - Meperdine
  - Codeine
- Antianxiety agents
  - Barbiturates
- Local anesthetics
  - Esters: Benzocaine
  - Sodium bisulfite
  - Methylparaben
- Others
  - Acrylic monomer
  - Latex

Allergic Reactions

Allergen

↓

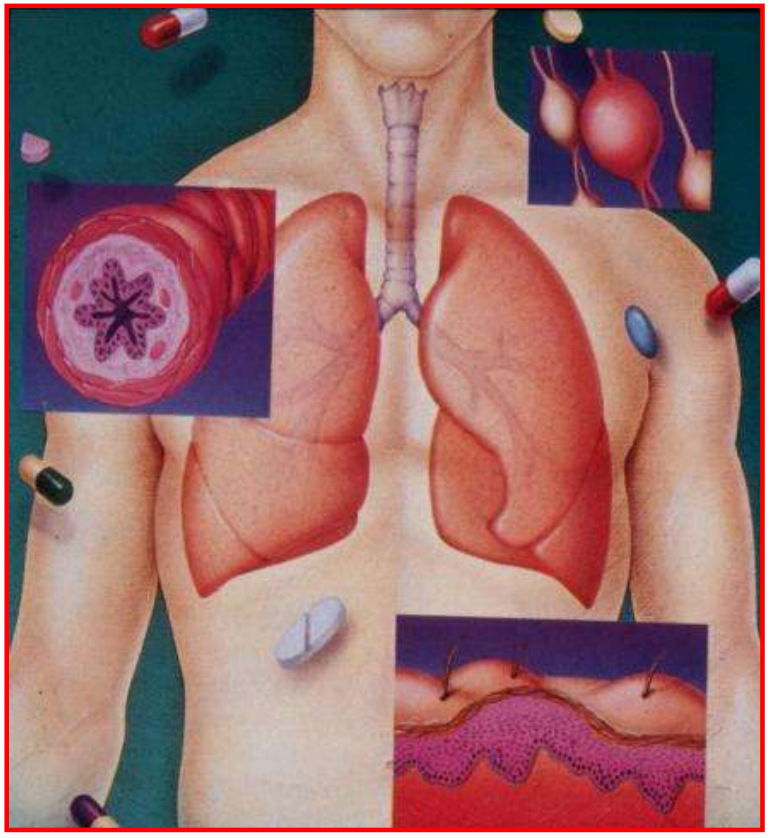
Mast cells & Basophils

↓

Histamine
Leukotreines
ECF – Anaphylaxis
Kallikreins
Prostaglandins

↓

Allergic phenomenon



Allergic Reactions - Cutaneous

Clinical manifestations

Increased vascular permeability

Vasodilation

Urticaria / Hives

Rash

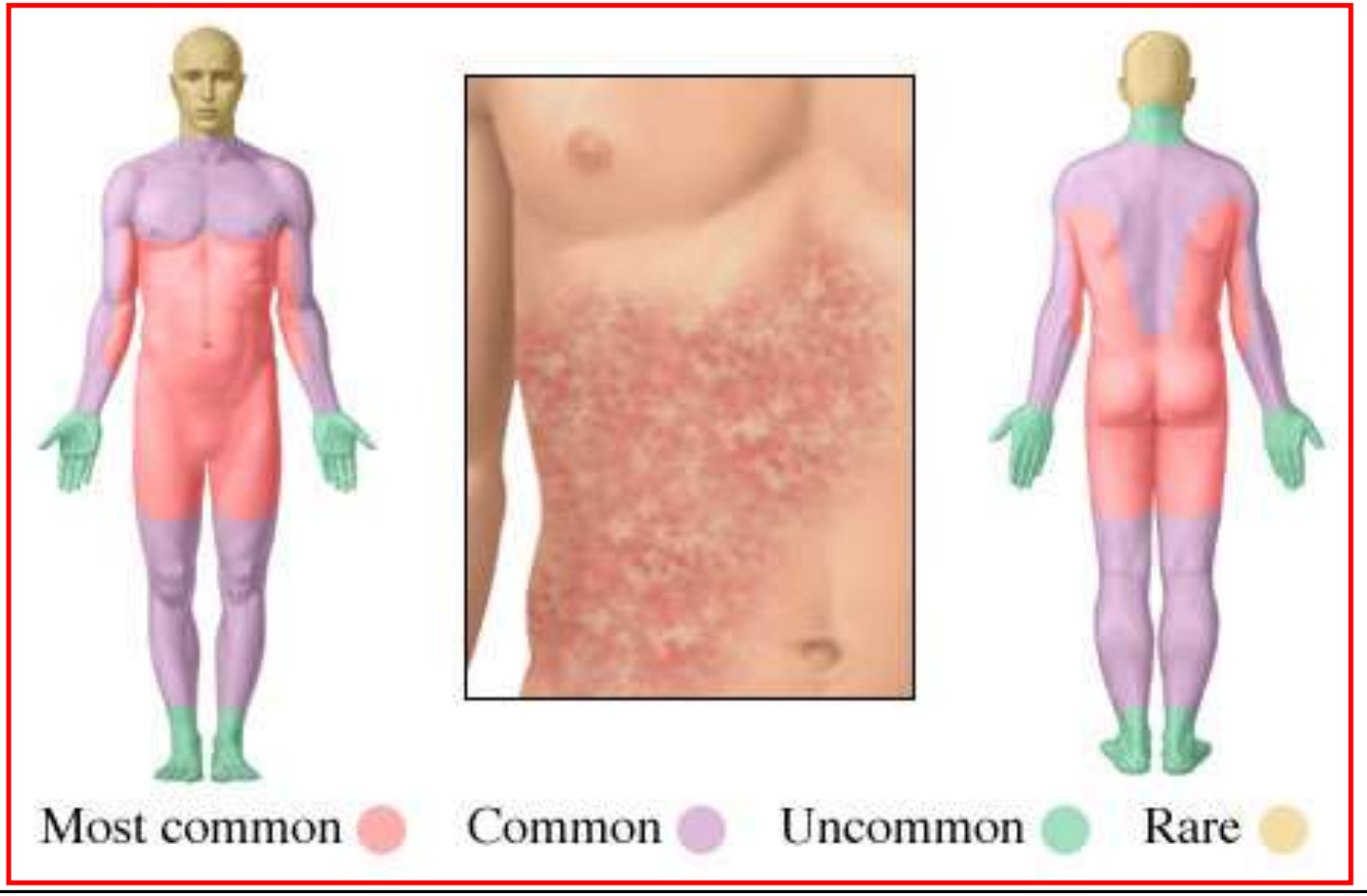
Pruritis (itching)

Tingling and warmth

Flushing

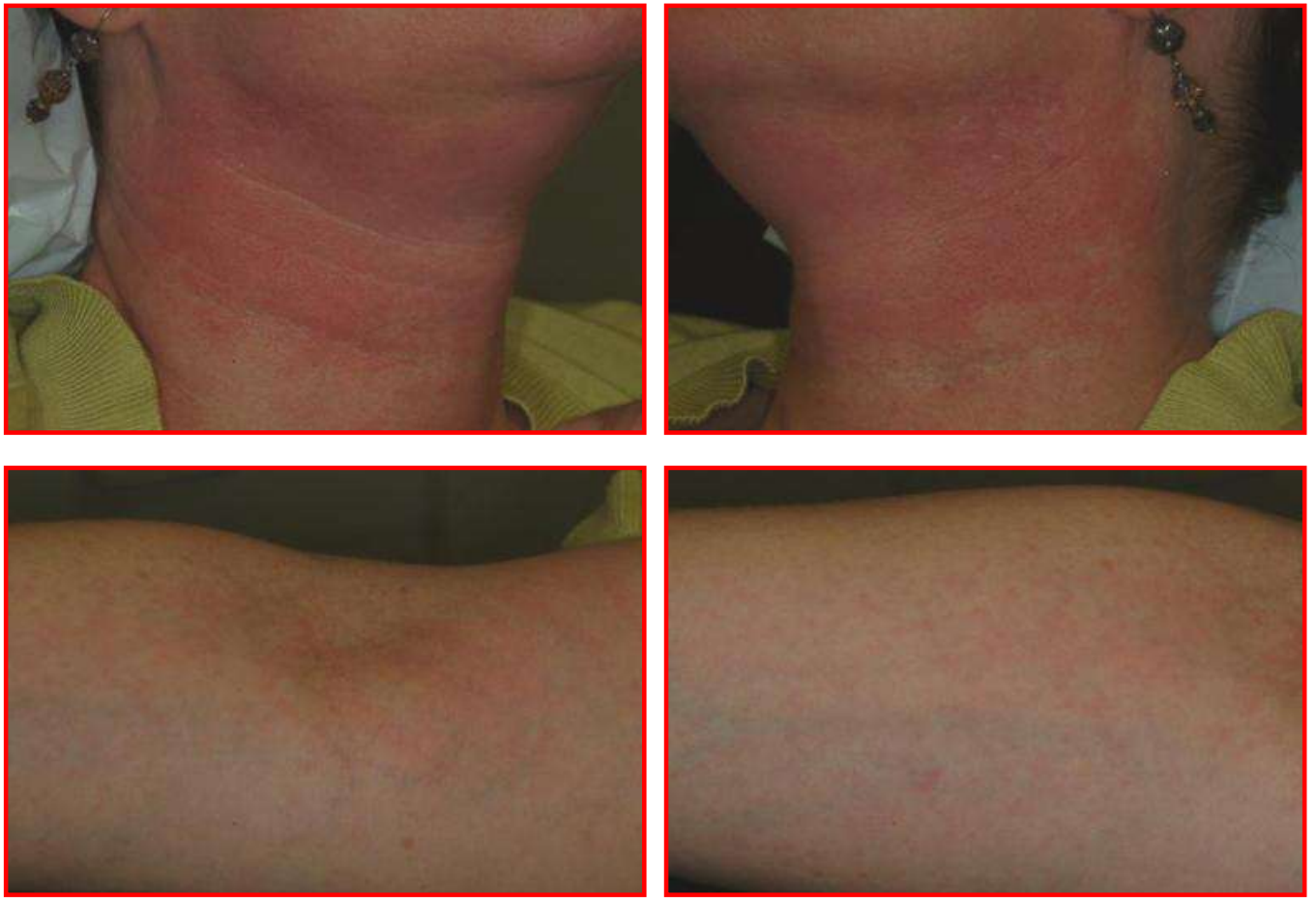
Allergic Skin Reactions

Typical Distribution Pattern



Allergic Reactions - Cutaneous

Allergic Reactions - Cutaneous



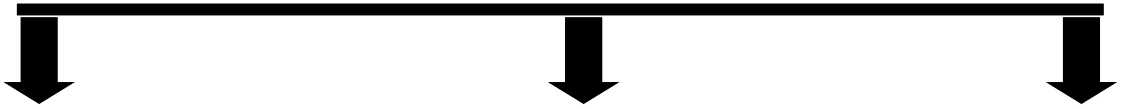
Allergic Reactions - Respiratory

Clinical manifestations

Increased vascular permeability & vasodilation

Increased exocrine gland secretions

Bronchiole smooth muscle contraction



Rhinitis

- Nasal congestion
- Nasal itching
- Rhinorrhea

Laryngeal edema

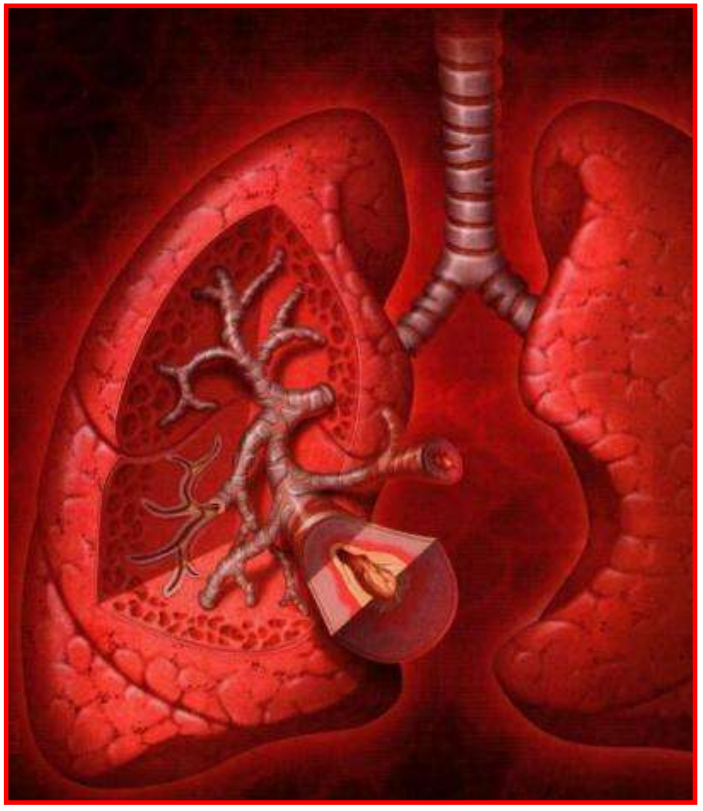
- Dyspnea
- Hoarseness
- Throat tightness
- Laryngeal stridor

Bronchospasm

- Cough
- Wheezing
- Tachypnea

Allergic Reactions - Respiratory

Bronchospasm



Cough

Wheezing

Tachypnea

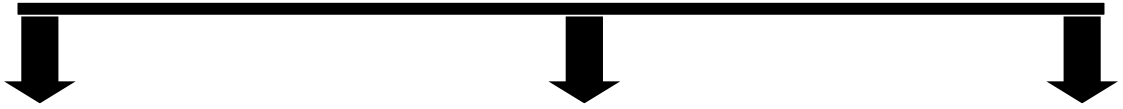
Allergic Reactions - Cardiovascular

Clinical manifestations

Increased vascular permeability & vasodilation

Decreased cardiac output

Loss of vasomotor tone



Circulatory collapse	Dysrhythmias	Cardiac arrest
Light-headed	Light-headedness	Pulselessness
Weakness	Weakness	EKG changes
Syncope	Palpitations	Vent fibrillation
Ischemic chest pain	Ischemic chest pain	Asystole

Allergic Reactions

Predictors of severity of the reaction

Rapidity of onset

of signs and symptoms

Rapidity of progression

of signs and symptoms

Tx Allergic Reactions

Epinephrine

- Reverses the pathologic processes causing the allergic reaction

Diphenhydramine

- Antagonizes histamine, preventing progression of the allergic reaction

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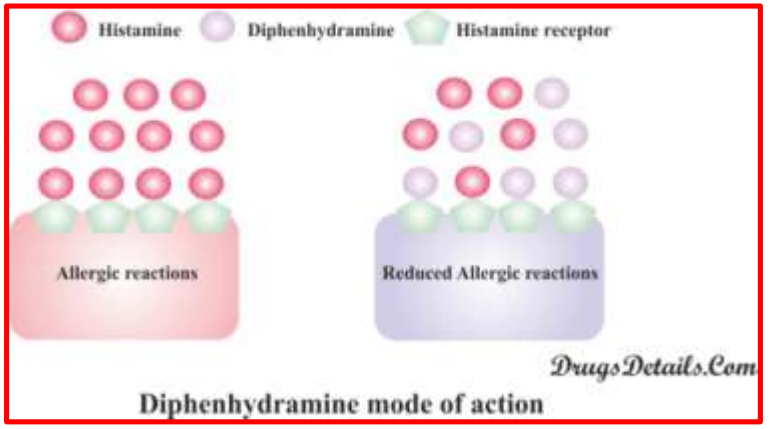
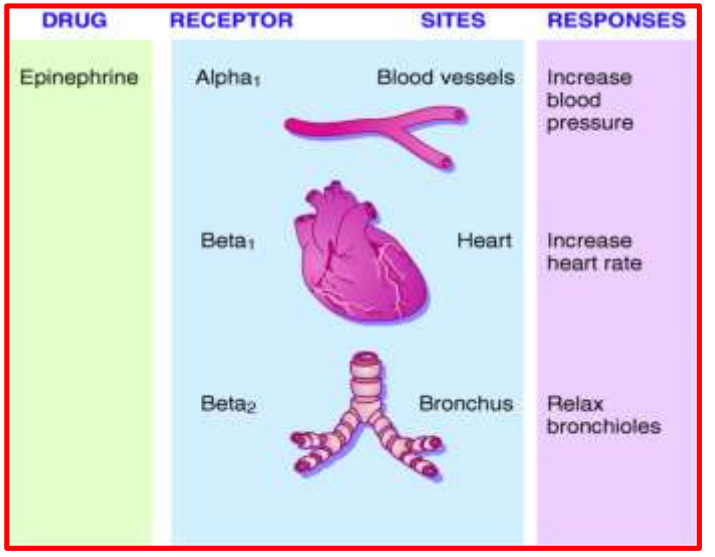


Tx Allergic Reactions

Epinephrine

- Reverses the pathologic processes causing the allergic reaction



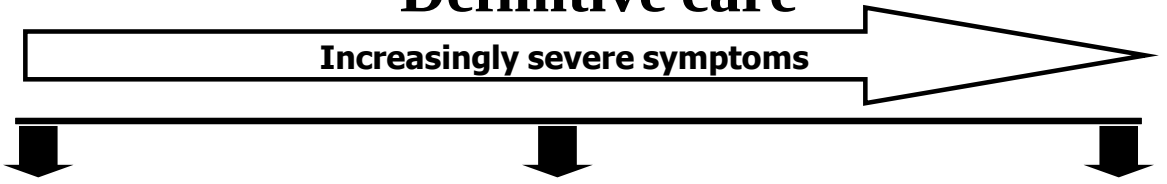
Delayed-Onset Allergic Skin Rxn Management

Onset skin reaction (> 1 hour) from allergen

Position patient comfortably

Assess and perform BLS as needed

Definitive care



Observe patient

Administer oral histamine blocker prn
Benadryl 50mg oral

Administer IM + oral histamine blocker q4-6h
Benadryl 50mg IV or IM
Benadryl orally X 2-3 days (25 – 50mg qid)

Rapid-Onset Allergic Skin Rxn Management

Onset skin reaction (< 1 hour) from allergen

Position patient comfortably

↓

Assess and perform BLS as needed

↓

Definitive care

NO ← **Cardiac or respiratory involvement ?** → **YES**

Benadryl 50mg oral / IM

↓

Discharge

Oxygen, start IV

↓

Epinephrine 0.3mg SQ, IM, IV

↓

Activate EMS 

↓

Benadryl 50mg IV or IM

↓

Hospital

Tx Respiratory Allergic Rxn

Position patient comfortably

Assess and perform BLS as needed

Calm patient

Activate EMS

Administer Epinephrine 0.3mg q 15-30 min
SC, IM, IV, inhaler

Benadryl 50mg IM

Discharge or hospitalize