

# Medical Emergencies Update 2017 - II



Steven W. Beadnell, DMD  
Gum Gardner's RDH Study Club  
September 25, 2017

# **Altered consciousness**

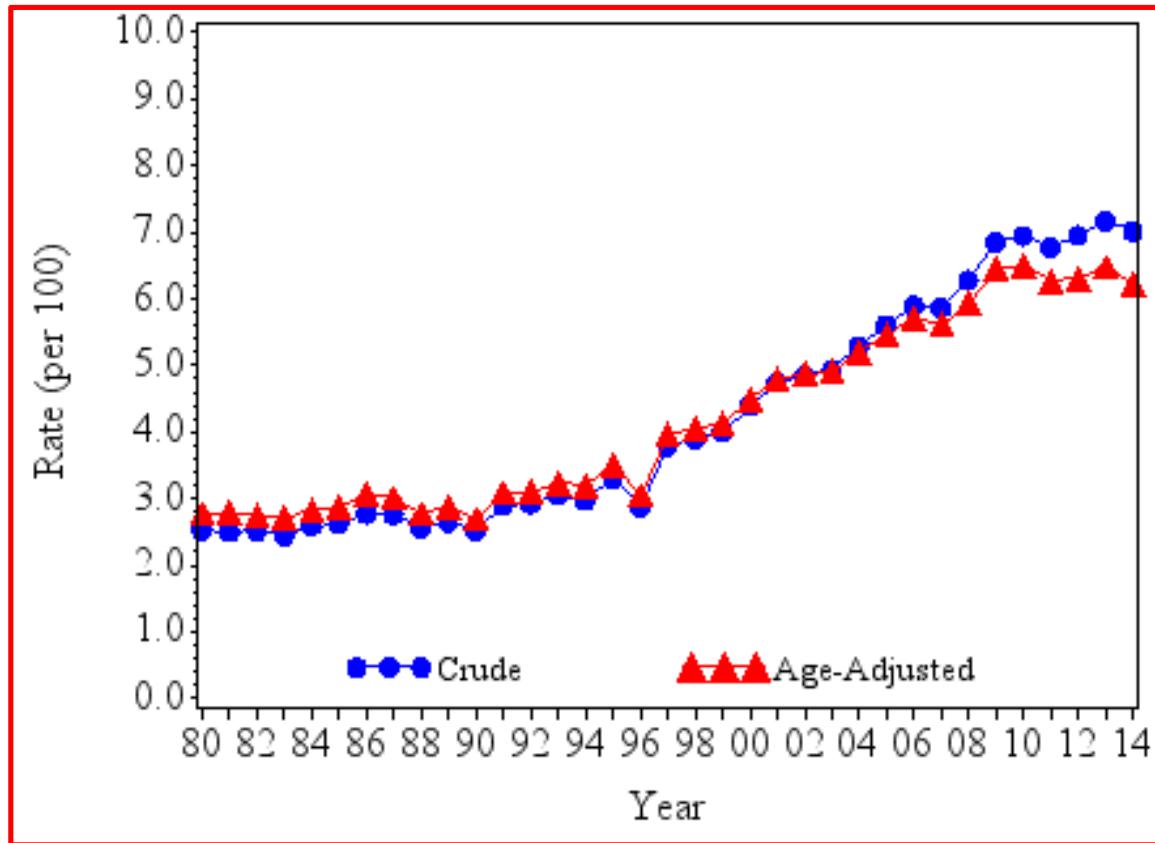
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# **Altered Consciousness**

# **Diabetic Emergencies**

# **( Insulin Shock )**

# U.S. Incidence of Diabetes



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

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# Diabetes Classification

## ❖ Type 1

- ❖ Absolute insulin deficiency, usually autoimmune process – 8%



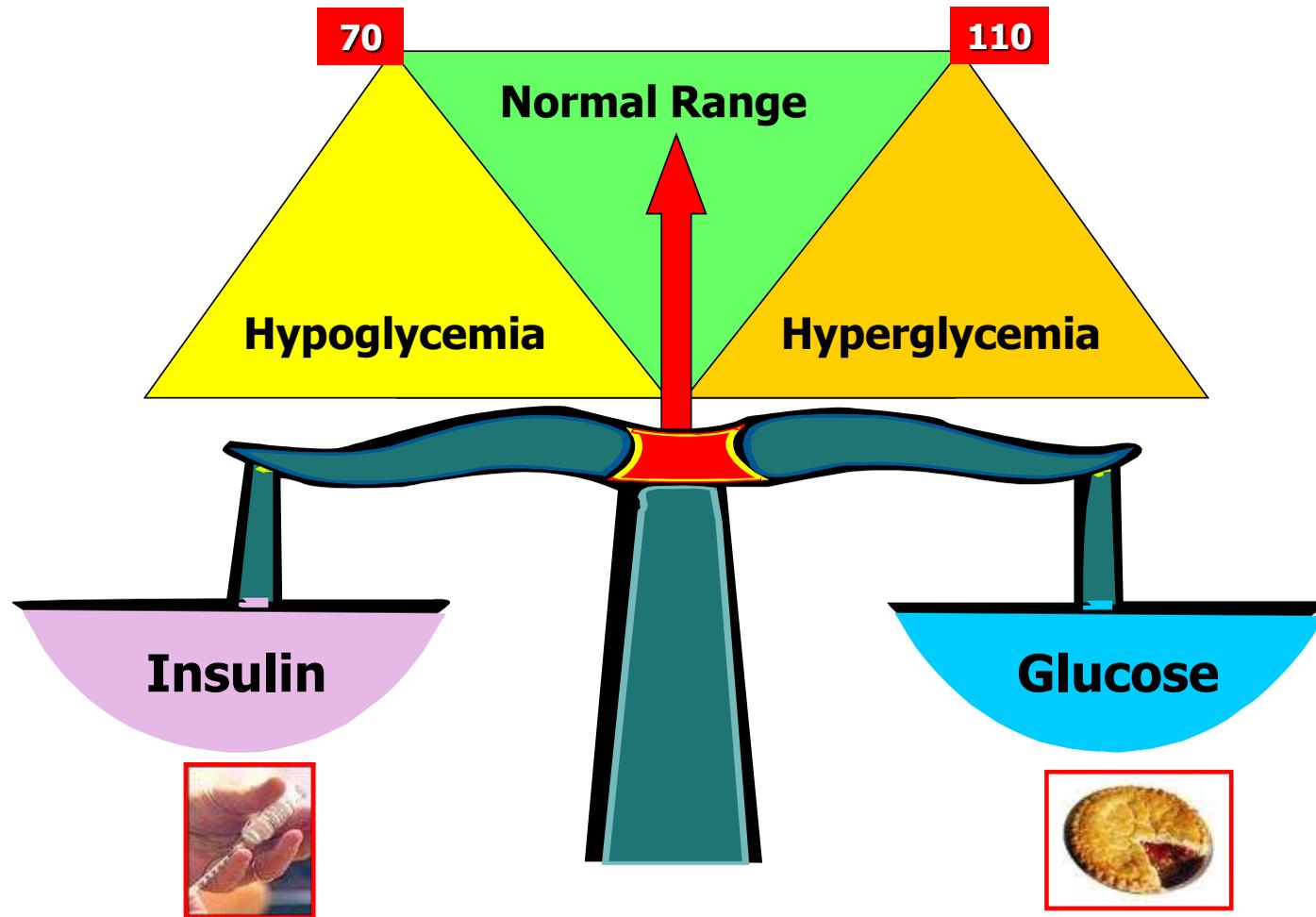
## Type 2

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



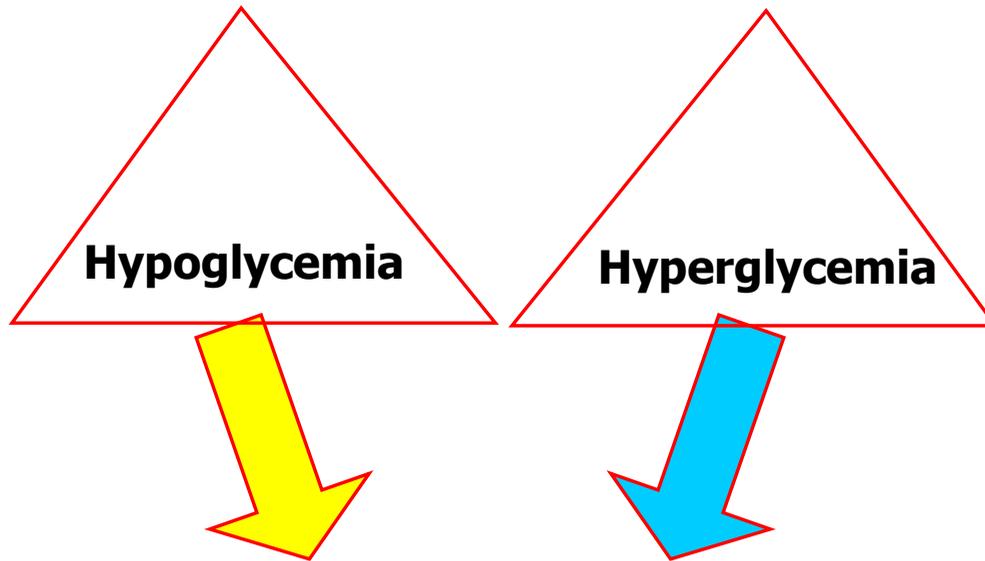
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# Diabetic Emergencies

## 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

Differential Diagnosis in Diabetic with aLOC

## Hypoglycemia

- ❖ Cool, wet, pale
- ❖ Confusion
- ❖ Lethargy
- ❖ Hunger

## Hyperglycemia

- ❖ Hot, flushed, dry
- ❖ Acetone breath
- ❖ Dry mouth
- ❖ Irritable

# Diabetic Emergencies

## Diabetic Ketoacidosis

Lack of Insulin - - Hyperglycemia



Glycogenolysis  
Gluconeogenesis

Ketogenesis



Ketoacidosis



Coma



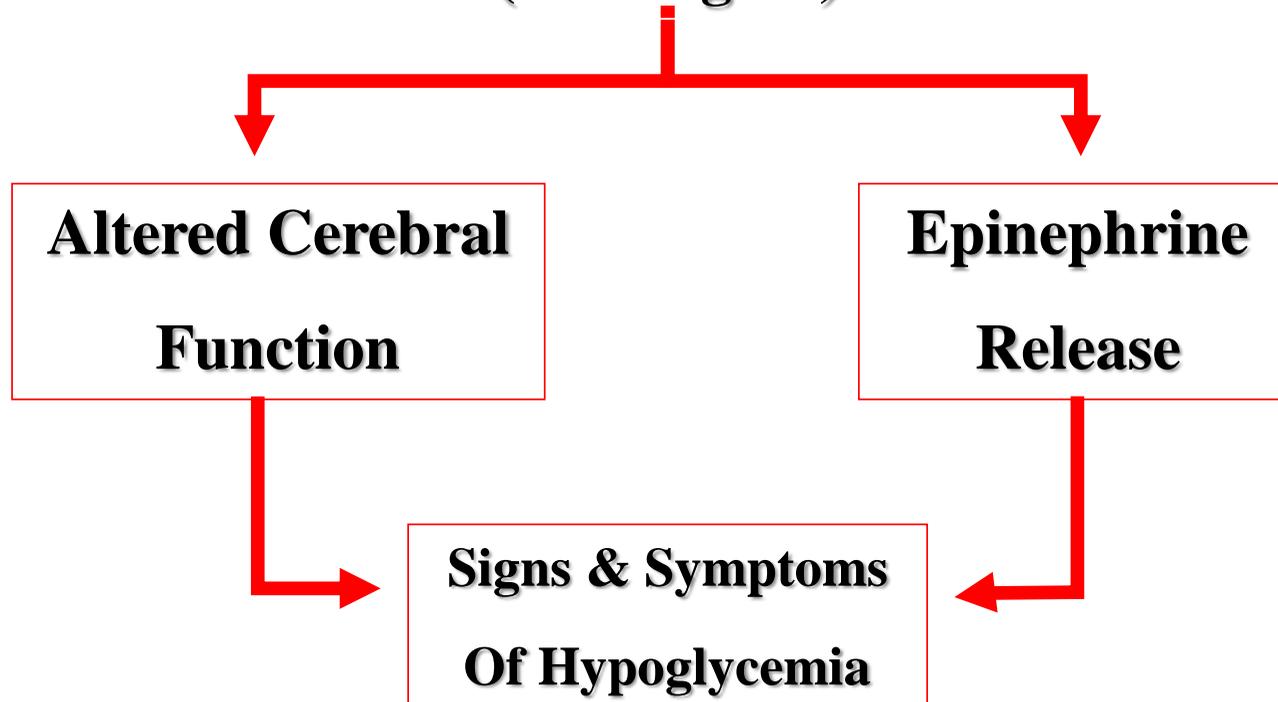
# **Diabetic Emergencies**

**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

## Hypoglycemia

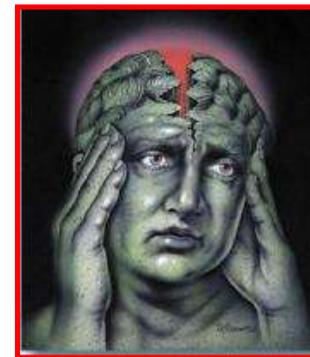
( < 40mg/dl )



# Insulin Shock

## Hypoglycemia – Early manifestations

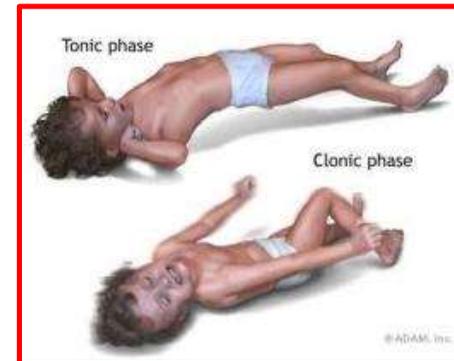
- ❖ Diminished cerebral function
  - ❖ Alteration of mood
  - ❖ Lack of spontaneity
- ❖ Weakness, dizziness
- ❖ Pale, moist skin
- ❖ Headache



# Insulin Shock

## Hypoglycemia – Late manifestations

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



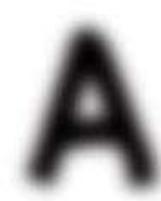
# Hypoglycemia Signs & Symptoms

**THE DIABETES COUNCIL**  
www.thediabetesCouncil.com

## HYPOGLYCEMIA (Low Blood Glucose Level)

**Causes:** Too little food or skip a meal;  
too much Insulin or Diabetes Pills;      **Onset:** Often Sudden;  
may pass out untreated

**SYMPTOMS:**

 <b>SHAKY</b>	 <b>FAST HEARTBEAT</b>		
 <b>SWEATING</b>	 <b>DIZZY</b>	 <b>ANXIOUS</b>	 <b>HUNGRY</b>
 <b>BLURRY VISION</b>	 <b>FATIGUE</b>	 <b>HEADACHE</b>	 <b>IRRITABLE</b>

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# Insulin Shock - Management

## \* \* Unconscious Patient \* \*

Position patient supine, legs elevated



C – A – B – BLS as needed



Activate EMS - ASAP



Parenteral Carbohydrates

Dextrose 50% 50ml IV

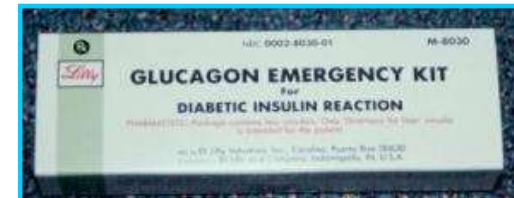
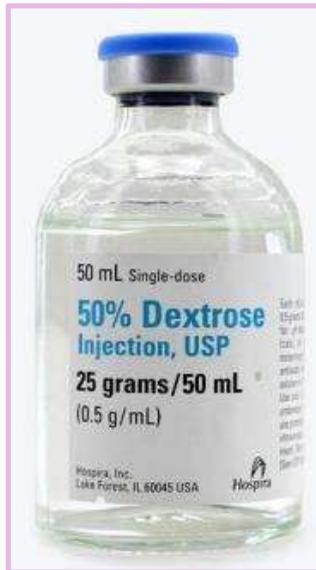
Glucagon 1mg IM or IV  
(Epinephrine 0.5mg SQ or IM)



Oral carbohydrates after recovers



Discharge or transport to hospital



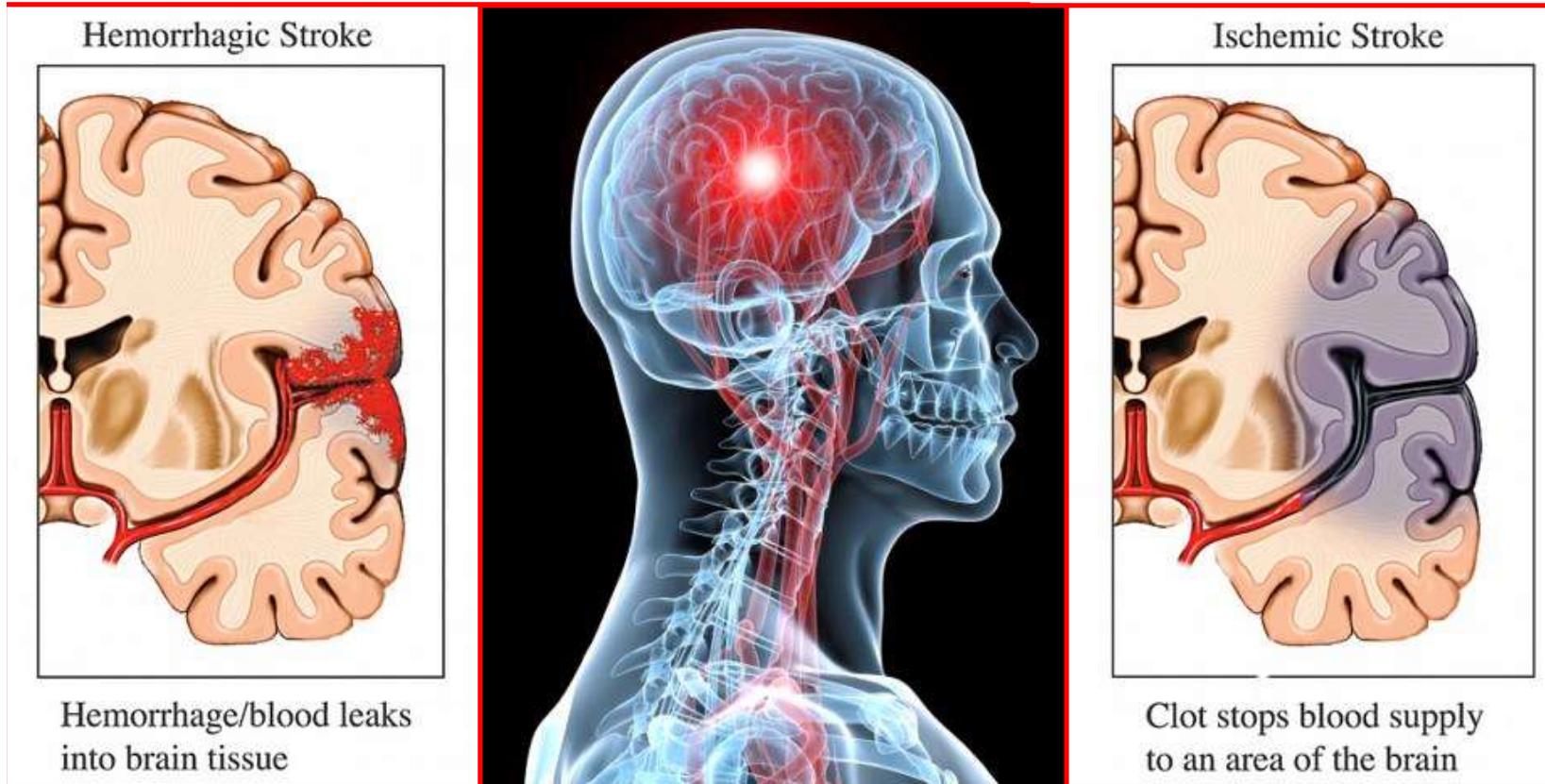
# **Altered Consciousness**

# **Cerebrovascular Accident**

**( Acute Stroke )**

# Cerebrovascular Accident

## CVA Classification



# Cerebrovascular Accident

## CVA Classification

### Transient Ischemic Attack (TIA)

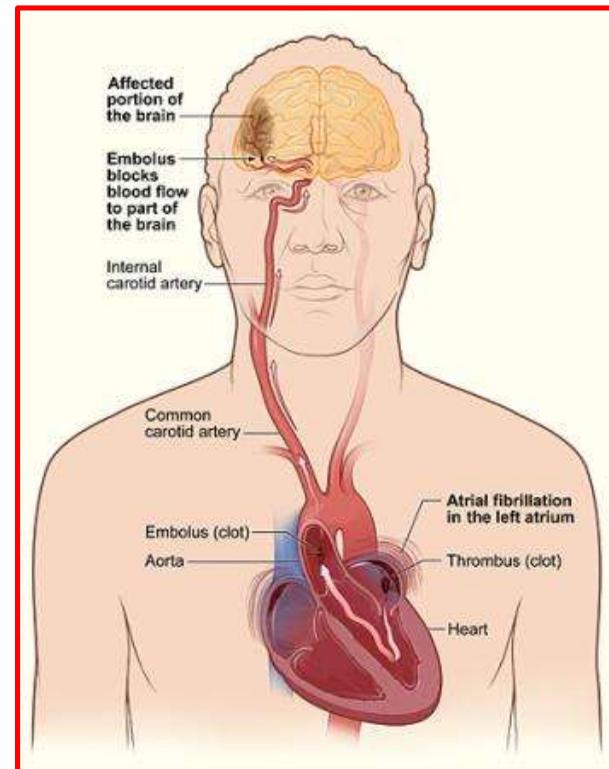
- ❖ Focal ischemic neurologic deficits that last < 24 hrs, usually resolve in 2 - 10 minutes
- ❖ Indicates cerebrovascular disease

**“Angina of the Brain”**

# Cerebrovascular Accident

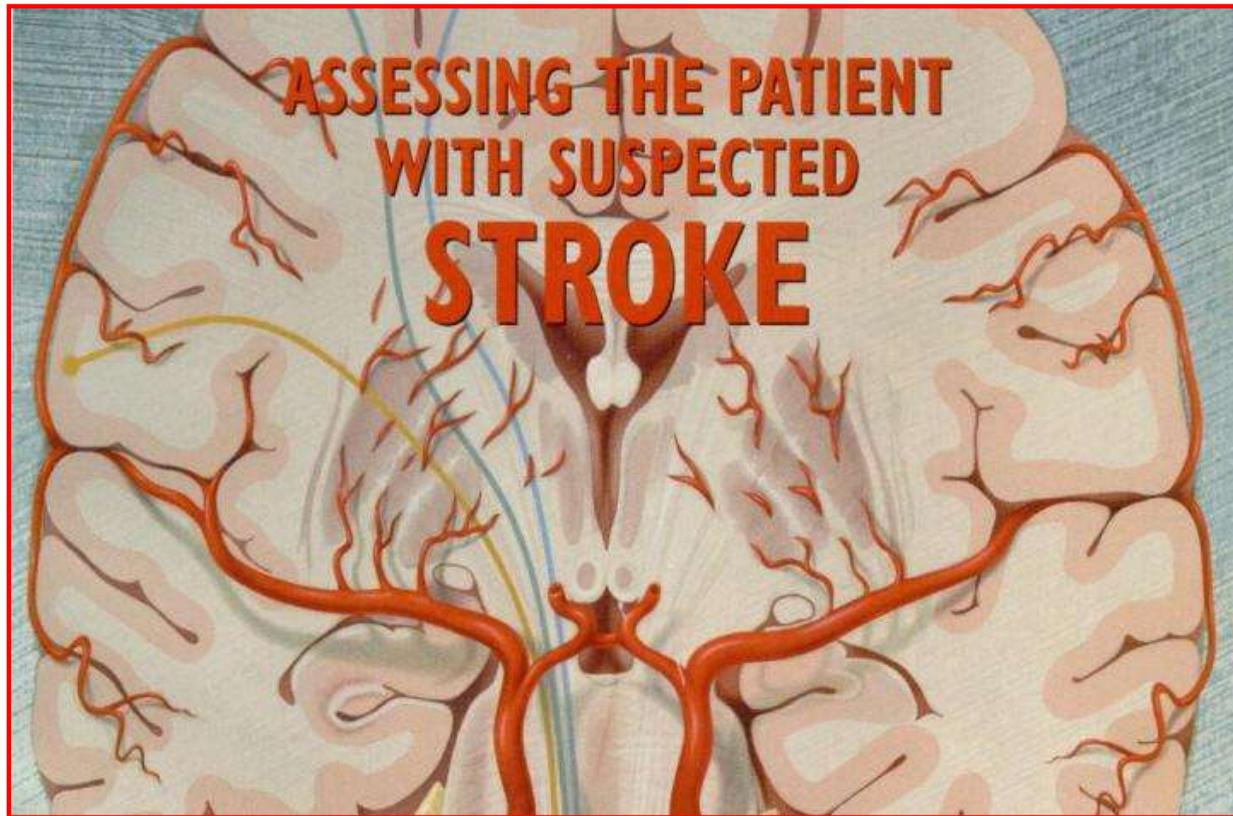
## Associated Risk Factors

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



# Cerebrovascular Accident

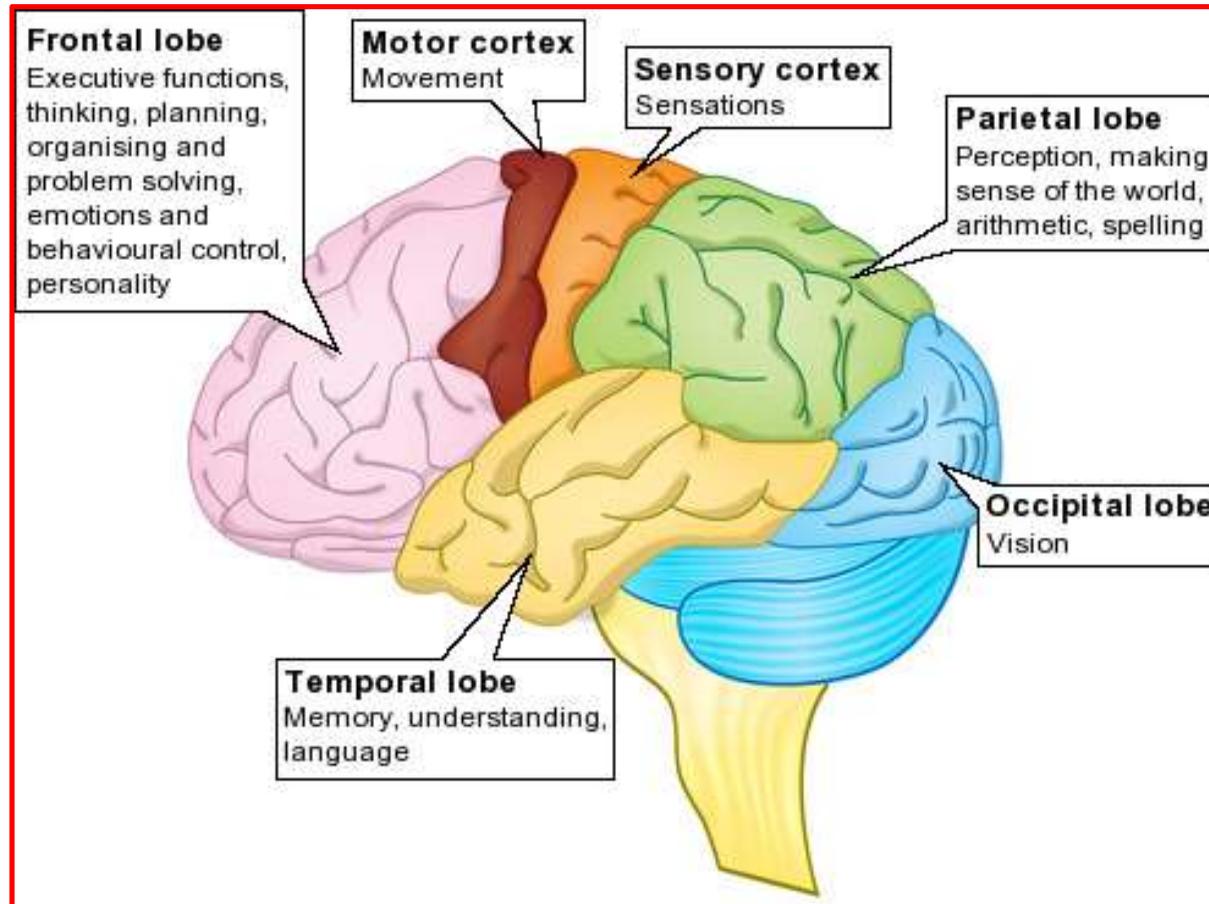
## CVA or TIA Diagnostic Clues



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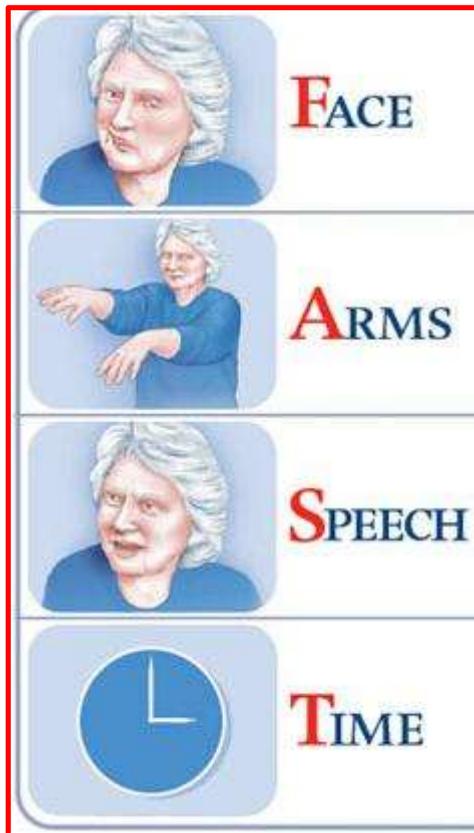
# Cerebrovascular Accident

## 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

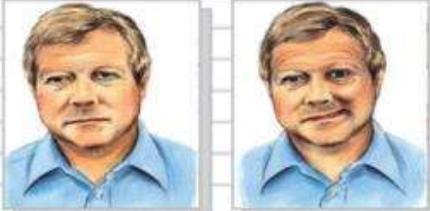
# Cerebrovascular Accident

If any one of these signs is present, chance of stroke is 72%

**Cincinnati Prehospital Stroke Scale**

**Facial Droop**  
Ask patient to smile

*Normal:* Both sides of face move equally  
*Abnormal:* One side of face does not move at all



**Arm Drift**  
Ask patient to close eyes and hold both arms out straight for 10 seconds

*Normal:* Both arms move equally or not at all  
*Abnormal:* One arm drifts compared to the other



**Speech**  
Ask patient to say "You can't teach an old dog new tricks"

*Normal:* Patient uses correct words with no slurring  
*Abnormal:* Slurred or inappropriate words or unable to speak

# **CVA or TIA Management**

**Position patient comfortably**



**C – A – B – BLS as needed**



**Monitor vital signs**

**Activate EMS**



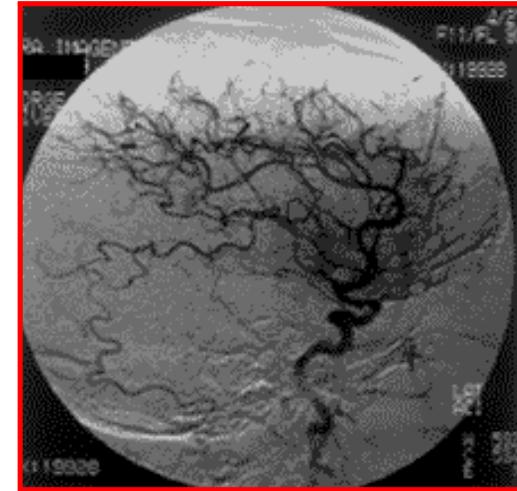
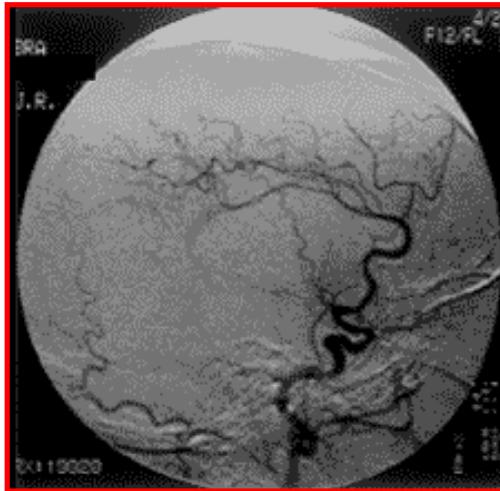
**Administer oxygen**

**Elevate head if BP elevated**



**ASA Stroke Protocols**

# CVA or TIA Management



# Altered Consciousness

# Seizures



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

Drs. Beadnell & Uebeck

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

Name: Ura Nervous Wreck    Date: 2/01/2014

Address: \_\_\_\_\_    Phone: \_\_\_\_\_

DOB: \_\_\_\_\_

Rx: Halcion 0.25mg tablet

Disp: Two (2)

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

Refills: 0 →    Steven W. Beadnell D.M.D.  
Generic approved    8 B 1 2 3 4 5 6 7 8 9    DEA

# Seizures

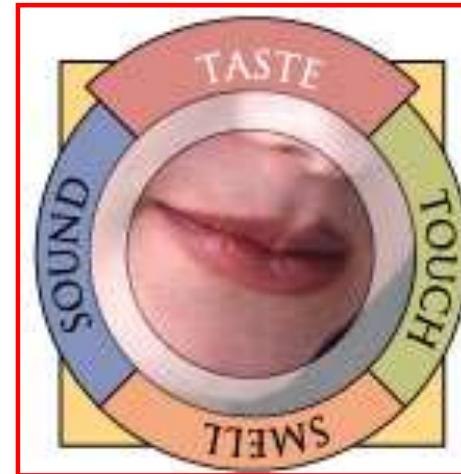
Possible causes in dental office

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

# Grand Mal Seizures

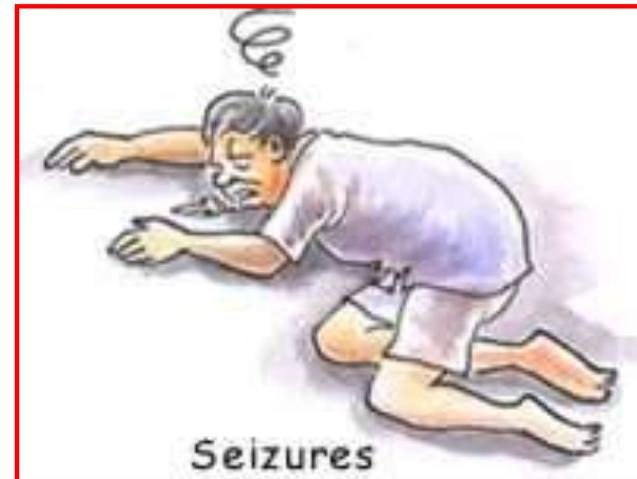
## ❖ Prodromol Phase

- ❖ Change in mood
- ❖ Aura – related to senses



## ❖ Preictal Phase

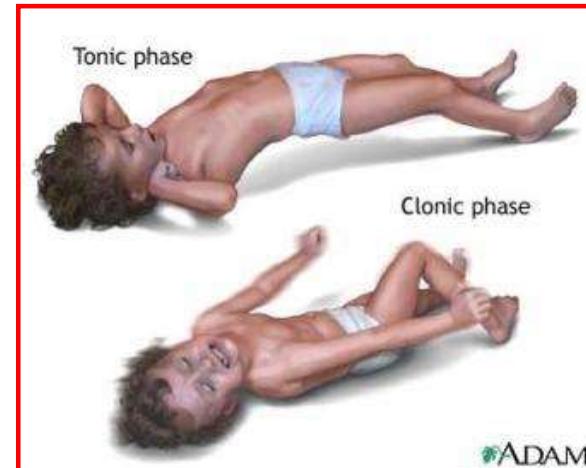
- ❖ Falls to floor
- ❖ Epileptic cry



# 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



# True Seizure vs Syncope

**Hypoxic seizure associated with syncope:**

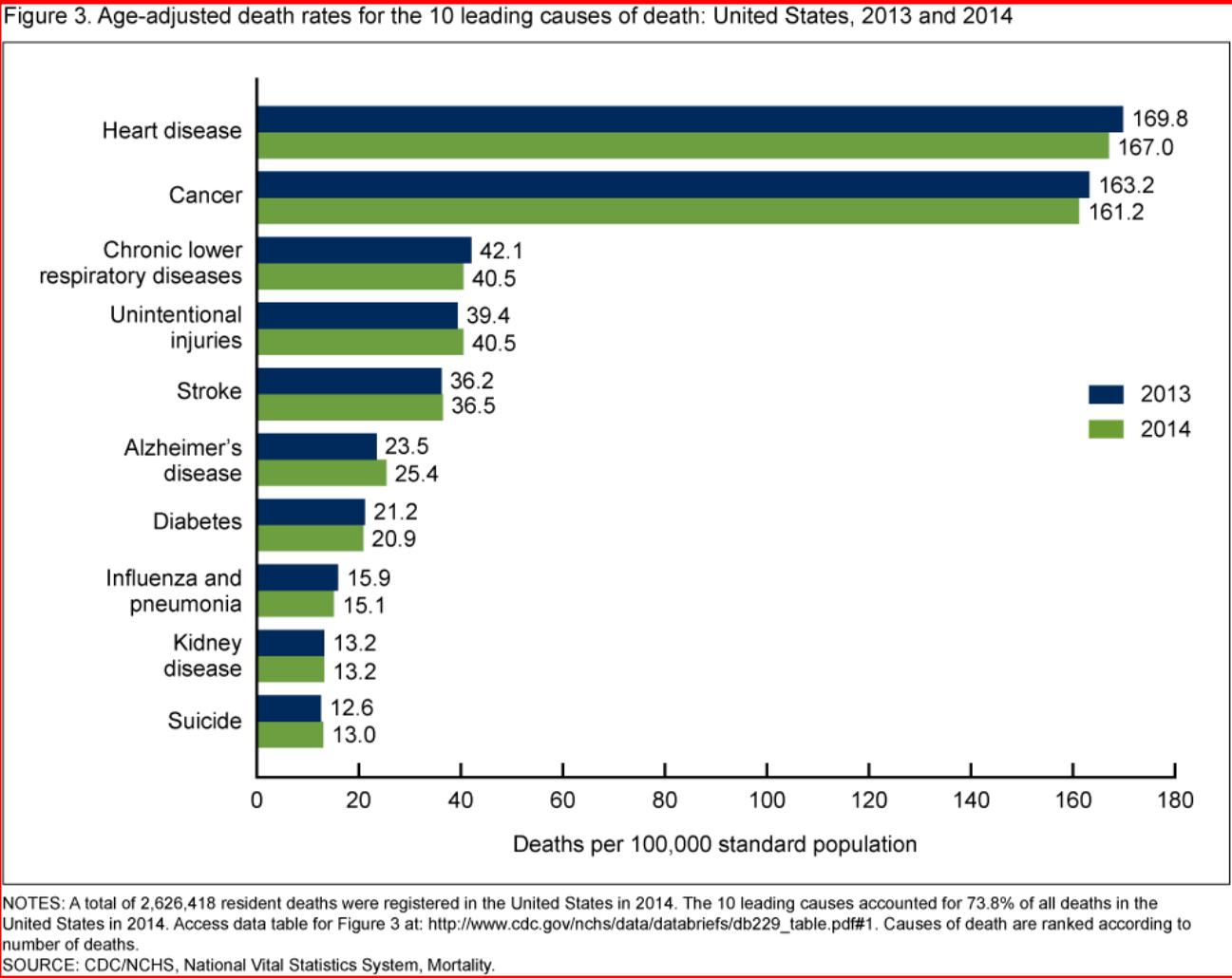
- ❖ **Movement mainly in extremities**
- ❖ **Generally lasts only 5 – 10 seconds**
- ❖ **No confusion afterwards**
- ❖ **No urinary incontinence**
- ❖ **No injury to tongue/cheek**

# cardiac Emergencies



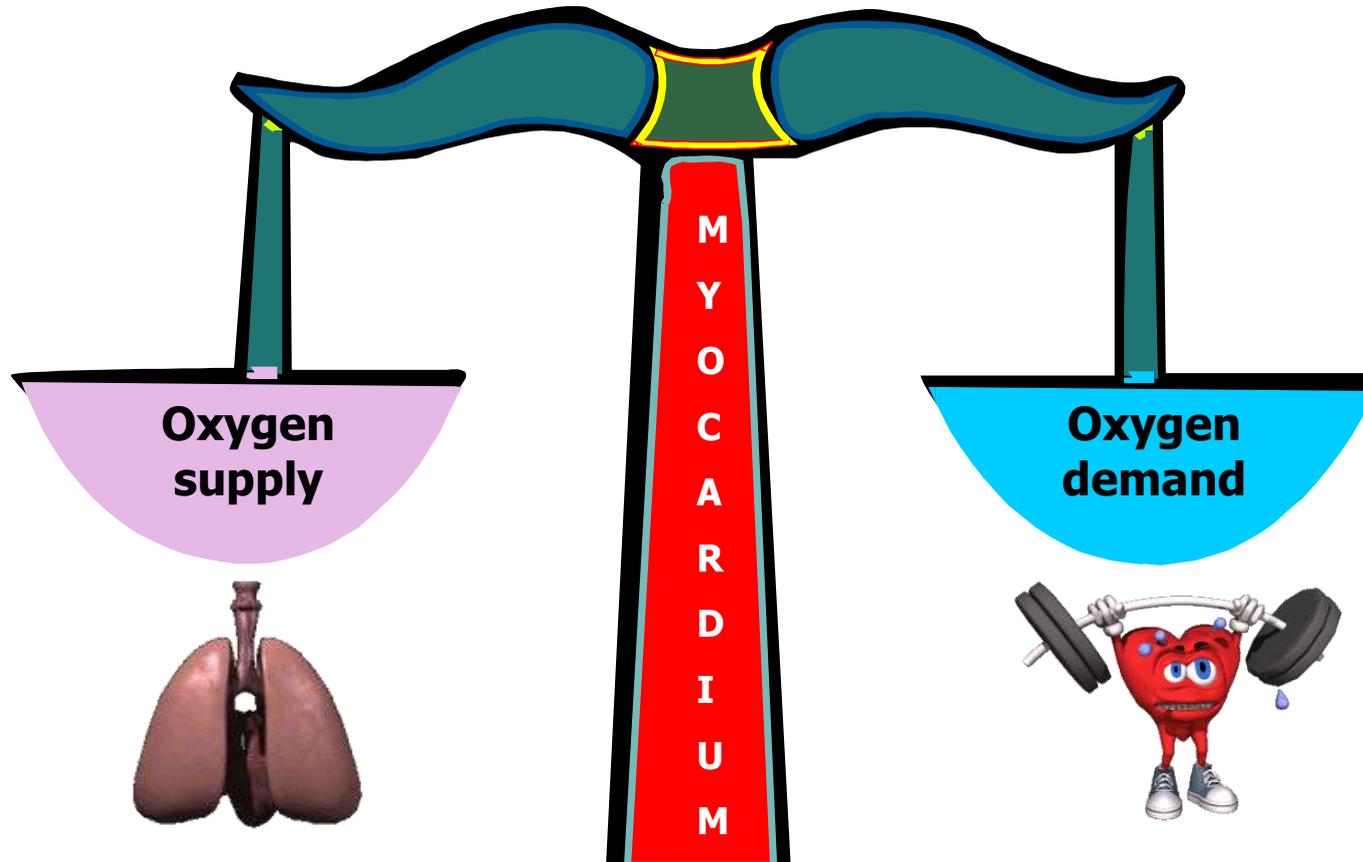
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# U.S. Causes of Death 2014



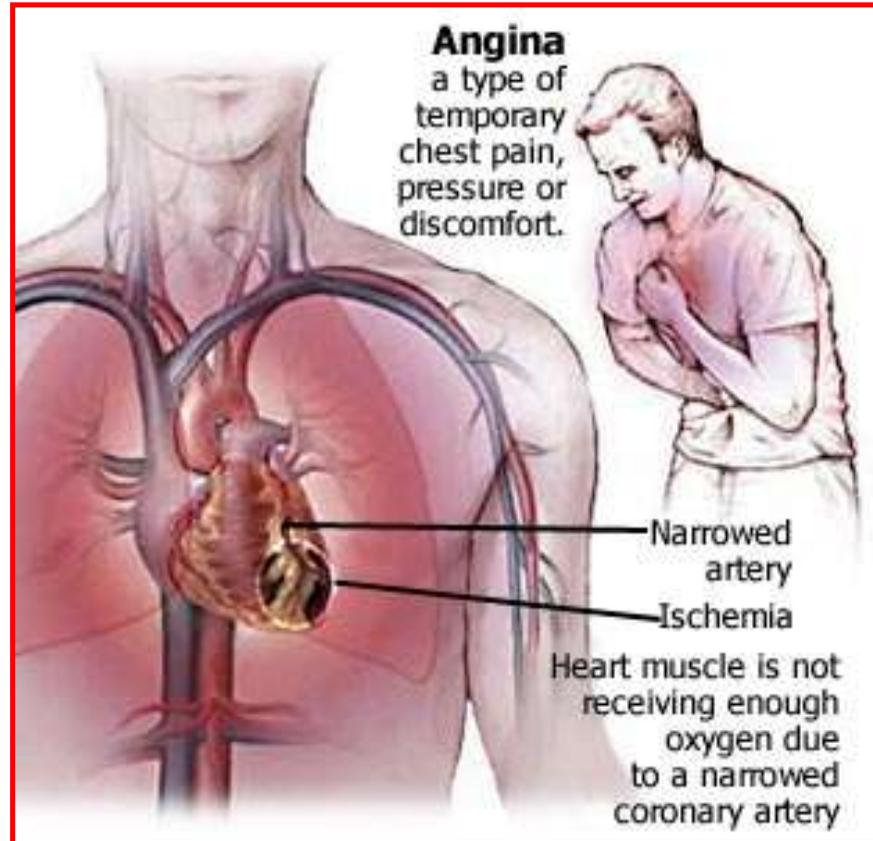
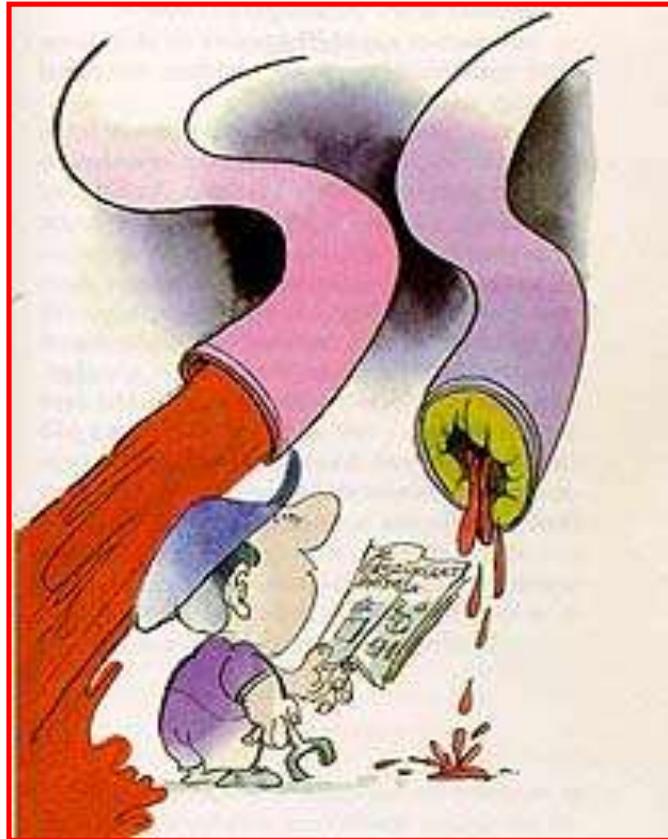
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# Ischemic Heart Disease



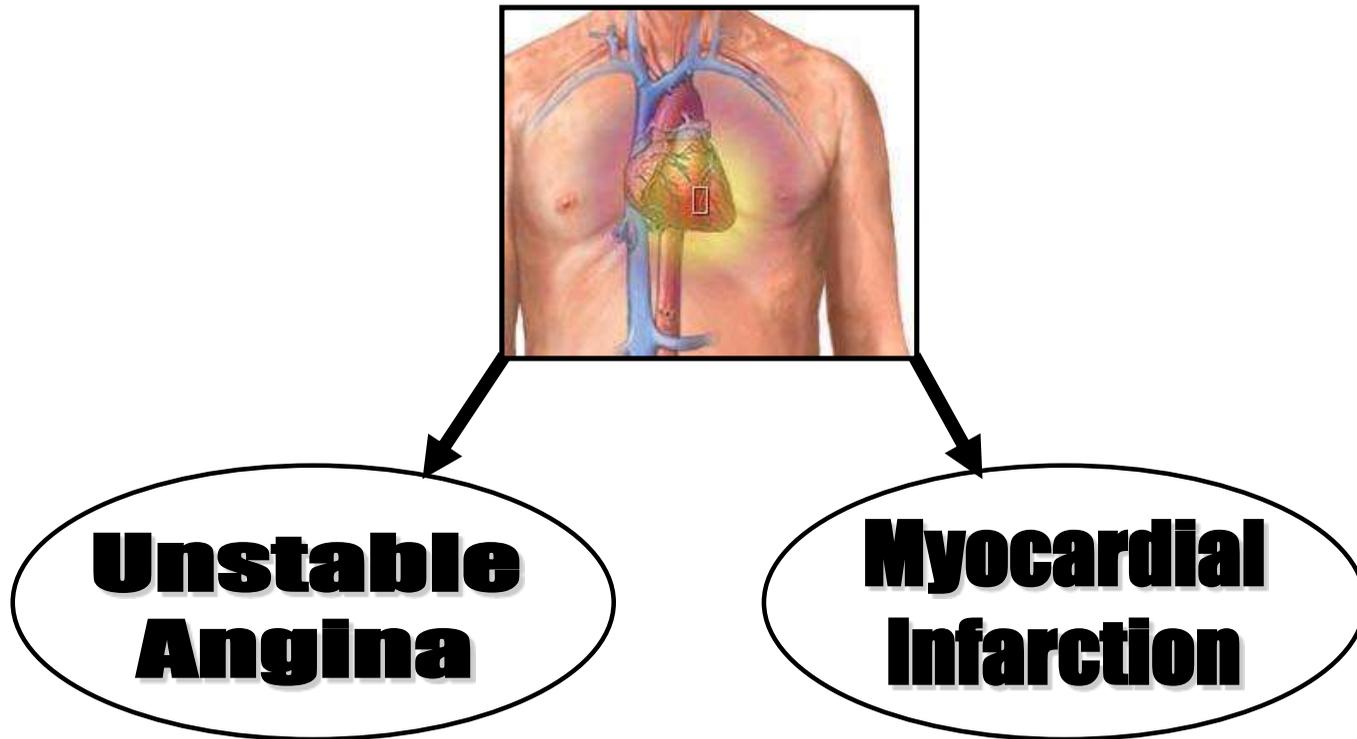
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# Ischemic Heart Disease



# Chest Pain

## Acute Coronary Syndrome



# Cardiac Emergencies

# Angina Pectoris

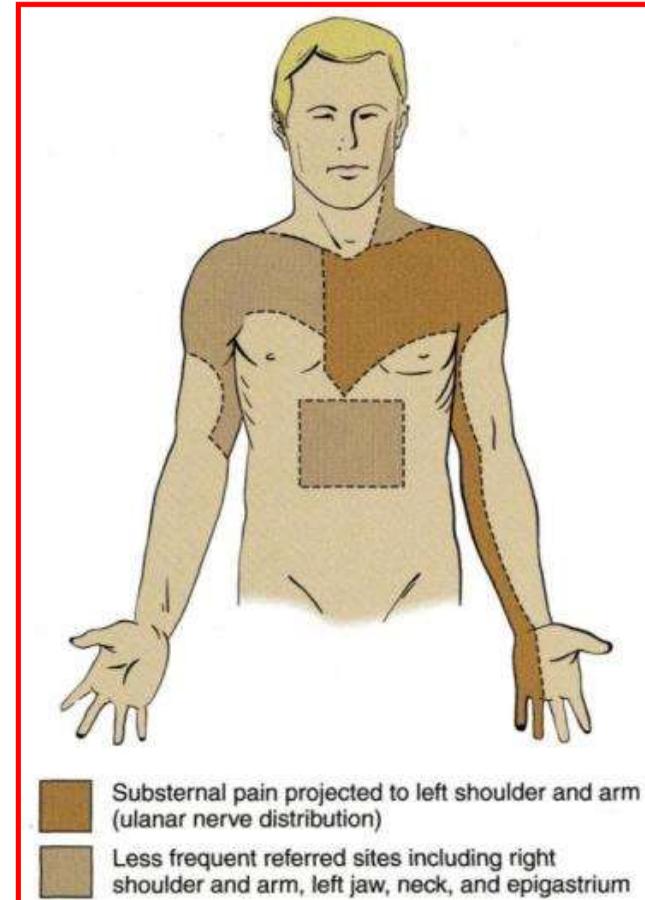


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# Angina Pectoris

## 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, monitor 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



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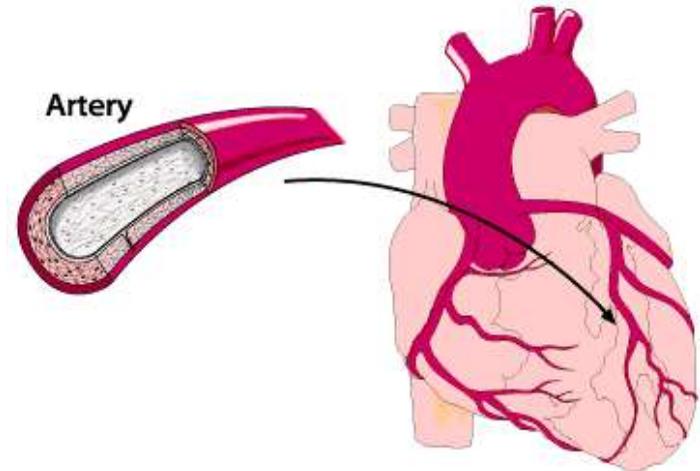
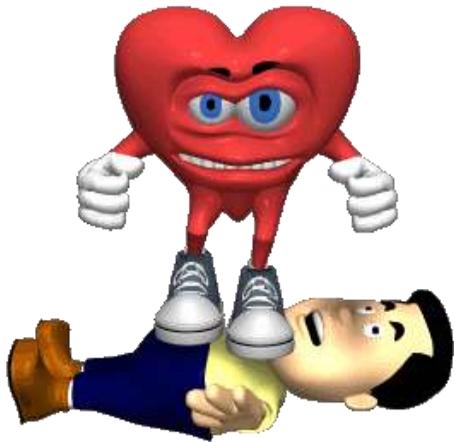
# Nitroglycerin Contraindication



**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.**

# Cardiac Emergencies

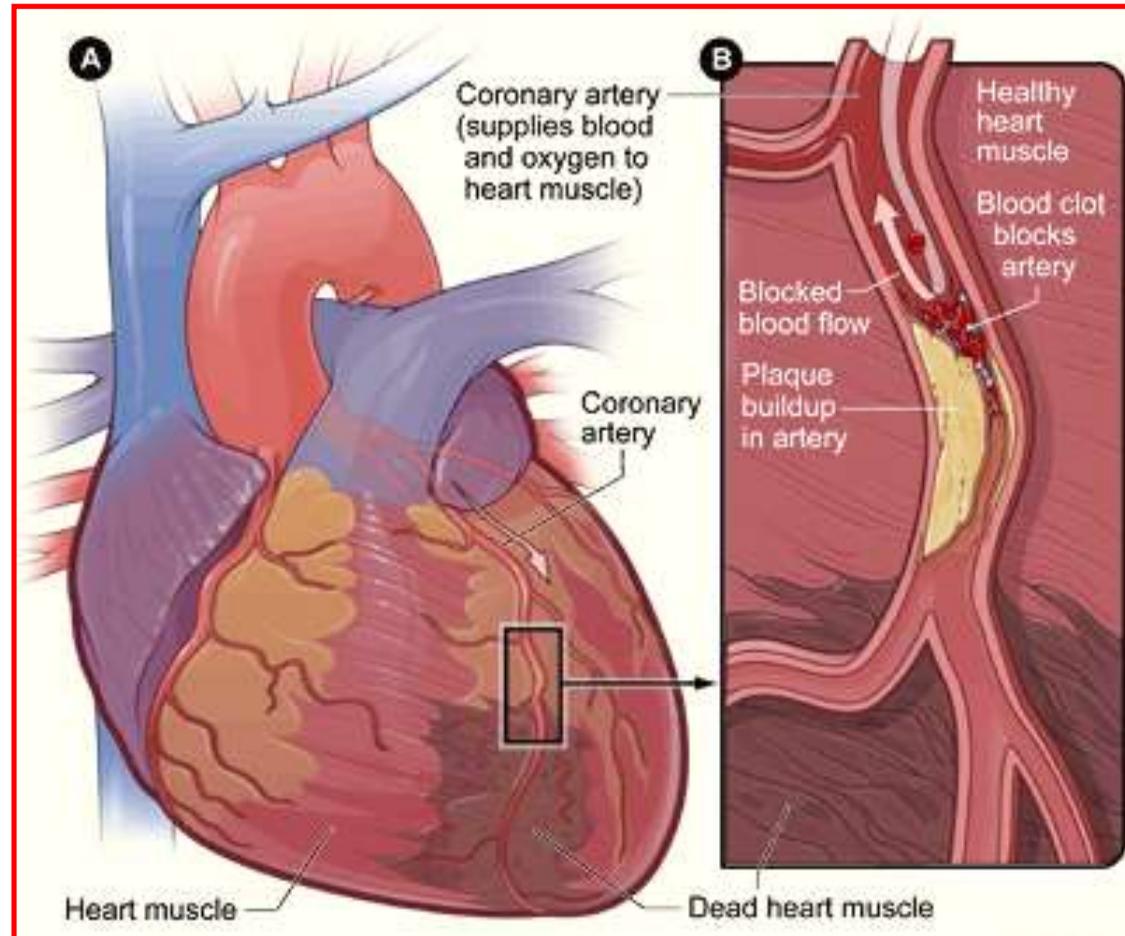
# Myocardial Infarction



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# Myocardial Infarction

## Etiology of Myocardial Infarction



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# Myocardial Infarction

## Clinical manifestations

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



# Medical Emergencies Update 2017 – Part II

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**

Source	Study Characteristic							Proportion Without Chest Pain, %		
	Study Description	Patient Population	Study Years	Sample Size	Mean Age, y	Age Adjusted	Race Adjusted	Men	Women	All
Brieger et al, <sup>37</sup> 2004	GRACE Registry	ACS	1999-2002	20 881	65.8	Yes	No	7.3	10.6	8.4
Canto et al, <sup>8</sup> 2000	National MI Registry	MI	1994-1998	434 877	69.3	Yes	Yes	28.6	38.6	32.7
Canto et al, <sup>38</sup> 2002	Alabama UA Registry	UA	1993-1999	4167	72.3	Yes	Yes	50.2	53.0	51.7
Culi et al, <sup>39</sup> 2002	CCUs Croatia	MI	1990-1995	1996	58.8	Yes	No	12.4	20.3	14.8
Dorsch et al, <sup>7</sup> 2001	United Kingdom	MI	1995	2096	70.6	Yes	No	17.6	24.6	20.1
Goldberg et al, <sup>40</sup> 1998	Worcester MI Study	MI	1986-1988	1360	67.7	Yes	No	18.0	23.0	20.0
Milner et al, <sup>41</sup> 2004	Worcester MI Study	MI	1997-1999	2073	70.2	Yes	No	30.9	45.8	37.3
Roger et al, <sup>42</sup> 2000	Olmsted County, Minnesota	UA	1985-1992	2271	63.0	Yes	No	25.0	19.0	22.0
Stern et al, <sup>43</sup> 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.

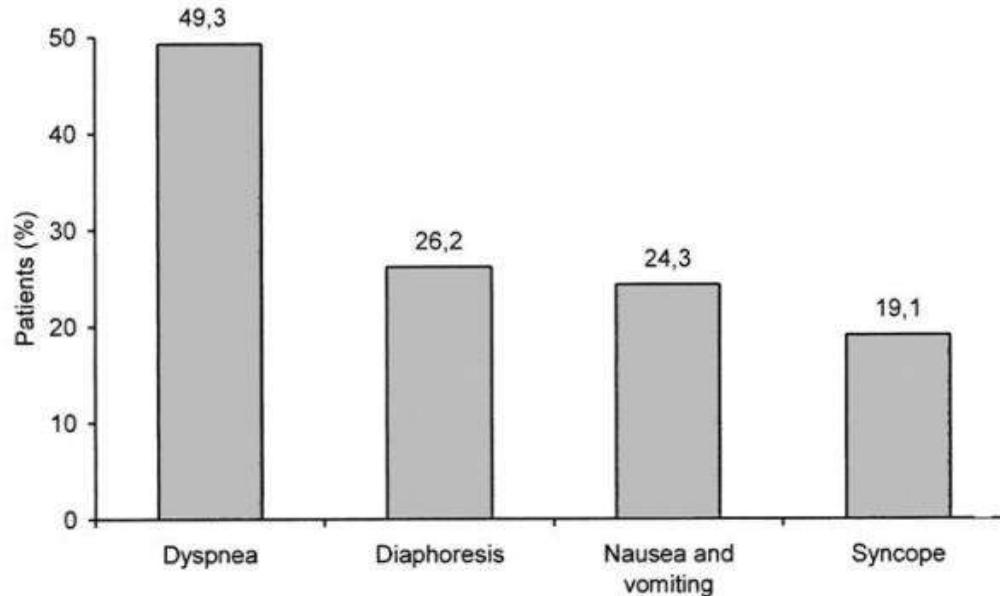
## Acute Coronary Syndrome Presentation Without Chest Pain or Discomfort According to Sex—Summary of Studies From Large Cohorts

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# ACS without chest pain

## ACS without Chest Pain

Dominant presenting symptoms in patients without chest pain (total exceeds 100% as patients may have presented with more than one dominant symptom)



Brieger, D. et al. Chest 2004;126:461-469

# Medical Emergencies Update 2017 – Part II

**HEART ATTACK**  
Know the symptoms.  
Take action.

CALL

## 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.

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**September 25, 2017**

# 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)



Monitor vital signs



Manage pain - narcotics

Morphine 2-15mg IV q15 minutes

Nitrous oxide is option



Transport to hospital - - ACLS



**23% mortality reduction**

*ISIS-2 study*

# Myocardial Infarction Management



# Time is Muscle

# Cardiac Emergencies

# Cardiac Arrest



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# Cardiac Arrest

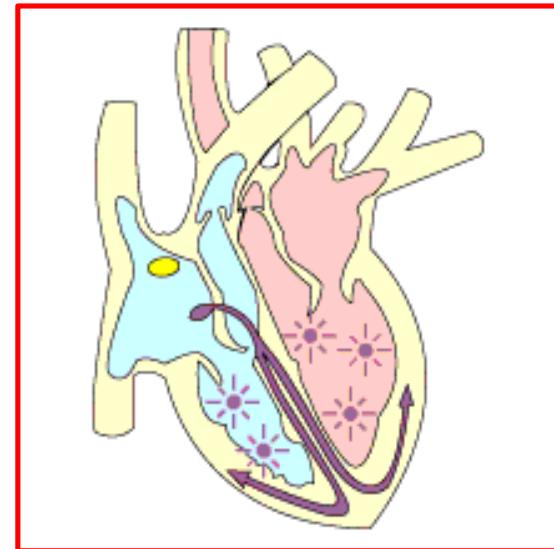
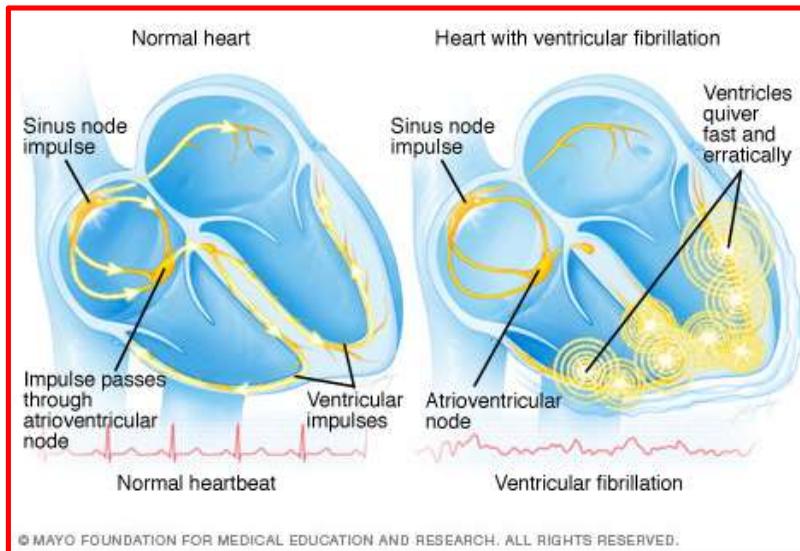
## Possible causes

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

# Cardiac Arrest

## Ventricular Fibrillation

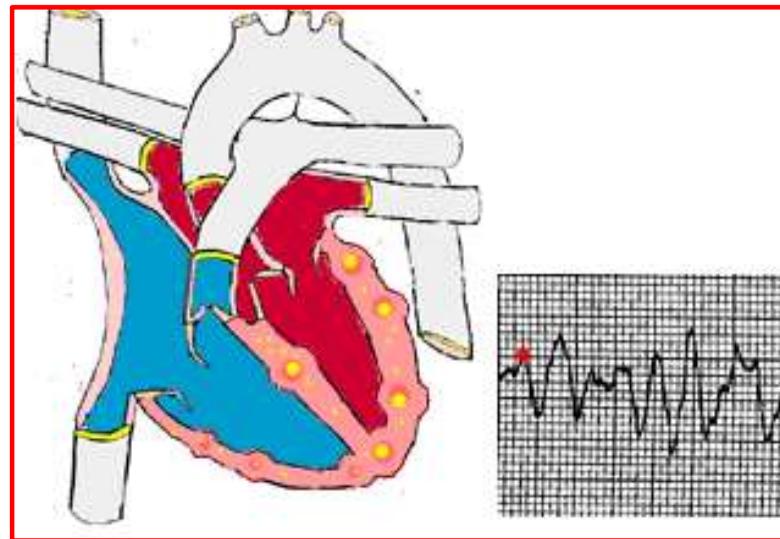
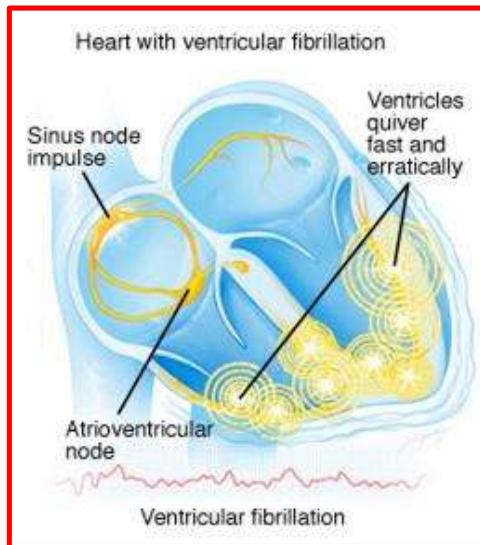
About 90% of cardiac arrests



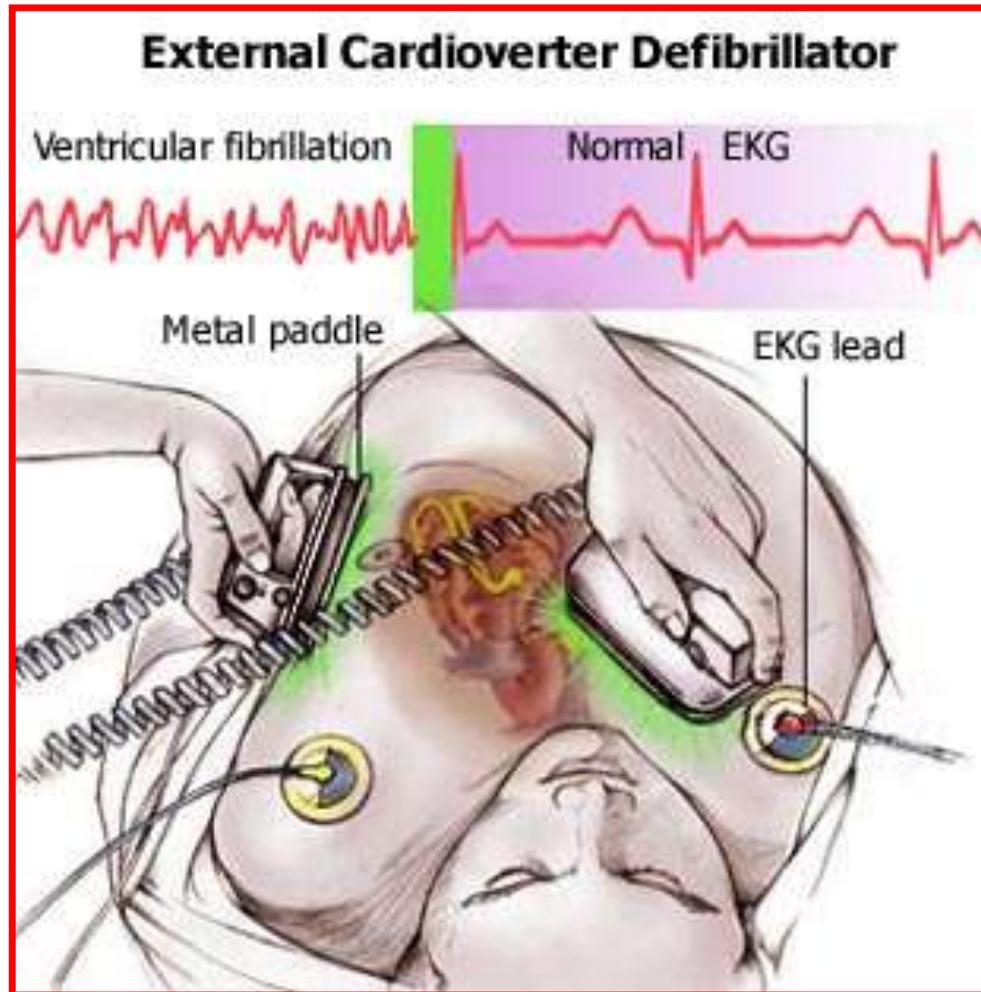
# Cardiac Arrest

## Ventricular Fibrillation

About 90% of cardiac arrests



# Cardiac Arrest



Steven W. Beadnell, DMD  
Gum Gardner's RDH Study Club  
September 25, 2017

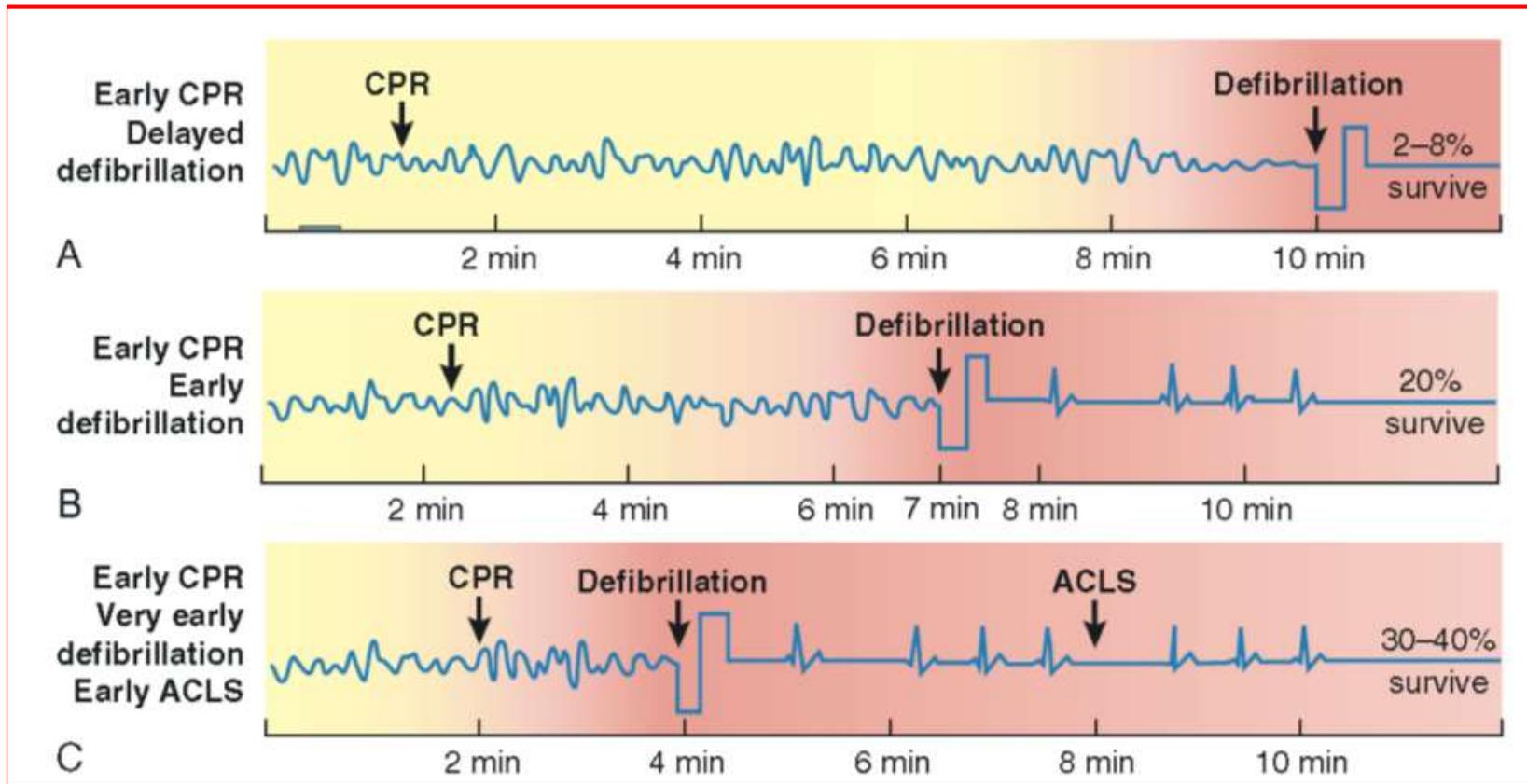
# Efficacy of Defibrillation

Conversion of Ventricular Fibrillation to normal rhythm

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

# Efficacy of Defibrillation

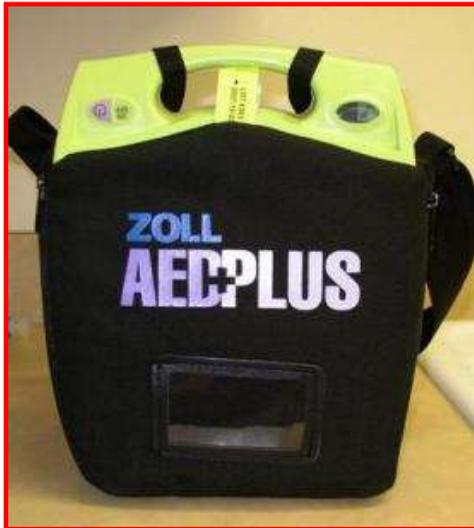
Conversion of Ventricular Fibrillation to normal rhythm



Source: American Heart Association

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# Automated External Defibrillator



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# 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

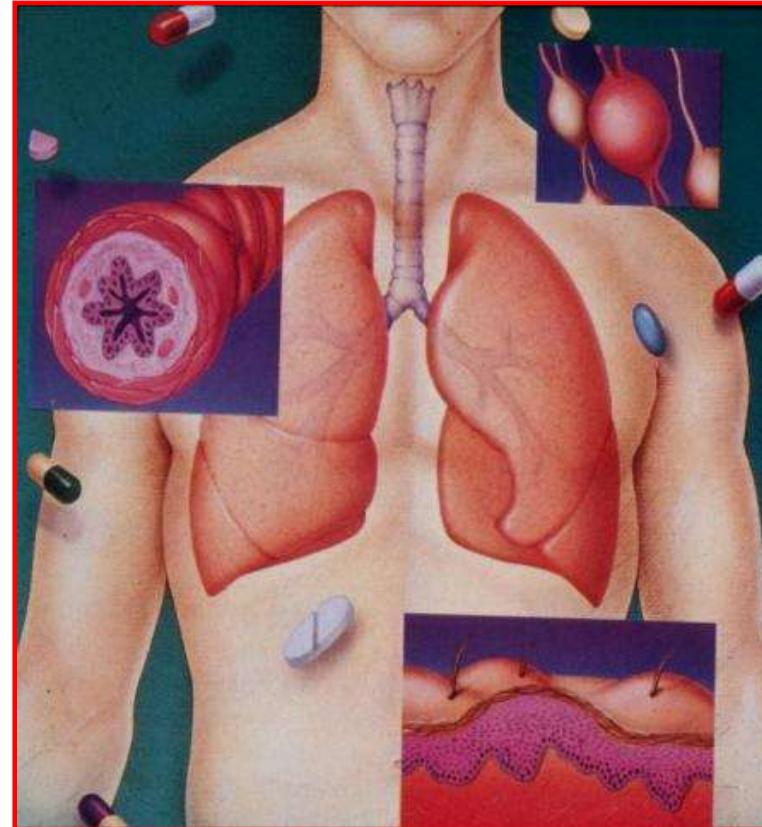
- ❖ **Antibiotics**
  - ❖ Penicillin
  - ❖ Cephalosporins
  - ❖ Tetracyclines
- ❖ **Analgesics**
  - ❖ Aspirin-compounds
  - ❖ Nonsteroidals
- ❖ **Opioids**
  - ❖ Meperdine
  - ❖ Codeine
- ❖ **Antianxiety agents**
  - ❖ Barbiturates
- ❖ **Local anesthetics**
  - ❖ Esters: Benzocaine
  - ❖ Sodium bisulfite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

# Allergic Reactions

Allergen  
↓  
Mast cells & Basophils

Histamine  
Leukotrienes  
ECF – Anaphylaxis  
Kallikreins  
Prostaglandins

↓  
Allergic phenomenon



# Allergic Reactions - Cutaneous

## Clinical manifestations

Increased vascular permeability

Vasodilation



Urticaria / Hives

Rash

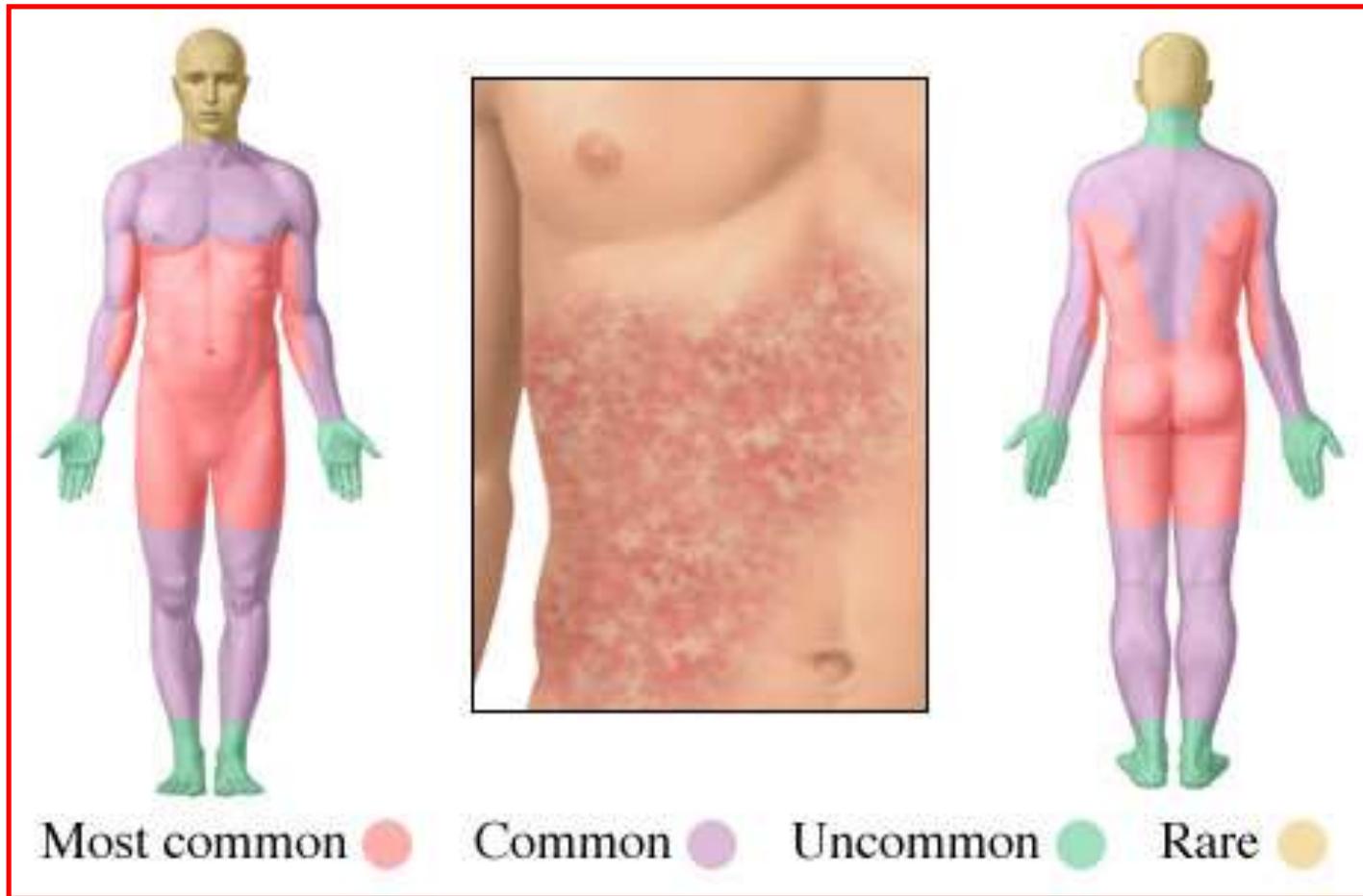
Pruritis (itching)

Tingling and warmth

Flushing

# Allergic Skin Reactions

## Typical Distribution Pattern



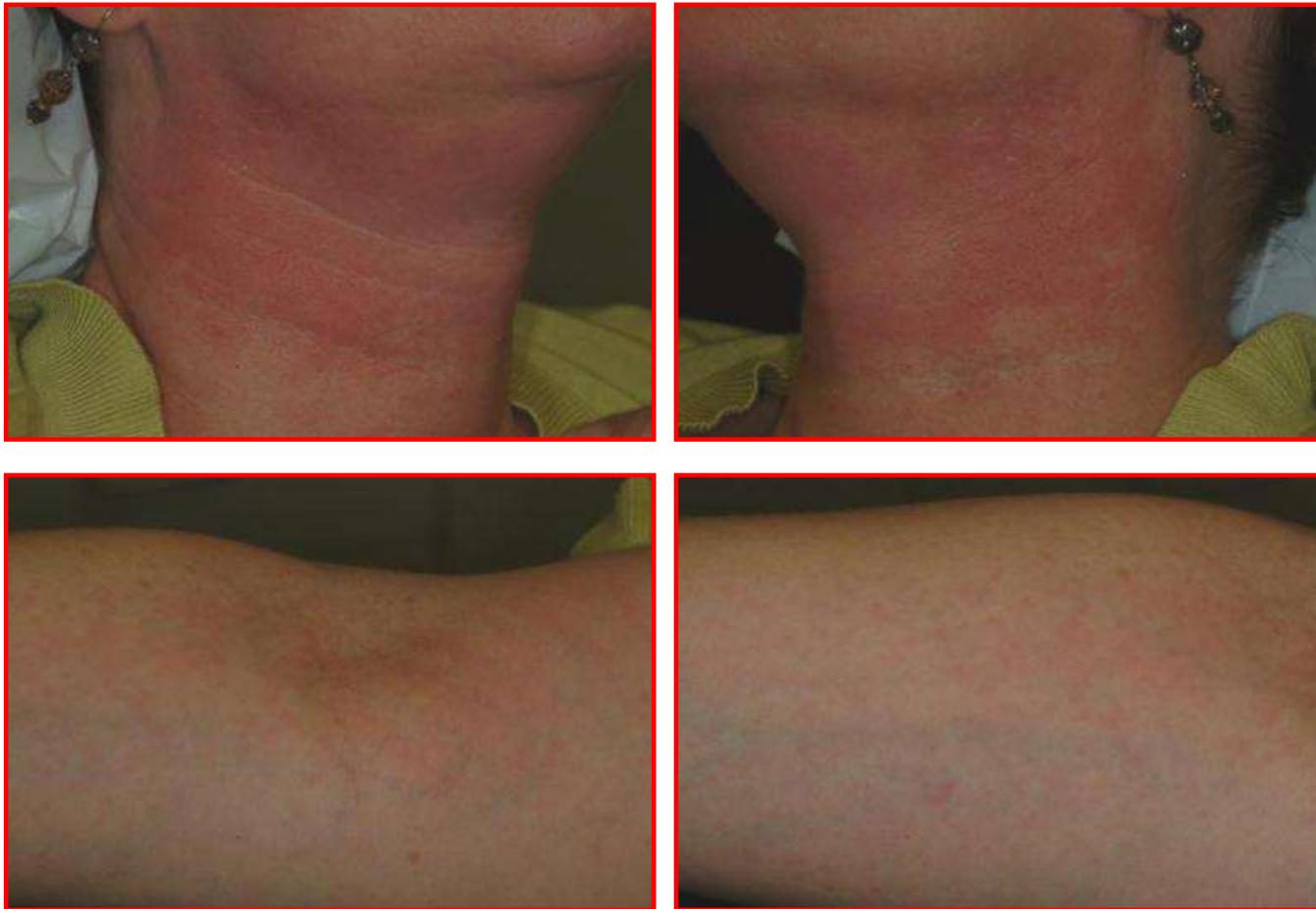
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# Allergic Reactions - Cutaneous



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# Allergic Reactions - Cutaneous



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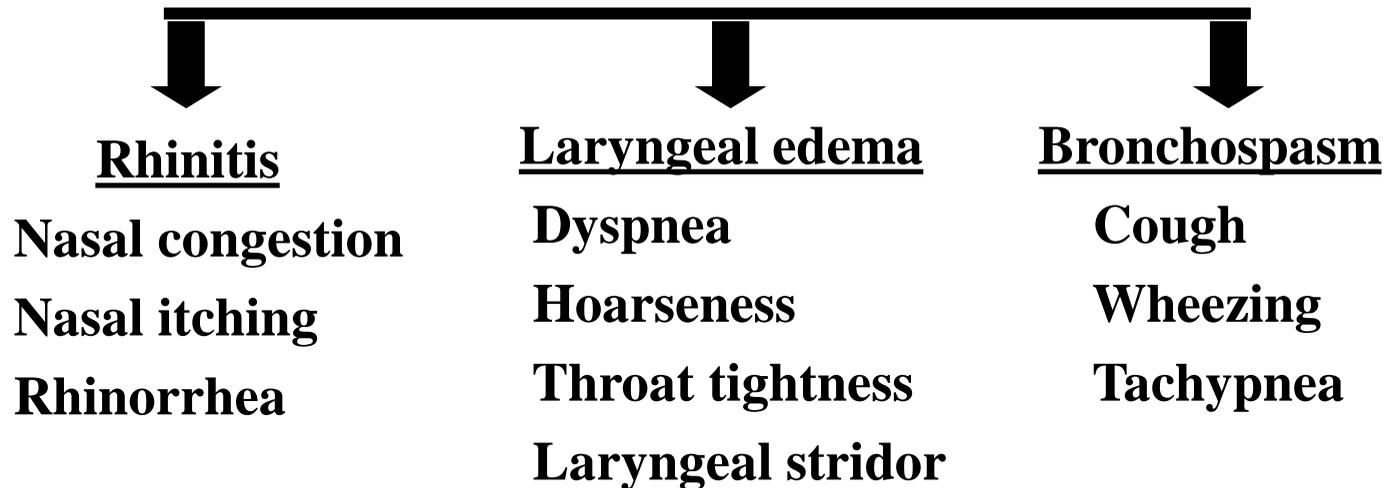
# Allergic Reactions - Respiratory

## Clinical manifestations

Increased vascular permeability & vasodilation

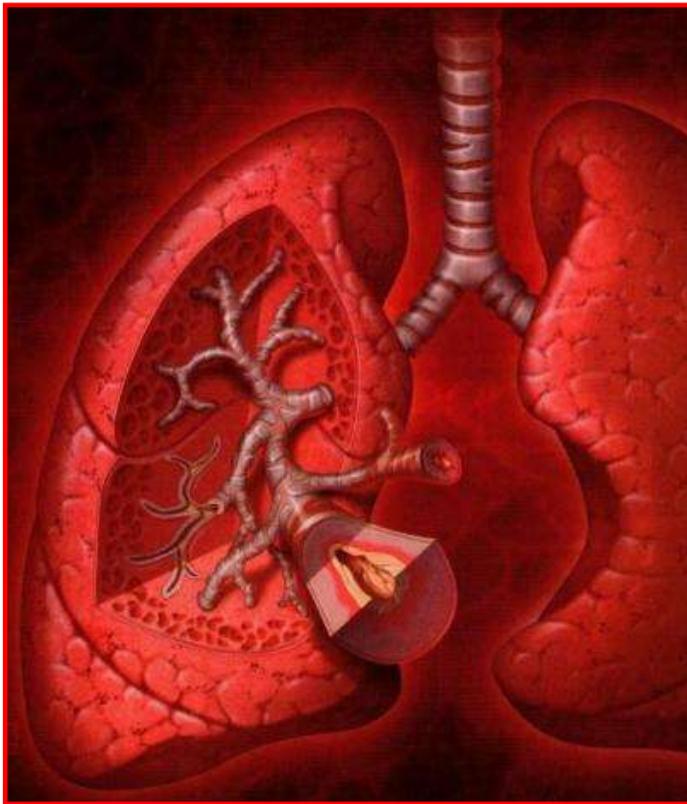
Increased exocrine gland secretions

Bronchiole smooth muscle contraction



# Allergic Reactions - Respiratory

## Bronchospasm



**Cough**  
**Wheezing**  
**Tachypnea**

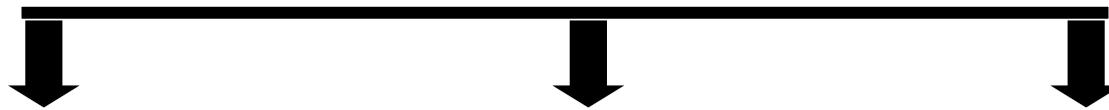
# Allergic Reactions - Cardiovascular

## Clinical manifestations

Increased vascular permeability & vasodilation

Decreased cardiac output

Loss of vasomotor tone



### Circulatory collapse

Light-headed

Weakness

Syncope

Ischemic chest pain

### Dysrhythmias

Light-headedness

Weakness

Palpitations

Ischemic chest pain

### Cardiac arrest

Pulselessness

EKG changes

Vent fibrillation

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

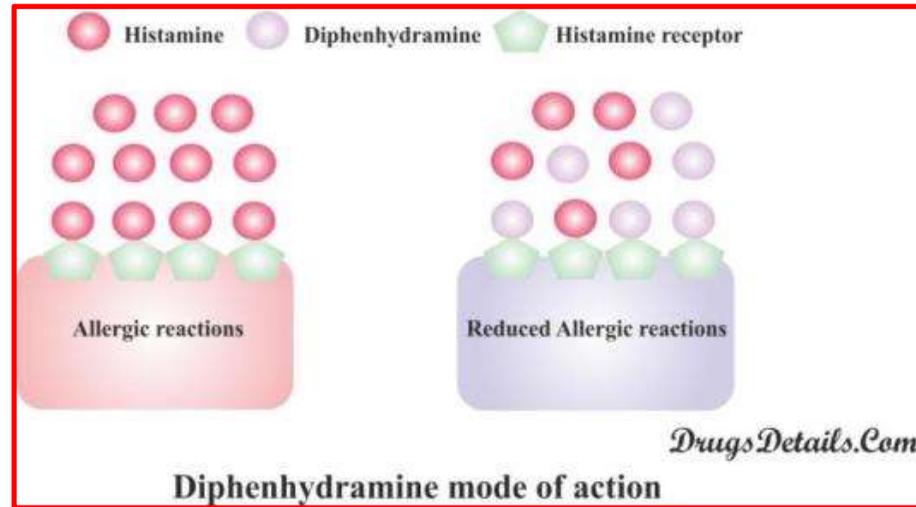


**Epinephrine**



**Diphenhydramine**

# Tx Allergic Reactions



## Diphenhydramine

- ❖ Antagonizes histamine, preventing progression of the allergic reaction

# Tx Allergic Reactions



## Epinephrine

- ❖ Reverses the pathologic processes causing the allergic reaction

DRUG	RECEPTOR	SITES	RESPONSES
Epinephrine	Alpha <sub>1</sub>	Blood vessels	Increase blood pressure
	Beta <sub>1</sub>	Heart	Increase heart rate
	Beta <sub>2</sub>	Bronchus	Relax bronchioles

# Delayed-Onset Allergic Skin Rxn Management

Onset skin reaction (> 1 hour) from allergen

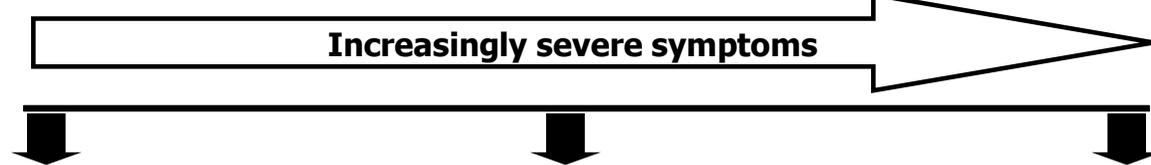
Position patient comfortably



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



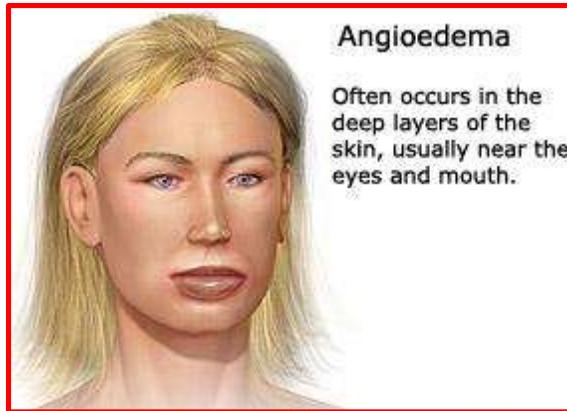
# **Allergic Reactions**

# **Angioedema**

# Angioedema

**A noninflammatory,  
nonpruritic edema involving  
the skin, subcutaneous tissue,  
underlying muscle, and mucus  
membranes, especially those  
of the GI and upper  
respiratory tracts.**

# Angioedema



# Angioedema

Three types of angioedema:

Allergic angioedema

Hereditary angioedema

Idiopathic angioedema

# Angioedema

Exposure to trigger



Faulty or deficient C1-INH



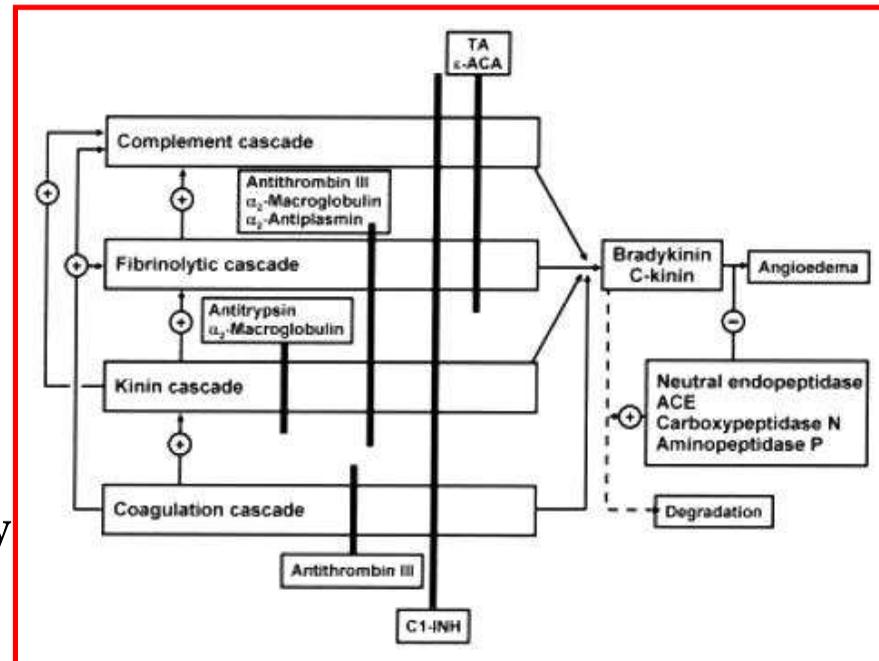
Increased Bradykinin levels



Increased vascular permeability



Mucosal edema



# Angioedema

**Deficiency or Defect in C1-INH**

**Inherited or acquired defect**

**High association with dental office triggers**

**Latex, other office materials**

**Other known triggers**

**ACE inhibitors**

**Other drugs: Abx, NSAIDs, ASA**

**Environmental**



# Allergic Angioedema

**Allergic angioedema symptoms include:**

**Marked skin swelling:**

**Eyes, mouth, hands, feet, throat**

**Usually does not itch, may burn or be painful**

**May be asymmetric**



# Allergic Angioedema

**Allergic angioedema symptoms include:**

**Marked skin swelling:**

**Eyes, mouth, hands, feet, throat**

**Usually does not itch, may burn or be painful**

**May be asymmetric**

**Abdominal pain or cramping – swollen mucosa**

**Hives possibly present**

**Laryngeal edema, hoarseness**

# Angioedema Management

**Remove trigger**



**Secure Airway**



**Transfer to hospital**



**Medical ICU**



**Medications include:**  
**Antihistamines (Benadryl)**  
**Adrenalin (Epinephrine)**  
**Terbutaline (Bronchodilator)**  
**Cimetidine (Tagamet)**  
**Corticosteroids**  
**Sedatives**  
**Tranquilizers**