

# RECOGNITION AND MANAGEMENT OF COMMON MEDICAL EMERGENCIES IN THE DENTAL OFFICE (PART TWO)

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## Famous Last Words

*“In all the years I have practiced, I have never had a medical emergency and if it does happen, I will just call “911”.*



## Medical Emergencies



Natalie is a 15 year old teenager who presented to her dentist’s office for routine dental treatment (MOD composite restoration on tooth #19). Her medical history was negative. No Medications, No Allergies, No Social History (- Tob, - Etoh, - Drugs) and a Past Surgical History of tonsillectomy w/o complications. Natalie is the “Star-forward” on her high school soccer team.

During her routine dental appointment, immediately after her local anesthesia injection, she complained of not feeling well, dizzy and nauseous. She then slumped in the chair and became unresponsive.....



## Medical Emergencies

What happened next changed Natalie’s Life “FOREVER”.....



## Medical Emergencies

Natalie Parker suffered a irreversible Hypoxia Brain Injury. This is her life today.



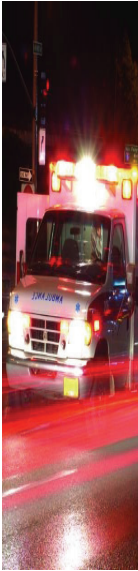
## Medical Emergencies can and do happen in the Dental Office

**Medical emergencies** occur in dental offices **every 2 to 4 years on average**, with **50-70% of practitioners witnessing at least one event annually**. If **quickly recognized and effectively managed** most emergencies (90.5%) are resolved on-site without hospitalization.

It is **Estimated** that the **Average Dental Office** will have to deal with at least one or two **Life-Threatening Medical Emergencies** in their office during their career.

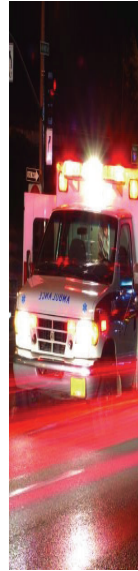
Whether a Medical Emergency occurs years in the future or this afternoon; **Prevention, Preparation, and Practice** are key to your patients safety.





## Common causes for Medical Emergencies

- Syncope (Fainting)
  - Stress or anxiety related to dental procedures can lead to vasovagal syncope, causing a sudden drop in blood pressure and loss of consciousness.



## Common causes for Medical Emergencies

- Allergic Reactions
  - Patients may experience allergic reactions to medications, local anesthetics, latex, or other materials used in dental procedures, leading to symptoms ranging from mild itching to severe anaphylaxis.



## Common causes for Medical Emergencies

- Respiratory Distress
  - Airway obstruction, bronchospasm, or aspiration of foreign objects during dental procedures can lead to difficulty breathing, respiratory distress and respiratory arrest.



## Common causes for Medical Emergencies

- Angina or Myocardial Infarction
  - Patients with underlying cardiovascular diseases may experience angina (chest pain) or even a heart attack (myocardial infarction) due to stress or the physiologic and/or pharmacologic effects of dental treatment.



## Common causes for Medical Emergencies

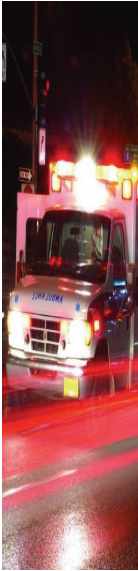
- Hypoglycemia
  - Diabetic patients may experience low blood sugar levels (hypoglycemia) during dental procedures, especially if they have not eaten or taken their medications as prescribed.



## Common causes for Medical Emergencies

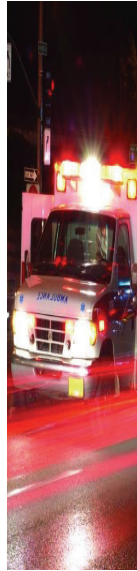
- Seizures
  - Patients with a history of epilepsy or other seizure disorders may experience seizures triggered by stress and anxiety of certain dental procedures.





## Common causes for Medical Emergencies

- Postural Hypotension
  - Changes in position, such as sitting up or standing suddenly, can lead to a sudden drop in blood pressure, resulting in dizziness or fainting.



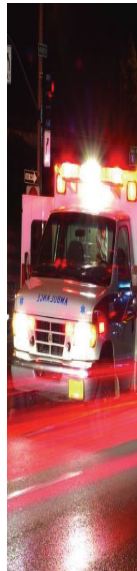
## Common causes for Medical Emergencies

- Drug-related Reactions
  - Adverse reactions to medications administered during dental procedures, such as local anesthetics or sedatives, can occur in some patients.



## Common causes for Medical Emergencies

- Choking
  - Accidental ingestion or inhalation of foreign objects or dental materials can lead to airway obstruction and choking.



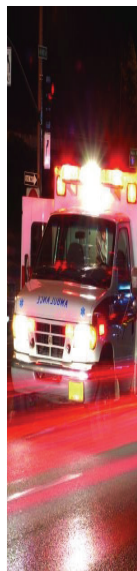
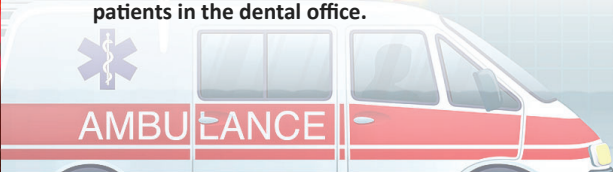
## Common causes for Medical Emergencies

- Stroke
  - Patients with underlying cardiovascular conditions may be at risk of experiencing a stroke due to factors such as hypertension, atherosclerosis, or clotting disorders.



## Common causes for Medical Emergencies

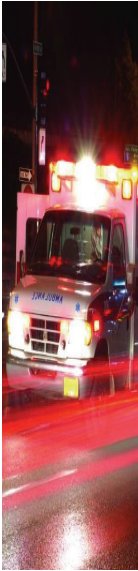
- It is essential for dental professionals to be aware of these common causes of medical emergencies and to have appropriate training, emergency protocols, and equipment in place to respond effectively in such situations.
- Regular training, communication, and readiness can help ensure the safety and well-being of patients in the dental office.



## How Prepared are YOU for Medical Emergencies your Office?

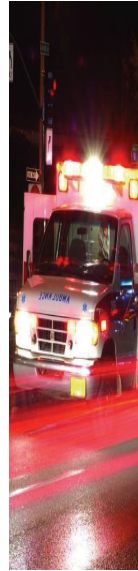
By prioritizing training, preparation, and communication, dental offices can enhance their readiness to effectively manage medical emergencies and ensure the safety and well-being of their patients.





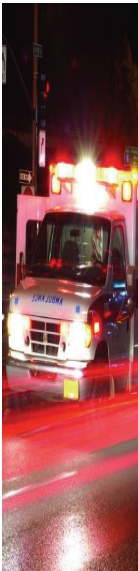
## Patient Screening and Medical History

- Obtain detailed medical histories and update them regularly for all patients.
- Screen patients for any medical conditions or allergies that may increase their risk of experiencing a medical emergency during dental treatment.
- Communicate with patients about their medical history and any potential risks before initiating treatment.



## Emergency Equipment and Supplies

- Regularly check and restock emergency kits with necessary supplies, medications, and equipment.
- Ensure that emergency equipment, such as AEDs, oxygen tanks, and airway management devices, are in working order.
- Keep emergency kits easily accessible and clearly labeled in designated locations.



## Emergency Protocols

- Develop and maintain detailed emergency protocols for various medical emergencies that may occur in the dental office.
- Clearly outline roles and responsibilities for each team member during an emergency.
- Ensure that all staff members are familiar with the location of emergency equipment and supplies.



## Training and Education

- Ensure that all staff members are trained in basic life support (BLS) and cardiopulmonary resuscitation (CPR).
- Provide regular training sessions on recognizing common medical emergencies and implementing emergency protocols.
- Conduct mock drills and simulations to practice responding to different emergency scenarios.



## Continuing Education and Review

- Stay current on the latest guidelines and best practices for managing medical emergencies in the dental office.
- Regularly review and update emergency protocols based on feedback, new information, and lessons learned from practice drills.
- Encourage staff members to participate in continuing education courses related to emergency preparedness and patient safety.

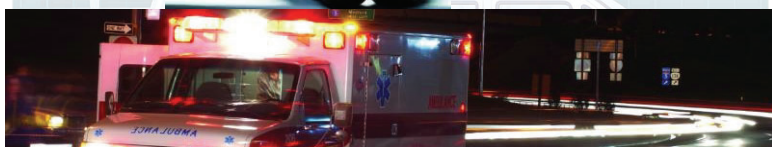
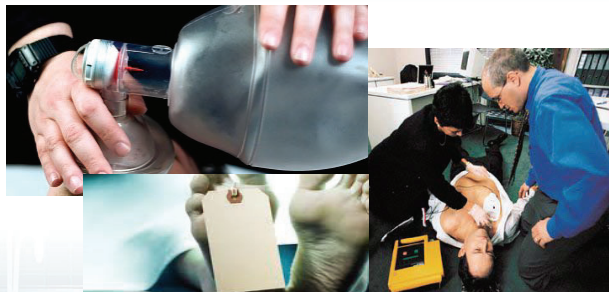


## Communication and Coordination

- Establish clear communication channels within the dental team to ensure prompt response to medical emergencies.
- Designate a team leader to coordinate emergency response efforts and communicate with emergency medical services if needed.
- Keep contact information for local emergency services and medical facilities readily available.



## MEDICAL EMERGENCIES



## EMERGENCY ALGORHYTHM

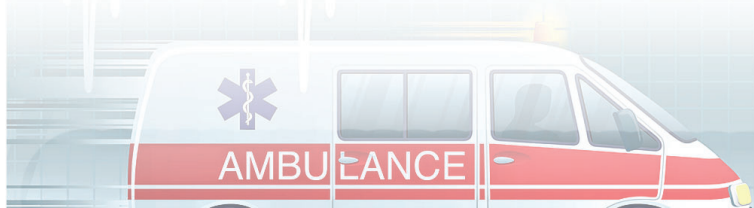
- RECOGNITION
- ACT - Call for Help, Active Office Plan/Emergency Kit/O2/ Monitors
- POSITION - Upright, Semi-Supine, Supine, Trendelenburg
- ASSESSMENT - ABCDE
- VITALS: HR, RR, BP, O2sat, Temp
- ACTIVATE EMS



## EMERGENCY ALGORHYTHM

### RECOGNITION

- Unresponsive or Responsive?
- Abnormal or Normal Breathing?
- Pulse - Too Fast, To Slow or "No Go"?
- Rash / Hives / Swelling?
- Chest Pain?



## EMERGENCY ALGORHYTHM

### ACT IMMEDIATELY

- STOP Procedure
- Call for Help
- Active Office Plan
- Bring Emergency Kit, Oxygen and Monitors



## EMERGENCY ALGORHYTHM

### POSITION

- Position the patient according to the emergency (e.g., supine for syncope/unconsciousness, upright for respiratory distress).
  - Upright
  - Tripod
  - Semi-Supine
  - Supine
  - Trendelenburg



## EMERGENCY ALGORHYTHM

### ASSESSMENT - ABCDE

- Airway
  - Chin Lift
  - Jaw Thrust
  - Tongue Pull
  - Airway Adjunct (oral airway, nasal airway, LMA, iGel)



## EMERGENCY ALGORHYTHM

### ASSESSMENT - ABCDE

- Breathing
  - 100% Oxygen
  - Nasal Canula, 2-5L/min
  - Non-Rebreather Mask, 5-10L/min
  - Bag-Mask Ventilate (BVM), if inadequate
  - Demand-Valve Resuscitator, if inadequate



## EMERGENCY ALGORHYTHM

### ASSESSMENT - ABCDE

- Circulation
  - Check Pulse
  - Tachycardia/Bradycardia
  - CPR, start compressions (100-120/min)
  - AED, if no pulse



## EMERGENCY ALGORHYTHM

### ASSESSMENT - ABCDE

- Drugs
  - Epinephrine (anaphylaxis/cardiac arrest)
  - Nitroglycerine + Aspirin (myocardial infarction)
  - Albuterol (asthma)
  - Glucose (hypoglycemia)
  - Midazolam (seizure)



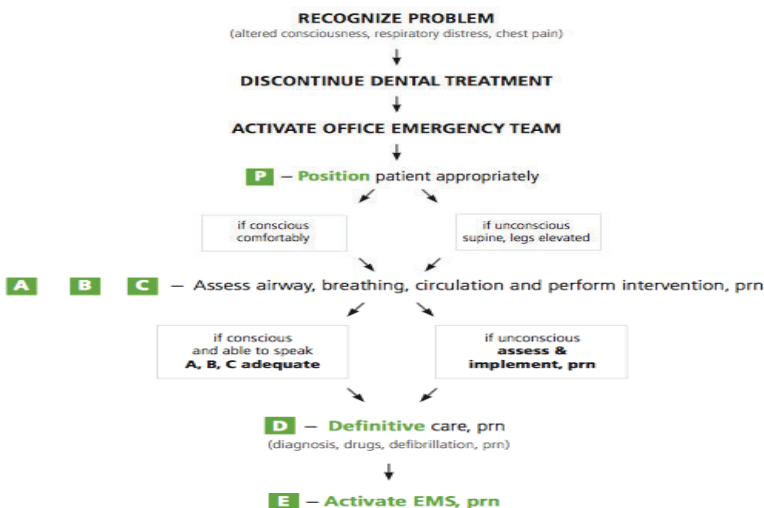
## EMERGENCY ALGORHYTHM

### ASSESSMENT - ABCDE

- Evaluate & Document
- Monitor Vitals
- Prepare handoff to EMS



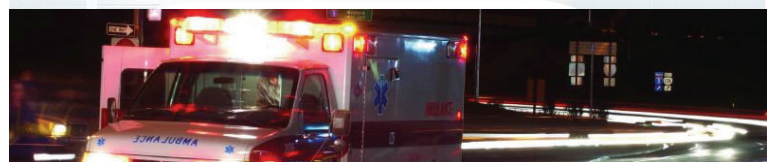
Algorithm for managing medical emergencies.



## EMERGENCY RESPONSE (A B C)

### Primary Assessment:

- **A**irway – Place in Chin-lift Position. Opened or Closed?
- **B**reathing – Yes or No? Too Fast or Too Slow? Enough or Not Enough.
- **C**irculation – PULSE or NO PULSE? Too Fast or Too Slow? Regular Rate or Irregular Rate?



# EMERGENCY RESPONSE (V O M I T)

## ACTION PNEUMONIC:

- **V**ITALS – Take Vitals: HR,RR,BP, O2 Sat.
- **O**XYGEN – Provide 2-10 L/min by cannula, facemask, BVM, or PPR
- **M**ONITORS – Place monitors. Continually assess & reassess patient
- **I**NTRAVENOUS/INTRA-OSSEOUS ACCESS – Advance training
- **T**REATMENT – Treat specific emergency and provide BLS and/or ACLS until EMS arrives and takes over.

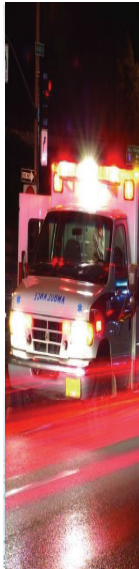


## MEDICAL EMERGENCIES

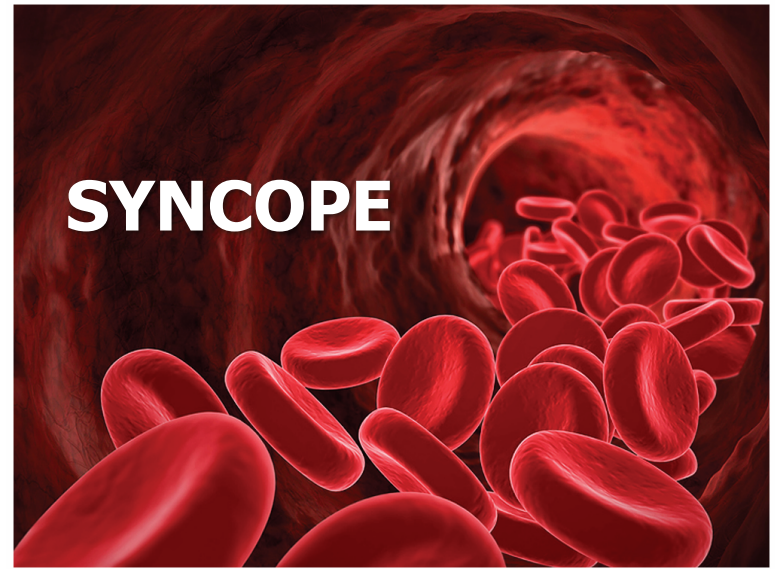


## MEDICAL EMERGENCIES

- Syncope
- Hypoglycemia
- Airway Obstruction
- Bronchospasm/Asthma
- Allergic Reaction/Anaphylaxis
- Seizure
- Stroke
- Angina
- Myocardial Infarction



# SYNCOPE



## SYNCOPE

- **DEFINITION:** Massive peripheral vasodilation leading to low cardiac output resulting in decreased cerebral blood flow which often results in transient loss of consciousness. **MOST COMMON EMERGENCY.**



## SYNCOPE

### CAUSES:

- Fear and anxiety
- Orthostatic/postural hypotension
- Cardiac conduction defects



## SYNCOPE

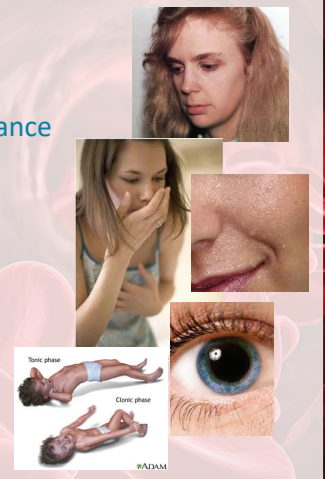
### PREVENTION:

- Medical History
- Stress Reduction Protocol
- Patient position
- Pre-Oxygenate

## SYNCOPE

### SYMPTOMS:

- Pale ashen-gray appearance
- Sweaty
- Nausea
- Eyes dilate (mydriasis)
- Convulsive movements



## SYNCOPE

### TREATMENT:

- CALL for HELP (Emergency Kit, Oxygen, AED).
- POSITION SUPINE with FEET ELEVATED.
- Administer 100% OXYGEN.
- MONITOR Vitals - heart rate, respirations, blood pressure, SpO2.
- Place cold moist towel to patients forehead and/or back of neck.



## SYNCOPE

### TREATMENT: (Continued)

- AMMONIA Inhalant (if unconscious)
- If continued unresponsive, ACTIVATE EMS - call 911 (remember ABC's).
- **\*\*Advanced Treatment\*\***
  - Place IV D5LR or 0.9NS. Bolus of 20mL/kg of IV fluids. If bradycardia, administer ATROPINE 0.5mg IV/IM
  - If **hypotension** persists, use EPHEDRINE: 5-10 mg IV/IM. Repeat q5min

## HYPOGLYCEMIA



## HYPOGLYCEMIA



### Definition

- Abnormal low levels of blood sugar (glucose)
  - Normal 60-100 mg/dL
  - Glucose is the main fuel source for the brain
  - Glucose is not stored or synthesized in the brain

## HYPOGLYCEMIA



### Causes

- Diabetes
- Medications
- Alcohol Abused
- Hunger/Anorexia
- Tumors of Pancreas or Pituitary Gland

## HYPOGLYCEMIA



### Signs & Symptoms

- Sweating
- Trembling
- Feelings of warmth
- Anxiety
- Nausea and/Vomiting
- Dizziness
- Confusion
- Tiredness
- Difficulty speaking
- Headache
- Inability to concentrate

## HYPOGLYCEMIA



### Treatment

- Call for Help/Emergency Kit/Oxygen/AED
- Position comfortably
- Oxygen 100%
- Monitor vitals
- Chem Stick with Glucometer

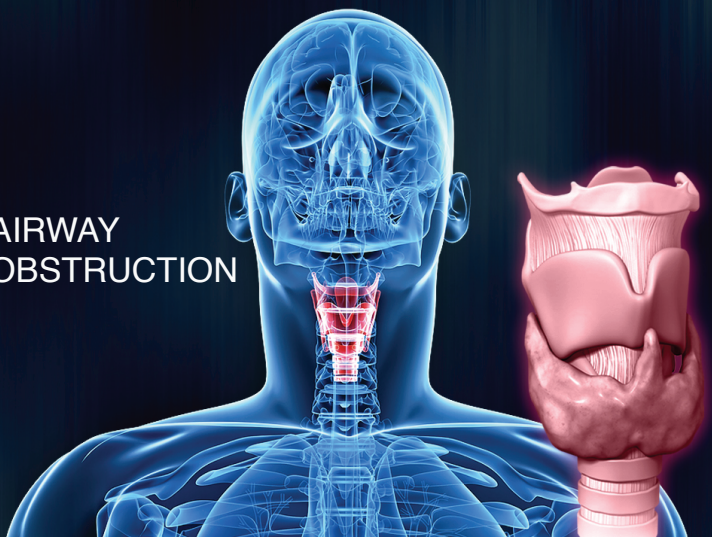
## HYPOGLYCEMIA



### Treatment

- If **AWAKE**:
    - ✓ **POSITION** comfortably (Semi-Supine).
    - ✓ **OXYGEN** - Nasal cannula 2L/min.
    - ✓ **ADMINISTER** Oral fluids with Sugar [Orange Juice, Coke, Pepsi].
    - ✓ **MONITOR** - Vital Signs: HR, RR, BP, SPO2, ECG.
  - If **UNCONSCIOUS** or **Continued Unresponsive**:
    - ✓ **POSITION** "Supine"
    - ✓ **OXYGEN**.
    - ✓ **ABC's**
    - ✓ **MONITOR** - Vital Signs: HR, RR, BP, SPO2, ECG.
    - ✓ **Activate EMS** - Call 911.
- \*\*Advanced Treatment\*\***  
IF I.V. access, **ADMINISTER** 50% Dextrose - 1ml/kg up to 50ml IV over 10 min **OR** Glucagon 0.025-0.1mg/kg IV/IM/SC up to 1mg

## AIRWAY OBSTRUCTION



## AIRWAY OBSTRUCTION

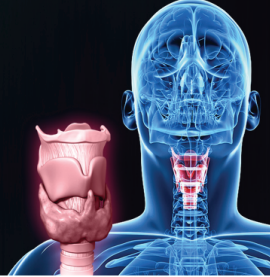
- **DEFINITION:** partial or complete obstruction of the airway. Frequently caused by object falling into the oral pharynx. Most serious are objects entering the larynx or trachea.



# AIRWAY OBSTRUCTION

## CAUSES:

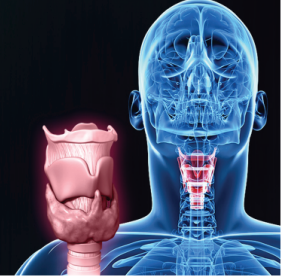
- Dental objects such as head of handpiece, mouth mirror, endodontic file, crown, extracted tooth, amalgam, or calculus



# AIRWAY OBSTRUCTION

## PREVENTION:

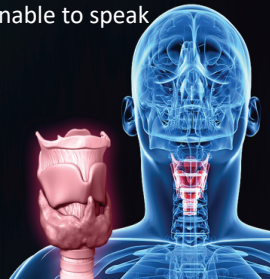
- Use rubber dam for restorative and endodontic procedures.
- Use "loose" throat screen for extraction or seating crowns (4x4 gauze).



# AIRWAY OBSTRUCTION

## SYMPTOMS:

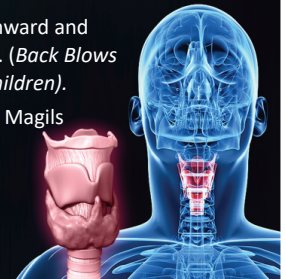
- Noisy breathing is partial obstruction (Crowing).
- Victim gasping for breath with great effort.
- Retraction of suprasternal notch and/or intercostal regions during attempted inspiration.
- Silence/Complete Obstruction - patient unable to speak (universal sign).



# AIRWAY OBSTRUCTION

## TREATMENT:

- Call for Help (Emergency Kit/Oxygen/AED)
- If **CONSCIOUS** - Perform Heimlich Maneuver. POSITION yourself behind patient, wrap your arms around their abdomen, place one fist into abdomen (thumb side first) then place the other hand over the fist.
- Administer ABDOMINAL THRUSTS. Brisk inward and upward delivery (J thrust). **NO Back Blows.** (*Back Blows are no longer recommended in adults or children.*)
- Remove foreign body using finger, suction, Magills Forceps.

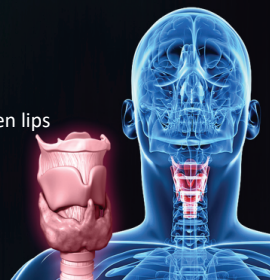


# AIRWAY OBSTRUCTION

## TREATMENT:

### If **Unconscious**:

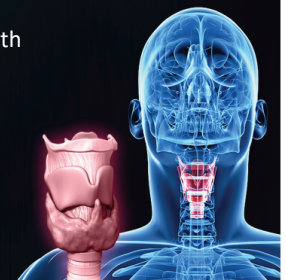
- **ACTIVATE EMS** - Call 911.
- Position in **SUPINE**.
- **MONITOR** - Vital Signs: HR, RR, BP, SPO2, ECG.
- Provide Airway Maneuvers;
  1. Chin Lift
  2. Jaw Thrust - displace mandible forward
  3. Retract lower lip to allow breathing between lips
- Attempt to **OXYGENATE & VENTILATE**.
- If object visible, remove foreign object.

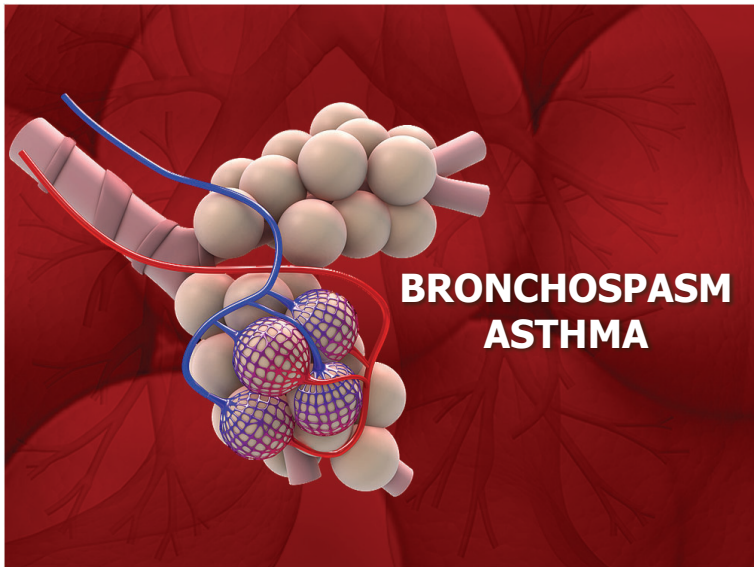


# AIRWAY OBSTRUCTION

## TREATMENT: (Unconscious - continued)

- Airway, Breathing, Circulation - ABC's
- Begin CPR
- 30 Compressions : 2 Breaths
- 5 Cycles (2 minutes)
- Re-eval / Re-access - Look into mouth
- Remove foreign body
- Continue CPR until object dislodges





## BRONCHOSPASM ASTHMA

## BRONCHOSPASM/ASTHMA

**DEFINITION:** partial or complete constriction of BRONCHIOLAR SMOOTH MUSCULATURE.

- Frequently encountered in patients with a history of bronchial asthma, chronic bronchitis and/or recent upper respiratory infection.

## BRONCHOSPASM/ASTHMA

**CAUSES:**

- Emotional stress.
- Allergy: antigen-antibody response.
- Vagal stimulation by mucous, blood, aspiration of gastric contents.
- Mechanical stimulation (i.e. intubation).
- Chemical stimulation (i.e. irritating vapors).

## BRONCHOSPASM/ASTHMA

**PREVENTION:**

- GOOD MEDICAL HISTORY.
- Pretreat with 2-4 puffs of Albuterol MDI 1 hour prior to procedure.
- Avoid irritating stimulus of upper airway.

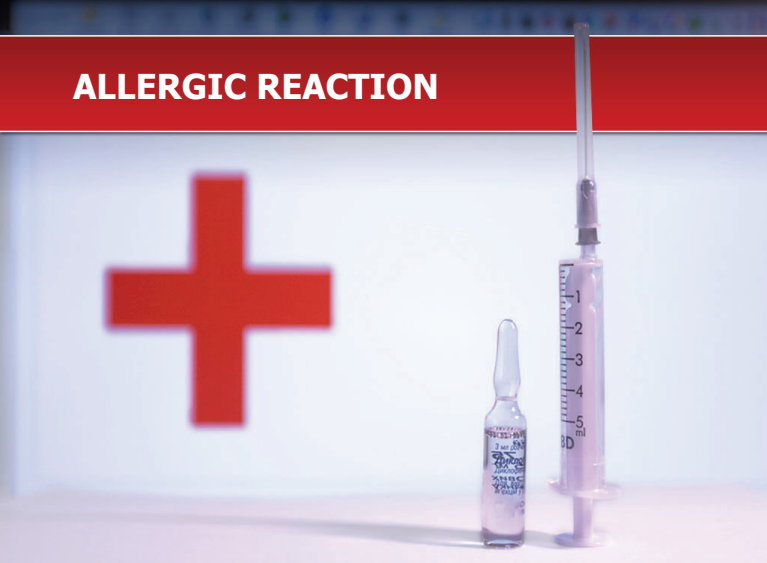
## BRONCHOSPASM/ASTHMA

**TREATMENT:**

- Call for HELP (Emergency Kit/Oxygen/AED).
- POSITION comfortably (Sitting Up/Semi-Supine).
- Administer 100% OXYGEN.
- MONITOR - Vital Signs: HR, RR, BP, SPO2, ECG.
  - If Mild- Moderate, give ALBUTEROL MDI: 2 - 4 puffs, may repeat q 3 minutes.
  - If Severe, ACTIVATE EMS, Call 911

**ADMINISTER EPINEPHRINE:**

- 1:1000 (1mg/ml) 0.1 - 0.3mg IM/SQ
- ADVANCED** - 1:10,000 (0.1mg/ml) 0.01mg - 0.03mg IV (0.010 - 0.020mg IV)



## ALLERGIC REACTION

## ALLERGIC REACTION

- **DEFINITION:** Anaphylaxis and Anaphylactoid reactions are immediate hypersensitivity reactions involving a generalized response to a specific antigen (Degranulation of mast cells and basophils, with release of histamine, leukotrienes and prostaglandins).

## ALLERGIC REACTION

- Anaphylaxis: involves antigen and IgE antibodies. Requires previous sensitization/exposure to an antigen.
- Anaphylactoid Reaction: mediated by histamine and may occur with first exposure to an antigen.

## ALLERGIC REACTION

### CAUSES:

- Local anesthetics or preservatives
- Antibiotics, especially I.M. or I.V.
- Any drug used in dental setting (i.e. barbiturate, narcotic)
- Venom of stinging insects

## ALLERGIC REACTION

### PREVENTION:

- **MEDICAL HISTORY** (include specific questions on allergies).
- Use large, visible label on the inside of allergic patient's chart.
- Perform skin or other tests for specific drug allergies (these tests considered questionable by some).

## ALLERGIC REACTION

### PREVENTION: (cont.)

- Don't use drugs or other agents that are chemically similar to those to which the patient is allergic (i.e. PCN or Cephalosporins)
- Use oral administration instead of injection of potential allergens (i.e. penicillin)

## ALLERGIC REACTION

### SYMPTOMS:

- Pallor
- Rash
- Itching
- Urticaria (hives)
- Angio-edema
- Hypotension
- Dyspnea
- G.I. Upset
- Coma
- Bronchial Constriction
- Laryngo-edema

## ALLERGIC REACTION

### TREATMENT:

- **CALL** for HELP (Emergency Kit/Oxygen/AED).
- **POSITION** patient comfortably.
- **OXYGEN** 100%.
- **MONITOR** - Vital Signs: HR, RR, BP, SPO2, ECG.
- If symptoms **Mild** (itching/rash):
  - **ADMINISTER** Diphenhydramine 25mg-50mg PO.
- If symptoms **Moderate (Bronchospasm)**:
  - **POSITION** - UPRIGHT.
  - Give 2-4 puffs ALBUTEROL MDI and/or **ADMINISTER** EPINEPHRINE 0.1-0.3mg SQ

## ALLERGIC REACTION

### TREATMENT: (cont.)

- If **SEVERE** (rash/hives/difficulty breathing/facial swelling):
  - **ACTIVATE EMS, Call 911.**
  - **ADMINISTER** - EPINEPHRINE (1:1000) 0.3mg - 0.5mg IM/SQ, may repeat at 2-3 minutes up to 3 doses.
- **\*\*ADVANCED TREATMENT\*\***
  - **INTUBATE EARLY, PLACE IV (2)** and **GIVE** Fluid Bolus 20 - 30mL/kg of 0.9NS
  - **ADMINISTER: SOLU-MEDROL 125mg IV/IM**
  - **ADMINISTER: EPINEPHRINE (1:10,000) 0.01 - 0.1mg IV, q3-5min.**
  - **ANTICIPATE** CardioPulmonary Collapse - **PERFORM CPR.**



## SEIZURE

- **DEFINITION:** convulsions resulting from excessive neuronal discharge which spreads throughout the brain

## SEIZURE

### CAUSES:

- Spontaneously occurring (i.e. epilepsy)
- Toxic effect of medications on the CNS (i.e. lidocaine)
- Metabolic disorders (i.e. hypoglycemia)

## SEIZURE

### PREVENTION:

- **MEDICAL HISTORY**
- **STRESS REDUCTION PROTOCOL**

# SEIZURE

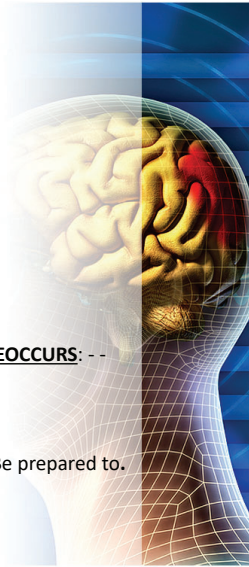
## TREATMENT:

- Call for HELP/Emergency Kit/Oxygen/AED.
- **POSITION** SUPINE and protect head/extremities.
- **ADMINISTER** 100% OXYGEN.
- **MONITOR** - Vital Signs: HR, RR, BP, SPO2, ECG.

## \*\*ADVANCED TREATMENT\*\*

If SEIZURE CONTINUES (Status Epileptics) or REOCCURS: - -

- ACTIVATE EMS - Call 911.
- ASSIST RESPIRATIONS
- ADMINISTER Versed 2mg IV/IM, may repeat. Be prepared to.

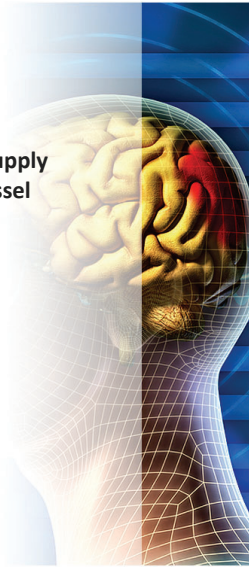


# STROKE

# STROKE

## DEFINITION:

- Occurs when something blocks blood supply to part of the brain or when a blood vessel in the brain bursts.
- Brain tissue becomes damaged or dies.
- Causes brain injury, long term damage, disability or even death.



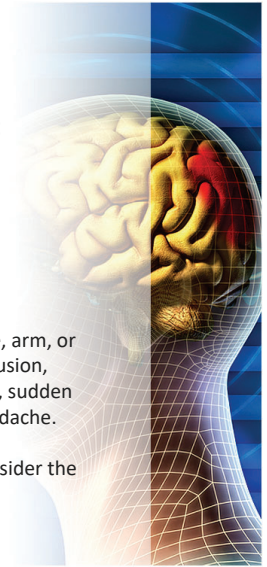
# STROKE

## Signs and Symptoms (FAST Acronym):

- **F**acial drooping
- **A**rm weakness
- **S**peech difficulties
- **T**ime to call emergency services.

✓ Sudden weakness or numbness in the face, arm, or leg (usually on one side of the body), confusion, trouble speaking or understanding speech, sudden vision problems, dizziness, and severe headache.

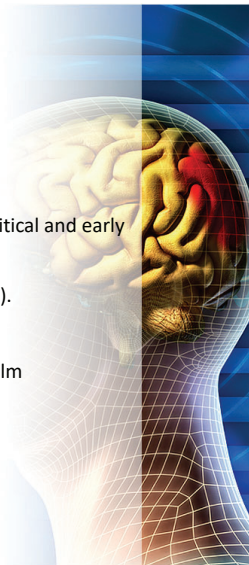
✓ If a patient exhibits any of these signs, consider the possibility of a stroke.



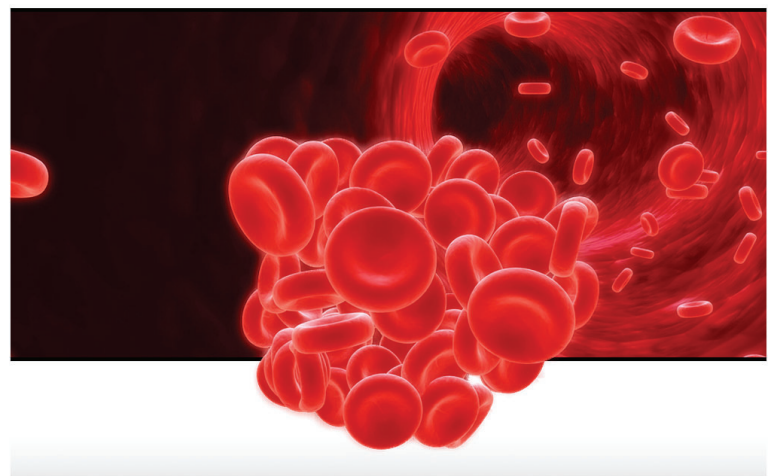
# STROKE

## TREATMENT:

- Call for HELP/Emergency Kit/Oxygen/AED.
- **ACTIVATE** EMS, Call 911. **DO NOT DELAY.** Time is critical and early intervention can improve outcomes.
- **POSITION** COMFORTABLY (Upright or SEMI-SUPINE).
- **ADMINISTER** 100% OXYGEN.
- **LIMIT Stimulation** to reduce stress. Keep patient calm
- **MONITOR** - Vital Signs: HR, RR, BP, SPO2, ECG.



# Angina Pectoris





## Angina Pectoris

### DEFINITION:

- Sub-Sternal pain varying from mild to severe. Pain often radiates to left shoulder, arm and jaw.
- Can be precipitated by exertion, anger, **EMOTIONAL STRESS**, or **FEAR**.
- Usually lasts less than 15 minutes.



## Angina Pectoris

### CAUSE:

- temporary **insufficient** supply of oxygen (ischemia) to the heart muscle due to narrowing of the coronary arteries and/or demand for increased cardiac output



## Angina Pectoris

### PREVENTION:

- **MEDICAL HISTORY**
- **STRESS REDUCTION PROTOCOL**
- Consider pre-treatment with **NITROGLYCERIN** 1-2 tablet SL.
- Monitor Vitals [HR, blood pressure, SPO2].
- Use effective local analgesia. Beware of maximum local anesthesia dosage with or without epinephrine.



## Angina Pectoris

### SYMPTOMS:

- **Chest Pain** often described as a sensation of squeezing, burning, pressing, choking, aching, bursting, tightness, or "gas".



## Angina Pectoris

### TREATMENT:

- **CALL** for Help/Emergency Kit/Oxygen/AED.
- **POSITION COMFORTABLY** or Semi-Supine.
- Administer **100% OXYGEN 10 - 15 mL/min** via Non-Rebreather facemask .
- **MONITOR** - Vital Signs: HR, RR, BP, SPO2, ECG.
- **ADMINISTER NITROGLYCERIN** 1-2 tablets SL q3min. (May repeat for 3 doses).



## Angina Pectoris

### TREATMENT: (Cont.)

- **\*\*NOTE:** Patients that have taken a phosphodiester inhibitor medication such as Viagra or Cialis within the last 48 hours should not be given nitroglycerin.\*\*
- If **NO RESPONSE**, pain intensifies, or different duration and/or character then follow **Myocardial Infarction Protocol** because.....

**"IT IS A HEART ATTACK"**



## MYOCARDIAL INFARCTION

## Myocardial Infarct

### DEFINITION:

- deficient coronary arterial blood supply to region of the myocardium resulting in cellular death and necrosis.



## Myocardial Infarct

### CAUSES:

- Stress
- Blood vessel disease
- Thrombosis



## Myocardial Infarct

### PREVENTION:

- **MEDICAL HISTORY**
  - M.I. less than 6 months prior to treatment indicates ASA Class IV (no elective treatment).
- **STRESS REDUCTION PROTOCOL**
- **Position** semi-supine
- **Aspirate** and give local anesthetics slowly if necessary
- **AVOID 1/50,000 EPINEPHRINE**
- Limit total dose of epinephrine to less than 0.04mg



## Myocardial Infarct

### SYMPTOMS:

- Severe pain of Anginal type:
  - sudden onset
  - radiating (left arm, lower jaw)
  - crushing pressure
- Pain not relieved with nitroglycerin
- Cold sweat, apprehension, fear of impending doom
- Light-headedness, fainting, nausea, vomiting.
- Unconsciousness/Unresponsiveness



## Myocardial Infarct

### TREATMENT:

- **CALL** for HELP/Emergency Kit/Oxygen/AED.
- **ACTIVATE EMS**, Call 911.
- **If Conscious, POSITION COMFORTABLY.**
- **MONITOR** - Vital Signs: HR, RR, BP, SPO2, ECG.
- **ADMINISTER 100% OXYGEN 10 - 15 mL/min Non-Rebreather Facemask.**
- **THINK "MONA"** (morphine/oxygen/nitroglycerine/aspirin).
- **Chew & Swallow 160-325mg ASPIRIN PO.**
- **ADMINISTER NITROGLYCERIN 1-2tabs SL.** \*\*NOTE: Patients that have taken a phosphodiester inhibitor medication such as Viagra or Cialis within the last 48 hours should not be given nitroglycerin.\*\*



## Myocardial Infarct

### TREATMENT (continued):

#### \*\*ADVANCED TREATMENT\*\*

- If not relieved in 2-3 minutes or pain intensifies, titrate **Fentanyl** 25-50 mcg IV/IM increments or 1-2mg **Morphine** IV/IM.
- **ANTICIPATE** CardioPulmonary Arrest (NO Pulse, NO Breathing).
- Continually **ASSESS / REASSESS**
- If CardioPulmonary Arrest, Immediately perform Professional Healthcare **CPR** or **ADVANCED CARDIAC LIFE SUPPORT**.



## COMPLICATIONS ASSOCIATED with SEDATION

- **Hypoventilation** from airway obstruction or respiratory depression causes **hypoxia** and **hypercapnia**.
- Cardiovascular depression results in **hypotension**.
- **Drug overdose** can lead to hypoventilation or adverse drug reactions can cause an **anaphylaxis** or **anaphylactoid** reactions.
- **Aspiration** associated with loss of protective airway reflexes.
- **Nausea** and **vomiting**.
- Equipment failure, loss of situational awareness, and human error.



## COMPLICATIONS ASSOCIATED with SEDATION

### Airway Obstruction

- Airway obstruction is the most common complication associated with any type of Sedation (Oral, IV Conscious, or General Anesthesia).
- Airway obstruction is the result of loss of muscle tone of the submandibular muscles, tongue and epiglottis.



## COMPLICATIONS ASSOCIATED with SEDATION

### Airway Obstruction

Factors associated with difficult airway management:

- Previous problems with sedation and anesthesia.
- Stridor, snoring and/or sleep apnea.
- Craniofacial abnormalities [i.e. Pierre-Robin Syndrome, Trisomy 21].
- Advanced rheumatoid arthritis
- Obesity
- Airway Evaluation showing small mouth, large tongue, short neck, protruding incisors, facial hair, edentulous, and/or short chin

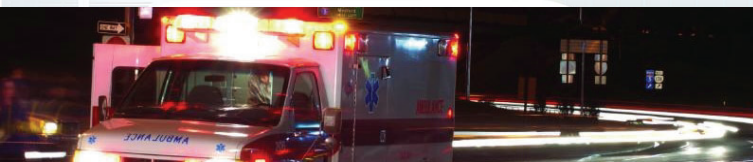


## COMPLICATIONS ASSOCIATED with SEDATION

### Airway Obstruction

Signs of Airway Obstruction:

- Inspiratory stridor
- Snoring
- Sternal retractions
- Rocking chest movements
- Absence of breath sounds
- Hypoxemia
- Hypercapnea



## COMPLICATIONS ASSOCIATED with SEDATION

### Hypoxemia

Hypoxemia is present when PaO<sub>2</sub> is less than 60mmHg or the SpO<sub>2</sub> is less than 90%.

Causes of Hypoxemia:

- Hypoventilation
- Low inspired oxygen
- Increased oxygen consumption from shivering, sepsis, or pain
- Low cardiac output



## COMPLICATIONS ASSOCIATED with SEDATION

### Treatment of Hypoxemia

- Oxygenate and Ventilate
- If Airway Obstruction:
  - Reposition Head - Chin Lift, Jaw Thrust
  - Use airway adjunct - oral airway, nasal airway, LMA, iGel, Oral Tracheal Tube
- If Over-Sedation: Administer reversal agents
  - Naloxone - (Adult dose) 0.4 - 2mg IV/IM/IN (Pediatric dose) 0.01mg/kg IV/IM/IN
  - Flumazenil - (Adult dose) 0.2mg IV/IM/IN (Pediatric dose) 0.01 - 0.02mg/kg IV/IM/IN



## COMPLICATIONS ASSOCIATED with SEDATION

### Hypercapnea

Hypercapnea refers to the buildup of Carbon Dioxide in the blood stream. The usual cause of hypercapnea is respiratory depression caused by the administration of;

- Sedatives - Benzodiazepines, Barbituates, Zolpidem (Ambien), Zaleplon (Sonata), Eszopiclone (Lunesta)
- Hypnotics - Propofol
- Narcotics - Morphine, Demerol, Fentanyl, Alfentanil, Remifentanil



## COMPLICATIONS ASSOCIATED with SEDATION

### Hypercapnea

Acute Hypercapnea is a life threatening emergency causing;

- Cardiac dysrhythmia - premature atrial contractions.
- Respiratory Acidosis leading to organ failure and life threatening coagulopathies.
- Seizures
- Coma
- Death



## COMPLICATIONS ASSOCIATED with SEDATION

### Hypercapnea

Hypoventilation resulting in "Hypercapnea" is difficult to detect when supplemental oxygen is being administered.

- **Ventilation** and **Oxygenation** are separate processes thus the monitoring of oxygenation with a pulse oximeter **does not** measure the adequacy of ventilations.
- Capnography allows for the measurement of CO<sub>2</sub> - adequacy of ventilations.



The End

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