2019 Oregon Dental Conference®
Course Handout

Steven Beadnell, DMD/Philipp Kupfer, DMD, MD

Course 3101: “Medical Emergency Update”
Thursday, April 4
1 - 5 pm
Medical Emergencies Update 2019

Professional Responsibility
- A moral or legal obligation to ensure the safety or well-being of others.

ADA Resources

IMEP - Six Links of Survival
- 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.

IMEP - Six Links of Survival
- 1. Doctor training
- 2. Staff training
- 3. Medical emergency plan
- 4. Emergency drug kit
- 5. Proper equipment
- 6. Mock drills

Basic Outline for Lecture
- Preparation
- Prevention
- Recognition
- Medical Emergency
- Management
- Satisfactory
- Outcome
**Medical Emergencies – Update 2019**

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

**Here Come The Baby Boomers**

By 2060, Nearly One-Quarter of Americans Will Be Ages 65 and Older.

Percent of U.S. Population in Selected Age Groups, 1960 to 2060

- Under Age 18
- Ages 18-64
- Ages 65+

Note: Numbers may return to 100 due to rounding.
Source: PwC analysis of data from the U.S. Census Bureau.

**“↑Age => Multimorbidity”**

**MULTIMORBIDITY**

When someone has two or more long-term health conditions.

**American’s love affair with prescription drugs**

- Billions of Prescriptions
- Prescription Opiods
- Prescription Use


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Oregon Dental Conference, Portland, OR, April 6, 2019
NOTE: Use is in the past 30 days. Except for age group estimates, percentages are age-
adjusted.

SOURCE: CDC/NCHS, Health, United States, 2013, Figure 20. Data from the National Health and Nutrition Examination Survey.

Medical Emergencies – Update 2019

Polypharmacy

Older patients
+ Multimorbidities
+ Polypharmacy
+ Longer appts
+ Invasive procedures
More Emergencies

Polypharmacy

Looking at the Road Ahead

Syncope
15,407 (50.3%)
Cardiac Arrest
331 (1.1%)

Mild allergy
2,583 (8.4%)
Anaphylaxis
304 (1.0%)

Angina Pectoris
2,552 (8.3%)
Myocardial Infarction
289 (0.9%)

Postural hypotension
2,475 (8.1%)
L.A. Overdose
204 (0.7%)

Seizure
1,595 (5.2%)
Acute Pulm Edema
141 (0.5%)

Anaphylaxis
1,392 (4.5%)
Diabetic Coma
109 (0.4%)

Angina Pectoris
1,326 (4.3%)
Stroke
68 (0.2%)

Asthmatic attack
913 (3.0%)
Adrenal Insufficiency
25 (0.09%)

Postural hypotension
890 (2.9%)
Thyroid Storm
4 (0.01%)

Frequency of Med Emerg in Dental Office

Private practice – 30,608 emergencies

Frequency of Med Emerg in Dental Office

What precipitates the medical emergency

Stress is a common etiologic factor in emergency situations

Stress

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Office Preparation

Critical Emergency Equipment

Medical Emergencies in the Dental Office, Malamed, 7th Edition

Emergency Equipment

Emergency Drugs

Critical Emergency Drugs

EpiPen 2-Pak®

15 - 30 kg / 33-66 lbs

> 30 kg / > 66 lbs

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"Non-Critical" Emergency Drugs

Drugs available should match what you do in your practice

"Antidotal" Emergency Drugs

These drugs should be maintained in the emergency drug kit only as warranted by the nature of the dental practice.

Prevention of Medical Emergencies

Recognition of risk

Comprehensive Medical History

Past Medical History

Review of Systems

Current Medications

Past Hospitalizations

Medication Allergies

Do we need a medical consultation?

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Vital Signs – BP & Pulse

Hypertension in the Dental Office

Medical Risk Factors (MRF)
- Prior Myocardial Infarction
- IHD – Angina
- High coronary disease risk
- Recurrent stroke prevention
- Diabetes
- Kidney disease

Vital Signs
- BP & Pulse

Hypertension in the Dental Office

Dental Treatment and Blood Pressure

<table>
<thead>
<tr>
<th>SBP (mmHg)</th>
<th>DBP (mmHg)</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 Med/Consult</td>
</tr>
<tr>
<td>&gt; 210</td>
<td>&gt; 120</td>
<td>Yes/No</td>
<td>No dental Tx; Refer emergent Med/Consult</td>
</tr>
<tr>
<td>&gt; 210</td>
<td>&gt; 120</td>
<td>No</td>
<td>No dental Tx: Refer emergent Med/Consult</td>
</tr>
</tbody>
</table>

*MRF = Medical Risk Factors

Blood Pressure – “Hypertension” JNC-8

Blood Pressure Categories 2017

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Medical Emergencies – Update 2019

**Blood Pressure – “Hypertension” JNC-8**

**Hypertension Today:**
JNC-8 Evidence-Based Guidelines

**Blood Pressure Categories 2017**
- Systolic BP > 180
- OR
- Diastolic BP > 120

**Hypertensive Crisis**

**Autoregulation of blood flow**

**Hypertensive Crisis => End Organ Damage**

**The relative frequency of end-organ involvement in hypertensive emergency**

<table>
<thead>
<tr>
<th>End-Organ Damage Type</th>
<th>Case (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cerebral infarction</td>
<td>24.5</td>
</tr>
<tr>
<td>Intracerebral or subarachnoid bleed</td>
<td>4.5</td>
</tr>
<tr>
<td>Hypertensive encephalopathy</td>
<td>16.3</td>
</tr>
<tr>
<td>Acute Pulmonary Edema</td>
<td>22.5</td>
</tr>
<tr>
<td>Acute Congestive Heart Failure</td>
<td>14.3</td>
</tr>
<tr>
<td>Acute MI or unstable angina</td>
<td>12.0</td>
</tr>
<tr>
<td>Acute aortic dissection</td>
<td>2.0</td>
</tr>
</tbody>
</table>


**Hypertensive Crisis:** Urgency vs Emergency

**Hypertensive crisis**

- Urgency: severe elevation of BP without progressive target organ dysfunction
- Emergency: severe elevation of BP complicated by evidence of impending or progressive target organ dysfunction

**Are Signs / Symptoms of End Organ Damage Present?**

**Signs / Symptoms of End Organ Damage**

- CNS: Dizziness, headache, nausea, emesis, confusion, ischemic stroke, encephalopathy
- Eyes: Ocular hemorrhage, blurred vision, loss of sight
- Heart: Angina, ACS, pulmonary edema, left ventricular failure, aortic dissection
- Kidneys: Acute renal failure

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Hypertensive Crisis: Urgency vs Emergency
Systolic BP >180 mmHg OR Diastolic BP > 120mmHg

Hypertensive crisis

Urgency

Emergency

Are Signs / Symptoms of End Organ Damage Present?

Patient Assessment

Patient Management – BLS
1. Unable to make diagnosis
2. Know the diagnosis but are uncomfortable with it
3. Whenever you think EMS is warranted

Unconscious Patient

Basic Unconsciousness Treatment
- 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

Unconscious Patient

Vasodepressor Syncope

Unconsciousness in the Dental Chair
Differential Diagnosis

<table>
<thead>
<tr>
<th>Cause</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vasodepressor syncope/faint</td>
<td>Most common</td>
</tr>
<tr>
<td>Drug administration or ingestion</td>
<td>Common</td>
</tr>
<tr>
<td>Orthostatic hypotension</td>
<td>Less common</td>
</tr>
<tr>
<td>Epilepsy</td>
<td>Less common</td>
</tr>
<tr>
<td>Hypoglycemic reaction</td>
<td>Less common</td>
</tr>
<tr>
<td>Acute adrenal insufficiency</td>
<td>Rare</td>
</tr>
<tr>
<td>Acute allergic reaction</td>
<td>Rare</td>
</tr>
<tr>
<td>Acute myocardial infarction</td>
<td>Rare</td>
</tr>
<tr>
<td>Cerebrovascular accident</td>
<td>Rare</td>
</tr>
<tr>
<td>Hyperglycemic reaction</td>
<td>Rare</td>
</tr>
<tr>
<td>Hyperventilation</td>
<td>Rare</td>
</tr>
</tbody>
</table>

Medical Emergencies in the Dental Office, Malamed, 7th Edition

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Syncope - Etiology
Temporary loss of consciousness caused by a fall in blood pressure

Syncope - Etiology
Neurally-Mediated  Orthostatic  Cardiac Arrhythmia  Structural Cardio-Pulmonary
- VVS  CSS  -Situalional  -Drug-induced  -Brady  -Aortic Stenosis
- Syncope  -Cough  -Neural Failure  -Primary  -Sinus  -HCM  -Hypertension
- Other  -Post-mistunition  -Secondary  -AV block  -Tachy  -Pulmonary
- Orthostatic  -Cotnp.  -Sensorineural  -VVT  -WVT  -Aortic  -Dysfunction
- Other  -transient  channel
- Posture  -stroke  -arrhythmias
- Unknown  -syndromes

Unknown Cause = Approximately 10%

Syncope – Predisposing Factors

Psychogenic
Fright
Anxiety
Emotional stress
Unwelcome news
Sight of blood

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

Normal Flight or Fight 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

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

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Syncope – Early signs and symptoms

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

Syncope – Late signs and 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 BLS/CPR as indicated
Activate EMS if recovery is not immediate
Administer oxygen
Monitor vital signs

Definitive management

Aromatic ammonia inhalants
Cold towel on face
Stimulate patient

Post-syncope recovery
Postpone dental treatment?

Unconscious Patient

Postural Hyoptension

Prevention of Syncope

Patient positioning
Anxiety relief
Preop sedation
Nitrous oxide

Unconscious Patient

Postural Hyoptension
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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

Respiratory Emergencies

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**Respiratory Distress**

Potential Causes

- Hyperventilation
- Syncope
- Asthma
- Heart Failure
- Hypoglycemia

**Respiratory Emergencies**

**Obstructed Airway**

**Airway Obstruction**

Relaxed Tongue Blocks Airway

Airway Obstruction

Opening the Airway => HTCL

Head Tilt – Chin Lift

**The Lost Crown**

- Magill’s Forceps

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The Lost Crown
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 Swallowed Object

Potential for Bowel Perforation?


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Avoiding Aspiration

Respiratory Emergencies

Hyperventilation

Hyperventilation

Hyperventilation - Pathophysiology

Hyperventilation - Manifestations

Hyperventilation - Management

Anxious patient
Shortness of breath
"Air hunger"
Palpitations
Tachycardia
Lightheadedness
Circumoral paresthesia
Carpopedal tetany

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
Asthma

Respiratory Emergencies

Asthma - Pathophysiology

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

Asthma

Medical Management of Asthma

Asthma - Signs and Symptoms

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

Asthma

Indicators of a Severe Attack

- SaO₂ (pulse oximeter) is below 91%
- Bronchodilator doesn’t improve 5x after two treatments
- Patient has difficulty speaking
  - Sentences < phrases < words < mute
- Patient is struggling for air

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Asthma Management

- Position patient comfortably (upright)
- C - A - B - BLS as needed
- Administer bronchodilator via inhalation
  (Albuterol inhaler)

(Episode continues)

- Complete dental treatment
- Administer oxygen, call EMS
- Epinephrine 0.3mg SQ or IM
- Discharge or hospital

(Episode terminates)

- Discharge patient

Altered Consciousness

Diabetic Emergencies

U.S. Diabetes Epidemic

1997: Change in diagnostic criteria (lowered FG to 126 from 140 mg/dL), change in NHS diabetes reporting

Yearly points are 3-year moving averages

Diabetes Classification

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

✓ Type 2
  - Insulin resistant with relative deficiency – 90%

Diabetes CBG Issues

Insulin

Glucose

Hypoglycemia

Hyperglycemia

Normal Range

70

110

DIABETES EMERGENCIES
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Diabetes Control – HbA1c

Know Your A1c!
The blood test with a memory
- poor control — more than 8
- good control — less than 7

LONG TERM CONTROL
Doesn’t reflect risk of hypoglycemia

Diabetic Emergencies

Dental Management to Avoid Problems
Morning appointments are best
Confirm took insulin and ate usual meal
What is their CBG – Check with glucometer

Diabetic Emergencies

Dental Management to Avoid Problems
CBG = Capillary Blood Glucose
What is their glycemic control NOW?

<table>
<thead>
<tr>
<th>Timing</th>
<th>Target in mg/dL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fasting</td>
<td>70-90 mg/dL</td>
</tr>
<tr>
<td>Pre-meal</td>
<td>90-100 mg/dL</td>
</tr>
<tr>
<td>1 hr after a meal</td>
<td>&lt;130 mg/dL</td>
</tr>
<tr>
<td>2 hrs after a meal</td>
<td>&lt;180 mg/dL</td>
</tr>
</tbody>
</table>

Target for dental tx: >70 mg/dL and < 200 mg/dL

Diabetic Emergencies – Altered LOC

Insulin Shock (Hypoglycemia)
- Cool, wet, pale
- Confusion
- Lethargy
- Hunger

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

Diabetic Emergencies – Altered LOC

Insulin Shock (Hypoglycemia)
- There is too much insulin, causing a lack of sugar in the blood.
- Causes:
  - Not enough food
  - Too much insulin
  - Excessive exercise
  - Insulin facilitates transport of sugar

Hyperglycemia
- Hyperglycemia is a lack of insulin, this causes too much sugar in the blood and not enough in the cells.
- Causes:
  - Not enough food
  - Too much insulin
  - Excessive exercise
  - Insulin facilitates transport of sugar

CBG < 50 mg/dL

CBG > 300 mg/dL

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Diabetic Emergencies – Altered LOC

**Insulin Shock (Hypoglycemia)**
- CBG < 50 mg/dL
- CBG > 300 mg/dL

**Diabetic Coma (Hyperglycemia)**
- CBG < 50 mg/dL
- CBG > 300 mg/dL

Diabetic Emergencies

Diabetic patients who behave in a bizarre manner or exhibit altered level of consciousness should be managed as if they are **HYPOGLYCEMIC** until proven otherwise.

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**Medical Emergencies – Update 2019**

**Hypoglycemia – Insulin Shock**

**Hypoglycemia – Early manifestations**
- Diminished cerebral function
- Alteration of mood
- Lack of spontaneity
- Weakness, dizziness
- Pale, moist skin
- Headache

**Hypoglycemia – Late manifestations**
- Sweating
- Tachycardia
- Hypotension
- Anxiety
- Seizure activity
- Unconsciousness

**Hypoglycemia Management**

* * Conscious Patient * *
- Position patient comfortably
- C – A – B – BLS as needed
- (Episode continues)
- Activate EMS
- Glucagon 1mg IM or IV
- Dextrose 50% 50ml IV
- (Episode terminates)
- Observe one hour
- Discharge patient, escort?

* * 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**

**Seizures**

Seizure Disorders

Classifying Epilepsy and Seizures

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

Characterized by muscle contractions with or without loss of consciousness

Consciousness is maintained
Consciousness is lost or impaired
Altered awareness

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Seizure Disorders
What do you do when you have your seizure?

Seizure Disorders
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?

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

Seizure Disorders
Possible causes in dental office
- Epilepsy
- Local anes overdose
- Hyperventilation
- CVA (stroke)
- Hypoglycemia
- Syncope (hypoxia)

Grand Mal Seizure
Seizures will generally last 1 to 3 minutes. If a tonic-clonic seizure lasts longer than 5 minutes requires medical attention. A seizure that lasts longer than 10 minutes, or three seizures without a normal period in between indicates a dangerous condition called convulsive status epilepticus.
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**GM Seizure 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

To hospital
To home
To physician

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**Epinephrine Overdose Reaction**

**Vasoconstrictors in Local Anesthetics**

**Clinical manifestations of EPI overdose**

**Signs:**
- Elevated blood pressure
- Elevated heart rate

**Symptoms:**
- Fear
- Anixety
- Tenseness
- Restlessness
- Tremor
- Perspiration
- Dizziness
- Weakness
- Respiratory difficulty
- Palpitations

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Clinical manifestations of EPI overdose

Recognize problem: anxiety, tremor, diaphoresis, headache, florid appearance, increased heart rate, elevated blood pressure

Discontinue dental treatment

P => Position patient comfortably

C-A-B => Assess circulation, airway, breathing
Check vital signs
Reassure the patient
Monitor vital signs
Administer supplemental oxygen
Permit patient to recover
Administer NTG for significant hypertension
Discharge patient

Cardiac Emergencies

U.S. Leading Causes of Death 2017

Ischemic Heart Disease

Coronary Artery Disease => Chest Pain

Ischemic Heart Disease

Coronary Artery Disease => Chest Pain

• Chronic Stable Angina
• Acute Coronary Syndrome
  • Unstable angina
  • Non-ST-segment elevation MI
  • ST-segment elevation MI
Medical Emergencies – Update 2019

**Ischemic Heart Disease**

Pathophysiology is different

**Chronic Stable Angina**

Acute Coronary Syndrome
- Unstable angina
- Non-ST-segment elevation MI
- ST-segment elevation MI

**Ischemic Heart Disease**

Coronary Artery Disease => Chest Pain

**Chronic Stable Angina**

- Previously diagnosed, chronic
- Consistent factors precipitate
- Consistent symptoms (no changes)
- Not associated with other symptoms
- Good relief with NTG
- Usually < 20 minutes

**Ischemic Heart Disease**

Coronary Artery Disease => Chest Pain

**Acute Coronary Syndrome**

- Unstable angina
- Non-ST-segment elevation MI
- ST-segment elevation MI

**Pathophysiology Chronic Stable Angina vs ACS**

Chronic Stable Angina vs ACS

*Is this your typical angina?*

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

*Do you have a history chest pain/angina?*

- **Yes**
  - Is this your “normal” chest pain?
    - **Yes**
    - Chronic Stable Angina
    - **No**
    - Acute Coronary Syndrome
  - **No**
    - Chronic Stable Angina
Cardiac Emergencies

Chronic Stable Angina

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

Chronic Stable Angina

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

Chronic Stable Angina Tx
- Position patient comfortably (upright)
- BLS as needed, monitor vital signs
- History of angina pectoris AND typical symptoms
- Nitroglycerin 0.4mg sublingual
- Administer oxygen, monitor VS
- Repeat NTG q3-5’, Total 3 doses
- Normal pain resolves with normal dose of NTG
- Discharge – Confirm Vital Signs are stable

Angina in the Dental Office
- Anxiety, fear, pain
- Release of catecholamines (EPI)
  - Increases BP, heart rate, contraction
  - Increases myocardial oxygen demand
- Myocardial ischemia
- Chest Pain

Stress Management Protocol!

NTG Contraindication
- Be cautious using it in patients taking these drugs

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NTG 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.

Chronic Stable Angina vs ACS

Do you have a history chest pain/angina?

Yes

Is this your "normal" chest pain?

No

Not chronic stable angina if...
- New onset chest pain
- Change in pattern/referral
- Increased severity of symptoms
- Change in pattern of relief (NTG)
- New symptoms: SOB, dizziness

Acute Coronary Syndrome
- Unstable angina
- Non-ST-segment elevation MI
- ST-segment elevation MI

Cardiac Emergencies

Acute Coronary Syndrome
(Unstable angina or MI)

Acute Coronary Syndrome

Clinical manifestations
- Retrosternal severe pain
- "Crushing", "choking"
- Usually > 30 minutes
- Radiates as angina
- N/V, palpitations, SOB
- "Impending doom"
Medical Emergencies – Update 2019

ACS – Management

Position comfortably
BLS, oxygen, NTG X 3 doses as in angina

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

- Activate EMS
- Administer fibrinolytics (ASA)
- Monitor vital signs
- Manage pain - narcotics
  - Morphine 2.5-15mg IV q15 minutes
  - Nitrous oxide is option
- Transport to hospital - ACLS

23% mortality reduction
ISIS-2 study

Cardiac Emergencies

Cardiac Arrest

Steven W. Beadnell, DMD & Philipp Kupfer, DMD, MD
Oregon Dental Conference, Portland, OR, April 6, 2019
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
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Cardiac Arrest – Keys to Survival
Chain of Survival

Cardiac Arrest – Keys to Survival
High Quality CPR
Defibrillation

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Cardiac Arrest
Ventricular Fibrillation
About 90% of cardiac arrests

Cardiac Arrest – Keys to Survival
EARLY Defibrillation

Cardiac Arrest – Keys to Survival
EARLY Defibrillation

Cardiac Arrest – Keys to Survival
EARLY Defibrillation

AED Operating 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

Never stop CPR

Allergic Reactions

Steven W. Beadnell, DMD & Philipp Kupfer, DMD, MD
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Medical Emergencies – Update 2019

Allergic Reactions

Common Dental Allergens

Antibiotics
• Penicillin
• Cephalosporins
• Tetracyclines

Analgesics
• Aspirin-compounds
• Nonsteroids

Opioids
• Meperidine
• Codeine

Antianxiety agents
• Barbiturates

Local anesthetics
• Esters: Benzocaine
• Sodium bisulfite
• Methylparaben

Others
• Acrylic monomer
• Latex

Allergic Reactions

Clinical manifestations

Increased vascular permeability
Vasodilation

Urticaria / Hives
Rash
Pruritis (itching)
Tingling and warmth
Flushing

Typical Distribution Pattern

Most common
Common
Uncommon
Rare

Allergic Rxn - Cutaneous

Allergic Rxn - Cutaneous
Allergic Rxn - Cutaneous

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

- Rhinitis
- Nasal congestion
- Nasal itching
- Rhinorrhea
- Bronchospasm
- Cough
- Wheezing
- Tachypnea

Allergic Rxn - Respiratory

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

- Rhinitis
- Nasal congestion
- Nasal itching
- Rhinorrhea
- Bronchospasm
- Cough
- Wheezing
- Tachypnea

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

Allergic Rxn - Cardiovascular

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

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

Allergic Rxn - Severity

When do we need to worry?
- Rapidity of onset of signs and symptoms
- Rapidity of progression of signs and symptoms

Allergic Rxn - Treatment

Epinephrine
- Reverses the pathologic processes causing the allergic reaction

Diphenhydramine
- Antagonizes histamine, preventing progression of the allergic reaction

Tx Delayed-Onset Skin Rxn

Onset skin reaction (> 1 hour) from allergen

- Position patient comfortably
- Assess and perform BLS as needed
- Definitive care

- Observe patient
- Administer oral histamine blocker prn
- Benadryl 50mg oral
- Administer IM + oral histamine blocker q4-6h
- Benadryl 50mg IV or IM
- Benadryl orally X 2-3 days (25 – 50mg qid)
Medical Emergencies – Update 2019

**Anaphylaxis**
Anaphylaxis is a severe and potentially fatal allergic reaction. It may start suddenly within seconds or minutes, or take a few hours to develop following contact with an allergen which is a substance that is capable of producing an allergic reaction. A severe anaphylactic reaction is sometimes known as anaphylactic shock.

**Anaphylaxis – Clinical Manifestations**
- **Multi-system involvement**

- **Tx Anaphylactic Rxn**
  - Position patient supine, legs elevated
  - Assess and perform BLS as needed, VS + oxygen
  - Activate EMS
  - Administer Epinephrine 0.3mg q5 min IM or IV
  - Benadryl 50mg IM, IV
  - Solucortef 100mg IV
  - EMS => ER/Hospital

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**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

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**Anaphylaxis – Clinical Manifestations**

**Allergic Rxn => Anaphylaxis**

- **Allergic rxn:**
  - Localized rxn, involving single system, e.g. Urticaria, angioedema, contact dermatitis

- **Anaphylaxis**
  - Severe systemic allergic rxn
  - Hive/angioedema NOT universally present

- **Anaphylactic Shock**
  - Above, plus hypotension and other signs of shock

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**Tx Rapid-Onset Skin Rxn**

- 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

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