Medical Emergencies in the Dental Office

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- "When you prepare for an emergency, the emergency ceases to exist. The ultimate aim in the management of any emergency is the preservation of life."

Life Threatening Emergencies

- Occurrences are infrequent however, several factors may increase these incidences.
  - older patients
  - therapeutic advances in medicine
  - longer dental appointments
  - increase use of drug administration

Life Threatening Situations

- Factors to help decrease
  - pretreatment physical evaluation
  - medical history questionnaire
  - dialogue history
  - physical examination
  - modifications in dental care

Top Eight Emergencies in Dentistry

- Syncope 15,407
- Mild allergic reaction 2,583
- Angina pectoris 2,552
- Postural Hypotension 2,475
- Seizures 1,595
- Bronchospasm 1,392
- Hyperventilation 1,326
- Epinephrine reaction 913

Emergencies in Dentistry

- Most medical emergencies are entirely stress induced.
  - Pain, anxiety, fear
- Exacerbation of preexisting conditions due to stressful situations

Stress Induced Situations

- Vasopressor syncope
- hyperventilation
- acute cardiovascular emergencies
- bronchospasm
- seizures

Occurrence of Systemic Complications

- Immediately before treatment 1.5%
- During or after local anesthesia 54.9%
- During treatment 22.0%
- After treatment 15.2%
- After leaving dental office 5.5%

Treatment Performed at Time of Complication

Treatment	Percentage
Tooth extraction	38.9
Pulp extirpation	26.9
Unknown	12.3
Other treatment	9.0
Preparation	7.3

Death in the Dental Office

- Most emergency situations that occur in dental practice potentially can threaten the patient's life.
- However, only on rare occasions does a patient actually die in a dental office.
- Accurate statistics on dental morbidity and mortality are difficult to obtain ADA survey of 4000 dentists 45 deaths were reported

Common Medical Emergencies in the Dental Office

- Unconsciousness
- Vasodepressor syncope
- Orthostatic hypotension
- Acute adrenal insufficiency
- Respiratory Distress
- Airway obstruction
- Hyperventilation
- Asthma
- Heart failure and acute pulmonary edema
- Altered consciousness
- Diabetes mellitus
- Thyroid gland dysfunction
- Cerebral vascular accident

Prevention in the Dental Office

- 90% of all life threatening situations can be prevented with an appropriate physical exam.
- 10% are sudden unexpected deaths in spite of all preventative measures

Common Medical Emergencies in the Dental Office

- Seizures
  - Drug related emergencies
  - Drug overdose reactions
- Allergy
- Chest pain
- Angina
- Acute myocardial infarction
- Cardiac arrest and resuscitation

Anxiety Recognition in the Reception Area

- Clinical signs of moderate anxiety
- Questions to receptionist regarding injections or use of sedation
- Nervous conversations with other patients in the waiting room
- History of emergency dental care only
- Cold, sweaty palms

Anxiety Recognition in the Dental Chair

- Clinical signs of moderate anxiety
- Unnaturally stiff posture
- Nervous play with tissue or handkerchief
- White-knuckle syndrome
- Perspiration of forehead and hands
- Overwillingness to cooperate with doctor
- Quick answers

Determination of Medical Risk

- Is the patient capable, both physiologically and psychologically, of tolerating in relative safety the stress involved in the proposed dental treatment plan?
- Is the patient at a greater risk than normal during the planned dental care?
- If the patient does represent an increased risk, what treatment modifications if any should be employed to minimize this risk during the planned dental treatment?
- Is the risk too great for the patient to be managed safely in the dental office?

ASA Physical Status Classification

- ASA I: A normal, healthy patient without systemic disease.
- ASA II: A patient with mild systemic disease.
- ASA III: A patient with severe systemic disease that limits activity but is not incapacitating.
- ASA IV: A patient with an incapacitating systemic disease that is a constant threat to life
- ASA V: A moribund patient not expected to survive 24 hours with or without an operation
- ASA E: Emergency operation of any variety.

Stress Reduction Protocols

- Length of appointment variable
- Follow up with post operative pain and anxiety control.
- Telephone the highly anxious patient the same day treatment was delivered.
- Arrange for early week appointments in case for emergency care if needed

Preparation

- The entire dental staff must be prepared fully to assist in the recognition and management of any potential emergency situation.
- If every staff member is not prepared, those few serious emergencies every doctor encounters may result in tragedy.
- The doctor always is expected to initiate emergency management and be capable of sustaining a patient's life through application of the steps of basic life support.

Preparation

– Basic Life Support
- P Positioning
- A Airway
- B Breathing
- C Circulation
- D Definitive treatment

Preparation

- Staff training should include BLS instruction for all members of the dental staff, recognition and management of specific emergency situations and emergency fire drills.
- Office preparation should include the posting of emergency assistance numbers and the stocking of emergency drugs and equipment

Team Management

- The emergency team should consist of a minimum of two to three members, each with a predefined role in emergency management.
- The doctor usually leads the team and directs the other team members.

Team Management

- Duties of Team Members
  - Provide BLS as indicated
  - Stay with victim
  - Alert office staff members
  - Assist with BLS
  - Monitor vital signs
  - Activate EMS system
  - Assist as needed
  - Maintain records
  - Meet rescue team at building entrance

Office preparation: emergency medical assistance

- Whom to call
  - Clinic Protocol
  - Nearby medical or dental doctor well trained in emergency medicine
- When to call
  - Call as soon as the leader of the team deems it necessary
  - Never hesitate to seek assistance
  - The earlier the better

Emergency Drugs and Equipment

- The Council on Dental Therapeutics in 1998
  - The most important factor in effective treatment of emergencies are the knowledge, judgement and preparedness of the dentist. Since emergency kits should be individualized to meet the special needs and capabilities of each clinician, no stereotyped kit can be approved by the Council on Dental Therapeutics

Emergency Drugs and Equipment

- Drug administration is not necessary for the immediate management of medical emergencies.
- Primary management of all emergency situations involves BLS.
- When in doubt, never medicate.

Administration of Injectable Drugs

- Parenteral Drug Administration
  - IV vs IM
- Administration of IM Medication
  - Grab muscle
  - Hold needle like a dart
  - Quickly insert needle
  - Aspirate
  - Inject
  - Remove syringe
  - Place dry gauze
  - Rub area

Basic Principles for Managing all Medical Emergencies

BLS: remember ABC's

- Place the patient supine.
- Call for assistance.
- Assure patient if conscious.
- Maintain airway.
- Place patient on Oxygen as indicated by nature of emergency.
- Monitor vital signs.
- Diagnose nature of event.
- Initiate specific treatment
- Document, Document, Document!

Airway Obstruction

- **General Signs and Symptoms**
  - Gasping for breath
  - Patient grabs at throat
  - Suprasternal or supraclavicular retraction
- **If Partial Obstruction**
  - Snoring
  - Gurgling
  - Wheezing
  - Crowing

Airway Obstruction

- **If Total Obstruction**
  - No noise
- **Causes of Airway Obstruction**
  - Hypo-pharyngeal Obstruction (Foreign body)
  - Blood, vomitus, water, or saliva in mouth
  - Bronchoconstriction
  - Laryngospasm
  - Tongue (This is the most common)

Airway Obstruction

Airway Obstruction

- **TREATMENT OF AIRWAY OBSTRUCTION**
  - Place patient supine on the floor or 15-30 degrees back in the dental chair
  - Head tilt/chin lift
  - Check airway and breathing, assess cause of obstruction
  - If obstruction caused by fluids use suction (Yankauer suction)
  - Consider Jaw Thrust
  - Place fingers behind posterior border of ramus and displace out
  - Open mouth with thumbs
  - Reassess airway and breathing
  - If not breathing attempt artificial ventilation
  - Reassess airway and breathing
  - If obstruction is caused by a foreign body use **Heimlich Maneuver** if conscious or Foreign Body Airway Obstruction Technique if unconscious (Finger sweep and Abdominal thrusts.)
  - **Surgical Airway**

Hyperventilation

- **Signs and Symptoms of Hyperventilation**
  - Dizziness
  - Hard to breathe.
  - Shaking and trembling.
  - Cold clammy hands (Diaphoresis.)
  - Tight feeling in chest, chest pain, and palpitations.
  - Lightheaded, giddy, impaired consciousness.
  - **Uncontrolled over-breathing**. Respiration rate increase to 25-30/minute.
  - Globus hystericus: feeling of lump in throat and suffocating.
  - Tingling in hands, feet, and perioral areas.
  - Increase in blood pressure and increase heart rate.

Hyperventilation

- **MANAGEMENT OF HYPERVENTILATON**
  - Discontinue treatment and remove any foreign objects from the patient's mouth.
  - Position patient upright.
  - Assess airway.
  - Reassure patient and try to calm them.
  - Have patient breath slowly and shallowly into a paper bag or mask 6-10 time/minute.
  - Monitor vital signs.
  - If available can use Versed IV 1mg/minute up to 4-6mg or IM 5mg to calm the patient.
  - Determine what precipitated attack.
  - Dismiss patient only after vital signs return to a normal range.

Allergic Reaction

- **Signs and Symptoms of an Allergic Reaction**
  - **Cutaneous** reactions are the most common occurrence and include urticarial, exanthematous, and eczemoid reactions.
  - **Angioedema** (Swelling) this varies from localized slight swelling of the lips, eyelids, and face to more uncomfortable swelling of the mouth, throat, and extremities.
  - **Respiratory** (Tightness in chest, sneezing, bronchospasm) bronchospasm is a generalized contraction of bronchial smooth muscles resulting in the restriction of airflow. This may also be accompanied by edema of the bronchiolar mucosa. Bronchospasm is more common with pre-existing pulmonary disease such as asthma or infection but can also be caused by the inhalation of a foreign substance.
  - **Ocular** reactions include conjunctivitis and watering of eyes.
  - **Hypotension** can occur with any allergic reaction.

Allergic Reaction

- **Anaphylaxis:** This is a severe systemic type allergic reaction and is a medical emergency. Signs and symptoms include:
  - Cardiovascular shock including; pallor, syncope, palpitations, tachycardia, hypotension, arrythmias, and convulsions.
  - Respiratory symptoms include; sneezing, cough, wheezing, tightness in chest, bronchospasm, laryngospasm.
  - Skin is warm and flushed with itching, urticaria, and angioedema.
  - Nausea, vomiting, abdominal cramps, and diarrhea also possible

Allergic Reaction

- **Evaluation of Allergic Reactions:** Things to remember.
  - Skin manifestations may precede more serious cardiorespiratory problems.
  - Recognition of skin reactions and early treatment may abort more serious problems.
  - **Most important factor is assessing the seriousness of the condition is the rate of onset.**
  - Reactions that occur greater than one hour after the administration of the allergen will usually be of a non-emergent nature.

Allergic Reaction

- **TREATMENT**
- **General Treatment**
  - ABC's
  - Maintain airway, administer oxygen, and determine possible need for intubation or surgical airway.
  - Monitor vital signs.
  - If in shock put patient in a horizontal or slight Trendelenburg position.
- **Mild Reactions**
  - Antihistamines usually effective. (Benadryl 50-100mg or Cholpheniramine maleate 4-12 mg PO, IV, or IM.)
  - Identify and remove allergen.
  - Follow up medications in 4-6 hours.

Allergic Reaction

- **Severe Reactions**
  - If available start IV Fluids
  - Epinephrine is drug of choice. Usually prepackaged 1:1,000 in 1mg vials or syringe
  - If IV in place titrate 1:1,000 solution to effect.
  - If drop in blood pressure is minimal, start with 0.5ml (0.5mg.)
  - If drop in blood pressure is severe start with 2ml (2mg.)
  - Repeat after 2 minutes if needed.
  - If no IV use 1:1,000 (1mg/CC) IM 0.3 to 0.5mg (0.3-0.5CC.)
  - For an adult repeat this dose in 10 to 20 minutes.
  - If the patient is intubated can give epinephrine endotracheally
  - If Asthma, edema, or pruritis (Itching) are present can use Corticosteroids. However these drugs are to slow acting to be used for an emergency situation
  - Hydrocortisone sodium succinate (Solu-cortef) 100-500mg IV or IM. Dexamethasone (Decadron) 4-12mg IV or IM.
  - Repeat dose at 1, 3, 6, and 10 hours as indicated by severity of symptoms.
- **Other Considerations**
  - Monitor and record vital signs.
  - Seizures are possible as a result of circulatory or respiratory insufficiency.
  - Most severe allergic reactions require hospitalization and observation for 24 hours.

Asthma Attack

- **Signs and Symptoms of an Asthma Attack**
  - Sense of Suffocation, patient will sit up like they are fighting for air.
  - Pressure or tightness in chest.
  - Non-productive cough.
  - Expiratory and inspiratory wheezes.
  - Expiration is prolonged and harder than inspiration.
  - Chest is distended.
  - Thick Stringy mucous. At termination of a period of intense coughing the patient will expectorate this mucous.
- **Severe Asthma Attack**
  - Cyanosis of the nail beds.
  - Perspiration and flushing of the skin.
  - Use of accessory muscle of respiration: Sternocleidomastoid, and shoulder/abdominal muscles.
  - Patient may also appear confused and agitated

Asthma Attack

- **MANAGEMENT OF AN ASTHMA ATTACK**
  - Discontinue dental treatment.
  - Place patient in easiest position for them to breath. This is usually upright with arms outstretched.
  - Albuterol Inhaler (Proventil) 2 puffs every 2 minutes.
  - Supplemental oxygen at 10L/min.
  - Monitor vital signs.
  - If no improvement call EMS.
  - Start IV.
  - Consider Epinephrine 1:1,000, 0.3g every 20 minutes.
- **Dental Treatment Considerations for the Asthmatic Patient**
  - Take a good Medical History prior to treatment; determine how often the patient has an asthma attack and what precipitates it.
  - Consider scheduling morning appointments.
  - If patient uses an inhaler they should have it on hand during treatment. Consider prophylactic use prior to treatment.

Angina

- **Signs and Symptoms of Angina**
  - Sub-sternal Pain that spreads across the chest and may radiate to any area above the diaphragm. This type of pain may also originate from gas, indigestion, or muscle strain.
  - May vary from a heavy squeezing pain to a pressure or heavy sensation in the chest.
  - Pain usually lasts for a few minutes and disappears with rest; can last for up to 60 minutes.
  - Other symptoms such as palpitations, faintness, dizziness, dyspnea, and digestive disturbances may accompany angina.

Angina

- **MANAGEMENT OF ANGINA**
  - Stop all treatment and stimulation of the patient.
  - Position the patient comfortably; sitting upright is usually preferred.
  - Activate EMS **(Call 911.)**
  - Administer Oxygen via mask at 10-15L/min.
    Monitor and record vital signs, if monitors are available use them.
  - Administer one tablet of Nitroglycerin 0.4mg sublingual or one metered dose spray. If using tablets do not touch use gloves. Nitroglycerin can be absorbed through the skin.
  - If no relief after two minutes repeat Nitroglycerin. Can repeat a third time if no relief.
  - Monitor blood pressure after each dose; do not repeat dose if systolic BP drops below 100.
- ***If no relief of angina after third dose of nitroglycerin it should be assumed the patient is suffering from a Myocardial Infarction (Heart attack.)***
- **Dental Treatment Considerations for Patients with a history of Angina**
  - Treatment should be oriented towards prevention of an angina attack.
  - Prophylactic nitroglycerin may be given sublingually prior to any injection or stressful procedure.
  - Administer Oxygen by nasal canula during procedure.
  - Consider use of oral or IV sedation to reduce anxiety.

Myocardial Infarction

- **Signs and Symptoms of a Myocardial Infarction (Heart Attack)**
  - Often preceded by a history of angina.
  - Pain usually described as heavy, squeezing, pressing, or crushing in nature. Pain is located over middle third of sternum.
  - Pain radiates to left arm in 25% of cases and can also radiate to the mandible.
  - Pain is not relieved by nitroglycerin and is longer in duration than angina (Angina generally last 30 minutes to one hour.)
  - Silent MI (No pain) occurs in 15-20% of cases though they may suffer from nausea, vomiting, weakness, and anxiety.
  - Other Clinical symptoms include weakness, diaphoresis, and hypotension.
  - Patient may appear very apprehensive and express intense fear of impending doom.
  - Patient is often restless, moving about in an attempt to find a comfortable position.
  - Dyspnea is present as patient complains that crushing pressure prevents normal breathing.
  - Patient may clutch chest with fist (This is called Levine's Sign.)
  - Cardiac arrhythmias occur in 95% of patients suffering from a MI.
  - Arrhythmias usually occur within the first two hours after onset of the MI.
  - Ventricular fibrillation is the most common arrhythmia. Cardiac arrest is the result and must be converted to a normal rhythm as soon as possible.

Myocardial Infarction

- **MANAGEMENT OF A SUSPECTED MYOCARDIAL INFARCTON**
  - Discontinue all treatment
  - Clear the mouth of all foreign material.
  - Place patient in a comfortable position (Usually upright.)
  - Administer Oxygen at 10-15L/min.
  - ***Activate EMS.***
  - Monitor and record vital signs every 5 minutes (Including blood pressure, pulse, and respiration rate.)
  - Give the patient an aspirin (325mg) if available and have them chew it and allow it to absorb through the oral mucosa.
  - If equipment available start an IV (18gauge catheter with Normal Saline.)
  - If equipment available attach cardiac monitors.
  - If a provider is properly trained and equipment is available proper ACLS protocols should be initiated.
  - If patient looses consciousness initiate proper BLS protocols.
  - Have AED available
- ***TRANSPORT: In the case of a MI the earlier the patient is transported to a hospital and definitive treatment begun the better the chance the patient will survive with minimal cardiac damage.***

Adverse Drug Reactions
Local Anesthetic and Epinephrine Toxicity

- **Signs and Symptoms of Epinephrine Toxicity**
  - Agitation, weakness, and headache.
  - Pallor, tremor, palpitation.
  - Sharp rise in blood pressure and heart rate.
- **Signs and Symptoms of Local Anesthetic Toxicity**
  - Agitation.
  - Muscular twitching and tremors.
  - Increased blood pressure and heart rate.
  - Light-headedness.
  - Visual and auditory disturbances (Tinnitis, Difficulty focussing.)
  - If moderate to high overdose of Local anesthetic can also have convulsions and depression of blood pressure, heart rate, and respiration

Adverse Drug Reactions
Local Anesthetic and Epinephrine Toxicity

- **MANAGEMENT OF TOXIC REACTIONS TO EPINEPHRINE:**
  - toxic effect of epinephrine is transitory rarely lasting more than a few minutes
  - Stop dental treatment.
  - Place patient in most comfortable position.
  - Monitor vital signs.
  - Consider administering oxygen.
  - Allow time for the patient to recover.
- **Dental Treatment Considerations for use of Epinephrine**
  - Due to its cardiovascular effects limit use in patients with history of heart disease or stroke.
  - Can cause uterine contractions in the pregnant female.
  - Possible drug interactions (Especially MAO inhibitors and Cocaine.)
- Remember the patient has endogenous epinephrine. Production of this is increased in stressful situations.

Adverse Drug Reactions
Local Anesthetic and Epinephrine Toxicity

- **MANAGEMENT OF TOXIC REACTIONS TO LOCAL ANESTHETIC:** treatment varies with the onset and severity of the reaction.
  - **MILD REACTION/RAPID ONSET** (Example is an intravascular injection)
    - Reassure patient.
    - Administer Oxygen.
    - Monitor and record vital signs.
    - Allow for recovery; determine if patient can be allowed to leave unescorted.
  - **MILD REACTION/SLOW ONSET**
    - Toxic reaction with a delayed onset is most likely a result of impaired biotransformation.
    - Evolves slowly, use caution. Monitor patient. Record vital signs

Adverse Drug Reactions
Local Anesthetic and Epinephrine Toxicity

- **SEVERE OVERDOSE/RAPID ONSET, SEVERE OVERDOSE/SLOW ONSET**
  - ABC's.
  - Activate EMS.
  - Administer Oxygen by mask at 10-15L/minute.
  - Start IV if available (18 gauge catheter with Normal Saline.)
  - If needed and available administer anticonvulsant, Versed 2mg, then 1mg/min to effect (Monitor respiration.)
  - Monitor and record vital signs.
  - Allow for recovery and discharge with appropriate escort or transport to hospital if required.
- **Treatment Considerations to Avoid Adverse Drug Reaction**
  - Prevention is the key. Take a complete medical history. Determine if there are any diseases present that affect the use of a drug.
  - Know what medications the patient is taking and possible drug interactions.
  - Careful injections make sure to aspirate to avoid an intravascular injection.
  - Know the maximum doses of local anesthetic.

Hypoglycemia

- **Signs and Symptoms of Hypoglycemia**
  - Diminished cerebral function; decreased spontaneous conversation, lethargy.
  - Increased sympathetic tone; sweating, tachycardia, piloerection.
  - Anxiety.
  - Bizarre behavior (Like intoxication.)
  - Rapid progression of symptoms

Hypoglycemia

- **MANAGEMENT OF THE HYPOGLYCEMIC PATIENT**
  - ABC's
  - If patient is unconscious or unstable activate EMS.
  - If patient is conscious administer oral carbohydrates (Orange juice, sugar, candy bar, cake icing.)
  - Unconscious patient administer parenteral carbohydrates if available (50cc of 50% dextrose IV over a period of 2-3 minutes.)
  - Patient should respond within 5 minutes.
  - Never give unconscious patient anything orally!
- **Dental treatment Considerations**
  - Prevention is the key. Take a complete medical history. Especially note a history of diabetes.
  - In the diabetic patient extra attention should be paid to stress management and assessing diet.
  - If the patient is on insulin and eating will be impaired by dental treatment the insulin dose should be decreased accordingly (Medical consult.)

Hypertensive Crisis

- **Signs and Symptoms of a Hypertensive Crisis**
  - A rise in the systolic blood pressure to 200 mm HG or greater and a corresponding rise in the diastolic pressure to 120 mm HG or greater.
- **MANAGEMENT OF A HYPERTENSIVE CRISIS**
  - **EMERGENCY MEDICAL REFERAL!!!!**
- **Dental Treatment Considerations**
  - In the dental office a hypertensive crisis will most likely be seen in four types of patients.
    - primary hypertension,
    - drugs that deplete catecholamine storage in adrenergic nerve endings,
    - undiagnosed pheochromocytoma
    - uncontrolled thyroid crisis

Hypotension

- **Signs and Symptoms of Hypotension**
  - Weakness.
  - Diaphoresis.
  - Decreased level of consciousness.
  - Possible nausea and vomiting

Hypotension

- **MANAGEMENT OF HYPOTENSION:**
  - The treatment of hypotension is based on treating the etiology. Possible etiologies include **Psychological Factors (Stress), Overdose of Medication, Postural Changes, Coexisting Disease, Hypovolemia, Anesthetic Overdose, Reflex (Pain), Hypoxemia, and Hypercarbia.**
    - Stop dental treatment and remove all foreign objects from the patient's mouth.
    - Administer Oxygen.
    - Place patient in semi-recumbent position with legs elevated above the level of the heart.
    - Monitor and record vital signs,
    - Check level of consciousness.
    - If patient does not respond to the above treatment a major systemic complication should be considered. Activate EMS at this point. Consider possible **Pulmonary Embolism, Cerebral Vascular Accident (Stroke), Myocardial Infarction, and Congestive Heart Failure.**

Unconsciousness/Syncope

- **Signs and Symptoms of Syncope:** Can be broken into three categories or phases
- **Pre-syncope**
  - Warm feeling in face and neck.
  - Pale or ashen coloration.
  - Sweating.
  - Feels cold.
  - Abdominal discomfort.
  - Lightheaded or dizziness.
  - Mydriasis (Pupillary dilatation.)
  - Yawning.
  - Increased heart rate.
  - Steady or slight decrease in blood pressure

Unconsciousness/Syncope

- **Syncope**
  - Patient loses consciousness.
  - Generalized muscle relaxation.
  - Bradycardia (Weak thready pulse.)
  - Seizure (Twitching of hands, legs, and face.)
  - Eyes open (Out and up gaze.)
- **Post-syncope**
  - Variable period on mental confusion.
  - Heart rate increases (Strong rate and rhythm.)
  - Blood pressure back to normal levels.

Unconsciousness/Syncope

- **MANAGEMENT OF SYNCOPE OR UNCONSCIOUSNESS**
  - Stop all dental treatment.
  - Remove all objects form the patient's mouth.
  - Place patient in supine position with legs and arms elevated and head at level of heart. If patient is pregnant roll onto left side.
  - ABC's, ensure that the airway is open.
  - Use Ammonia ampule to stimulate breathing.
  - Oxygen 3-5L/min by nasal canula, 10L/min by mask.
  - Reassess airway.
  - If unconscious for more than 1 minute activate EMS.
  - Start IV if available.
  - Augment ventilation if respiratory effort is poor (Use Ambu bag.)
  - Reassess airway every 30 seconds.

Unconsciousness/Syncope

- **Dental Treatment Considerations**
  - Delay further dental treatment 24 hours especially if the patient lost consciousness.
  - If the patient lost consciousness they must not be permitted to leave unescorted or drive a motor vehicle.
  - Determine the cause of the syncopal episode prior to completing further treatment.
  - Stress is the major cause of syncope in the dental practice. Prevention is the key to management of syncope. This includes taking a complete medical history and thorough evaluation of the patient.
  - Use stress management protocols, morning appointments, consider sedation.
  - Ensure that patients do not miss meals prior to treatment.

Unconsciousness/Syncope

- **Differential Diagnosis for Unconsciousness**
  - **General**
    - Postural Hypotension.
    - Psychological (Stress.)
  - **Under 40 Years Old**
    - Hypoglycemia.
    - Epilepsy.
    - Acute Adrenal Insufficiency

Unconsciousness/Syncope

- **Over 40 Years Old**
  - Myocardial Infarction
  - Cerebral Vascular
  - Acute Arrhythmia's
- **No Response to BLS**
  - Drug Induced (Overdose.)
  - Hypoglycemia/Hyperglycemia.
  - Acute Adrenal Insufficiency.

Take Home Points

- **Staff Training and Preparation**
  - Training: Staff needs to have the knowledge to identify and correctly manage each emergency.
  - Easily accessible emergency equipment and drugs.
  - Coordination of office personnel.
- **What is adequate Preparation?**
  - Guidelines vary by state and organization. In general it is expected that the doctor will be able to initiate emergency management and be capable of sustaining a victims life through the application of **B**asic **L**ife **S**upport.
  - " In times of crisis simplicity halts confusion!"

"Who you calling old?"

- Definition of Geriatrics
- Age 65 or older!
- 2040 – 24% of US population
- ~50% of total federal healthcare budget

"70 is the new 50"

- Not all elderly are alike
- Age is just a number
- Altered physiology is not uniform
- Requires more thorough pre-op assessment
- Tailored personalized plan

90th Birthday

The Geriatric Patient

- Aging: inherent impairment of function
- Difference between
  - Chronologic age
  - Biologic age
- Elderly: 65 – 74
- Aged: 75 – 84
- Very old: > 85

Altered Physiology

- Age related changes in anatomy, physiology and response to medications
- 3 fold increase in peri-operative death

Age Related Changes

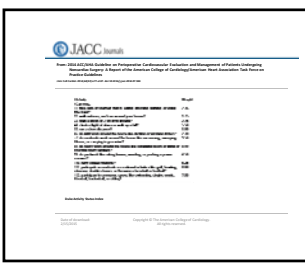
Cardiac

- Increased disease
  - HTN
  - Cholesterol
  - Valve disease
  - Heart blocks
  - Heart failure
- Decreased strength
- Decreased compliance

Individual Cardiac Functional Assessment

METS

- Defined as the energy expenditure for sitting quietly
- Exercise capacity
- Duke Activity Status
- Can this patient's heart tolerate the stress of the procedure?



JACC Journals

From: 2014 ACC/AHA Guideline on Perioperative Cardiovascular Evaluation and Management of Patients Undergoing Noncardiac Surgery: A Report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines

Duke Activity Status Index

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Cardiovascular Changes

Distensibility of the aorta	↓
Baroreceptor sensitivity	↓
Response to catecholamines	↓
Maximum heart rate	↓
Maximal cardiac output	↓
Maximum coronary blood flow	↓
Cardiac dysrhythmias	↑

Hmm.. To sedate or not to sedate

- Grows short of breath moving from wheelchair to operating chair
- Pops nitro below tongue before breakfast
- Rubs chest in discomfort
- 50 page medication list

Age Related Changes

- **Respiratory**
  - Cumulative effects of environmental insults – smoking, COPD
  - Loses protective airway reflexes
  - Stunted response to hypoxia and hypercarbia

Changes in Pulmonary Function

Total lung capacity	Decreased
Vital capacity	Decreased
FEV_1	Decreased
Residual volume	Increased
Functional residual capacity	Increased
Dead space	Increased
Closing capacity	Increased

Chest Wall Mechanics

- Calcification of the thoracic cage
- Loss of height of intervetebral disks
- Fibrosis
  - Lungs stiffer and less compliant
    - Increased effort to expand
    - Less muscle strength
- Less efficient diaphragmatic contraction
  - Impaired coughing

Gas Exchange

- Alveolar – arterial oxygen gradient increases with aging
  - $\Rightarrow$ Decrease in PaO_2
  - $\Rightarrow$ Ventilation perfusion mismatching
- Decreased lung elasticity
- Break-up of alveolar septa $\rightarrow$ enlarged alveoli $\rightarrow$ diminished surface area
- Airway collapse
  - Air trapping
  - Uneven inhaled gas distribution
- Parenchymal changes $\rightarrow$ abnormal blood flow patterns

Hmm.. To sedate or not to sedate

- Grows short of breath moving from wheelchair to operating chair
- Home oxygen tank on wheel chair
- Leans forward to take deep breathes during conversation
- Smokes through trach
- Huffing, puffing and coughing more than talking

Age Related Changes

- **Kidneys and Liver**
  - Blood flow and mass decreased
  - Structure and function altered
  - Affects drug metabolism, clearance and elimination
  - Increased adipose

Drug	Young Adult	Older adult
Versed	250 mins	925 mins
Fentanyl	2.8 hrs	4.3 hrs

Hmm.. To sedate or not to sedate

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Age Related Changes

- **Endocrine**
  - Diabetes
  - Thyroid dysfunction
  - HRT
  - Osteoporosis and calcium disturbances
  - Finding a vein!

Age Related Changes

- **Brain and Cognition**
  - Decline in CNS function
    - Motor
    - Sensory
    - Autonomic dysfunction
  - Prone to depression and delirium
  - Generally need less meds and take longer to wake up

Hmm.. To sedate or not to sedate

Your Recipe for Anesthesia

- Take one patient
- Heat – medical history, meds, allergies
- Add anesthetic of choice as needed
- Consider adding more or less depending on procedure, expected blood loss, recovery time etc
- Garnish with good recovery

Tweaking that Recipe

- Anesthetic plan based on patient evaluation
- Local whenever possible and feasible
- Hospital whenever possible and feasible

Considerations in Geriatric Anesthesia

- Co-morbidities , not age
- Power of Attorney
- Ability to manage potential complications
  - CV
  - Airway
- Discharge criterion
  - PACU staffing – full attention
  - Baseline
  - Transport
  - 24 hr monitoring

With Aging

- Generalized changes in virtually every subcellular, cellular and tissue element
- Age related alterations of function / functional reserve
- Anesthesia
  - Brain
  - Cardiovascular system
  - Pulmonary
  - Hepatic
  - Renal

Anesthetic management of the geriatric patient

- Local anesthesia → general anesthesia
- Pharmacokinetic
  - What the patient does to the drug
    - Clearance
    - Volume of distribution →
    - Half-life
    - Bioavailability
- Pharmacodynamic
  - What the drug does to the patient

↑Adipose tissue

↓Intracellular water

Prep

NPO Guidelines

- **Adults**
  - 8 hours for a normal meal
  - 6 hours for a light meal (toast and clear liquids)
  - 2 hours for clear liquids
- Gastric clearance is slower in geriatrics
- Ensure NPO
- Scheduling is key – youngest to oldestsickest to healthiest

Prep

Medication list

- Document current meds at consult
- Write down pre-op instructions for patient
- Re-affirm meds on morning of surgery
- Make contact with PCP

Safety of Medications in the Elderly

Inhalational Agents

- MAC drops with age
- Less gas
- Nitrous Oxide
  - Easy on and off
  - Safety margin
  - Anxiolytic, analgesic
  - O2 supplementation

Safety of Medications in the Elderly

Moderate Sedation

- 1-2 agents
- Midazolam + Fentanyl
  - Short acting
  - Reversible
  - Be conservative in dosing
  - Can extend well beyond recovery
  - Other benzos or opioids?

Deep Sedation / GA

- Slip in some Propofol
- An adjunct to deepen anesthesia
- Fat re-distribution and slower metabolization
- Only for administration of LA?
- Longer recovery

Recovery

- After the procedure –
  - Avoid orthostatic hypotension
  - Gradually sit patient up
  - Consider recovering in the OR
  - Full monitoring until baseline
  - O2 during recovery
- Stricter d/c criterion
- If in doubt, don't discharge
- Written clear instructions

Escort, Transport

- Who is the escort?
- Who is the POA for consent?
- Who will be with the patient during recovery?

Post-op Pain Management

- Pre-op meds
- Complexity of procedure
- Existing co-morbidity
  - Liver Disease – avoid Acetaminophen
  - Gastric Ulcers – avoid ASA
  - OSA – avoid narcotics
- Keep new prescriptions simple, minimal

Post-operative cognitive dysfunction

- *"never been the same"*
- The patient wants to know what is the risk of him sustaining long-lasting cognitive dysfunction.

Incidence of POCD

- POCD 1 week after surgery is common at any age following major non-cardiac surgery
  - Incidence: 19.7% - 41.4%
- POCD at 3 months is age associated
  - < 60's incidence no different between surgery and non-operated
  - 60 to 69: 9.9 – 14.3%
  - 70+: twice the rate of POCD than group 60 to 69

Factors associated with postoperative delirium

- Preoperative cognitive impairment or dementia
- Older age
- Poor physical function
- High risk surgeries
- Under-treated pain
- Infection, metabolic derangement

An Association between Anesthesia & Delirium

- Narcotics
  - Meperidine
- Benzodiazepines
  - Longer acting
  - Higher dosage
- Anticholinergics

Summary

- Separate the effects of aging per se from the consequences of age-related disease.
- Aging produces progressive atrophy, fibrosis and loss of elasticity in virtually all tissues and organs.
- In the absence of disease, however, organ function remains adequate to meet the basal requirements
- Pre-op eval is king!

Obesity

- Body mass index (BMI) weight (kg) / Height^2 (meters)
- Underweight: <18.5

- Normal: 18.5 to 24.9
- Overweight: 25 to 29.9
- Obese: 30 to 39.9
- Extremely obese: > 40
- Obesity
  - 20% > IBW
- Morbid obesity
  - > 2 x's IBW

Emergency Kit

Emergency Kit

The ADA Council on Scientific Affairs, in its 2002 report in the *Journal of the American Dental Association*, "Office Emergencies and Emergency Kits," recommends the following drugs be included as a minimum. This essential list remains the standard:

•Epinephrine 1:1,000 (injectable)
•Histamine-blocker (injectable)
•Oxygen with positive-pressure administration capability
•Nitroglycerin (sublingual tablet or aerosol spray; be aware of contraindications)
•Bronchodilator (asthma inhaler)
•Sugar (a quick source of glucose such as orange juice)

Emergency Kit

- Additional items to include in a patient emergency kit:
- Aromatic ammonia
- Blood pressure monitoring equipment
- CPR pocket mask
- Syringes
- Tourniquets
- High-volume suction and aspiration tips or tonsillar suction

Employee Requirement

- OSHA requires employers to have emergency kits for employees and lists the following supplies as adequate for small work sites, consisting of approximately two to three employees. Larger practices should provide additional supplies or emergency kits.

Employee Requirement

- Directions for requesting emergency assistance
- Gauze pads (at least 4 x 4 inches)
- Two large gauze pads (at least 8 x 10 inches)
- One box of adhesive bandages
- One package gauze roller bandage (at least 2 inches wide)
- Two triangular bandages
- Wound cleaning agent (such as sealed moistened towelettes)
- Scissors
- At least one blanket
- Tweezers
- Adhesive tape
- Latex gloves
- Resuscitation equipment (such as resuscitation bag, airway or pocket mask)
- Two elastic wraps
- Splint

Thank you