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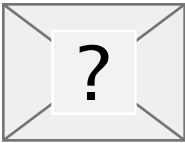
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Medical Emergencies in the Dental Office



"Dentists are increasingly using sedation and anesthesia in the dental office and a certification course does not yet exist to train dentists in sedation-related emergencies. Unlike in medicine, dentists operate in the patient's airway, which presents unique challenges," states the ADA Foundation's RFP.

ADA News, 2007

Medical Emergencies in the Dental Office

94.9% of dentists in North America
have experienced at least one medical emergency
in their office

Malamed, JADA 1993



Medical Emergencies in Anesthesia

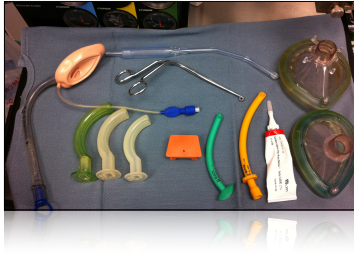
medical emergencies can develop or
will happen when you practice anesthesia
ALWAYS

The goal is to recognize when this cascade of events
is beginning and prevent them from continuing

It is much easier to manage a potential problem
than the actual problem

Anesthetic Emergencies

- prevention
- preparation
- recognition
- management



Be Prepared



Be Prepared

Utilize Cognitive Aids

Emergency Protocols Dental Office Emergencies

Severe Allergic Reaction
Laryngospasm
Total Airway Obstruction
Altered Mental Status
Stroke
Hypoxemia
Hypotension
Bradycardia
Foreign Body Choking / Soft Tissue Obstruction
Severe Pain
Seizure
Hypoglycemia
Hypothermia
Diabetes
Cardiac Arrest

Call 911

- Terminate all treatment
- Suction oral cavity
- Suction hypopharynx region
- Head tilt, chin lift or jaw thrust
- Consider placement of nasal or oral airway
- Consider bag-mask ventilation if possible (personnel)
- If no airway still established, perform LMA

Cognitive Aids

- Anesthesia Critical Events
 - <http://emergencymanual.stanford.edu/>
- ACLS
 - http://www.anesthesiaillustrated.org/cog aids/wp-content/uploads/2014/10/ACLS_OBJECT_ACTION_8_20_14.pdf

PREPARATION

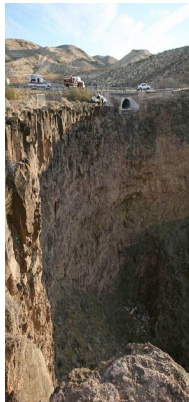
Minimal Monitoring Gives Limited Information and the Little Picture

- NIBP
- Pulse oximetry



Additional monitoring gives you the bigger picture

- EKG
- NIBP
- Pulse oximetry
- Capnography
- Blue Tooth Stethoscope



Anesthetic Emergencies

Management

Utilize Cognitive Aids

Treat symptoms first then determine the cause

Anesthetic Emergencies

In anesthesia we are primarily concerned about the function of the heart, lungs and the brain.

Acute failure of any of these organs will result in the death of the other organ systems or the entire individual

Respiratory

Cardiovascular

Cerebral

AIRWAY MANAGEMENT

Difficult or failed airway management is the major factor in anesthesia related morbidity and mortality

The first complication in sedation is the great majority of the time of an airway nature. Hence, the skill of airway management is of the utmost importance to learn, practice and master.

The ability to skillfully manage these emergencies is crucial in the successful navigation of a safely administered sedation.

Respiratory Emergencies

Respiratory distress- obstruction

Respiratory failure- at the cellular level

Is it obstruction or apnea from the sedatives



Respiratory Emergencies

Hypoventilation vs. Respiratory depression
depth and rate

Airway obstruction
anatomic (supra-glottic)
laryngospasm (glottic)
bronchospasm (sub-glottic)

Emesis with aspiration



Respiratory Emergencies- airway obstruction

Anatomic (supra-glottic)
short & thick neck
large tongue

Laryngospasm (glottic)
primitive reflex
patient is semi-conscious/deep sedation

Bronchospasm (sub-glottic)
asthma
anaphylaxis
physical irritation



Respiratory Emergencies- airway obstruction

Don't hesitate

Apply full face mask

Evaluate level of obstruction

Positive pressure

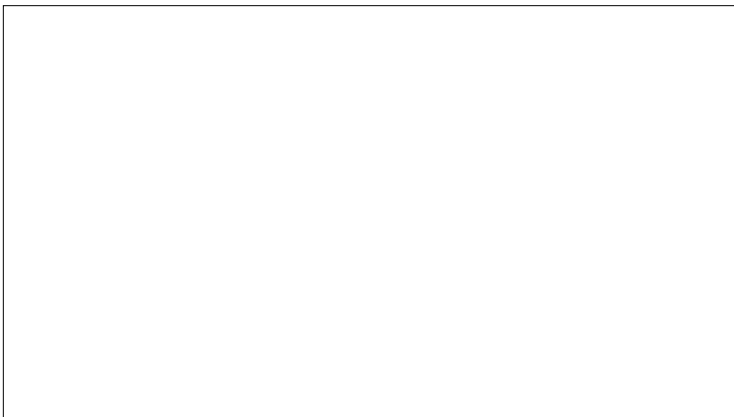
100% oxygen



Bag Valve Mask

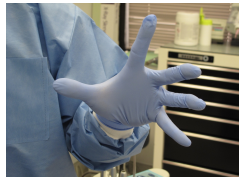


You Know WHAT it is, Do You Know HOW to Use it



MASK HOLDING TECHNIQUE

THE "C" AND THE "E"



Grasp the mandible with the "E"



Grasp the Mask with the "C"



Place downward pressure on the mask toward the face

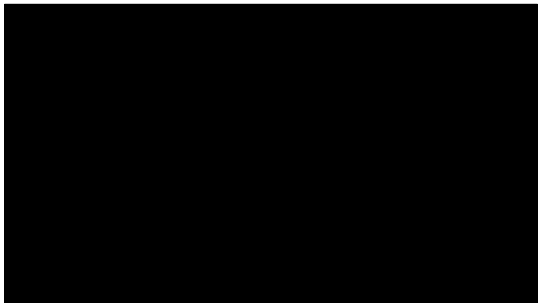


While holding the mask simultaneously tilt the head back and perform chin lift





Bag-Valve-Mask Technique



Bag-Valve-Mask Technique

OPA
Placement





NPA: Non-Placement-Airway



Placement of NPA



Placement of the NPA

Placement of the LMA

Laryngospasm

Symptoms

Crowing sound

Desaturation

No breath sounds

Unable to ventilate

Call 911

- Terminate all treatment
- Initiate medical emergency plan
- Place patient in a supine position
- Suction oral cavity, hypopharynx, and nasopharynx with nasal suction tip ONLY Turn on 100% O₂, administer under positive pressure
- Stimulate laryngospasm heath
- Attempt mask ventilation, holding jaw forward, attempting to bag ventilate, airway adjuncts
- If spasm continues
- Reversal of sedatives
- Flumazenil: 2-4 mg, Midazolam: 4-8mg
- Administer succinylcholine IV 20-40mg which only should be administered if you are trained in Advanced Airway Management

Laryngospasm

Laryngospasm

Aggressive treatment

- Call 911

Suction, laryngospasm notch, head tilt, chin lift, jaw thrust

Attempt to ventilate, airway algorithm

Reversal of sedatives

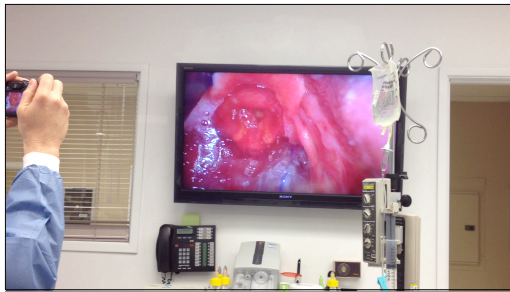
- Succinylcholine only if GA trained

Consider mechanical obstruction or Bronchospasm

Call 911

- Terminate all treatment
- Initiate medical emergency plan
- Place patient in a supine position
- Suction oral cavity, hypopharynx, and nasopharynx with tonsil suction tip **ONLY** Turn on 100% O₂, administer under positive pressure
- Stimulate Laryngospasm Notch
- Attempt mask ventilation, holding jaw forward, attempting to bag ventilate, airway adjuncts
- If apnea continues
- Reversal of sedatives
- Flumazenil 2-4 mg, Naloxone 4-8mg
- administer Succinylcholine 10-20 mg which **only should be administered if you are trained in Advanced Airway Management**

Laryngospasm



Laryngospasm

Bronchospasm / Asthma Attack

Bronchospasm is a life threatening emergency

Wheezing, shortness of breath, respiratory distress usually in conjunction with allergic reaction, aspiration or an asthma attack

Signs and Symptoms

- Wheezing
- Coughing
- Shortness of breath
- Tightness in chest

Assess Severity of Attack

- Discontinue Dental Treatment
- Place patient in a comfortable position
- Call 911**
- Administer 2-4 puffs of Albuterol (bronchodilator)
- Epinephrine IM
 - 0.3 mg of 1:1000 Lateral thigh q 5 minutes
- Administer O2
- Monitor vital signs

If symptoms do not improve...

- Assess ACPs
- Activate office emergency team
- Perform BLS
- Prepare for transport to Emergency Department

Asthma Attack/Bronchospasm

Bronchospasm / Asthma Attack

Depending on severity

Administer 2 puffs Albuterol

Epinephrine

IM .3 mg 1:1000 (1mg/ml)

IV 3ml of 1:10,000 concentration (100mcg per 1 ml or .1mg/ml)

Signs and Symptoms

- Wheezing
- Coughing
- Shortness of breath
- Tightness in chest

Assess Severity of Attack

- Discontinue Dental Treatment
- Place patient in a comfortable position
- Call 911**
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- Administer O2
- Monitor vital signs

If symptoms do not improve...

- Assess ACPs
- Activate office emergency team
- Perform BLS
- Prepare for transport to Emergency Department

Asthma Attack/Bronchospasm

"mg" = "milligram" (1/1000 [10⁻³] of a gram)
"µg" = "microgram" (1/1,000,000 [10⁻⁶] of a gram)
(Note: "microgram" may also be written "mcg")
"kg" = "kilogram"
"IV" = "intravenous"

One ampoule of 1:1000 adrenaline in 1 ml volume.

- This equals 1mg in 1 ml
- This equals 1000 µg/ml

If one ampoule is diluted to 10ml

- This equals 0.1 mg/ml
- This equals 100 µg/ml
- This is 1:10,000 adrenalin

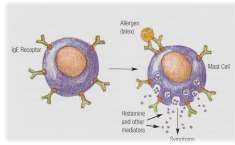
If one ampoule is diluted to 100ml

- This equals 0.01 mg/ml
- This equals 10 µg/ml
- This is 1:100,000 adrenalin

If one ampoule is diluted to 1000ml

- This equals 0.001 mg/ml
- This equals 1.0 µg/ml

Allergy



Allergy represents an **OVERREACTION** by the bodies immune system to a foreign substance (allergen)

Allergic Reactions

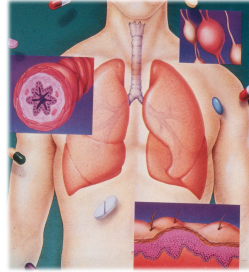
Diagnosis
&
Management



Histamine

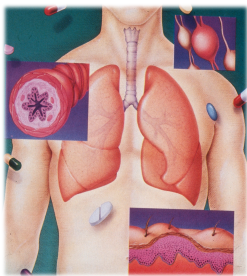
The Primary Mediator of the Allergic Reaction

- Heart rate = increases
- Blood pressure = decreases
- Small blood vessels = dilate
- Flushing
- Increased capillary permeability



Histamine

Pharmacology - Summary



- Itching . . . Pruritis
- Hives . . . Urticaria
- Rash . . . Erythema
- Swelling...Angioedema
- Bronchospasm
- Vasodilation

Allergic Reactions

Possible predictors of severity of the reaction



Rapidity of *ONSET*
of signs and symptoms

PROGRESSION
of signs and symptoms

Onset of S&S

Delayed:

- S & S develop slowly [>60 min]
- Reaction involves skin

Immediate:

- S & S develop within minutes of exposure
- Reaction involves respiratory a/o cardiovascular systems

Rash after the administration of antibiotics



Delayed Onset Skin Reaction

Management:

Parenteral histamine blockers:

- Diphenhydramine . . . IV
- 50 mg adults
- 25 mg (< 30 kg)

ANAPHYLAXIS

The diagnosis and management of anaphylaxis practice parameter: 2010 Update.
Lieberman P, Nicklas RA, Oppenheimer J, et al
Allerg Clin Immunol 126:477-480, 2010

**The more rapidly
anaphylaxis develops, the
more likely the reaction is
to be severe and
potentially life-threatening**

The diagnosis and management of anaphylaxis practice parameter: 2010 Update.
Lieberman P, Nicklas RA, Oppenheimer J, et al
Allerg Clin Immunol 126:477-480, 2010

**Prompt recognition of signs and
symptoms of anaphylaxis is crucial.**
**If there is any doubt, it is
generally better to administer
epinephrine**



Laryngeal Edema
Angioedema of the Larynx

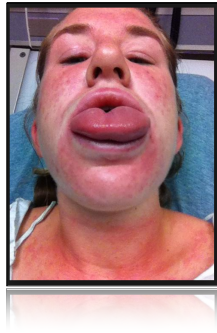


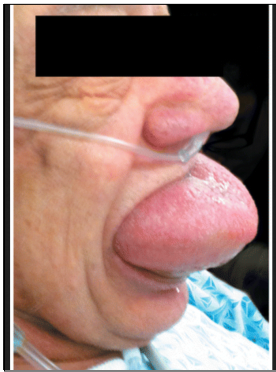
Angioedema of the Eyes and Lips



Angioedema of the Lips

Lingual Edema
(Angioedema of the
tongue)





Anaphylaxis . . . Management



0.3 mg/dose = adult
0.15 mg/dose = child (15 - 30 kg)

There is no absolute contraindication to epinephrine administration in anaphylaxis

- **Epinephrine and oxygen are the most important therapeutic agents administered in anaphylaxis.**
- **Epinephrine is the drug of choice, and the appropriate dose should be administered promptly at the onset of apparent anaphylaxis**

Allergic Reaction

Treatment depends on severity

Skin/rash/nausea and or delayed reaction is considered mild and should be treated with 25-50 mg IV Benadryl

Signs and symptoms: Allergic Reaction
Hives
Swelling
Sore throat
Difficulty breathing
Sneezing
Runny nose
Itchy eyes

- Discontinue Dental Treatment
- Administer **Benadryl 25-50 mg IV**
- Refer to Physician

Signs and symptoms: Anaphylaxis
Wheezing
Chest tightness
Swelling of the tongue or throat
Hypotension

Call 911

- Discontinue dental treatment
- Activate office emergency team
- Position patient in supine position
- Remove dental materials from mouth
- Access ABC's and perform BLS
- Give **O2 @ 10Lpm** with nasal cannula
- For **bronchospasm**
Administer **Albuterol**

For wheezing: 2-14 puffs

- For **Anaphylaxis**
Administer **epinephrine**
(if needed) IV - 1.0ml of 1:10,000
(**1mg**) infused slowly over 5 minutes
g 0.5-10 minutes
IM - 0.3ml of 1:1000

Allergic reaction
(Mild to Moderate)

Allergic Reaction Anaphylaxis
(Immediate or Severe)

Allergic Reaction

Anaphylaxis

Respiratory and Cardiovascular involvement

Wheezing, stridor, hypotension, laryngeal edema

Epinephrine

IM .3ml (.3mg) of 1:1000

IV 1-3ml (.1-.3mg slowly) of 1:10,000

Signs and symptoms Allergic Reaction

Rhinitis
Rash
Swelling
Swelling of the Lips

- Discontinue Dental Treatment
- Administer **Benadryl** 25-50 mg IV
- Refer to Physician

Signs and symptoms Anaphylaxis

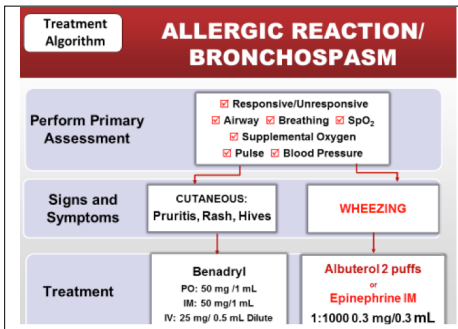
Stridor
Sweating
Severe Swelling
Swelling of the tongue or throat
Hypotension

Call 911

- Discontinue dental treatment
- Activate office emergency team
- Position patient in supine position
- Remove dental materials from mouth
- Access ABC's and perform BLS
- Give **O2** @ 8 liters per minute with nasal cannula
- For Bronchospasms
 - Administer Albuterol
 - For wheezing: 2-14 puffs
- For Anaphylaxis
 - Administer **Epinephrine**
 - (if needed) IV - 1.0ml of 1:10,000
 - (.1mg.) infused slowly over 5 minutes
 - q 5-10 minutes
 - IM - 0.3ml of 1:1000

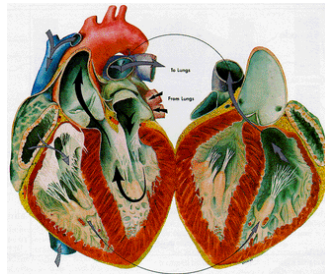
Allergic reaction (Mild to Moderate)

Allergic Reaction Anaphylaxis (Immediate or Severe)



Cardiovascular Emergencies

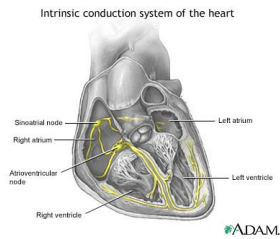
- Bradycardia
- Tachycardia
- Conduction disturbances
- Ectopic beats
- Hypotension
- Hypertension
- Compromised myocardial perfusion (angina, MI)
- Syncope



Cardiovascular Emergencies

- 3 lead EKG

What is the Rate?
What is the rhythm?
Where is the pacemaker?
Is there a P-wave?



Cardiovascular Emergencies- bradycardia

Pulse < 60
treat if symptomatic
Hypotension
PVC's
Poor Perfusion
Desaturation

atropine - 0.4mg iv

glycopyrrolate 0.2mg iv

epinephrine - 10 mcg titrated
to effect. Dilution 1mg of
1:1000 concentration into
100ml of Na Cl





Cardiovascular Emergencies- bradycardia

Cardiovascular Emergencies- tachycardia

supraventricular tachycardia

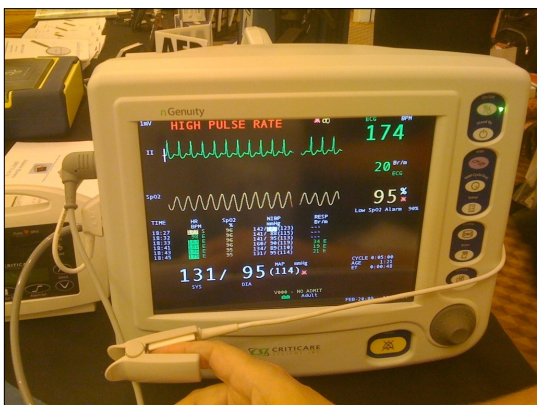
sinus tachycardia

ventricular tachycardia

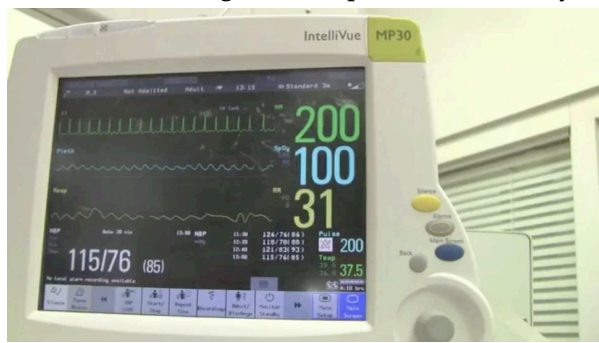
Cardiovascular Emergencies- Supraventricular tachycardia



HR > 160 bpm
1st dose- 6mg rapid bolus
2nd dose- 12mg rapid bolus
lasts 10 seconds
only works for SVT
May need synchronous
cardioversion if unsuccessful



Cardiovascular Emergencies- Supraventricular tachycardia



Cardiovascular Emergencies- sinus tachycardia

- Try to determine the cause
- Pain- Ineffective Local Anesthesia
 - Anxiety
 - Full bladder
 - Hypovolemia
 - positioning
 - fluid challenge
 - carotid sinus massage
 - Sedation
 - Ineffective Local Anesthesia



Cardiovascular Emergencies- sinus tachycardia

If the rate is too high, the ventricles don't get a chance to fill



If the rate is high, determine if the patient is hypovolemic and t

Give fluids- $CO = SV \times Rate$

- Slow the rate to make the heart a better pump

Cardiovascular Emergencies- sinus tachycardia

positioning
fluid challenge
carotid sinus massage
Sedation
Ineffective Local Anesthesia

Tachycardia and hypertension-labetalol (titrate) 5 -10 mg IV
Tachycardia and normal BP-esmolol (titrate) 10 mg IV

Signs and Symptoms: Prolonged QT Interval
Heart Rate Above 100 beats per minute and Below 180 bpm

Causes

- Ineffective Local Anesthesia: BAIN
- Anxiety
- Full Bladder
- Hyperventilation

Primary Treatment

- Discontinue Dental Treatment
- Maintain Vital Signs/Perform Primary Assessment
- Discontinue Cause and provide treatment
 - Ineffective Local
 - Full Bladder
 - Under sedation-Midazolam and Fentanyl
 - Hyperventilate-Reservoir Puff Challenge of 200 ml

If Tachycardia Persists:

- Sinus Tachycardia and Hypertension
 - Labetalol 5-10 mg IV repeat q 5 minutes if necessary
- Sinus Tachycardia and Normal BP
 - Esmolol 10 mg repeat q 5 minutes if necessary

Call 911

Sinus Tachycardia

Esmolol



Cardiovascular Emergencies- conduction disturbance

PVC's



junctional rhythm



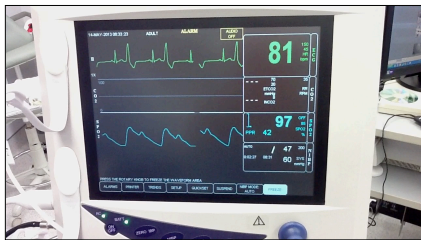
atrial fibrillation



atrial flutter



Bigeminy- PVC's on every other heartbeat



Administer Lidocaine 1mg/kg

Conduction disturbance- atrial fibrillation

Regularly irregular heart beats

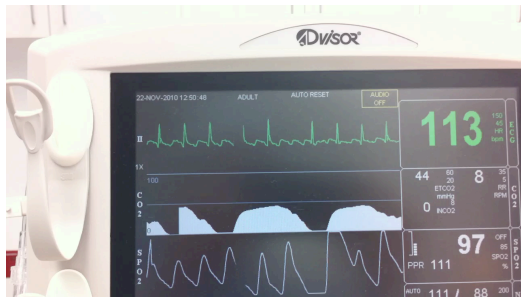


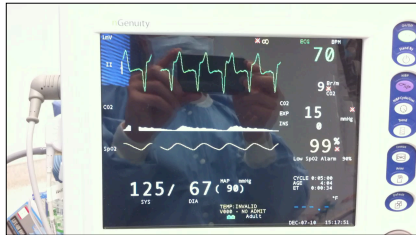
Conduction disturbance- atrial flutter

One of the atrial fibers is firing with a re-entry phenomenon

Atrial tachycardia

You lose the atrial kick





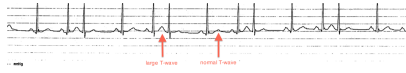
What do you do? Defib?



What Are You Going To Do?

3 lead EKG

Premature atrial contractions- the most common ectopic beat



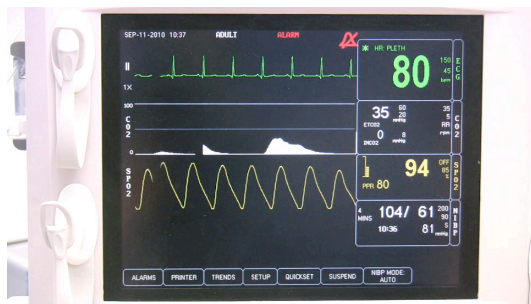
Cardiovascular Emergencies- ectopic beat

Premature Atrial Contraction
most common ectopic beat
associated with caffeine
and alcohol consumption
Non-compensatory pause, still
produces a pulsatile pressure



No treatment is necessary

Cardiovascular Emergencies- ectopic beat (pac)



Cardiovascular Emergencies- hypotension

positioning

Trendelenburg- 15 degrees
below the horizontal
800cc of blood in each leg
fluid challenge



250-350 ml

How long to administer depends on size of the catheter being used. 22g vs 20g vs 18g
Only 25% stays in the circulation after 1 hour
Repeat in 5 minutes

Hypotension

Most common cause is Hypovolemia especially when combined with tachycardia

Can also be caused by over sedation

Ephedrine 5-10 mg (Low or normal pulse)

Phenylephrine (10mg/ml diluted in 100 ml) for hypotension and tachycardia.

PROBLEM Signs and symptoms
Systolic BP <90mm Hg
Blood pressure

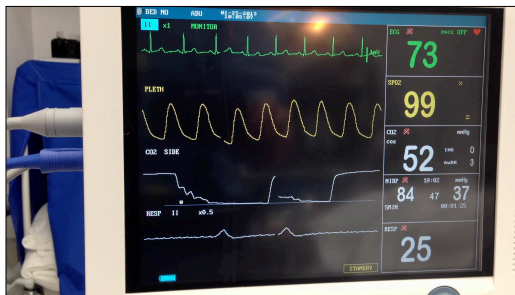
Call 911

- Discontinue dental treatment
- Activate office emergency team
- Administer O2 at 6L/minute
- Treatment based on cause:
 - Decrease depth of anesthesia
 - Increase O2
 - Increase IV fluids- Fluid bolus 250 ml
 - Re-position patient into Trendelenburg position. Elevate legs
 - Administer Vasopressor such as:
 - Ephedrine 5-10 mg IV if hypotension AND bradycardia
 - Phenylephrine 0.1-10 mg IV if hypotension and Elevated pulse or tachycardia

Hypotension

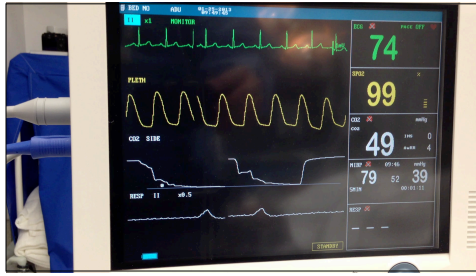
Ephedrine

alpha and beta effects
Stimulates release of NE
Increases BP, HR, and CO
Additional doses every 10 minutes



Neo-Syneprine

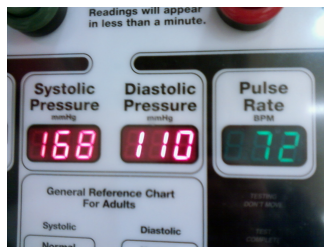
increases BP, decreases HR
"double dilution" 10mg in 100ml
alpha 1 agonist +++
lasts 5-10 minutes



Cardiovascular Emergencies- hypertension

- Pain Control
- local anesthesia
 - limit epinephrine
- opiates
- Increase depth of sedation
- Full bladder?

Labetolol-
antagonist Alpha 1,
Beta 1 and 2
titrate 5-10mg, direct effect
on heart and vessels
5-10 mg q 5 minutes



Cardiovascular Emergencies- hypertension

- esmolol- titrate 5-10mg,
effects HR, decreases CO
Beta 1 selective
lasts up to 20-30 minutes

- hydralazine (apresoline)
direct vasodilator on
arterioles, not veins
titrate 10-20mg iv
lasts 20-90 minutes



Call 911

Hypertension

Pre existing condition
 Anxiety
 Diabetes of age
 Dysmetabolism of non-hypertension work

Subacute assessment
 Hypoxia
 High blood CO2

- Discontinue dental treatment
- Perform Primary Assessment
- Assess Local Anesthesia
- Assess Depth of Sedation
- Activate office emergency plan
- Position patient in a reclined position
- Administer O2 at 4L/minute
- Treatment based on cause:
 - Increase depth of sedation
 - Increase O2
 - Reduce fluid overload by emptying full bladder
 - Administer a Beta-Blocker such as:
 - Esmolol 10 mg IV
 - Repeat q 3-5 minutes prn
 - Labetalol 5-10 mg
 - Repeat q 5 min prn.
 - OR
 - Administer a Vasodilator such as:
 - Hydralazine 10-20 mg IVIM
- Prepare to transport to Emergency Department

Characteristics of the ANS

Receptor	Effector Organ	Response to Stimulation	Agonist	Synthetic Drugs
Beta1	Heart	Increased heart rate Increased contractility Increased conduction velocity	Dobutamine Dopamine Isoproterenol*	Propafenone Dofetilide Labetalol*
Beta2	Blood vessels (especially dilated and coronary arteries)	Dilation	Albuterol Salmeterol	Propafenone Dofetilide Labetalol*
Bronchioles	Stomach	Relaxation		Labetalol*
Bladder	Relaxation			
Uterus	Relaxation			
Parotid	Salivary secretion			
Alpha1	Blood vessels	Constriction	Phenylephrine	Propafenone Dofetilide Labetalol
Parotid	Inhibition of saliva secretion			
Intestine and bladder	Relaxation			
Constriction of sphincters				
Alpha2	Parasympathetic (sympathetic nerve ending)	Inhibition of norepinephrine release	Clonidine Dexmedetomidine	Midolone Phenylephrine
Central nervous system (sympathetic)	Increase in glutamate concentration (?)			
Platelets	Aggregation			
Dopamine1	Blood vessels	Dilation	Fenoldopam	Dofetilide
Dopamine2	Parasympathetic (sympathetic nerve ending)	Inhibition of norepinephrine release	Dopamine	Dofetilide
Muscarinic	Heart	Decreased heart rate Decreased contractility Decreased conduction velocity Constriction	Atropine Dofetilide	Propafenone Dofetilide Dofetilide
Bronchioles	Stimulation of secretion			
Salivary glands	Stimulation of secretion			
Intestine	Relaxation			
Bladder	Relaxation of sphincter Constriction			
Bladder	Relaxation of sphincter			
Nicotinic	Neuromuscular junction	Skeletal muscle contraction	Succinylcholine	Nondepolarizing muscle relaxants
Autonomic ganglia	Sympathetic nervous system stimulation			

Basics of Anesthesia
 6th Ed.
 Stoelting & Miller

Cardiovascular Emergencies- Angina

Perform Primary Assessment
 Pulse, blood pressure, airway ,
 oxygen saturation

Is the episode new onset,
 unprovoked

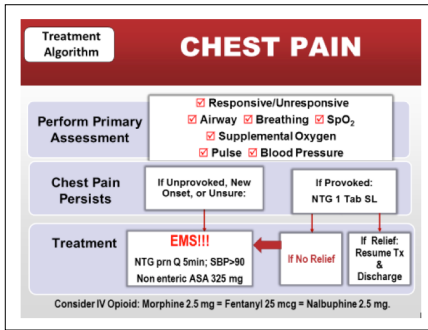
Is There Prior History of Angina

Call 911

Angina/Chest Pain

ANGINA/CHEST PAIN
 Signs and symptoms
 History
 Assessment
 Anesthetic history POC
 Chest pain
 Shortness of breath

- Discontinue dental treatment
- Perform Primary Assessment
- Activate office emergency team
- Position patient in a reclined position
- Assess ABC's and pulse/SpO2
- Consider Nitroglycerin
- Administer O2 at 4L/minute
- Monitor vital signs
- If Provoked Angina
 - Administer NTG 1 tab Sublingual
 - If Relief, reassess dentistry and discharge
- If New Onset, unprovoked or Resistant to NTG:
 - Call 911 and prepare for transport
 - Consider NTG 0.5 mg/ml at 0.5 mg x 3 doses at 5-10 min
 - Non Esteric Aspirin 325 mg
 - Apply AED
 - Consider IV Morphine 2.5-5 mg, Fentanyl 25 mcg or Hydromorphone 2.5-5 mg

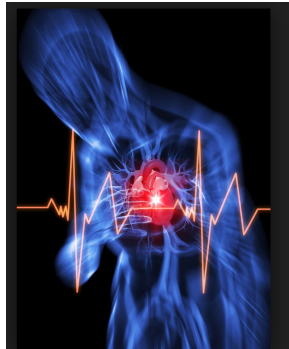


Cardiovascular Emergencies- Myocardial Infarction

symptoms similar to angina but more severe and not relieved by NTG

Perform Assessment
Pulse? Breathing?
Unresponsive?
Cardiac Arrest

Activate EMS immediately





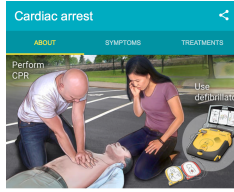
Cardiovascular Emergencies- Myocardial Infarction

Management
Get the AED

Morphine or Nitrous Oxide 50%
Oxygen
Nitro-Glycerin
Aspirin 325 mg

Unresponsive? **CARDIAC ARREST**

Start BLS



Sudden, unexpected loss of heart function, breathing, and consciousness.

Nitrous Oxide - Oxygen

50% - 50%

As analgesic as IV morphine

- Separates pain from suffering

Sedative

- Relaxes scared patient

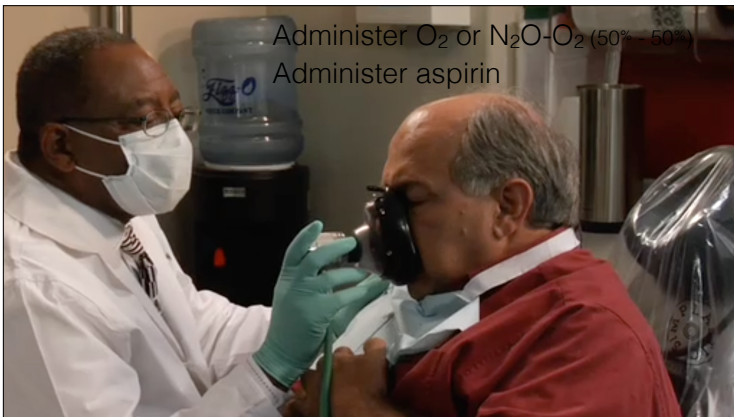
50% O₂

- 2.5 times ambient air

Prehospital management of suspected MI



Entonox
Dolonox

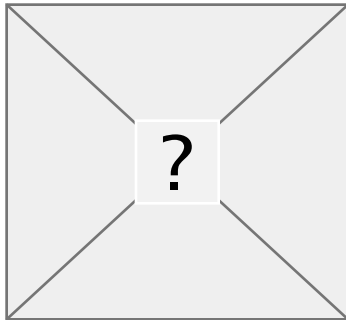


Administer O₂ or N₂O-O₂ (50% - 50%)
Administer aspirin



3 lead EKG
AED
100% oxygen
positive-pressure ventilation

Provide Early defibrillation
10% reduction in success to
convert to a stable rhythm for
every minute of delay



Cardiac Arrest

Perform Primary Assessment

Airway, Circulation, Breathing

Unresponsive

Not Breathing

No Pulse

Call 911

- Discuss the patient's condition
- Position patient in a safe position
- Perform Primary Assessment, ABCs
 - o Unresponsive
 - o No Pulse
 - o No Breathing
- Perform CPR
 - o 30 Compressions/2 breaths
 - o Compressions rate 100/minute
 - o Full hand depth
- Call for AED and Place it on the patient
 - o Ask someone else to do it if possible
 - o Unlock Bag/Volvo Mask
 - o Monitor Vital signs
- Do Not Stop Compressions unless AED is available or directed to STOP action
- Prepare to transport to Emergency Department

Cardiac Arrest/ MI

Cardiac Arrest

- **ACTIVATE EMS !!!!!**

Call for AED and **TURN IT ON**

Start CPR

Immediate Chest Compressions

Fast and Deep

Call 911

- Discontinue dental treatment
- Position patient in a supine position
- Perform Patient Assessment: ACB's
 - Unresponsive
 - No Pulse
 - No Breathing
- Perform CPR
 - 30:2 Compressions/Ventilations
 - Compressions only 100:0 ratio
 - Fast and Deep
- Call for AED and Place it on the patient
- Advocate O2 at 10-15 L/min
 - Use Bag-Valve-Mask
- Monitor Vital signs
- Do Not Stop Compressions unless AED is analyzing or shocking or EMS arrives
- Prepare to transport to Emergency Department

Cardiac Arrest

Turn on O2 at 15 LPM

30:2 Ratio

Use Bag-Valve-Mask

Call 911

- Discontinue dental treatment
- Position patient in a supine position
- Perform Patient Assessment: ACB's
 - Unresponsive
 - No Pulse
 - No Breathing
- Perform CPR
 - 30:2 Compressions/Ventilations
 - Compressions only 100:0 ratio
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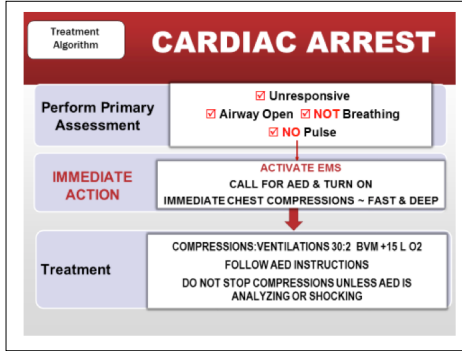
Cardiac Arrest

Follow AED Instructions

**DO NOT STOP
COMPRESSIONS UNLESS AED
IS ANALYZING OR
SHOCKING**

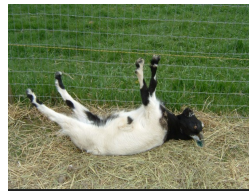
Call 911

- Discontinue dental treatment
- Position patient in a supine position
- Perform Patient Assessment: ACB's
 - Unresponsive
 - No Pulse
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Cardiovascular/ Neurologic Emergencies- Syncope

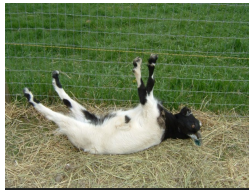
position in Trendelenberg
100% oxygen
IV fluids
Usually self limiting



Cardiovascular/ Neurologic Emergencies- Syncope

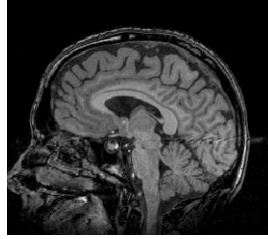
Differential Diagnosis of a visualized collapse

- Cardiac Arrest
- Hypoglycemic Shock
- Syncope



Neurologic Emergencies

- seizures
- nausea & vomiting
- disorientation
- headache



Seizures

- Prevent Injury
- Suction Oral Cavity Delicately if needed
- Administer oxygen
- Monitor ACB's- Open Airway

Signs and Symptoms:
Unconsciousness, incontinence
Biting tongue
Bursts of forceful eye movements
Stereotyped motor movements
Cyanosis

Brief Episode
• Duration limited
• Person awakes in unaltered position
• Person never loses airway

Is person conscious?

YES

- Suction and certify airway
- Monitor vitals
- Administer O2
- Contact patient's physician
- Identify treatment and discharge status

NO

Call 911

- Assess and certify airway
- Administer O2
- Open airway
- Administer oxygen
- Prepare to transport to Emergency Department

Prolonged Seizure

Call 911

- Administer Midazolam (Versed) 0.1-0.2 mg IV if needed
- O2
- Administer Lorazepam (Ativan) 0.1 mg IV if needed
- Suction and certify airway
- Administer O2
- Assess vital emergency team
- Prepare to transport to Emergency Department

Seizure Disorder

Seizures

- Administer Benzodiazepine
- IV Midazolam 2 - 3 mg
- IV Diazepam 5-10 mg
- Intranasal midazolam 0.2 mg/kg

Signs and Symptoms:
Unconsciousness, incontinence
Biting tongue
Bursts of forceful eye movements
Stereotyped motor movements
Cyanosis

Brief Episode
• Duration limited
• Person awakes in unaltered position
• Person never loses airway

Is person conscious?

YES

- Suction and certify airway
- Monitor vitals
- Administer O2
- Contact patient's physician
- Identify treatment and discharge status

NO

Call 911

- Assess and certify airway
- Administer O2
- Open airway
- Administer oxygen
- Prepare to transport to Emergency Department

Prolonged Seizure

Call 911

- Administer Midazolam (Versed) 0.1-0.2 mg IV if needed
- O2
- Administer Lorazepam (Ativan) 0.1 mg IV if needed
- Suction and certify airway
- Administer O2
- Assess vital emergency team
- Prepare to transport to Emergency Department

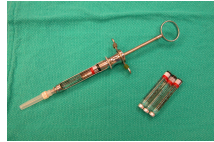
Seizure Disorder

Cerebral Emergencies- seizures

local anesthesia overdose
calculate local anesthetic doses

Poorly controlled Epilepsy

Long NPO without medication

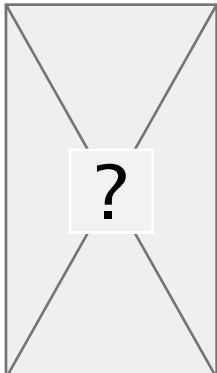


Anesthetic Doses & Durations

Preparation	Maximum Dose (mg)		Duration (minutes)			
	Mg/kg	Total	Pulpal	Tissue	Pulpal	Tissue
2% lidocaine + epi	7	500	60	170	85	190
3% mepivacaine	6.6	400	25	90	40	165
2% mepivacaine + levo	7	550	50	130	75	185
4% prilocaine	8	600	20	105	55	190
4% prilocaine + epi	8	600	40	140	60	220
4% articaine + epi	7	-----	60	190	90	230
0.5% bupivacaine + epi	-----	90	40	340	240	440

Yagiela JA. In: Dionne, Phero, Becker. 2002

Do You Know The Doses ?



- Percent solutions of anesthetics
 - Move decimal one place to the right and this will be mg/mL
 - 2.0% = 20 mg/mL
- Ratio solutions of vasopressors
 - 1:100,000 = 10 mcg/mL
 - 1:200,000 or 1:50,000 = 5 Or 20mcg/ml
- Cartridges Contain 1.8 mL
- Therefore 2 ½ cartridges (4.5 mL) of standard 2% lidocaine 1:100K epi =
 - ✓ 90 mg lidocaine
 - ✓ 45 mcg epinephrine

Anticholinergics

Scopolamine Patch- The anticholinergic agent scopolamine blocks muscarinic receptors in the vestibular system, thereby halting the signaling to the central nervous system and central vomiting center. It may be effective for preventing PONV

Place at least 2-4 hours

Glycopyrrulate 0.2 mg has some evidence supporting its use as well

Ondansetron

5 HT3 blocker

Blocks Serotonin in the central vomiting center of the brain and also blocks signals from 5 HT3 receptors from the GI tract

Signals stimulating vomit centers of the brain never get there

May prolong QT intervals

Administer 4 mg 20 minutes before the end of the procedure

Dexamethasone

8 mg is as effective as 4 mg of ondansetron

Use in conjunction with ondansetron for synergistic prevention of PONV

The mechanism of action of dexamethasone is not fully elucidated. There are 2 theories: prostaglandin antagonism and release of endorphins.

Metoclopramide

The substituted benzamide metoclopramide acts as a Dopamine₂ antagonist both centrally in the CTZ and peripherally in the GI tract.

It also displays cholinergic activity, which increases lower esophageal sphincter tone and promotes gastric motility.

Less effective than 4 mg ondansetron

Crosses Blood brain barrier; 10-20 % incidence of side effects such as depression, somnolence, reduced mental acuity

Contraindicated in Patients with Parkinsons Disease

Aprepitant (EMEND)

Substance P Antagonist mediated by blocking the Neurokinin I receptor (NK-1). Preventing emesis

Higher Percentage (37.9 %) of complete prevention of PONV than Ondansetron (31.2%)

80 mg PO of EMEND was found to be superior to 4 mg IV ondansetron

40 mg costs roughly \$100.00

Combination Therapy

8 mg of Dexamethasone and 4 mg Ondansetron

Evidence shows that the combination is better than either one of the agents administers by itself

Consider Scopolamine if you desire longer coverage

Consider metoclopramide for those most susceptible for PONV (10 mg IV)

Cerebral Emergencies- Emergence Delirium

rule out CVA
excitement phase
reversal agent
time
elderly patients
Hypercarbia
Reverse Benzodiazepines



Cerebral Emergencies- Headache

migraine
avoid nitrous oxide
prophylactic migraine meds

hydration

caffeine withdrawals- consider
allowing sips of black coffee or
cola drinks up to 2 hours
before appt. No milk or cream



Endocrine Emergencies- hypoglycemia

Glucose check- another vital sign
NPO status
known diabetic on insulin or
oral hypoglycemics
dextrose containing IV solution
Consider 2 I.V. lines. One solution
containing glucose, one without
serial blood sugars-
every 30-60 minutes