DIAGNOSIS AND TREATMENT OF MEDICAL EMERGENCIES IN THE DENTAL OFFICE

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What is your definition of a medical emergency?

Any situation you feel uncomfortable treating by yourself

What is the best way to treat a medical emergency in your office?

Prevent them from occurring

What is your best preventative tool?

Know your Patient

Incidence of Medical Emergencies in a Dental Office

Syncope	**55.0%**
Angina	9.1%
Seizures	5.7%
Asthma (Bronchospasm)	5.0%
Reaction to Epinephrine	3.3%
Hypoglycemia	3.2%
Cardiac Arrest	1.2%
Anaphylactic Reaction	1.1%
Stroke	0.22%

Data collected from 4,309 clinicians (all 50 U.S. States, 7 Canadian provinces over a 10 year period) A total of 30,608 medical emergencies reported.

Case 1

25 year old male presents to your office for a DO restoration of tooth # 18

This is his second visit to the office. His first visit was for data gathering and treatment planning.

PMH: Negative for any systemic diseases

Meds: None

Allergies: None

VS: BP 118/68 P 68 T 98.6

You give 1 carpule of Xylocaine 2% with 1/100k epi. You turn to your assistant and ask for the appropriate bur for the handpiece. When you turn back to the patient he C/O

1. **Dizziness**
2. **Nausea**
3. **Feeling Hot**
4. **Exhibits Pallor**

VS: BP 89/58 P 59
RR. 10

Case 1

Differential Diagnosis

1. Pre-Syncope
2. Drugs
3. Adverse Drug Reaction
4. Hyperventilation

Definition of Syncope

Syncope:

“A faint; temporary loss of consciousness due to generalized cerebral ischemia”*

* Dorland’s Pocket Medical Dictionary

Universal Emergency Algorithm

- **First Steps**
  - **R**ecognition
  - **D**iscontinue Treatment
  - **A**ctivate Office Emergency Protocol
  - **I**nitiate BLS (Assess Circulation – Airway – Breathing)
  - **P**lace Patient in a Supine Position (exceptions)
  - **V**ital Signs

Treatment of Syncope

Recognition
Discontinue Treatment
Activate Office Emergency Protocol
Initiate BLS (Assess Circulation – Airway – Breathing)
Place Patient in Supine or Trendelenburg Position
Vital Signs
Loosen Restrictive Clothing
Cool Towel to Forehead
O_2 via Nasal Canula 2 – 4 liters per minute
Consider Ammonia inhalant
Consider Finger Stick Glucose (To exclude hypoglycemia)
Reassurance

Presyncope

Signs and Symptoms

- Lightheaded
- Feeling warm or cold
- Sweating
- Palpitations
- Nausea
- Pallor

Types of Syncope

Transient Loss of Consciousness (TLOC)

Etiology

- Reflex Syncope (Vasovagal)
- Orthostatic Syncope
- Other Causes That Mimic Syncope
    - Cardiac Dysrhythmias
    - Seizures
    - Sleep Disturbances (Narcolepsy)

Types of Syncope

Determining Type of Syncope

Prodrome (presyncope)
Short Duration (1 – 2 Minutes)
Situational Anxiety
Younger Patients
Male
No history of Previous Episodes
Position
Full Recovery

} Vasovagal

Types of Syncope

Determining Type of Syncope

Older Patients
Sudden Change in Position
No Prodrome
Sudden Onset

→ Orthostatic Syncope (Postural Hypotension)

No Prodrome
Sudden Onset
Physical Stress
History of Multiple Episodes
Can Occur in a Supine Position

→ Cardiogenic

Altered / Loss of Consciousness

Common Etiologies

- Pre-Syncope
- Syncope
- Hypoglycemia in the top 10 most common emergencies
- CVA
- TIA
- Seizure
- Cardiac Arrest
- Drugs
- Hyperventilation
  - Most common non-drug cause

What Do All These Etiologies Have In Common?

They Decrease Nutrients To The Brain

Altered / Loss of Consciousness

Mechanisms that cause loss of consciousness

1. **Decreased blood flow to the brain**
   - Hypotension
   - Orthostatic Hypotension
   - Dysrhythmias (pump failure)
   - Narrowing / occlusion of the Carotid arteries
2. **Systemic or metabolic disruption**
   - Drugs
     - Narcotics and Sedatives
     - Nitrates
     - Diuretics
3. **Direct effect on the central nervous system**
   - CVA
   - Seizure
4. **Psychic Mechanisms**
   - Emotional issues (Stress)
   - Hyperventilation (Loss of CO_2 = constriction of cerebral blood flow)
   - Syncope

Syncope and orthostatic hypotension are the most common causes

Altered / Loss of Consciousness

Diagnostic Aids

- **Pre-syncope** (Vital Signs, observation of physical signs)
- **Hypoglycemia** (Glucometer finger stick glucose less than 70 mg/dL)
- **CVA** (F.A.S.T.)
- **TIA** (Abrupt onset, transient numbness and weakness of limbs, transient monocular blindness)
- **Seizure** (Grand-Mal Pre-seizure aura)
- **Cardiac Arrest** (No pulse, BP, or respiration)
- **Drugs** (Pin Point Pupils with narcotics, slow respiratory rate slurred speech)
- **Hyperventilation** (Rapid respiratory rate, palpitations, anxiety and panic, sense of impending doom)

Treatment Algorithm For Altered or Loss of Consciousness

Recognition
Discontinue dental treatment
Activate office emergency protocol
Circulation
- Evaluate carotid pulse no more than 10 seconds

Airway
- Head tilt chin lift
- Jaw thrust

Breathing
- Look, Listen, and Feel

Supine Position
Vital Signs
CPR if needed
Pharmacologic Intervention (Sugar, Glucagon, Narcan) if needed
Call 911

Case 2

62 year old male presents to your office with deep caries in his last remaining teeth (23, 24, 25 and 26). The patient wants these remaining teeth extracted and is interested in implant supported upper and lower dentures. After your evaluation you feel this patient would be a good candidate for the proposed treatment. The patient states he is very nervous about having his teeth out.

PMH: Angina, Hypertension
PSH: Coronary artery stent placed 5 years ago
Meds: Nitroglycerin PRN, ASA, Lisinopril, Atorvastatin
Allergies: Penicillin

The patient is in a supine position and you give 2 carpules of Xylocaine 2% with 1:100,000 Epi. The patient complains of dull substernal chest pain. He says he has had this type of pain before.

Case 2

Differential Diagnosis

1. Stable Angina
2. Unstable Angina
3. Epinephrine Overdose

Treatment of Stable Angina

Recognition
Discontinue Treatment
Activate the office emergency protocol
Initiate BLS (Assess Circulation – Airway – Breathing)
Let patient position themselves
Vital Signs
O_2 Via Nasal Cannula 2 – 4 Liters/Minute
Nitroglycerin 0.3 – 0.6 mg Q 5 min X 3 if needed (If systolic BP greater than 90 mm Hg)
ASA 325 mg Chewed (Non-enteric Non-buffered)

If pain is relieved and patient is comfortable contact patients PCP or Cardiologist.

If the patient requests transport to the ER call 911
If the patient has a prior history of a myocardial infarction call 911
If the patient has symptoms or signs of heart failure call 911

Case 3

62 year old male presents to your office for a restoration of tooth #14

PMH: moderately controlled Hypertension, Hypercholesterolemia

PSH: Left Knee Arthroscopy 2000

Meds: Metoprolol, Atorvastatin ASA Motrin PRN

Allergies: NKDA

Occupation: Fund Manager

Social History: Smokes tobacco 2PPD

Drinks 5 cups of coffee per day

2 -3 glasses of wine per night “to relax”

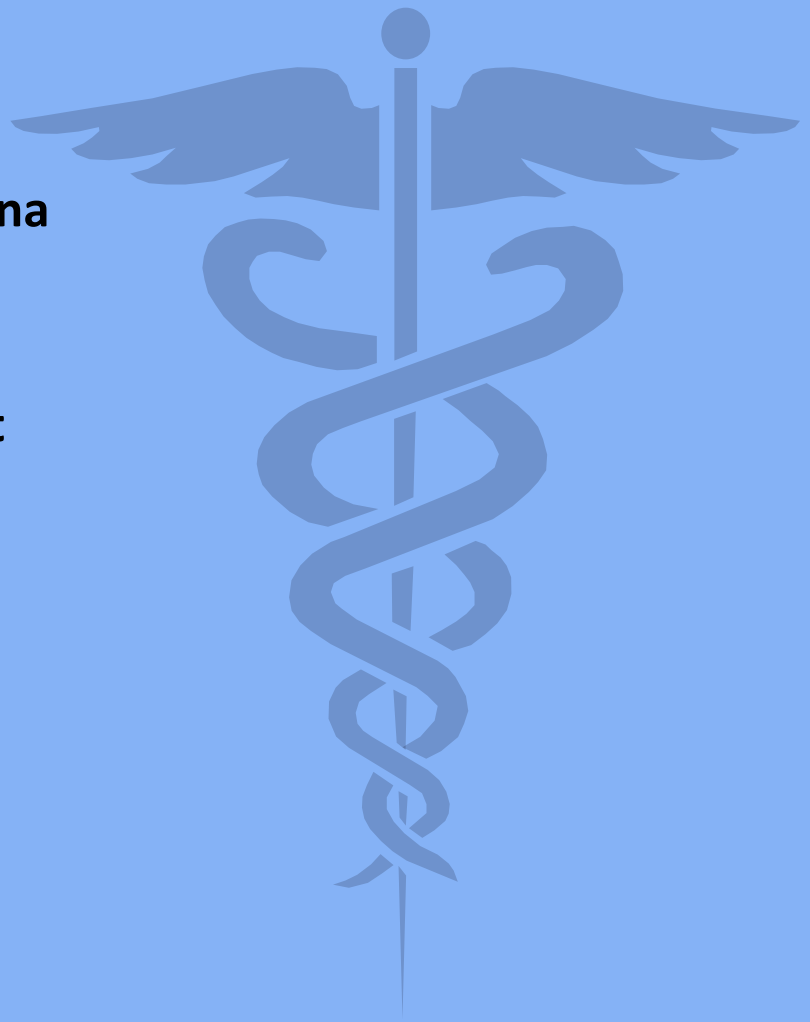
VS: BP 150/85 P 87 T 98.6 Height 5’10” Weight 260 lbs

You inject 1 Carpule of Xylocaine 2% with 1/100k Epi for infiltration.
After 3 minutes you begin your prep. The patient becomes diaphoretic
and complains of intense substernal chest pain that is radiating down his left arm.

Case 3

Differential Diagnosis

1. Unstable Angina
2. Stable Angina
3. Cardiac Arrest



Treatment of Unstable Angina

Recognition
Discontinue Treatment
Activate the office emergency protocol
Initiate BLS (Assess Circulation – Airway – Breathing)
Let patient position themselves
Call 911
O_2 Via Nasal Cannula 2 – 4 Liters/Minute
Nitroglycerin 0.3 – 0.6 mg Q 5 min X 3 if needed (If systolic BP greater than 90 mm Hg)
ASA 325 mg Chewed (Non-enteric Non- buffered)
Monitor vital signs

M. Morphine
O. Oxygen
N. Nitroglycerine
A. Aspirin

Nitroglycerine

How do you know it's working?

- Pain relief
- Patient C/O headache
- Burning under tongue

Do not give Nitroglycerine if patient has taken:

- Sildenafil (Viagra) or Vardenafil (Levitra) within 24 hrs..
- Tadalafil (Cialis) within 48 hrs..

Do not give Nitroglycerine if:

- Systolic BP is less than 90 mmHg or 30mmHg below patient's baseline value
- HR less than 50

Angina Pectoris

Stable vs. Unstable Angina

Characteristics	Stable	Unstable
Nature of Symptoms	**Predictable with Exertion or Stress** **No Change in pain Intensity**	**Unpredictable** **Spontaneous (Even at rest)** **Pain more intense**
Duration of Pain	**1 -15 Minutes**	**More than 10 Minutes**
Pathology	**Stenosis of a Coronary Artery**	**Complete Occlusion**
Treatment	**D/C Exertion** **Nitroglycerin**	**Angioplasty with Stent** **Coronary Artery** **Bypass Graft (CABG)**

Office Considerations

An Ounce of Prevention is Worth a Pound of Cure

Office Evaluation

- Office location and EMS Response Time
  - Urban vs. Rural
  - Ground Floor vs. Highrise
  - Rush Hour vs. Off Hours
- Door openings
  - Wheelchair / Stretcher Accessible

When Calling 911

- Location
- Telephone number in case contact is lost
- Why you are calling (e.g. MI, CVA, Seizure)
- Condition of victim
- Aid being rendered currently
- Additional information requested

Your Office Emergency Team Staff Responsibilities

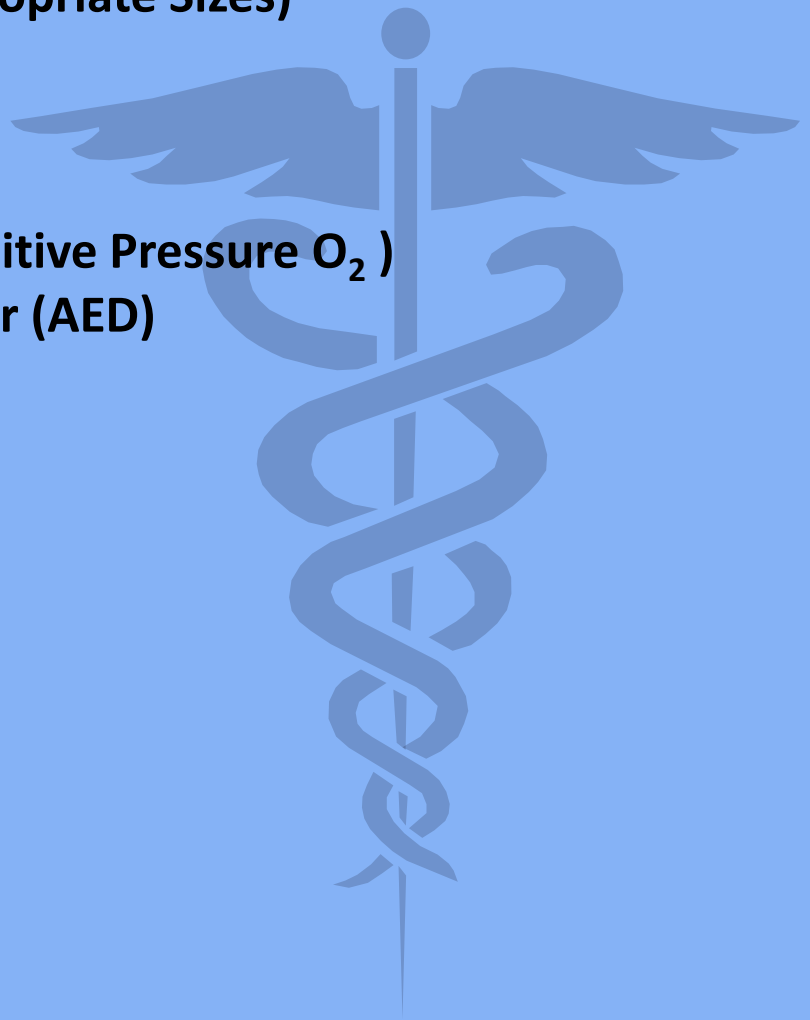
Designated Defined Roles (The person with the most training will be the "Captain of the Ship")

- All office staff should be BLS certified
  - Staff Responsibilities

1. Notify office of emergency
2. Notify front desk to call 911
3. Office personnel to direct paramedics to office
4. Runner (Circulator) to bring O_2 AED and Meds to operatory
5. Airway Management
6. Compressions
7. Scribe

Emergency Equipment

- Stethoscope
- Oxygen Tank (“E” size) with nasal cannula
- Blood Pressure Cuff (With Appropriate Sizes)
- Pulse Oximeter
- Alternate Light Source
- Pocket Mask
- Bag Valve Mask (To Provide Positive Pressure O_2)
- Automated External Defibrillator (AED)
- Half Backboard
- Manual Suction
- Mechanical Suction
- Glucometer
- Nasal / Oral Airways
- Suction (Yankauer)
- Magill Forceps



Emergency Drugs

- Oxygen
- Epinephrine (IM, Nasal, Sulfite Free)
- Nitroglycerine
- Aspirin
- Ammonia Inhalants
- Bronchodilator
- Antihistamine
- Glucose Supplement
- Glucagon
- Naloxone

Case 4

30 year old female presents to your office for a restoration of tooth #14

PMH: Non-contributory

PSH: None

Meds: None

Allergies: NKDA

The patient is in a supine position and is given Septocaine 4% with 1/200k epi via infiltration. The patient complains of tunnel vision, her eyes roll back, loses consciousness and starts tonic clonic movements

Case 4

Differential Diagnosis

1. Grand Mal Seizure
2. Syncope
3. Hypoglycemia
4. CVA

Treatment of Grand Mal Seizures

Recognition
Discontinue Dental Treatment Remove all intraoral dental instruments
Activate office emergency protocol
Initiate BLS (Assess Circulation – Airway – Breathing) Airway control is critical
Place Patient in a Supine Position and Protect
Call 911
Consider checking blood sugar

In the Postictal Phase

Continue BLS
Monitor Vital Signs
Reassure Patient

Seizures

Excessive brain activity effecting:

- Visceral Function
- Sensory Function
- Motor Movements
- Mental Acuity
- Consciousness

Seizures

- **Generalized**
  - **Absence (Petit Mal)**
    1. Occur Frequently (after waking or periods of inactivity)
    2. Short Duration (seconds)
    3. Unresponsive (lights on nobody home)
    4. Sudden, No Aura
    5. No Postictal Symptoms

  - **Tonic-Clonic (Grand Mal, Epilepsy)**
    1. Most Common Form
    2. Pre-Seizure Aura
    3. Tonic Clonic Activity
    4. Duration of Minutes (usually less than 5)
    5. Postictal Phase (can last 2 hours)
    6. Causes
       1. Infection (Encephalitis, Meningitis, Abscess)
       2. Drug or Alcohol Induced
       3. Tumors
       4. Trauma
       5. Fever (102^0 F)

Grand Mal Phases

1. Prodrome
    1. Duration of Minutes to Hours
    2. Aura (Visual, Auditory, Olfactory)

2. Preictal
    1. Loss of Consciousness
    2. Bilateral Jerky Movements
    3. Eyes Roll Back

3. Ictal (2 – 5 minutes)
    1. Skeletal Muscle Contractions
    2. Tonic (Flexion 10 – 20 seconds)
    3. Clonic (Extensor)

4. Postictal
    1. Consciousness Returns
    2. Loss of Bladder Rectal Control
    3. Disorientation and Confusion
    4. May Have Total Amnesia
    5. Recovery May Take 2 Hours

Seizures

Status Epilepticus

Status Epilepticus is defined as a continuous or repetitive seizure without recovery between attacks.

This is a Potentially Life Threatening Condition

- **Mortality Rates 3 – 23%**
- **Can Last Hours**
- **Most cases result from**
  - **Severe Head Injury**
  - **Drug or Alcohol Withdrawal**
  - **Metabolic Causes**

Status Epilepticus Causes

- **Hyperthermia (106^0 F)**
- **Tachycardia, Dysrhythmias**
- **Elevated BP (300/150 mm Hg)**

Cause of Death [7,10]

- **Cardiac Arrest**
- **Brain Damage From Hypoxia**
- **Decreased Cerebral Blood Flow Due to Increased ICP**
- **Hypoglycemia Secondary to Increased Metabolic Demand**

1. Logroscino G, Hesdorffer DC, Cascino G, et al.: Mortality after a first episode of status epilepticus in the United States and Europe, *Epilepsia* 46 Suppl 11:46-48, 2005
2. Maytal J, Shinnar S, Moshe SL, Alvarez LA: Low morbidity and mortality of status epilepticus in children, *Pediatrics* 83:323-331, 1989
3. Sanya EO: Status epilepticus – a review article, *Niger J Med* 13:89-97, 2004
4. Chin RF, Neville BG, Scott RC: A systemic review of the epidemiology of status epilepticus, *Eur J Neurol* 11:800-810,

Case 5

30 year old male presents to your office for a restoration of tooth #29 and has a dental phobia

PMH: Asthma, hypertension

PSH: Right knee arthroscopy

Meds: Albuterol, HCTZ

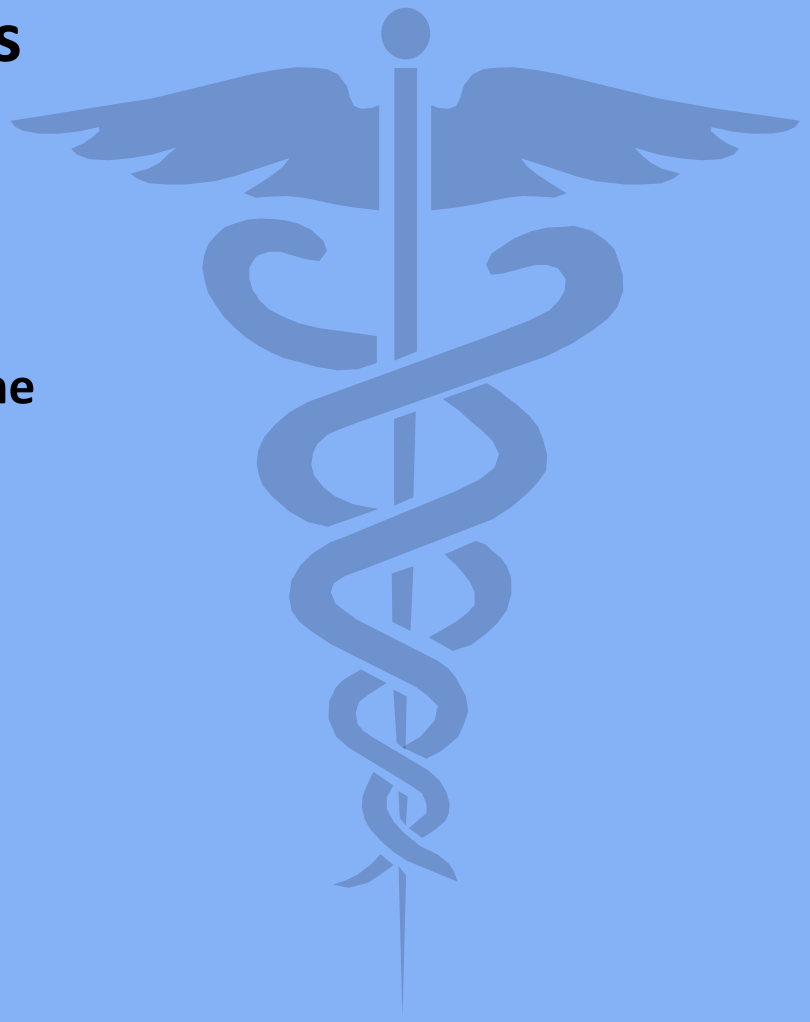
Allergies: NKDA

The patient is in a supine position and is given Xylocaine 2% with 1/100k epi via infiltration. The patient complains of dyspnea, anxiety, and wants to sit up. He starts to cough, has nasal flaring, chest tightness, a band-like constriction, or the sensation of a heavy weight on the chest and has audible wheezing

Case 5

Differential Diagnosis

1. Asthma
2. Hyperventilation
3. Reaction to Epinephrine
4. Anaphylactic Reaction



Treatment of an Acute Asthmatic Attack

Recognition
Discontinue Dental Treatment
Activate the office emergency protocol
Initiate BLS (Assess Circulation – Airway – Breathing)
Allow the patient to position themselves (Sitting may be preferred)
Vital Signs
Administer Albuterol (Ventolin, Proventil) inhaler (2 – 4 Puffs Q 20 Min. X 3 Doses)
O_2 Via Nasal Cannula 2 – 4 Liters/Minute
If Patient Refractory to Multiple Doses of Albuterol OR if patient is:

- ✓ **Breathless at rest**
- ✓ **Unable to speak full sentences**
- ✓ **HR greater than 120/min or Respiratory Rate greater than 30/min**
- ✓ **O_2 Sat less than 90%**

Call 911

1. Malamed, Stanley Medical Emergencies in the Dental Office, Seventh Edition, Elsevier 2015 p. 214
2. National Center for Health Statistics: Asthma FastStats, Hyattsville, MD, Centers for Disease Control and Prevention, www.cdc.gov/nchs/fastfacts/asthma.htm, September 2013

Asthma

Asthma can be defined as a chronic inflammatory disorder that is characterized by reversible obstruction of the airways

Asthma affects approximately 8% of adults and 10% of children in the US

40% of adults go to the ER at least once a year with an acute attack

Asthma is the third leading cause of ER visits

Asthma

There are three major types of asthma:

- Intrinsic (Nonallergic, Idiopathic)
  - Causes:
    - Infection
    - Physical stress
    - Pollution
- Extrinsic (Allergic)
  - Inherited predisposition
    - Causes
      - Environmental (dust mold)
      - Food
      - Drugs
- Mixed
  - Most common trigger
    - Infection

Asthma

Signs and Symptoms of Asthma

- Chest Congestion
- Wheezing
- Dyspnea
- Tachypnea (>20 – 40 breaths per minute)
- Cyanosis
- Increased Anxiety and Apprehension
- chest tightness, a band-like constriction, or the sensation of a heavy weight on the chest

Drugs To Avoid When Treating Asthmatics

- Opioids (histamine release)
- LA containing vasoconstrictors (bisulfites)

1. Peters S, McCallister JW. Treatment of moderate persistent asthma in adolescents and adults. Post TW, ed. UpToDate. Waltham, MA: UpToDate Inc.
2. Wenzel S. Treatment of severe asthma in adolescents and adults. Post TW, ed. UpToDate. Waltham, MA: UpToDate Inc.

Case 6

50 year old male presents to your office with a fractured amalgam and reversable pulpitis in tooth # 30 The patient wants the tooth restored.

PMH: Hypertension, Arthritis of the Left Knee

PSH: T&A as a child, Right Inguinal Herniorrhaphy age 22

Meds: Hydrochlorothiazide, Motrin

Allergies: None

Pre-procedure VS BP 140/80 P 72 Resp 14 Temp 98.4ºF

The patient is in a supine position and you give 1 carpule of Xylocaine 2% with 1:100,000 Epi. for a right IAN block. Profound anesthesia is not obtained so a second carpule is given. During the second injection the patient complains of palpitations, becomes anxious, and feels as though his "heart is racing".

Repeat VS BP 165/90 P105 Resp 20

Case 6

Differential Diagnosis

1. Reaction to Epinephrine
2. Acute Atrial Fibrillation
3. Presyncope
4. Hyperthyroid Reaction

Drug Reactions and Overdose

Treatment of Epinephrine Overdose

Recognition
Discontinue Dental Treatment
Activate Office Emergency Protocol
Initiate BLS (Assess Circulation – Airway – Breathing)
Position the patient in a supine position
Vital Signs
Reassure Patient
Monitor Vital Signs
Call 911 IF:

1. **Patient Exhibits Cardiac Symptoms (Chest Pain, SOB)**
2. **Patient Exhibits CNS Symptoms of a CVA (Severe Headache, Burry Vision, Weakness, Slurred Speech)**

1. **Administer O_2 via Nasal Canula 2 – 4 L/min. (if needed)**

Drug Reactions and Overdose

Management of Epinephrine Overdose

Reaction to Epinephrine overdose is usually short lived

Elimination Half-Life of Epinephrine < 5 min. *

- **Signs and Symptoms**
  - **Anxiety**
  - **Palpitations**
  - **Sweating**
  - **Headache**
  - **Tremor of limbs**
  - **Increased Heart Rate**
  - **Increase Blood Pressure**

* Lexicomp Pharmacologic Data Base

Drug Reactions and Overdose

- **Causes of Reaction to Epinephrine**
  - **Too Large a Dose**
  - **Technique (Failure to Aspirate Prior to Injecting)**
    - ✓ **Intravascular injection results in rapid rise in blood levels**

Case 7

45 year old male presents to your office complaining of pain in tooth #5. The patient only wants the tooth extracted. The tooth has hopeless periodontal bone loss and has caries into the pulp. It is late in the afternoon.

PMH: Diabetes, Hypertension, Coronary Artery Disease

PSH: Appendectomy Cardiac Stent placement 2 years ago

Meds: Metformin, Insulin, Lisinopril, HCTZ, ASA

Allergies: None

The patient is in a supine position and you give 1 carpule of Xylocaine 2% with 1:100,000 Epi. for infiltration. You achieve profound anesthesia and proceed with the extraction. The patient becomes confused, diaphoretic, and irritable

Case 7

Differential Diagnosis

1. Hypoglycemia
2. TIA
3. Presyncope
4. Narcotic Overdose

Treatment of Hypoglycemia

Recognition (Glucometer)
Discontinue Dental Treatment
Activate Office emergency protocol
Initiate BLS (Assess Circulation – Airway – Breathing)
Place patient in a supine position
Administer oral sugar if patient can tolerate
Vital Signs
If oral glucose fails to give desired effect OR if the patient becomes unconscious or seizure activity is noted
    Call 911
If patient cannot tolerate oral forms of sugar or they are unresponsive
    Give Glucagon 1 mg IM (Response may take up to 15 min)
Transfer to hospital is appropriate

Hypoglycemia

Can develop rapidly and be life threatening ("Insulin Shock")

- Causes
  - Inadequate Food Intake
  - Excessive Insulin Dose (Type of Insulin can be a factor)

IT IS BETTER TO BE TOO SWEET THEN NOT SWEET ENOUGH

Hypoglycemia

Hypoglycemia is defined as having a blood glucose level less than 70 mg/dL (normal range 80 – 99 mg/dL)

Signs and Symptoms

Mild to Moderate

Jittery
Diaphoretic
Hungry
Headache
Blurred Vision
Sleepy
Confused
Uncoordinated
Combative
Weak
Fast or irregular heart rate

Hypoglycemia

Signs and Symptoms

- **Severe**
  - **Unable to Eat or Drink**
  - **Seizures**
  - **Unconsciousness**

Case 8

58 year old male presents to your office complaining of intermittent pain in tooth #3. The patient exhibits the signs and symptoms of reversible pulpitis. You decide to restore tooth # 3. The patient has a medical clearance letter from his PCP

PMH: Diabetes, Hypertension, Coronary Artery Disease, Angina

PSH: Cardiac Stent placement 2 years ago

Meds: Metformin, Metoprolol XL, HCTZ, ASA, Nitroglycerin and Atorvastatin

Allergies: Lisinopril

The patient is in a supine position and you give 1 carpule of Xylocaine 2% with 1:100,000 Epi. for infiltration. You achieve profound anesthesia and proceed with the restoration. The patient becomes diaphoretic, short of breath, complains of extremely painful pressure in his chest, then looses consciousness.

BP undetectable

No pulse

Case 8

Differential Diagnosis

1. Cardiac Arrest
2. Hypoglycemia
3. Syncope
4. Stroke

Treatment of Cardiac Arrest

Recognition
Discontinue Dental Treatment
Activate Office Emergency Protocol
Initiate BLS (Assess Circulation – Airway – Breathing) IF NO PULSE
CALL 911
Place Patient in a Supine Position
Begin Chest Compressions (back board as needed)
Open And Maintain Adequate Airway
Rescue Breathing (100% O2 via Ambu Bag)
AED Defibrillate if indicated
Transport to ER

Case 9

62 yo Male presents for an exam and prophylaxis.

PMH SP mitral valve replacement 2018
CHF
Hypertension
Hyperthyroidism

Meds Methimazole
Metoprolol
Lasix
Potassium Chloride

Allergies NKDA

Coumadin

BP 156/89 P 77 O2 sat 98%

The patient states he forgot to take his premed. Your next patient cancelled at the last minute so you decide to treat this patient and give him 2 grams of Amoxicillin. After about 15 minutes the patient C/O an itchy feeling all over, he develops a rash, you observe some mild facial swelling and SOB.

Case 9

Differential Diagnosis

1. Anaphylaxis
2. Mild Allergic reaction
3. MI
4. Acute CHF

Answer

Treatment of Generalized Anaphylaxis

Recognition
If Signs of Airway Compromise (Respiratory Distress, *Stridor*, Exaggerated Chest Movements, Cyanosis)
Activate Office Emergency Protocol Call 911
Discontinue Dental Treatment
Initiate BLS (Assess Circulation – Airway – Breathing)
Place Patient in a Supine Position
Administer Epinephrine via Epi-Pen Q 5 – 15 min (Maximum of 3 doses)
Position the patient in a supine position)
Administer supplemental O_2 via nonrebreather mask at 15 L/min if spontaneous breathing is present
BLS protocol (C – A – B)
Take Vital Signs (Pulse, BP, HR, Respiratory Rate)

Delayed use of Epinephrine is associated with fatalities

1. Asero, Riccardo, New-Onset Urticaria *Up-to-Date* May 2019
2. Campbell, Ronna L, Kelso, John M, Anaphylaxis: Emergency treatment Up-to-Date May 2019

Allergic Reaction

Onset

- **Rapid**
  - **In general the more rapid the S&S occur the more severe the reaction**
  - **More likely to be life threatening (Anaphylaxis)**
  - **Need for immediate and aggressive management**

Clinical Signs and Symptoms of Generalized Anaphylaxis

Rapid Onset

- Pruritus that may be associated with Hives
- Angioedema
- Airway Symptoms (Upper Airway Obstruction, Wheezing, Chest Tightness)
- Cardiovascular Symptoms (Hypotension, Dysrhythmias, Hypovolemic Shock)
- Gastrointestinal (Cramping, Pain, Nausea, vomiting)

Asero, Riccardo, New-Onset Urticaria *Up-to-Date* May 2019
Campbell, Ronna L, Kelso, John M, Anaphylaxis: Emergency treatment Up-to-Date May 2019

Administration of Epinephrine

Therapeutic Actions

- Increases vasoconstriction and peripheral vascular resistance
- Decreases upper airway mucosal edema
- Increases inotropy and chronotropy
- Increases bronchodilation
- Decreases release of inflammatory mediators from mast cells and basophils

Administration of Epinephrine

In the treatment of Anaphylaxis Epinephrine should be given ASAP

- **Delayed use of Epinephrine is associated with fatalities**
- **The risks of *not* using Epinephrine are greater than its use**
- **IM injection is preferred**
- **IM Epi can be given every 5 – 15 minutes**

12 to 36% of patients will require a second dose

Sheikh A, Shehata YA, Brown SG, Simons FE, Adrenaline for the treatment of anaphylaxis: Cochrane systemic review. Allergy 2009; 64:204
Soar j, Pumphrey R, Cant A, et al. Emergency treatment of anaphylactic reactions guidelines for healthcare providers. Resuscitation 2008; 77:157

Case 10

68 year old male presents to your office with caries in tooth #19. The patient is scheduled for a restoration of tooth #19. The patient is a well controlled diabetic (finger stick glucose today is 100, BP 156/89) The patient has medical clearance and his PCP told him to hold the Xarelto for 2 days

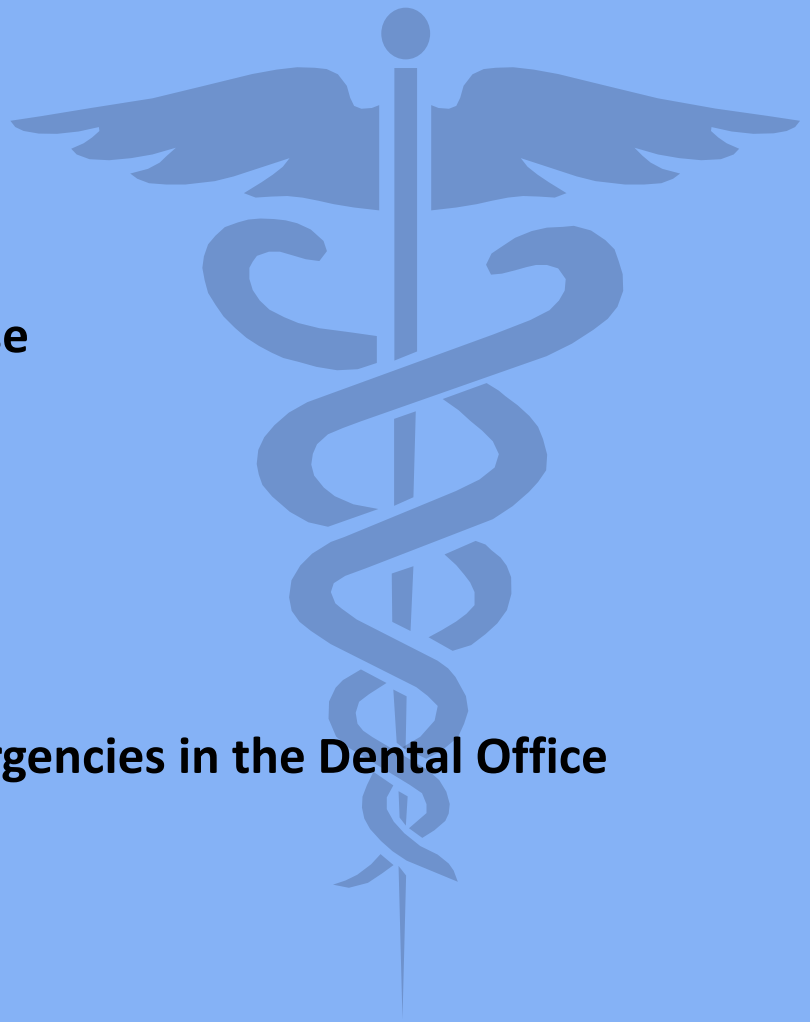
PMH: Diabetes, Hypertension, Atrial Fibrillation
PSH: T&A age 6, PDA ligation age 4
Meds: Insulin, ASA, Metoprolol XL, HCTZ, and Xarelto
Allergies: None

The patient is in a supine position and you give a carpule of Xylocaine 2% with 1:100,000 Epi. Shortly after the injection the patient complains of severe headache, weakness, dizziness, and has slurred speech.

Case 10

Differential Diagnosis

1. Stroke
2. Hypoglycemia
3. Seizure
4. Local Anesthetic Overdose



0.22% of Medical Emergencies in the Dental Office

Stroke Treatment

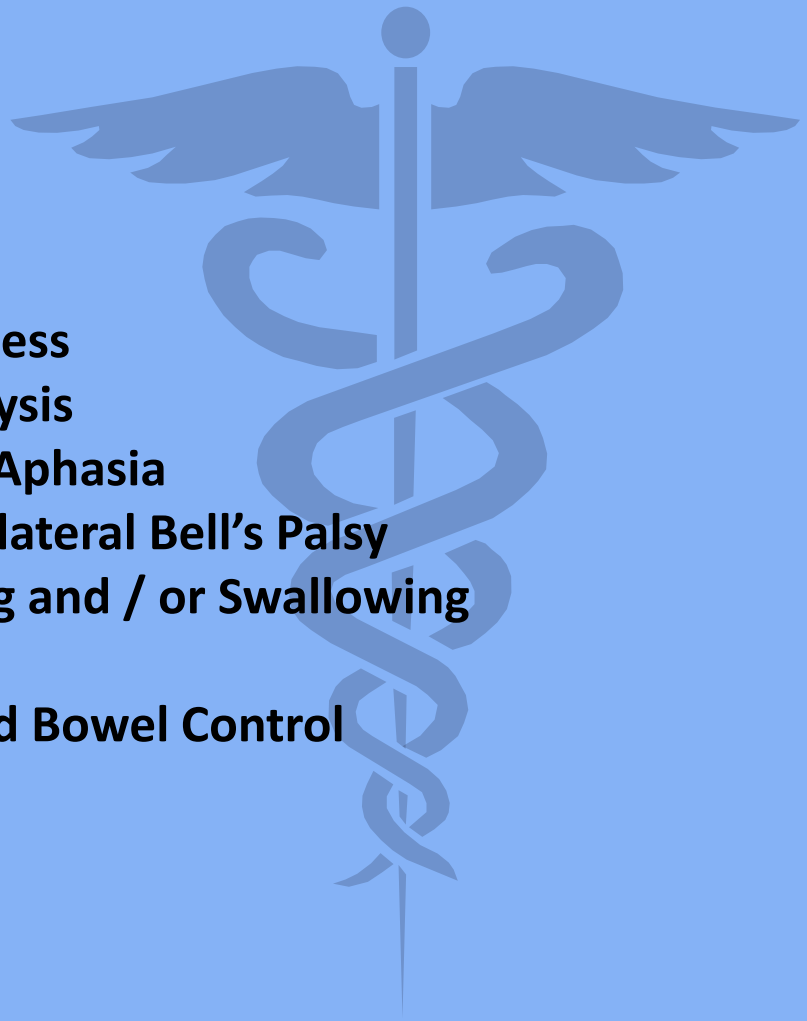
Recognition
Discontinue Treatment
Activate Office Emergency Protocol
Initiate BLS (Assess Circulation – Airway – Breathing)
Position Patient

- **Keep the head in neutral alignment with the body and elevating the head 30 degrees for patients in the acute phase of stroke who are at risk for any of the following:**
  - ✓ **Elevated Intracranial Pressure**
  - ✓ **Aspiration**
  - ✓ **Cardiopulmonary Decompensation**
  - ✓ **Oxygen Desaturation**

Vital Signs
Call 911
Administer O2

Signs and Symptoms of Stroke

- **Vary with the area of the brain affected and type of stroke**
  - Headache
  - Dizziness
  - Vertigo
  - Drowsiness
  - Nausea Vomiting
  - Loss of Consciousness
  - Weakness or Paralysis
  - Slurred Speech or Aphasia
  - “Facial Droop” Unilateral Bell’s Palsy
  - Difficulty Breathing and / or Swallowing
  - Unequal Pupils
  - Loss of Bladder and Bowel Control



Cerebrovascular Accident (Stroke)

Classification of Stroke (CVA)

- Hemorrhagic Stroke ("Wet")
  - 10% of acute strokes
  - Most patients older than 50
  - Most are from an arterial bleed
  - Long standing hypertension and aneurysms are the major causes
    - Anxiety and pain responsible for increasing blood pressure
  - Recurrence rates are high
    - Approximately 33% of aneurysm patients will have a recurrence
  - Risk of CVA increases 30% for every 10mm Hg increase in BP over 160mm Hg systolic

Cerebrovascular Accident (Stroke)

Classification of Stroke (CVA)

- **Cerebral Infarction (Occlusive, "Dry")**
  - **87% of acute strokes**
  - **Atherosclerosis or emboli can cause obstruction of flow**
  - **Cerebral emboli account for 7% of CVA's**
  - **Major source of emboli is from atrial fibrillation (AF)**
  - **Patients with AF are 5 – 17 times more likely to develop a stroke**
  - **Most patients 60 – 70 years old**
  - **Major risk factors are hypertension and diabetes**

Differences Between Embolic and Hemorrhagic Strokes

- **Hemorrhagic CVA's** generally have a more rapid onset
- **Hemorrhagic CVA's** symptoms are generally more intense
- **Hemorrhagic CVA's** associated with higher risk of death

Cincinnati Quick Stroke Assessment

Time is of the Essence When Treating a Stroke Patient

Rapid Diagnosis is The Key to Survival (F.A.S.T.)

F. Face Drooping

A. Arm Weakness

S. Slurred Speech

T. Time (Is Critical)

One of three signs positive 72% chance of stroke

Three of three signs positive > 85% chance of stroke

Newer Stroke Assessment Tool

BE - FAST

B. Balance

E. Eyes

F. Face Drooping

A. Arm Weakness

S. Slurred Speech

T. Time **(Is Critical)**

Supporting Research

BE-FAST (Balance, Eyes, Face, Arm, Speech, Time)
Reducing the Proportion of Strokes Missed Using the FAST Mnemonic

Sushanth Aroor, MBBS; Rajpreet Singh, MD; Larry B. Goldstein, MD

Stroke. 2017;48:479-481. DOI: 10.1161/STROKEAHA.116.015169.)

Summary

1. **858 consecutive records identified, 736 met inclusion criteria; 14.1% did not have any FAST symptoms at presentation.**

2. **42% had gait imbalance or leg weakness, 40% visual symptoms, and 70% either symptom.**

3. **Of patients with ischemic stroke with deficits potentially amenable to acute intervention, 14% are not identified using FAST. The inclusion of gait/leg and visual symptoms leads to a reduction in missed strokes.**

Supporting Research

Enhancing Stroke Recognition: A Comparative Analysis of Balance and Eyes-Face, Arms, Speech, Time (BE-FAST) and Face, Arms, Speech, Time (FAST) in Identifying Posterior Circulation Strokes

Onur Tanglay, Cecilia Cappelen-Smith , Mark W Parsons , Dennis J Cordato

J Clin Med 2024 Oct 3;13(19):5912. doi: 10.3390/jcm13195912.

Summary

1. Posterior circulation stroke (PCS) poses a diagnostic challenge due to the diverse and subtle clinical manifestations.

2. Conclusions: The incorporation of Balance and Eye assessments into the FAST protocol improves PCS detection, although may yield more false positives.