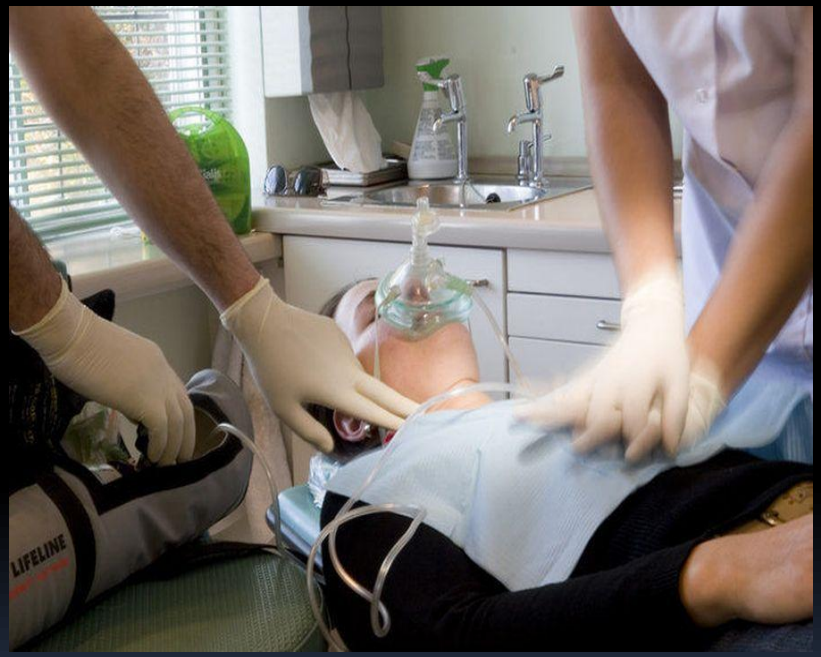
MEDICAL EMERGENCIES IN DENTAL CLINIC:
WHEN READY FOR IT, IT SEIZES TO HAPPEN!

Survival decreases by 7 -10% /min delay



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Objectives

- To learn & recognize some of the common Life-threatening ME and precipitating factors
- To appreciate the importance of basic life support (BLS) for dental students, dentists and staff.
- To learn how to prepare the dental office to be ready for ME should happen:
  - Emergency Drugs
  - Emergency supplies for the dental office
- To prevent/ treat ME should happen! Examples…

What is the most common precipitating factor of Medical Emergencies in dental office?

A. Age extreme
B. Obesity
C. Smoking
D. Full Stomach
E. Obstructive sleep apnea
F. Stress and Anxiety

What is the most common Medical Emergency in dental Chair?

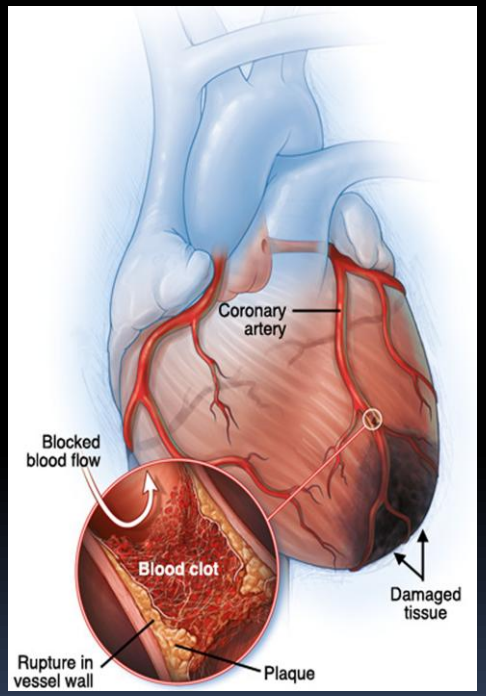
A. Angina
B. Thyroid storm
C. Hyperventilation syndrome
D. Fainting & Syncope
E. Suffocation
F. Allergic reactions

What differentiate Fainting from Angina? True or False?

A. Fainting patient is usually anxious but healthy
B. Fainting patient responds well to posture correction (<5mn)
C. Fainting has similar manifestations to Angina but no chest pain
D. Fainting patient usually report history of fainting
E. Fainting patient is better treated under Sedation

What differentiate Angina from Myocardial infarction? True or False

A. Angina is a warner, which responds to O_2, ASA, NG & R_{est} within 15 min
B. Angina is due to Partial blockage & MI is due to complete blockage
C. MI patients have elevated cardiac enzymes (e.g. Troponin, KC)
D. MI responds only to reperfusion
E. Angina and MI are treated the same?



Putting patient in supine position is the most appropriate for the following emergencies **Except**?

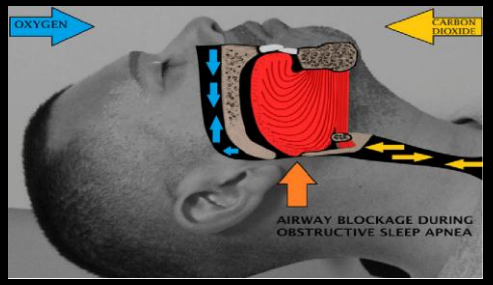
A. Anaphylaxis
B. Asthma/ COPD/ OSA
C. Fainting
D. Seizure

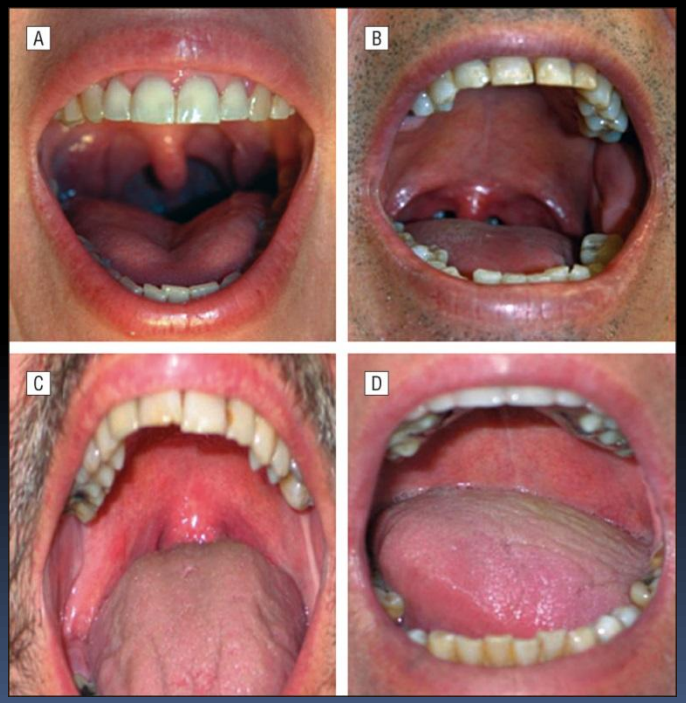
Risk Factors for Medical Emergencies

- Infrequent; can and do happen in dental clinics to anyone
- Several **risk factors** may increase their incidences including:
  - Stress (pain & anxiety) 75% of Medical Emergencies
  - Extreme age
  - Inadequate patient assessment
  - Longer dental appointments
  - Unhealthy, unfriendly environment

Other Risk Factors when we do sedation.

- OSA
- Mallampati class
- Increased drug administration
- Multi-pharma patients
- Addict patients





Mallampati classification

When?

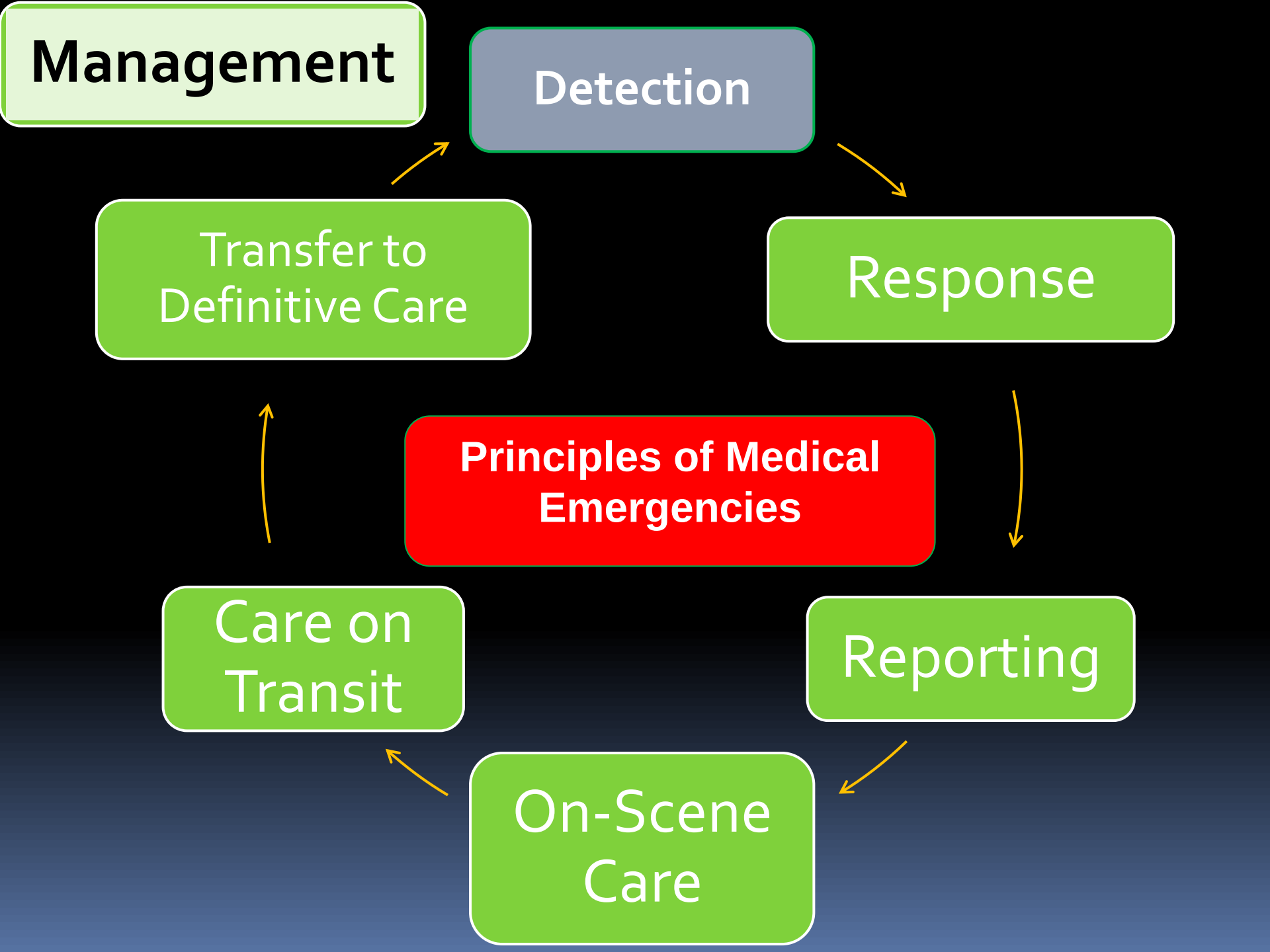
- 55% during LA
- 39% tooth extraction
- 27% pulpal extirpation
- 22% ensuing dental treatment
- 2 % in the waiting room

Which one?

95% does not kill the patient if managed properly!

Stress Related	Non-related to stress
• Syncope • Acute angina • Acute Asthma • Stroke • Seizures • HVS	• Allergy • Hypoglycemia • LA Toxicity • Postural Hypotension • Airway Obstruction

B. Matsuura, H. Analysis of systemic complications and deaths during treatment in Japan. *Anesth Prog* 1990; 36: 219-228.


Management
Detection
Response
Reporting
On-Scene Care
Care on Transit
Transfer to Definitive Care
Principles of Medical Emergencies

Prevention of medical emergencies

"When you prepare for an emergency,
the emergency ceases to exist"

Goldberger

- Know your patient and know yourself?
- Personal continuing education in emergency recognition and management.. (BLS).
- Establishment and periodic testing of preparedness
- Equipping office with supplies necessary for emergency care
- Preparedness of office Emergency Team
- Friendly Workplace
- Access to EMS

Office Emergency team

- **Develop a plan before an emergency happens:**
  - Member #1: is the first person at the scene of the emergency, shout for help.
  - Member #2: is assigned to immediately bring the emergency equipment to the site of the emergency
  - Members #3: the remaining office staff.
    - Patient Management: monitoring & maintaining vital signs; preparing emergency drugs for administration;
    - activation of EMS & waiting outside for its arrival;
    - holding' the lift in the reception area for the EMS;
    - keeping a written record of the event, including a timeline and treatment (e.g., 10.15 am

Who and when should call the EMS

- **When the Dentist feels it is needed!**
- **This occurs:**
  - ✓ if the diagnosis of the problem remains unknown;
  - ✓ when the diagnosis *is* known but is disturbing to the dentist;
  - ✓ at any time the dentist feels uncomfortable and wishes to seek help.

Call 911.....Never hesitate to seek assistance in managing a medical emergency

Basic life support (BLS)

BLS was introduced in1960,
Improved survival 5-75%

CPR 30:2 rate of 120/min (if no Breathing & circulation)

PABCD

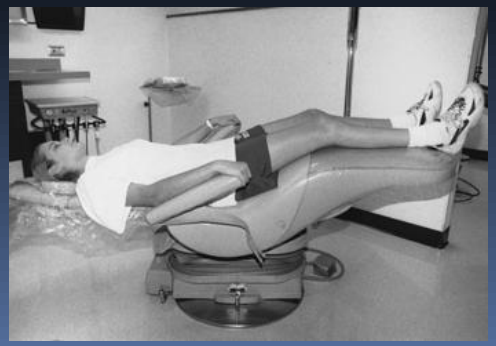
- P Positioning
- A Airway
- B Breathing
- C Circulation
- D Definitive Tx:

  Diagnosis, Drugs, Defibrillation (if applicable)


Welcome To
Action First Aid

P = Position

- Conscious patient:
  - Most comfortable position: e.g. upright position in Asthmatic, bronchospasm, chest pain (better breath)
- Unconscious patient:
  - Supine with feet elevated slightly, back parallel to the floor so that Brain and Heart are at the same level



Circulation and Breathing

- *Conscious* :
  - no need to palpate for carotid pulse
  - Measure Bl P.
- *Unconscious* :
  - Check carotid pulse (10 seconds).
  - If no pulse, or in doubt, initiate CPR, the ratio of 30:2 at 100-120 compression/minute

Air Way

- *Conscious and speaking* – airway is patent. No need for airway management.
- *Unconscious* – Assess and maintain patency , head tilt – chin lift should be performed.

Airway maintenance

- Extending head and neck by tilting the forehead back with one hand and lifting the chin up with the other hand
- Pushing the mandible forward by pressure on the mandibular angles.
- Pulling the mandible forward by pulling on the anterior mandible.
- Pulling tongue forward, using suture material or instrument to grasp anterior tongue.

Airway control: http://www.youtube.com/watch?v=Je9yiCDVNzg

Drugs in Emergency
PABCD

- Drug administration is not necessary for the immediate management of medical emergencies

- Primary management of all emergency situations involves BLS
- When in doubt regarding medication, never medicate

Emergency equipment for Dental Office

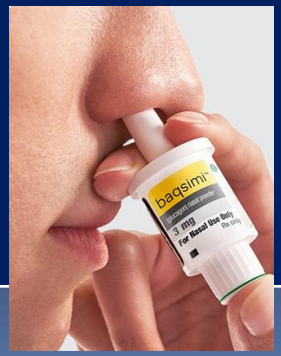
- Pocket mask
- bag-valve-mask device
- Syringes
- An automated external defibrillator (AED)
- Portable O2 cylinder

Survival decreases by 7 -10% /min delay

Emergency drugs for the dental office

Parenteral (injectable) preparations

General drug group	Use
1. Epinephrine (Epipen, Anapen) 1:1000 (IM)	Life threatening allergy; Anaphylaxis Shock EpiPen: 0.15 - 0.3 mg IM
2. Histamine-blocker: Benadryl Diphenhydramine	Non life threatening allergy (rash, hives, itching
3. Anti-hypoglycemic	50% dextrose in water, Candy Glucagon 1 mg/ IM or Glucagon nasal powder spray (**Baqsimi**)



Emergency drugs for the dental office 2

Non-injectable & inhalational drugs

Drug	Use
1. O2 (3 – 6 Liters)	1. For almost all emergencies
2. Glucose	2. Hypoglycemia
3. Nitroglycerin	3. Acute Angina/ MI
4. Salbutamol (2 puffs)	4. Bronchodilator: spasm, Acute asthma
5. Aspirin (chewable)	5. Chest pain, suspected MI
6. Aromatic ammonia	6. Respiratory stimulant / fainting

ER drugs for dental offices(Sedation)

Parental (injectable) preparations

General drug group	Common examples
1. Opioid analgesic	1. Morphine sulphate, Fentanyl
2. Anticonvulsant	2. Diazepam, midazolam
3. Antihistamine	3. Diphenlhydramine (Benadryl),
4. Antihyperglycemic	4. 50% dextrose in water, glucagon 1mg
5. Corticosteroid	5. Methylprednisolone (Solumedrol), dexamethasone (Decadron), hydrocortisone (Solu-Cortef).
6. Narcotic antagonist	6. Naloxone (Narcan)
7. Benzo. antagonist	7. Flumazenil
8. Vasopressor	8. Epinephrine, Ephedrine
9. Vagolytic	9. Atropine, Glycopyrolate

Emergency supplies for offices(Sedation)

- Establishment and maintenance of IV access:
  - IV Catheters
  - IV tubing with flow valve
  - Tourniquet
  - 1-in-wide plastic tape
  - Crystalloid solution (e.g.: normal saline 0.9 %, Dextrose 5 %, …)
- Drug administration
  - Plastic syringes (5 and 10 mL sizes)
  - Needles (18-and 21-gauge)
  - Tourniquets
  - IV catheters

Emergency supplies for offices(Sedation)

- Oxygen administration
  - Clear face mask
  - Resuscitation bag (AMBU)
  - Extension oxygen tubing (with and without nasal catheters)
  - Oxygen cylinder with flow valve
  - Oral and nasal airways
  - Laryngoscope
  - Endtracheal tube
  - Lubricating jelly
- High-volume suction
  - Large-diameter suction tip
  - Tonsillar suction tip
  - Extension tubing
  - Connectors to adapt tubing to office suction

Common Medical Emergencies in Dental Office

1. Unconsciousness:
   - Vasovagal syncope
   - Orthostatic hypotension
2. Chest pain:
   - Angina pectoris
   - Acute Myocardial infarction
   - Sudden Cardiac arrest
3. Drug-related Er.:
   - Drug overdose
   - Allergy, Anaphylaxis
4. Respiratory distress:
   - Asthma
   - Hyperventilation
5. Endocrinal:
   - Hypoglycemia
   - Thyroid gland dysfunction
   - Acute adrenal insufficiency
6. Seizures
7. Cerebrovascular accident
8. Nausea and Vomitting

Fainting: Vasovagal Syncope

https://youtu.be/umQ6rJRzY3E?t=2

- Syncope is a sudden loss of consciousness due to transient brain ischemia.
- Mainly 2 types: 1. due to underling medical cause,

  2. vasovagal type occurs in otherwise healthy people quite frequently.
- Psychic, smelling, hearing, Panic, anxiety, acute pain may trigger it
- Vagal stimulation → **Slow HR** → Decrease CO → Decrease BP and Brain ischemia → Transient LOC.

Management of VS Prodrome

- Dizziness
- Sweating
- Nausea
- Salivation
- Cold
- Decreased: HR, BP

- Terminate all dental treatment
- Position patient in supine posture with legs raised above level of head
- Attempt to calm patient
- Cool towel to forehead
- Monitor vital signs
- Reassure pt.

Management of Syncope

Syncopal episode:

1. Terminate all treatment
2. Position patient in supine posture with legs raised
3. Check for **Pulse & breathing**, hook monitors

If present:

1. Crush ammonia ampoule under nose, administer O2
2. Monitor vital signs
3. Have patient escorted home
4. Plan anxiety control measures during future dental care

If absent:

1. Start BLS
2. Have someone summons medical assistance
3. Consider other causes of syncope including hypoglycaemia, cerebral vascular accident, Angina, MI,

Allergic Reactions

Skin signs: Erythema, Raches urticaria, pruritus, angioedema

Respiratory tract signs (wheezing, dyspnoea)

Management:

1. Stop administration of all drugs presently in use
2. Have someone summon medical assistance
3. Administer **epinephrine** (0.3 mg IM)
4. Give oxygen (6 L/Min) by face mask or nasally
5. Monitor vital signs frequently
6. Administer antihistamine
7. Provide IV access, fluids
8. Observe in the office at least 1 hr
9. Prescribe antihistamine home
10. Consult the patient-physician

Anaphylaxis

Manifestations:

(with or without skin signs):

- Malaise, wheezing, moderate to sever dyspnea, stridor, cyanosis, tachycardia, hypotension, dysrhythmias, cardiac arrest.

Anaphylactoid reactions:

• Manifestations are similar

But, not mediated by antigen-antibody reaction

Management:

- Stop administration of all drugs presently in use
- Position the patient supine on a backboard or on the floor and have someone summon assistance
- Administer epinephrine IM 0.3mg
- Initiate BLS and monitor vital sings
- Give oxygen 6L/min
- Provide IV access
- Antihistamines- IV or IM 50-100 mg diphenhydramine
- Corticosteroids-high dose
- Intubate if needed
- May recur within 1-8 hours (20% of patients)
- Prepare for transport to hospital

Latex Anaphylaxis

Chest pain

Common causes:

- Cardiovascular system:
  - angina pectoris,
  - myocardial infarction
- Gastrointestinal tract:
  - dyspepsia (heartburn), hiatal hernia, reflux esophagitis, gastric ulcers
- Musculoskeletal system:
  - intercostal muscle spasm
- Psychologic

Myocardial Ischemia

Clinical characteristics of chest pain:

- Squeezing, bursting, pressing, burning, choking, and/or crushing in character (not typically sharp or stabbing in quality).
- Substantially located, with variable radiation to left shoulder, arm, and/or left side of neck and mandible.
- Frequently associated at the onset with exertion, heavy meal, anxiety, or upon assuming horizontal posture.
- Relieved by vasodilators, such as nitroglycerin, or rest (in the case of angina); not relieved in case of infarction.
- Accompanied by dyspnea, nausea, weakness, palpitations, perspiration, and/or a feeling of impending doom.

Management of patient with chest pain

1. Terminate all dental treatment
2. Position patient in semi-reclined posture
3. Give nitroglycerin (NG) (about 0.4 mg-S/L tablet or 100 migc. Puffs, up to 3 doses (diagnostic and therapeutic)
4. Give chewable Aspirin 160-325 mg
5. Administer oxygen 4L/min
6. Check pulse and blood pressure

If discomfort is relieved:

6. Assume angina pectoris was present
7. Slowly taper oxygen over 5 minutes
8. Modify dental treatment to prevent recurrence
9. Refer to Hospital

If pain persists, diagnosis is MI, so, give Morphine IV if pain not relieved by NG…Call for EMS as soon as possible

Management of acute asthmatic episode

1. Terminate all dental treatment
2. Position patient in fully sitting posture
3. Administer bronchodilator by spray (Salbutamole)
4. Administer oxygen
5. Monitor vital signs

If signs and symptoms continue

6. Give epinephrine 0.3 mg of 1: 1,000 IM or SQ
7. Start IV line and drip of crystalloid solution
8. Start theophylline IV 250 mg dose given over 10 minutes
9. cortisone 100 mg IV (or equivalent
10. *Transfer to ER.*

Hyperventilation Syndrome

Manifestations:

- Anxiety
- Hyperpnea
- Light-headedness
- Circumoral numbness
- Tingling extremities
- Tetany
- Unconsciousness (very uncommon)

Hyperventilation Syndrome

1. Terminate all dental treatment and remove foreign bodies from mouth
2. Position patient in almost fully upright position
3. Attempt to verbally calm patient
4. Have patient breathe CO_2 enriched air, such as in and out of a small bag or hand.
5. if symptoms persist or worsen, administer diazepam 10 mg IM (midazolam 5 mg IM) or
6. Monitor vital signs
7. Perform all further dental surgery using anxiety-reducing measures

Manifestations and management of acute hypoglycaemia 1

Mild Signs:

Hunger

Nausea

Weakness

Moderate Signs:

- Tachycardia
- Perspiration
- Pallor
- Anxiety
- confusion, uncooperativeness

Severe Signs:

- Hypotension
- Unconsciousness
- Seizures

Manifestations and management of acute hypoglycaemia[2]

Management:

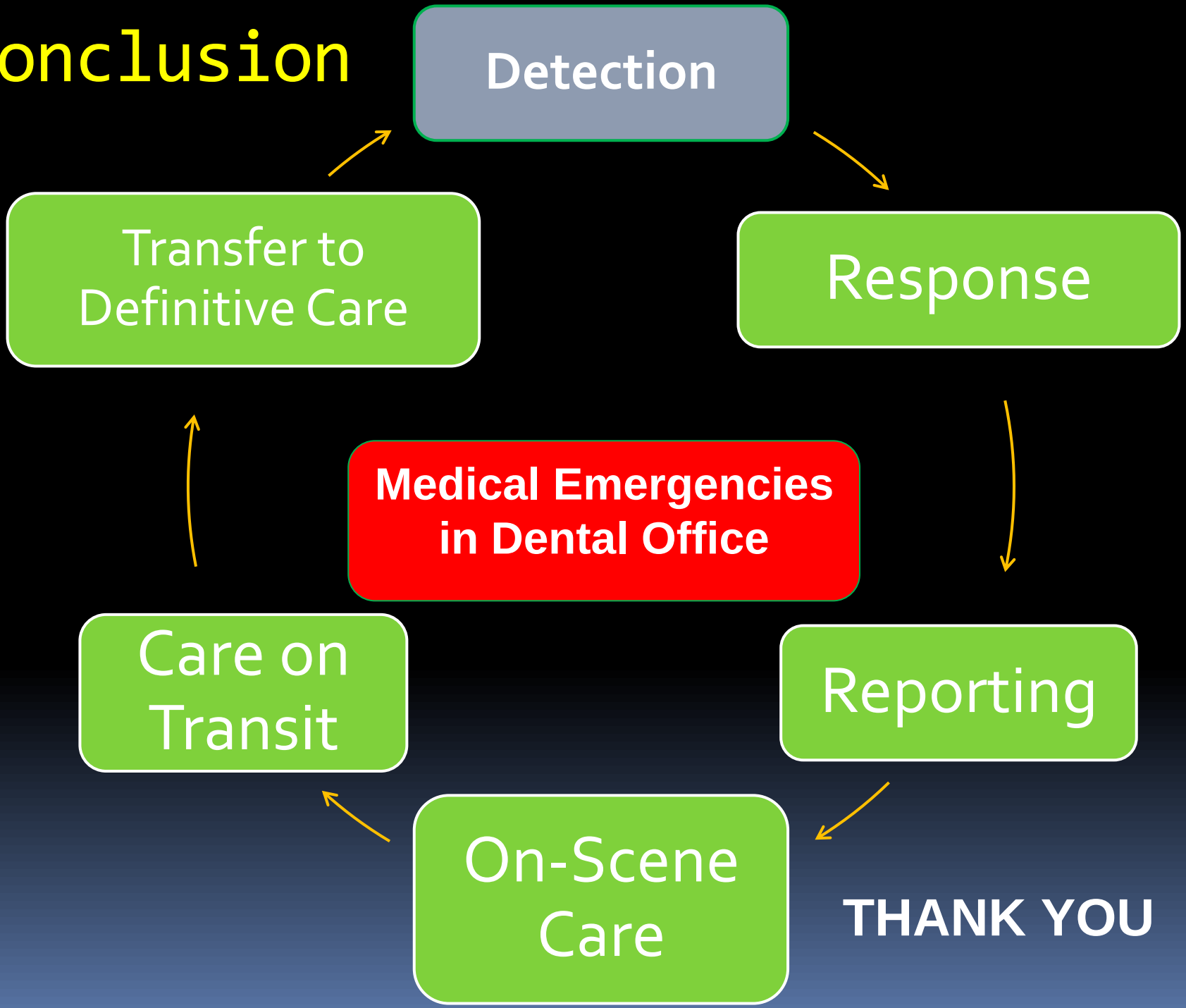
1. Administer glucose source such as sugar or fruit juice PO if **conscious**
2. If symptoms do not rapidly improve or the patient is **unconscious** administer 50 ml of 50% glucose or 1 mg glucagon IM or 3mg nasal powder spray (baqsimi).
3. Consult a physician before further dental treatment

Patient Preparing to Vomit

Patient Preparing to Vomit

- **Manifestations**
  - Nausea
  - Frequent swallowing
  - Perspiration
  - Feeling of warmth
  - Feeling of anxiety
  - Gagging
- **Prevention:**
  - NPO
  - H_2 Blocker
  - Semi-erect position
  - Antiemetic: Gravol Ondansetron

Conclusion



THANK YOU

Thank You

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2. B. Matsuura, H. Analysis of systemic complications and deaths during treatment in Japan. *Anesth Prog* 1990; 36: 219-228.
3. https://www.youtube.com/watch?v=HivQ7P35DPg&t=4838s