MANAGING MEDICAL EMERGENCIES

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OVERVIEW

Oral healthcare providers are called upon to treat an ever-increasing number of medically compromised patients.

- Clinicians can expect to face situations that threaten the physical well-being of their patients.
- Being ill prepared for such an eventuality is inexcusable.
- Being subjected to public censure or accused of negligence is an agony best prevented.

LEARNING OBJECTIVES

Upon completion of this program clinicians will be able to:

- Discuss the etiology of common medical emergencies.
- Recognize signs and symptoms.
- Implement preventive and treatment strategies.

MEDICAL EMERGENCIES

Common life-threatening medical emergencies that can and do occur in oral healthcare settings:

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BEING PREPARED

Oral healthcare providers must be able to:

- Assess the physical and emotional status of their patients.
- Identify high-risk patients who may experience a medical emergency and implement preventive strategies.
- Recognize the signs and symptoms of common medical emergencies and know how to sustain life with their hands, their breath, a few basic therapeutic agents.

First do no harm

- Didactic and hands-on training in emergency medicine
- Practice with staff under simulated emergency conditions
- Prevention, recognition, and management of common medical emergencies
- Basic life support for healthcare providers
- Automated external defibrillator
- Advanced cardiac life support
- Pediatric advanced life support
<ul><li>Develop an emergency team</li></ul>

- Team leader: the dentist
- Assesses level of consciousness
- Performs physical examination
- Obtains initial vital signs
- Determines the course of treatment
- Initiates CPR & AED

- Team member 2
  - Gathers emergency equipment and supply
  - Emergency kit
  - Oxygen tank and attachments
  - AED
  - Prepares therapeutic agents
  - Administers oxygen
  - Assists with CPR

- Team member 3
  - Activates EMS
  - Meets paramedics at building entrance
  - Monitors vital signs
  - Records information in the patient's chart
  - Assists with CPR

- Team member 4
  - Assists with CPR
  - Performs other duties as needed

#### Emergency equipment and drugs

- Equipment
  - Oxygen tank
  - Portable E cylinder with regulator
  - Nasal canulae
  - Nonbreathing masks with an oxygen reservoir
  - Nasal hood
  - Positive pressure administration capability
  - Bag-valve-mask device with oxygen reservoir
  - Oropharyngeal airways (adult sizes 7, 8, and 9 centimeters)
  - Magill forceps
  - To retrieve foreign objects from the hypopharynx
  - Automated external defibrillator (AED)
  - Stethoscope and sphygmomanometer (adult small, medium, and large cuff sizes)

- Emergency drugs
  - Epinephrine, 1:1,000
  - Autoinjectors (adult, 0.3 mg; child, 0.15 mg)
  - Histamine (H1)-receptor blocking agent
  - Injectable and oral Nitroglycerin
  - Bronchodilator
  - Albuterol inhalor
  - Glucose
  - ASA
  - Aromatic ammonia

#### Never treat a stranger

- Medical history
  - Provides valuable information that will help in identifying high-risk patients
- Physical examination
  - Visual inspection
  - Baseline vital signs
  - Provides an objective assessment of the patient's quality of life at the moment
Managing Medical Emergencies (being prepared)

- ASA physical status III
  - Evidence of severe systemic disease
  - Medically fragile
  - Limitation on physical activity
    - Moderate functional capacity

- ASA physical status IV
  - Evidence of incapacitating systemic disease
  - Condition(s) constant threat to life
  - No physical activity
    - Poor functional capacity

Managing Medical Emergencies

BASIC EMERGENCY PROCEDURES
Those activities a clinician “can’t afford not to do” when faced with an unexpected urgent problem

▼ Primary survey
▼ Secondary survey

- Assess responsiveness
  - Conscious (alert)
  - Altered consciousness (disoriented)
  - Unconscious (unresponsive)
    - PERRLA (pupils equal, round, reactive to light, and accommodate)
      - Constricted, as in drug overdose
      - Dilated, as in shock
      - Unequal, as in stroke

Managing Medical Emergencies (basic emergency procedures)

- Position the patient
  - Conscious patient
    - Should be allowed to assume a comfortable position
  - Unconscious patient
    - Should be placed in a supine position with legs elevated to about 15° to 30°
    - Facilitates blood flow to the brain

Managing Medical Emergencies (basic emergency procedures)

Primary survey (all patients)
- Five fundamental steps are to be implemented in every emergency situation
  - Assess responsiveness
  - Position the patient
  - Check airway
  - Check breathing
  - Check circulation
- Identifies problems that are life-threatening and must be treated immediately
Managing Medical Emergencies
(basic emergency procedures)

- Check airway
  - Remove all foreign objects from the mouth
  - Suction excessive or frothy saliva and blood
  - Examine the throat for evidence of edema
  - Signs of anaphylaxis

- If the patient is conscious and talking
  - The airway is patent at this time

- If the patient is unconscious
  - Ensure patency of the airway
    - Tilt the patient’s head and lift the chin
    - Jaw thrust
  - Check for movement of air
    - Look to see if the chest rises
    - Listen for airflow
    - Feel the chest wall for movement

- If the patient is breathing
  - Monitor the rate and character
    - Bradypnea (rates <12)
    - Hypoventilation
    - Tachypnea (rates >15)
    - Hyperventilation
    - Labored with stridor or wheezing
    - Bronchospasm (asthma, allergic reaction)

- If the patient is not breathing
  - Administer two slow deep breaths
    - Each lasting one second
    - Should see the chest rise
  - Initiate rescue breathing
    - 10 to 12 breaths per minute for an adult
    - 12 to 20 breaths per minute for a child

- Check breathing
  - If the patient is breathing
    - Monitor the rate and character
  - Bradycardia
  - >60 beats per minute
  - Tachycardia
  - <100 beats per minute

- If the patient is conscious
  - Palpate the radial artery
  - Medial aspect of the antecubital fossa

- If the patient is unconscious
  - Palpate the radial artery
  - Medial aspect of the antecubital fossa
If the patient is unconscious:
- The carotid is the best artery for assessing the pulse.
- The absence of a palpable pulse and unresponsiveness must be assumed to be a result of sudden cardiac arrest.
- ACTIVATE EMS & AED.
- Begin chest compressions at a rate of 100 per minute.
- Consistent with current BLS training.

Blood pressure:
- Blood pressure greater than 180/120 mm Hg: Hypertensive syndrome.
- Blood pressure less than 90/50 mm Hg: Reliable sign of cardiogenic shock.

Secondary survey (patient is conscious and communicative):
- Focuses on those organ systems that are associated with the patient’s complaints and/or primary survey findings.
- Chief complaint.
- Signs and symptoms.
- Allergies.
- Medications.
- Past medical history.
- Last oral intake of food.
- Events leading to this incident.

Identifies problems that are not imminently life-threatening, but require immediate stabilization.

VASOPRESSOR SYNCOPE
Sudden brief loss of consciousness.
- Cerebral hypo-perfusion precipitated by a generalized, progressive autonomic discharge.
- The initial appropriate adrenergic response to a precipitating factor.
- Overwhelmed by a cholinergic response just prior to unconsciousness.

Prevention:
- Identify high-risk patient
- Reduce stress
- Sedation
- Ensure profound local anesthesia
- Use local anesthetic agents containing a vasoconstrictor with caution
- Treat patient in a supine position
- Recognize pre-syncope
### Managing Medical Emergencies (vasopressor syncope)

#### Signs and symptoms
- Adrenergic component
  - Feeling of anxiety
  - Pallor
  - Dilation of pupils
  - Hyperventilation
  - Tachycardia
  - Palpitation
- Cholinergic component
  - Perspiration
  - Nausea
  - Salivation
  - Bradycardia
  - Hypotension
  - Sudden, brief loss of consciousness
  - Seizure (rarely)

#### Treatment
- Place patient in a supine position
  - Head and chest parallel to the floor
  - Feet slightly elevated
- Administer oxygen
  - 4 to 6 L/min by nasal cannula
- Stimulate cutaneous reflexes
  - Cold towel
  - Aromatic ammonia
- Evaluate pulse rate, respiratory rate, and blood pressure every 10 minutes
- In the absence of a palpable pulse and unresponsiveness
  - Activate EMS
  - CPR
    - Automated external defibrillator

### Managing Medical Emergencies (vasopressor syncope)

#### Nota bene
- Most cases of syncope are benign, especially in young adults
  - Patients typically respond to positional changes within 30 to 60 seconds
- If the patient does not respond in 30 to 60 seconds consider
  - Hypoglycemia
    - Patient breathing spontaneously
    - BP normal
  - CVA
    - Patient is breathing spontaneously
    - BP high
  - Sudden cardiac arrest
    - Patient does not breathe spontaneously

### Managing Medical Emergencies (postural hypotension)

#### Pre-disposing factors
- Impaired homeostatic mechanisms of blood pressure regulation
  - Age-related changes
  - Disease-related changes
  - Antihypertensive medications
  - Recent food intake

#### Prevention
- Identify high-risk patients
  - Pre-treatment
    - Appoint 30 to 60 minutes after food and/or medication intake
  - Post-treatment
    - Allow susceptible patients to assume an upright position gradually

#### Signs and symptoms
- No prodromal signs and symptoms
- Syncope
  - Following postural change from a supine to an upright position

#### POSTURAL HYPOTENSION
- A fall of ≥20 mm Hg in systolic BP; or a fall of ≥10 mm Hg in diastolic BP; or an increase in pulse rate of ≥20 beats per minute
  - Following postural change from a supine to an upright position
  - Accompanied by syncope (cerebral hypo-perfusion)
Managing Medical Emergencies (postural hypotension)

**Treatment**
- Return pt. to supine position for 5-10 min.
- Evaluate blood pressure, pulse rate, and respiratory rate
- Administer oxygen
  - 4 to 6 L/min by nasal cannula
- Allow pt. to assume a sitting position for ≥2 min.
- Re-evaluate blood pressure, pulse rate and respiratory rate
- Allow patient to stand up
- Re-evaluate blood pressure, pulse rate and respiratory rate
- In the absence of a palpable pulse and unresponsiveness
  - Activate EMS
  - CPR
  - Automated external defibrillator

**Nota bene**
- Postural hypotension, often observed in older patients, may result in significant morbidity from associated falls
  - The lack of prodromal signs and symptoms should prompt oral healthcare providers to take preemptive action
- In the conscious patient experiencing chest pain and a drop in BP below baseline value consider acute myocardial infarction
  - A systolic blood pressure of 90 mm Hg is a reliable sign of cardiogenic shock

Managing Medical Emergencies (hypertensive crisis)

**Hypertensive crisis**

Increased vascular resistance caused by endogenous vasopressors or by sympathomimetic drugs

- Hypertensive urgency
  - Systolic BP ≥180 mm Hg OR diastolic BP ≥120 mm Hg
- Hypertensive emergency
  - Systolic BP ≥200 mm Hg OR diastolic BP ≥140 mm Hg

**Predisposing factors**
- Undiagnosed or under-treated hypertension
  - Primary hypertension
    - Hereditary
    - Environmental
  - Secondary hypertension
  - Renal disease
  - Adrenal disease
  - Coarctation of the aorta
  - Hyperthyroidism
  - Diabetes mellitus
  - Pregnancy
  - Eclampsia
  - Autonomic hyperactivity
  - CNS disorders
  - Sleep apnea
  - Medications

**Prevention**
- Identify high-risk patients
  - Reduce anxiety
  - Sedation
- Determine the patient’s functional capacity
- Ensure profound local anesthesia
- Use local anesthetic agents containing a vasoconstrictor with caution

**Signs and symptoms**
- A “hammering” pulse
  - BP ≥ 180/120 mm Hg
  - Altered mental state
  - Chest pain
  - Angina pectoris
  - Myocardial infarction
  - Seizure
  - Hypertensive encephalopathy
**Managing Medical Emergencies (hypertensive crisis)**

- **Treatment**
  - Elevate the patient’s head
  - Administer oxygen
    - 4 to 6 L/min
  - Hypertensive urgency
    - BP should be lowered within a few hours
    - Same day referral to a physician
  - Hypertensive emergency
    - BP should be lowered immediately
    - Administer nitroglycerin
      - 0.4 mg, SL
    - Activate EMS
  - In the absence of a palpable pulse and unresponsiveness
    - CPR
    - Automated external defibrillator

**Nota bene**
- If inadequately treated
  - Hypertensive crisis can progress
  - Cerebral hemorrhage
  - Coma
  - Death
- In a conscious patient experiencing chest pain and elevated BP, consider angina pectoris

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**Managing Medical Emergencies**

**ANGINA PECTORIS**
A clinical syndrome characterized by transient ischemia to the myocardium

- Increased cardiac oxygen demand in the presence of decreased perfusion

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**Managing Medical Emergencies (angina pectoris)**

- **Predisposing factors**
  - Decreased perfusion of the myocardium
    - Atherosclerosis
    - Increased oxygen demand
    - Physical stress
    - Anxiety
    - Cold
    - Meals

- **Prevention**
  - Identify high-risk patients
  - Reduce anxiety
  - Sedation
  - Determine the patient’s functional capacity
  - Ensure profound local anesthesia
  - Use local anesthetic agents containing a vasoconstrictor with caution

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**Managing Medical Emergencies (angina pectoris)**

- **Signs and symptoms**
  - Mild to moderate substernal pain of sudden onset
    - Squeezing
    - Tight
    - Constricting
    - Heavy
    - Radiating
      - Left shoulder
      - Left arm
      - Left mandible
    - BP elevated

- **Treatment**
  - Allow pt. to assume a comfortable position
  - Note the time
    - Administer nitroglycerin
      - 0.4 mg, SL
    - Administer oxygen
      - 2 to 4 L/min by nasal cannula
    - Nitrous oxide-oxygen in a 50:50 concentration
  - Monitor vital signs
Managing Medical Emergencies

**Angina Pectoris**
- If pain is not relieved 5 min. after the initial dose:
  - Repeat nitroglycerin 0.4 mg SL
- If pain is not relieved 10 min. after the initial dose:
  - Repeat nitroglycerin 0.4 mg SL
- Continue to monitor vital signs
- Chest pain lasting more than 10 min.
  - Must be assumed to be myocardial infarction
  - Activate EMS
- In the absence of a palpable pulse and unresponsiveness:
  - CPR
  - Automated external defibrillator
- Nota bene
  - Nitrate-induced vasodilatation may precipitate syncope and paradoxical angina pectoris
  - In the conscious patient experiencing chest pain and a drop in BP below baseline value consider acute myocardial infarction
  - If the patient becomes unconscious consider sudden cardiac arrest

**Myocardial Infarction**
- Abrupt anoxia to a portion of the myocardium resulting in myocardial cell death
- Occlusion of large and medium-sized coronary arteries

**Predisposing Factors**
- Atherosclerosis
  - Large fibrous plaques
  - May become occlusive
  - May become disrupted
  - Contribute to thrombus formation
- Prevention
  - Identify high-risk patients
    - Reduce anxiety
    - Sedation
  - Determine the patient’s functional capacity
  - Ensure profound local anesthesia
  - Use local anesthetic agents containing a vasoconstrictor

**Signs and Symptoms**
- Severe sub-sternal pain
  - Radiates to the left, shoulder, arm, neck, and/or mandible
- Weakness
- Dizziness
- Palpitation
- Nausea and vomiting
- Dyspnea, tachypnea, or apnea
- Pallor or cyanosis
- Diaphoresis
- Cool, clammy skin
- Hypotension
  - BP drops below baseline value
- Tachycardia
  - Pulse rate greater than 100 beats/min
- Predisposing factors
- Prevention
- Signs and Symptoms
- Treatment
- Myocardial Infarction
  - MYOCARDIAL INFARCTION
  - Abrupt anoxia to a portion of the myocardium resulting in myocardial cell death
  - Occlusion of large and medium-sized coronary arteries

**Treatment**
- Activate EMS
- Place pt. in a semi-reclining position
- Administer oxygen
  - 6 L/min by nasal cannula
  - In case of respiratory distress or altered mental state
    - Provide positive pressure ventilation
- Monitor vital signs
  - In the absence of a palpable pulse and unresponsiveness
    - CPR
    - Automated external defibrillator
**Managing Medical Emergencies**

**(myocardial infarction)**

- **Nota bene**
  - Signs and symptoms of MI vary widely from mild, vague discomfort to cardiogenic shock
  - A life-threatening emergency
  - Overall mortality rate >80%
  - Patient denial may minimize symptoms and elderly and diabetic patients have a high incidence of silent MIs
  - Vague symptoms of shortness of breath, epigastric distress, hypotension, and altered mentation

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**CEREBROVASCULAR ACCIDENT**

A syndrome associated with the interruption of the blood supply to a portion of the brain resulting in transient, reversible, or irreversible ischemia.

- A blood clot, which progressively blocks a cerebral artery
- An embolus that lodged in a cerebral artery, obstructing blood flow
- Hemorrhage into brain tissue from a ruptured cerebral blood vessel

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**Managing Medical Emergencies**

**(cerebrovascular accident)**

- **Predisposing factors**
  - Cardiovascular diseases
    - Atherosclerosis
    - Recent MI (< 6 mo)
    - Valvular disease
    - Atrial fibrillation
  - Dyslipidemia
  - Hypertension
  - Diabetes mellitus
  - Smoking

- **Prevention**
  - Identify high-risk patient
  - Reduce anxiety
  - Determine the patient’s functional capacity
  - Use local anesthetic agents containing a vasoconstrictor with caution
  - Ensure profound local anesthesia

- **Signs and symptoms**
  - Headache
  - Stiffness in neck
  - Nausea and vomiting
  - Slurred speech
  - Motor dysfunction
  - Generalized or focal seizure
  - Altered consciousness
  - BP ø, pulse rate ø

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**Managing Medical Emergencies**

**(cerebrovascular accident)**

- **Treatment**
  - Activate EMS
  - Provide a calm and quiet environment
  - Administer oxygen
    - 2 to 4 L/min by nasal cannula
    - In case of respiratory distress or altered mental state
  - Provide positive pressure ventilation
  - Monitor vital signs
    - Blood pressure
    - If elevated
    - Elevate head slightly
    - Pulse rate
    - Respiration
  - Monitor mental state

- **Nota bene**
  - During the first day of a stroke, neither progression nor outcome can be predicted
  - Be reassuring to the patient, but do not make exaggerated claims that everything will be all right
  - About 20% of the patients die
  - Any neurological deficit noted after 6 months should be considered permanent
SEIZURES
A sudden episode of cerebral dysfunction characterized by altered motor activity, altered sensory phenomenon, and altered consciousness.

- Focal or generalized disturbance of cortical function caused by excessive discharges of cerebral neurons.

**Predisposing factors**
- Epilepsy
- Head trauma
- CVA
- Hypoxia
- Drugs and alcohol
- Hypoglycemia
- Exogenous factors
  - Sensory input
  - Anxiety
  - Heat exhaustion

**Prevention**
- Identify high-risk patient.
- Eliminate causative or precipitating factors.
- Confirm compliance with anticonvulsant chemotherapy.
- Reduce anxiety.
- Ensure profound local anesthesia.

**Signs and symptoms**
- Aura phase
  - Visual
  - Auditory
- Dizziness
- Altered consciousness
- Sudden loss of consciousness
- Tonic-clonic phase
  - Tongue-biting
  - Increased salivation
  - Incontinence
  - Hyperventilation
- Post-ictal phase
  - Fatigue
  - Mental confusion
  - Amnesia
- Tonic-clonic phase
  - Tongue-biting
  - Increased salivation
  - Incontinence
  - Hyperventilation

**Treatment**
- Protect patient from injury.
  - It may be safer to leave patient in the dental chair.
  - Otherwise, lower patient to the floor.
- Guide the extremities during seizure.
  - Do not restrain.
- After the seizure is complete.
  - Suction if needed.
  - Position patient on his/her side.
  - Recovery position.
- Administer oxygen.
  - 4 to 6 L/min by nasal cannula.
  - In case of respiratory depression.
  - Activate EMS.
  - Monitor vital signs.

**Nota bene**
- In the post-ictal phase, monitor respiration closely.
- Respiratory depression can lead to death.
- Be prepared to initiate positive pressure ventilation.
- If the patient has a history of diabetes mellitus, rule out hypoglycemia.
  - Tachycardia
  - Pallor
  - Diaphoresis.

**Hyperventilation**
A state of decreased systemic carbon dioxide concentration.

Cerebral hypoxia secondary to cerebral vasoconstriction.
Managing Medical Emergencies (hyperventilation)

- **Predisposing factors**
  - Pain
  - Anxiety
  - Cardiopulmonary disease
    - Cardiogenic shock
    - COPD
    - Pulmonary edema
  - Stimulants

- **Prevention**
  - Identify high-risk patient
  - Reduce anxiety
  - Ensure profound anesthesia

Managing Medical Emergencies (hyperventilation)

- **Prevention**
  - Identify high-risk patient
  - Reduce anxiety
  - Ensure profound anesthesia

Signs and symptoms
- Increased rate (> 20 breaths/min) and depth of respiration
- Light-headedness
- Paresthesia
  - Burning or prickling feeling of the face and extremities
- Tonic muscle spasm
- Tightness in the chest
- Syncope

Managing Medical Emergencies (hyperventilation)

- **Treatment**
  - Provide a calm and quiet environment
  - Instruct the patient to take a shallow breath and hold it as long as possible
  - Repeat sequence 6 to 10 times

  Alternatively, have patients rebreathe expired air from a paper bag
  - If hyperventilation is secondary to a medical condition other than anxiety
    - Activate EMS

Managing Medical Emergencies (hyperventilation)

- **Nota bene**
  - The most common precipitation factor associated with hyperventilation is anxiety
  - These patients respond well to pre-operative sedation
  - Patients who relate a history of hyperventilation secondary to a medical condition other than anxiety
    - Should not receive pre-operative sedation

Managing Medical Emergencies (asthma)

- **Predisposing factors**
  - Pollens and other allergens
  - Pollutants such as smoke and dust
  - Physical or emotional stress
  - Infection

- **Prevention**
  - Identify high-risk patient
  - Reduce stress
  - Ensure profound local anesthesia
  - Avoid respiratory depressants
  - Use COX-inhibitors with caution
**Managing Medical Emergencies (asthma)**

- **Signs and symptoms**
  - Coughing, wheezing, shortness of breath
  - Anxiety, restlessness, agitation
  - Pallor or cyanosis of lips
  - Noticeable use of the accessory muscles of respiration
  - Patient may become confused and lethargic

- **Treatment**
  - Place patient in a sitting position
  - Administer a short-acting beta₂ adrenergic receptor agonist
    - Albuterol
    - Two puffs by metered-dose inhaler
  - Administer oxygen
    - 2 to 4 L/min by nasal cannula
  - In case of respiratory depression or altered mental state
    - Provide positive pressure ventilation
    - Activate EMS

- **Nota bene**
  - When ventilating an asthmatic patient
    - Squeeze bag only until resistance is felt or the chest starts to rise and allow time for expiration
  - Patients with particularly severe ongoing asthma attack, i.e., status asthmaticus,
    - May progress to acute respiratory failure and death

**Managing Medical Emergencies (acute respiratory distress)**

- **Precipitating factors**
  - COPD
    - Chronic bronchitis
    - Excess mucus production
    - In response to smoking
    - Exposure to allergens, chemicals, and pollutants
    - Recurrent infections
  - Emphysema
    - Decreased elasticity of lung tissue leading to distortion of the alveoli
    - Which become filled with trapped air

- **Prevention**
  - Identify high-risk patients
    - Reduce anxiety
    - Sedation
    - Ensure profound local anesthesia

- **Signs and symptoms**
  - Shallow, labored breathing
  - Wheezing, gasping, coughing
  - Anxiety, restlessness, agitation
  - Pallor or cyanosis of the lips
  - Noticeable use of accessory muscles of respiration

**ACUTE RESPIRATORY DISTRESS**

A condition characterized by either too little oxygen (or too much carbon dioxide) in the blood secondary to a functional abnormality, which interferes with gas exchange

- Oxygenation failure
  - AND/OR
  - Ventilation failure
Managing Medical Emergencies (acute respiratory distress)

- **Treatment**
  - Place patient in a sitting position
  - Administer a short-acting beta₂ adrenergic receptor agonist
    - Albuterol
      - Two puffs by metered-dose inhaler
  - Administer oxygen
    - 2 L/min by nasal cannula
  - In case of respiratory depression or altered mental state
    - Provide positive pressure ventilation
    - Activate EMS

- **Nota bene**
  - Despite the possibility that raising the blood oxygen level could reduce the drive to breath
  - Patients with COPD in acute respiratory distress need oxygen
  - When ventilating a patient with COPD
    - Squeeze bag only until resistance is felt or the chest starts to rise and allow time for expiration

Managing Medical Emergencies (anaphylactic reaction)

**ANAPHYLACTIC REACTION**

Type I (immediate) hypersensitivity reaction in response to an allergen following re-exposure

- Initial exposure to the allergen resulted in antigen-specific IgE antibody production
- Sensitization occurs rapidly (e.g., bee sting)

**Precipitating factors**

- Following re-exposure to the specific antigen
  - IgE antibodies
  - Bind to mast cells, basophiles, and eosinophils associated with mucosal and epithelial tissues resulting in the release of
    - Histamine
    - Leukotrienes
    - Prostaglandins
    - Chemokines
    - Enzymes
    - Cytokines

**Signs and symptoms**

- Within 1 to 15 min. following re-exposure to a specific allergen
  - Coughing, sneezing, wheezing
  - Agitation, flushing, palpitation
  - Pruritus, urticaria, angioedema
  - Unresponsiveness
  - Convulsion
  - Cardiogenic shock

**Prevention**

- Identify high-risk patients
- Avoid re-exposure to specific allergens

**Treatment**

- Place patient in a recumbent position with legs elevated
- Immediately treat with epinephrine 1:1000
  - Adult
    - Epinephrine (EpiPen), 0.3 mg, IM (anterolateral thigh)
    - May be repeated in 20 min
  - Child
    - Epinephrine (EpiPen Jr.), 0.15 mg, IM (anterolateral thigh)
    - May be repeated in 20 min
- Monitor vital signs
  - If at any time the patient becomes unresponsive with no palpable pulse
  - CPR
  - Automated external defibrillator
**Managing Medical Emergencies**

**Notabene**

- For patients with cardiovascular diseases and/or diabetes mellitus, start treatment with smaller doses of epinephrine.
- Yet, patients taking beta-adrenergic blocking agents may require more epinephrine to reverse anaphylaxis.

**Managing Medical Emergencies**

**Delayed hypersensitivity reaction**

**Precipitating factors**
- Following re-exposure, the antigen interacts with immunologically committed CD4+ T-lymphocytes, which release cytokines (lymphokines).
  - Lymphokines activate macrophages associated with mucosal and epithelial tissues resulting in the release of:
    - Histamine
    - Leukotrienes
    - Prostaglandins
    - Enzymes
    - Cytokines

**Signs and symptoms**
- Within 6 to 48 hours following re-exposure to a specific allergen:
  - Fever, malaise
  - Erythema, pruritus
  - Perioral paresthesia
  - Urticaria, angioedema
  - Wheezing

**Treatment**

- Identify:
  - Drug and other potential allergens to which the patient may have been exposed to in the clinical process.
- Verify:
  - Onset of signs and symptoms was after the initiation of pharmacological or clinical intervention.
- Determine:
  - Time interval between the initiation of drug therapy or clinical intervention and the onset of signs and symptoms.

- If the patient is still exposed to the suspected allergen:
  - Stop its use.
- If the patient is experiencing respiratory distress:
  - Instruct patient or caretaker to immediately call EMS.
- In the absence of respiratory distress:
  - Prescribe:
    - Diphenhydramine hydrochloride: 25 to 50 mg, PO, qid.
**Managing Medical Emergencies**

**HYPOGLYCEMIA**

*Defined as an abnormally low plasma glucose level*

- Leads to ANS stimulation and the release of epinephrine and glucagon
- Persistent hypoglycemia leads to CNS dysfunction

**Prevention**

- Identify high-risk patient
- Medical history
- Vital signs
- Confirm compliance
- Insulin
- Oral hypoglycemic agent
- Food intake
- Reduce stress

**Notes**

- Most signs and symptoms of hypoglycemia are caused by the release of epinephrine
- Altered mentation is secondary to inadequate energy supply (glucose) to the brain
- Distress in a patient with diabetes mellitus must always be assumed to be due to hypoglycemia
SUMMARY
Preparedness in emergency medicine includes:
- Current BLS certification of all office staff
- Didactic and clinical courses in emergency medicine
- Periodic office emergency drills
- Maintaining basic emergency drugs and equipment

References
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