Medical Emergencies Update 2017

**Misconceptions**

The Five Deadly Misconceptions
- A medical emergency will not happen to me.
- A medical emergency will not happen in my office.
- Calling EMS/9-1-1 is the answer.
- My staff and I will not panic during a medical emergency.
- CPR is all we need to know

**Six Links of Survival**

The Six Links of Survival are imperative for every office when confronted with the issue of being prepared for medical emergencies. Any missing link will cause a decrease in the survivability of the patient.

The Six Links:
1. Doctor training
2. Staff training
3. Medical emergency plan
4. Emergency drug kit
5. Proper equipment
6. Mock drills

The average response time for medical emergency services (EMS) to respond to a 911 call can be 11 minutes in an urban setting and 15 minutes in a rural setting.

**Medical Emergencies Basic Principles**

Preparation

Recognition

Management

Satisfactory Outcome
**Medical Emergencies Update 2017**

**Medically Complicated Patient**
- Cardiac Disease
- Diabetes Mellitus
- Renal Dialysis
- Organ Transplants
- Immune Disorders
- Liver Failure
- Anticoagulated Pt

**Here comes the Baby Boomers**

**Here comes the Baby Boomers**

![Bar Chart](image)

- 2016 => 15% U.S. Population > 65y/o
- (with life expectancy of 19.3yr)

---

**A Pill Cures All**

---

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Sunset Study Club
September 14, 2017
Medical Emergencies Update 2017

A Pill Cures All

Polypharmacy

Be Prepared!

Medical Emergencies

What's happening?
When's it happening?
What's causing it to happen?

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September 14, 2017

*Total number of retail prescriptions filled annually in the United States from 2013 to 2022 (in billions)
Medical Emergencies Update 2017

Medical Emergencies
Private practice – 30,608 emergencies

<table>
<thead>
<tr>
<th>Emergency</th>
<th>Occurrence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Syncope</td>
<td>15,407(50.3%)</td>
</tr>
<tr>
<td>Mild allergy</td>
<td>2,583(8.4%)</td>
</tr>
<tr>
<td>Angina Pectoris</td>
<td>2,552(8.3%)</td>
</tr>
<tr>
<td>Postural hypotension</td>
<td>2,475(8.1%)</td>
</tr>
<tr>
<td>Seizure</td>
<td>1,595(5.2%)</td>
</tr>
<tr>
<td>Asthmatic attack</td>
<td>1,392(4.5%)</td>
</tr>
<tr>
<td>Hyperventilation</td>
<td>1,326(4.3%)</td>
</tr>
<tr>
<td>Epinephrine Rxn</td>
<td>913(3.0%)</td>
</tr>
<tr>
<td>Insulin Shock</td>
<td>890(2.9%)</td>
</tr>
</tbody>
</table>

Malamed, JADA 1993

Medical Emergencies
Stage of Treatment

<table>
<thead>
<tr>
<th>Treatment Stage</th>
<th>Occurrence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Immediately before Tx</td>
<td>1.5%</td>
</tr>
<tr>
<td>During or after local</td>
<td>54.9%</td>
</tr>
<tr>
<td>During treatment</td>
<td>22.0%</td>
</tr>
<tr>
<td>After treatment</td>
<td>15.2%</td>
</tr>
<tr>
<td>After leaves office</td>
<td>5.5%</td>
</tr>
</tbody>
</table>

Malamed, JADA 1993

Medical Emergencies
Treatment being performed

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Occurrence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tooth extraction</td>
<td>38.9%</td>
</tr>
<tr>
<td>Pulp extirpation</td>
<td>26.9%</td>
</tr>
<tr>
<td>Unknown</td>
<td>12.3%</td>
</tr>
<tr>
<td>Other treatment</td>
<td>9.0%</td>
</tr>
<tr>
<td>Preparation</td>
<td>7.3%</td>
</tr>
<tr>
<td>Filling</td>
<td>2.3%</td>
</tr>
<tr>
<td>Incision</td>
<td>1.7%</td>
</tr>
</tbody>
</table>

Malamed, JADA 1993

Medical Emergency
Stress is a common etiologic factor in emergency situations

Stress is a common etiologic factor
in emergency situations

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Preparing for medical emergencies, Rosenberg, M., JADA 141:supp:15s-19s, 2010

Basic Emergency Equipment

- Portable oxygen cylinder (E size) with regulator
- Supplemental oxygen delivery devices
- Nasal cannula
- Nonrebreathing mask with oxygen reservoir
- Nasal hood
- Bag-valve-mask device with oxygen reservoir
- Oropharyngeal airways (adult sizes 7, 8, 9 centimeters)
- Magill forceps
- Automated external defibrillator
- Stethoscope
- Sphygmomanometer with adult small, medium, and large cuff sizes
- Wall clock with second hand

Inspiratory oxygen concentration with different delivery systems:

<table>
<thead>
<tr>
<th>Delivery System</th>
<th>Inspired Oxygen Concentration (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spontaneous Breathing</td>
<td>25-40</td>
</tr>
<tr>
<td>Nasal cannula</td>
<td>40-60</td>
</tr>
<tr>
<td>Nonrebreathing mask with oxygen reservoir</td>
<td>60-100</td>
</tr>
<tr>
<td>Positive Pressure Ventilation</td>
<td></td>
</tr>
<tr>
<td>Mask-to-mask (oxygen flows to mask, 10 liters/minute)</td>
<td>90</td>
</tr>
<tr>
<td>Bag-valve-mask device with nose air</td>
<td>21</td>
</tr>
<tr>
<td>Bag-valve-mask device with supplemental oxygen reservoir</td>
<td>75-95</td>
</tr>
</tbody>
</table>

Fio2=17%  Fio2=75+%  www.AEDsuperstore.com

Basic Emergency Equipment

- Automated External Defibrillator (AED)

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Primary Emergency Drugs - Gotta Have 'Em

<table>
<thead>
<tr>
<th>Category</th>
<th>Drug</th>
<th>Preparation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anti-allergy</td>
<td>Epinephrine</td>
<td>1:1000 (EpiPen)</td>
</tr>
<tr>
<td>Histamine Blocker</td>
<td>Benadryl</td>
<td>50mg/ml</td>
</tr>
<tr>
<td>Vasodilator</td>
<td>Nitroglycerin</td>
<td>Spray (0.4mg/puff)</td>
</tr>
<tr>
<td>Bronchodilator</td>
<td>Albuterol</td>
<td>Inhaler</td>
</tr>
<tr>
<td>Anti-hypoglycemic</td>
<td>Insta-Glucose</td>
<td>Tube</td>
</tr>
<tr>
<td>Oxygen</td>
<td>Portable</td>
<td>100%</td>
</tr>
<tr>
<td>Antiplatelet</td>
<td>Aspirin (chewable)</td>
<td>81mg tablets</td>
</tr>
</tbody>
</table>

Basic Emergency Drugs

Preparing for medical emergencies, Rosenberg, M., JADA 141:supp:15s-19s, 2010
Mylan Pharmaceuticals: EpiPen’s price had soared from about $103.50 in 2009 to more than $608.61 in 2016.

**Recognition of risk**

**Prevention**
Medical History

- Past Medical History
- Review of Systems
- Current Medications
- Past Hospitalizations
- Medication Allergies

Vital Signs

BP & Pulse

Blood Pressure Classification for Adults

<table>
<thead>
<tr>
<th>Blood Pressure Classification</th>
<th>Systolic BP (mmHg)</th>
<th>Diastolic BP (mmHg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>&lt; 120</td>
<td>&lt; 80</td>
</tr>
<tr>
<td>Pre-Hypertension</td>
<td>120 – 139</td>
<td>80 – 89</td>
</tr>
<tr>
<td>HTN Stage I</td>
<td>140 – 159</td>
<td>90 – 99</td>
</tr>
<tr>
<td>HTN Stage II</td>
<td>&gt;160</td>
<td>&gt;100</td>
</tr>
<tr>
<td>HTN Stage III</td>
<td>&gt;180</td>
<td>&gt;110</td>
</tr>
</tbody>
</table>

US Dept Health & Human Services, NHLENC7

Blood Pressure Classification

BP = 198/96 – Should we treat the patient?

Is it safe to treat you today?

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Management of Blood Pressure

Medical Risk Factors (MRF)

- Prior Myocardial Infarction
- IHD – Angina
- High coronary disease risk
- Recurrent stroke prevention
- Diabetes
- Kidney disease

US Dept Health & Human Services, NIH, JNC7

Management of Blood Pressure

Dental Treatment and Blood Pressure

<table>
<thead>
<tr>
<th>SBP</th>
<th>DBP</th>
<th>MRF*</th>
<th>Dentist Guidelines</th>
</tr>
</thead>
<tbody>
<tr>
<td>120-139</td>
<td>80-89</td>
<td>Yes/No</td>
<td>Routine Tx OK; Discuss HTN guidelines</td>
</tr>
<tr>
<td>140-159</td>
<td>90-99</td>
<td>Yes/No</td>
<td>Routine Tx OK; Refer for Med/Consult</td>
</tr>
<tr>
<td>160-179</td>
<td>100-109</td>
<td>No</td>
<td>Routine Tx OK; Refer for Med/Consult</td>
</tr>
<tr>
<td>180-209</td>
<td>110-119</td>
<td>No</td>
<td>No Tx w/o consult; Refer prompt M/Consult</td>
</tr>
<tr>
<td>≥ 210</td>
<td>≥ 120</td>
<td>Yes/No</td>
<td>No dental Tx; Refer emergent Med/Consult</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No</td>
<td>Urgent Tx OK; Refer for Med/Consult</td>
</tr>
</tbody>
</table>

*MRF = Medical Risk Factors

US Dept Health & Human Services, NIH, JNC7

Management of Blood Pressure

Hypertensive Urgency & Emergency

The Basic (JNC 7)*

Hypertensive Crisis

Systolic BP >180 mmHg
Diastolic BP >120 mmHg

Hypertensive urgency/crisis

End organ damage

????????

US Dept Health & Human Services, NIH, JNC7

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Hypertensive Crisis

Hypertensive Crisis → End Organ Damage
- Neurological Deficit (HTN encephalopathy, cerebral infarction/hemorrhage)
- Features of Acute LV Heart failure
- Coronary insufficiency (Angina)
- Aortic Dissection
- Acute Kidney failure (Anuria)

Hypertensive Crisis

Hypertensive Crisis

Hypertensive Crisis

Hypertensive Crisis

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**Prevention**
- Recognition of risk
- Assessment of risk

**Patient Assessment**

**Emergency Management**

**P - C - A - B - D**

**Emergency Management**

- Position
- Circulation
- Airway
- Breathing
- Definitive Treatment

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If you are wondering if you should call EMS, you should call EMS:

1. Unable to make diagnosis
2. Know the diagnosis but are uncomfortable with it
3. Whenever you think EMS is warranted
Unconsciousness in the Dental Chair

Differential Diagnosis

- Vasodepressor syncope
- Drug administration or ingestion
- Orthostatic hypotension
- Seizure disorders
- Hypoglycemic reaction
- Cerebrovascular accident (CVA)

Basic Unconsciousness Tx

Recognition of Unconsciousness

- Position patient supine, feet elevated
- Assess Circulation (Carotid pulse)
  - Artificial circulation if needed
- Assess Breathing (Look, Listen, Feel)
  - Artificial ventilation if needed
- Activate EMS if delayed recovery
- Definitive management of cause

Unconsciousness Mechanisms

- Inadequate blood flow to brain
- Inadequate oxygen to brain
- Metabolic deficiencies
- Disorders of nervous system
- Psychic mechanisms

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Unconsciousness

Vasodepressor Syncope

Psychogenic
- Fright
- Anxiety
- Emotional stress
- Unwelcome news
- Sight of blood

Nonpsychogenic
- Upright position
- Hunger
- Exhaustion
- Male gender
- Age 16 – 35 yrs

Syncope - Etiology

Syncope - Predisposing Factors

Fight or Flight Response

Pain or fear
- Release of catecholamines (Adrenalin)
- Blood pumped to peripheral muscles
- Muscle activity – run or fight
- Blood pumped back to heart
- Normal cardiac output maintained

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**Syncopal Reaction**

- Pain or fear – Catecholamine release – Blood to muscles
- No muscle activity - Blood pools in muscles
- Compensatory => vasoconstriction, tachycardia
- Mechanoreceptors => reflex bradycardia, vasodilation
- Reduced cardiac output & hypotension
- Cerebral ischemia – loss of consciousness

**Presyncopal - Early signs & symptoms**

- Feeling of warmth
- Loss of skin color, pale
- Heavy perspiration
- Nausea
- “Feel bad”, “feel faint”
- Tachycardia (↑ pulse)

**Presyncopal - Late signs & symptoms**

- Pupils dilation
- Yawning
- Rapid respirations
- Cold hands and feet
- Hypotension
- Bradycardia (↓ pulse)

**Syncope Management**

- Assess level of consciousness
- Position supine, feet elevated
- Assess Circulation, Airway, Breathing
  - Provide CPR if needed
- Activate EMS if recovery is not immediate
- Administer oxygen
- Monitor vital signs

*Medical Emergencies Update 2017*

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Syncope Management

Definitive management
- Aromatic ammonia inhalants
- Cold towel on face
- Stimulate patient

(Post-syncopal recovery) (Delayed recovery)
- Postpone dental treatment?
- Activate EMS

- Escort for patient
- Patient to hospital

Prevention of Syncope

- Patient positioning
- Anxiety relief
  - Preop sedation
  - Nitrous oxide

Unconsciousness

Postural Hypotension

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Postural Hypotension
Predisposing factors
- Drug administration
- Prolonged recumbency
- Inadequate postural reflex
- Pregnancy
- Addison’s disease

Postural Hypotension
Drugs causing postural hypotension
- Antianginals
- Antiarrhythmics
- Antidepressants
- Antihistamines
- Antihypertensives
- Antipsychotics
- Beta-blockers
- Diuretics
- Phenothiazines
- Tranquilizers

Postural Hypotension Management
- Assess consciousness
- Position supine, feet elevated
- Assess Circulation, Airway, Breathing
- Provide CPR if needed
- Administer oxygen
- Monitor vital signs

(Episode terminates)
Slowly reposition chair, discharge

(Episode continues)
Summon medical assistance

Prevention of Postural Hypotension
- PMH: medications, fainting Hx
- Slowly discharge from supine

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**Respiratory Emergencies**

**Respiratory Distress**

Potential Causes

- Hyperventilation
- Syncope
- Asthma
- Heart Failure
- Hypoglycemia
- Acute MI
- Anaphylaxis
- Angioedema
- Stroke
- Epilepsy

**Airway Obstruction**

Relaxed Tongue Blocks Airway
Airway Obstruction

Opening the Airway

Head Tilt – Chin Lift

The Displaced Crown

63y/o M, “routine” prophy

The Lost Object

Aspirated Object

- Cough, wheeze, choking, shortness of breath
- Symptoms present within one hour 90% of the time
- Symptoms may be delayed up to six hours
Management of Possible Aspiration

Place patient in left lateral decubitus position
   Head tilted down over edge of chair

Encourage patient to cough

Object is retrieved

Consult physician or pulmonologist

Post-aspiration complications?

Object not retrieved

Transport to E.R.

Flat plate abdomen

Lateral and PA Chest X-rays

Management of Swallowed Object

Swallowed object => Asymptomatic

Management of Aspiration

Object is retrieved

Consult physician or pulmonologist

Post-aspiration complications?

Object not retrieved

Transport to E.R.

Flat plate abdomen

Lateral and PA Chest X-rays

Management of Swallowed Object

Potentiel for Bowel Perforation?

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Management Swallowed Object

Avoiding Aspiration

Respiratory Emergencies

Hyperventilation

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Hyperventilation - Pathophysiology

- Hyperventilation ••••••••••• Lowered arterial PCO₂
  - Respiratory Alkalosis
  - Serum Ca²⁺
  - Tetany
  - Paresthesias
  - Cerebral Vasconstriction
  - Cerebral Circulation
  - CNS & Cardiac Symptoms
  - Sympathetic Tone

Hyperventilation - Manifestations

- Anxious patient
- Shortness of breath
- Palpitations
- Tachycardia
- Lightheadedness
- Circumoral paresthesia
- Carpopedal tetany

Hyperventilation - Management

- Position patient comfortably (upright)
- C – A – B – BLS as needed
- Remove dental materials from patient’s mouth
- Calm patient
- Correct respiratory alkalosis
- Drug management if needed – Versed, Valium
- Complete treatment, discharge

Respiratory Emergencies

Asthma

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Asthma

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Asthma - Pathophysiology
Hyperactivity of tracheobronchial tree
- Bronchial smooth muscle contraction
- Bronchial wall edema
- Mucus hypersecretion
- Narrowed airways
- Wheezing
- Shortness of breath
- Coughing

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

CDC – National Center for Health Statistics

Medical Management of Asthma

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**Asthma**

**Indicators of a Severe Attack**

- SaO₂ (pulse oximeter) is below 91%
- Bronchodilator doesn’t improve Sx after two treatments
- Patient has difficulty speaking
  - Sentences < phrases < words < mute
- Patient is struggling for air

**Asthma Management**

- Position patient comfortably (upright)
- C - A – B – BLS as needed
- Administer bronchodilator via inhalation (Albuterol inhaler)
- (Episode terminates)
  - Administer oxygen, call EMS
  - Epinephrine 0.3mg SQ or IM
- Complete dental treatment
- Discharge patient
- (Episode continues)
-Epinephrine 0.3mg SQ or IM
- Complete dental treatment
- Discharge or hospital

**Altered Consciousness**

**Diabetic Emergencies**

(Insulin Shock)
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**U.S. Incidence of Diabetes**

![Graph showing diabetes incidence]

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

**Diabetes Classification**

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

- **Type 2**
  - Insulin resistant with relative deficiency – 90%
  - Gestational Diabetes Mellitus
    - Abnormal glucose tolerance during pregnancy
  - DM associated with other conditions
    - Pancreatic disease, drug-induced, etc.

**Diabetic Emergencies**

![Diabetic emergencies diagram]

- 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”
Hypoglycemia
- Cool, wet, pale
- Confusion
- Lethargy
- Hunger

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

Diabetic Ketoacidosis
- Lack of Insulin → Hyperglycemia
- Glycogenolysis
- Gluconeogenesis
- Ketogenesis
- Ketoacidosis
- Coma

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**

*(< 40 mg/dl)*

- Altered Cerebral Function
- Epinephrine Release
- Signs & Symptoms Of Hypoglycemia

**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**

- Shaky
- Fast heartbeat
- Sweating
- Dizzy
- Anxious
- Hungry
- Blurry vision
- Fatigue
- Headache
- Irritable
**Insulin Shock - Management**

**Conscious Patient**
- Position patient comfortably
- C - A – B – BLS as needed
-Administer oral carbohydrate (InstaGlucose)

(Episode terminates)
- (Episode continues)
- Activate EMS
- Glucagon 1mg IM or IV
- Dextrose 50% 50ml IV

(Episode terminates)
- Observe one hour
- Discharge patient, escort?

(Episode continues)
- Discharge or hospital?

**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

- Hemorrhagic Stroke
- Ischemic Stroke
Cerebrovascular Accident
CVA Classification

Transient Ischemic Attack (TIA)
- Focal ischemic neurologic deficits that last < 24 hrs, usually resolve in 2 - 10 minutes
- Indicates cerebrovascular disease

“Angina of the Brain”

Cerebrovascular Accident
Associated Risk Factors

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

Cerebrovascular Accident
CVA or TIA Diagnostic Clues

Cerebrovascular Accident
CVA or TIA Diagnostic Clues
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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

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

Cerebrovascular Accident

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

ASA Stroke Protocols
Seizures

Classifying Epilepsy and Seizures

Seizure types:
- Partial
  - Simple
  - Complex
- Generalized
  - Absence
  - Convulsive

- Consciousness is maintained
- Consciousness is lost or impaired
- Altered awareness
- Characterized by muscle contractions with or without loss of consciousness

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

What do you do when you have your seizure?

Altered Consciousness

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Seizures

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

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

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

Postictal Phase
- Muscle flaccidity
- Incontinence
- Slowly regains consciousness

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**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

**Postictal Phase**
- Keep supine, legs slightly elevated
- C - A – B – BLS as needed
- Monitor vital signs
- Reassure patient, permit recovery
- Discharge patient

**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

Ischemic Heart Disease

Ischemic Heart Disease

Chest Pain
Acute Coronary Syndrome

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Sunset Study Club
September 14, 2017
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

Nitroglycerin Contraindication

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

Nitroglycerin Contraindication

Nitroglycerin 0.4mg SL
Administer oxygen, monitor VS
Repeat NTG q3-5’, Total 3 doses
Discharge if Pain Resolves
Hospital

If no response in 3 doses, Tx as MI

Position patient comfortably (upright)
BLS as needed, monitor vital signs
History of angina pectoris? Typical Symptoms?

YES
Nitroglycerin 0.4mg SL
Administer oxygen, monitor VS
Repeat NTG q3-5’, Total 3 doses
Discharge if Pain Resolves
Hospital

NO
Activate EMS

NO
Activate EMS

BLS as needed, monitor vital signs

NO
Activate EMS

History of angina pectoris? Typical Symptoms?

Is this your typical angina?

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

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Cardiac Emergencies

Myocardial Infarction

Clinical manifestations

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

Etiology of Myocardial Infarction

- Coronary artery (saps blood and oxygen to heart muscle)
- Blocked blood flow
  - Places buildup on artery
- Healthy heart muscle

Acute Coronary Syndrome Presentation Without Chest Pain or Discomfort According to Sex—Summary of Studies From Large Cohorts
Medical Emergencies Update 2017

ACS without chest pain

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

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

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Ventricular Fibrillation

About 90% of cardiac arrests

Conversion of Ventricular Fibrillation to normal rhythm

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

Source: American Heart Association
Automated External Defibrillator

AED Instructions
Instructions for operation – two steps

Step one
✓ Patient is unconscious
✓ Patient is not breathing
✓ Patient is pulseless

Step two
✓ Apply defibrillator pads
✓ Follow verbal instructions

BLS – The Primary Survey
First C – A – B - D

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

Drug-Related Emergencies

Allergic Reactions
Allergic Reactions

Common Dental Allergens
- Antibiotics
  - Penicillin
  - Cephalosporins
  - Tetracyclines
- Analgesics
  - Aspirin-compounds
  - Nonsteroidal
- Opioids
  - Meperidine
  - Codeine
- Antianxiety agents
  - Barbiturates
- Local anesthetics
  - Esters: Benzocaine
  - Sodium bisulfite
  - Methylparaben
- Others
  - Acrylic monomer
  - Latex

Allergic Reactions - Cutaneous

Clinical manifestations
- Increased vascular permeability
- Vasodilation
  - Urticaria / Hives
  - Rash
  - Pruritis (itching)
  - Tingling and warmth
  - Flushing

Allergic Skin Reactions

Typical Distribution Pattern
- Most common
- Common
- Uncommon
- Rare
Allergic Reactions - Cutaneous

Clinical manifestations
- Increased vascular permeability & vasodilation
- Increased exocrine gland secretions
- Bronchiole smooth muscle contraction

- Rhinitis
- Nasal congestion
- Nasal itching
- Rhinorrhea

- Laryngeal edema
- Dyspnea
- Hoarseness
- Throat tightness
- Laryngeal stridor

- Bronchospasm
- Cough
- Wheezing
- Tachypnea

Allergic Reactions - Respiratory

- Bronchospasm
- Cough
- Wheezing
- Tachypnea
### Allergic Reactions - Cardiovascular

#### Clinical manifestations
- Increased vascular permeability & vasodilation
- Decreased cardiac output
- Loss of vasomotor tone

<table>
<thead>
<tr>
<th>Circulatory collapse</th>
<th>Dysrhythmias</th>
<th>Cardiac arrest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Light-headedness</td>
<td>Weakness</td>
<td>Pulselessness</td>
</tr>
<tr>
<td>Syncope</td>
<td>Palpitations</td>
<td>Vent fibrillation</td>
</tr>
<tr>
<td>Ischemic chest pain</td>
<td>Ischemic chest pain</td>
<td>Asystole</td>
</tr>
</tbody>
</table>

- Light-headedness
- Weakness
- Syncope
- Ischemic chest pain

#### 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**

  - Diphenhydramine:
    - Antagonizes histamine, preventing progression of the allergic reaction

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**Tx Allergic Reactions**

Epinephrine
- Reverses the pathologic processes causing the allergic reaction

**Delayed-Onset Allergic Skin Rxn Management**

Onset skin reaction (> 1 hour) from allergen
Position patient comfortably
Assess and perform BLS as needed
Definitive care

- Increasingly severe symptoms
- 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

- Cardiac or respiratory involvement?
- NO
  - Benadryl 50mg oral / IM
  - Oxygen, start IV
  - Discharge

- YES
  - 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

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