Antibiotic Strategies

* Cardinal Rules: 1) Use the right drug. 2) Use the right dose. 3) Use the correct dosing schedule. 4) Correct duration.
* Use a loading dose to rapidly achieve therapeutic blood levels.
* Avoid combinations of bacteriostatic and bacteriocidal drugs.
* Most odontogenic infections are caused by mixed organisms .
* When we prescribe antibiotic we have to reach MIC ( Minimum Inhibitory Concentration: is the smallest concentration of an antimicrobial needed to stop bacterial growth ).

 Commonly used ABxs dosage :

 Amoxicillin Dose: 250-500 mg q 8 h x 7-10 days

Clindamycin Dose: 100-450mg q 6 h x 7-10 days

Azithromycin (Zithromax), clarithromycin (Biaxin) Dose: 250-500 mg/day x 5-10 days

Metronidazole (Flagyl) Dose: 250-1000 mg q 6-8 h x 7-10 days

**osteomyelitis**

what is the meaning of osteomyelitis-

the literal meaning: inflammation in the bone marrow

but osteomyelitis refer to infection of the bone marrow ,cortical bone and cancellous bone (the whole components)

osteomyelitis now is rare, in the past it was more common -

-it is more common in the mandible than the maxilla because the bone in the mandible is dense cortical

maxilla has much stronger blood supply , that's why osteomyelitis more common in the mandible

-when we see a case of osteomyelitis of the jaw ,you have to investigate underlying conditions ) local or systemic diseases)

-local factors : Dental infection , jaw fracture , osteopetrosis, paget disease

systemic factor : immunocompromised , uncontrolled diabetes , radiotherapy , leukemia, Alcoholic patient , sickle cell anemia

-bacteria in the mouth , make infection and inflammation associated with edema, that compress the blood vessels so it compromise the blood supply so the bone start to die

once you have dead bone , you don't have defense so the disease start to spread

-we will have a large segment of dead bone, and it doesn't cure unless you open a flap and debried

the antibiotic alone is not enough, that’s the main diffrance between osteomyelitis and other infections.

now osteomyelitis , initial case of infection start as acute osteomyelitis, most likely from periapical infection.

clinical manifestation start like the dentoalveolar abscess , inflammation of the mucosa and the gengiva , some time extra oral swelling occur

pus around the teeth and mobility may occur , also trismus may occur , fever (acute phase)

also alter sensation of the inf alveoler nerve , for ex: pt came with osteomylitits due to infected alveoler cyst (dentegerous cyst)

-for example a patient came with altered sensation and she had infected follicular cyst, she had neurosensory defect, swelling that become indurated , this was exactly the same signs of osteomyelitis.

-It is very difficult to differentiate it from the dentoalveolar abscess and the treatment at this stage is the same but the patient start to feel altered sensation of the ID , so we start to think that the infection spread into the marrow beginning to become osteomyelitis.

-in order to have radiographic changes on x-ray we need more than 10-12 days to see resorption

here we may only see widening of PDL we don't see bone resorption.

-Microbilogy : the Microorganism, no differences from the one that make dentoalveolar infection or facial spaces infection

it is mixed pool of microorganism that contain streptococcus , anaerobic rod & cocci

staph aureus is rare

so it is mixed of aerobic and anaerobic

how do i treat osteomyelitis in the acute phase , I have to treat the cause ,if it was due to tooth infection we took it off , if it was fracture we fix it , if foreign body we remove it

so we treat the cause , then we give antibiotic (broad spectrum)

-clindamycin is perfect , because it has good penetration of bone even in compromised blood supply

amoxicillin is good , both are effective-

here we have compromised blood vessels , the doctor prefer **clindamycin**.

-osteomyelitis is a serious infection , we have poor blood supply , to the antibiotic need long time to reach the site of infection, so we give the antibiotic for at least 4 weeks.

-the doctor prefer to extract the tooth , others says that RCT could help but the doctor say it won't

-when does the acute phase turn into chronic ? either if the acute osteomyelitis were not treated or sometimes the microorganism has low virulence and the defenses of the body increase so it become chronic course ( they don't give us the acute phase)

-chronic osteomyelitis produce sensitivity , less sever signs and symptoms and there is no immunocompromised function , we can see diffuse area of bone resorption (moth eaten appearance)

although sometimes we can see some areas of reactive bone build up (radiopacities)

also in chronic case we see sequester area of bone

pool of infection (areas of radiopacities and areas of radiolucencies )

-you always have to identify the cause and then you have to explore the area and debried with large round bur until you see fresh red blood, you have to remove the cortical surface of the bone to allow fresh air to enter, also remove the sequestrum

-obviously you have to identify the cause and remove it.

Hyperbaric O2 , we put the pt in closed room and we put O2 under high pressure, for 1-2 hours -

-usually used with scuba divers to decompress the chamber

O2is therapeutic , we apply it to the areas of poor blood supply

-decompression chamber , is expensive and it has side effects on the retina.

-we have subtypes of osteomylitis like Garre's osteomylitis it occur in young children , prolifration of the periosteum occur

 it is realted to 1st molars cause it is the most common tooth to get carious then pulpitis occur then low purulent infection occur that will lead to expantion of the periosteum , so the periosteum react by producing bone, it appear as bone swelling

so it is low grade infection-

sometimes it occur in young adult

we treat it by giving Antibiotic

**LASER IN ORAL SURGERY**

The laser in general is one of treatment modalities that can be used to provide to the patient a definitive treatment.

The most common used treatment that provide definitive treatment is the conventional surgery (blade surgery), but the conventional surgery sometimes is inappropriate specially for specific lesions with specific presentations. for example a patient with lesion on the posterior part of the tongue it is very difficult and inconvenient for the patient and the operator, for this reasons we have other treatment modalities likechemotherapy,radiotherapy, laser and photodynamic therapy.

So the LASER is acronym that stands for :

L>>light

A>>amplification

S>>stimulated

E>>emission

R>> radiation

SO the light ( normal photon with normal energy ) will be amplified ( get energy) by sort of electrical stimulation or which called “stimulated emission radiation”.

In laser we cut a tissue with coagulation or without coagulation, or we blade the superficial structure .for example if a patient come with leukoplakia we apply a laser on it with specific characteristics and it will remove the superficial area only.

So the laser will be faster than the conventional surgery and more comfortable in terms of healing and post. Operative complication ( pain ,bleeding ,swelling ,..etc). That will reduce the anxiety and the fear of the patient from drilling and the noise of the suction .also there will be no need for needle for anesthesia or needle for suture, and there is increase visualization for surgical site . HOWEVER it is specially indicated for patient with specific lesion and specific presentation.

The doctor shows us a slide aboutHemangiomaaffecting the orbital area.

Note: Hemangioma present at birth and start to involute with the time. We wait until the school age and we treat the rest of the lesion before he go to school for his psychological situation.

The most commonly used surgery in maxillofacial surgery is CO2 LASER.

There are different types of laser.

How does the laser work??

It is amplification of lights by times of electrical stimulation.so the electrical stimulation connecting to the power supply .when the power supply is on the electrical stimulation start between cathode and anode. In the tube we have an active medium which consist of atoms and electrons which present in resting state without energy. When the electrical stimulation pass through this active medium that will lead to activate the resting photon and electrons (with energy). Here again in this tube there is a gas flow it could be CO2,argon, ER:YAG , ND:YAG, copper laser . This gas will stick with this active electrons (e.g.: co2 active electrons) this active electrons are the laser .these active electron will be concentrated by a group of reflecting mirror to produce a laser beam or active electron concentrated at one point. Now we have active electron (laser)if it pass through a tissue or anything it may make a difference .

Keep in mind that not all tissue can be affective by these active electrons. There is something called chromophore, which means those tissue which can absorbs the laser beams, if the tissue absorbs the laser beam, the laser will affect the tissue. If the tissue cannot absorb the laser beam there will be no effectiveness. SO for that reason the type of the tissue will determine the type of the laser .for example CO2 laser has an affinity to the tissue containing water like skin, mucosa. SO the skin and mucosa called chromophores for co2 or ER: YAG laser. And if we want to treat a vascular lesion or pigmented lesions, thereis a chromophore lesion for ND: YAG laser or copper laser

Again chromophore with is tissue that can absorb laser beams. Any tissue containing of water (like leukoplakia, lichen planus which don’t contain a hemoglobin or pigmented lesion) are chromophore for co2 and ER:YAG laser. So for that reason we say that the most common use laser is co2 because the most tissue in counter is skin and mucosa. and if the lesion contain melanin or blood are chromophore to copper , argon and ND:YAG laser.

So the Grotthuss-Draper law state that it has to have absorption of these chromophores to enhance the effect of laser .Without absorption there will be an effect of laser .so if you put the argon laser on skin it will not effect on it .

Photodynamic therapy has the same mechanism, so if we have lesion on the skin, we bring light with specific wave length, and when we apply the light to the lesion ,we may also injure the normal tissue, so for that reason we inject the patient with specific material that has two main properties:

First : it is selectively absorbs by the material itself (e.g. if the material is highly absorbs by the hyperkeratotic cell it will go to the area of leukoplakia and absorb it )

Second: the material will be selectively affect by specific light with specific wave length.

So when we apply the light with specific wave length to the lesion there will be an interaction (ablation or vaporization). So itwill make ablation the lesion only, because the material is only on the lesion.

So when we want to treat a Hemangioma we will apply a copper, ND: YAG laser because the tissue is chromophores to this laser.

Now what I want to do to the lesion, ablation, blading OR resurfacing??

So if I you are intending to do an incision, you need a laser with deep penetration and effect. If you need just affect the superficial area( resurfacing or ablation for lichen planus for example) you need just superficial effect for the laser.

**SO HOW TO ACHIEVE THIS??**

We have many icons in the laser device which are:

***Power density or energy density***: which are measures of the amount of the laser power apply to the tissue over specific time. If you **increase** the power density or energy density you are achieving **deep penetration** and effect, you intending to **cut and incise** the tissue. And if you intend to **superficial effect** you need to **decrease** it.

***Spot size (focused on defocused):***if you intend to **incise** the tissue you need a **focused** spot size, and if you need **superficial effect** you need **defocused** effect.

**Thermal relaxation time:**is the time to needed by the tissue to dissipate 50% of the absorb heat generated by laser. The laser when enter the tissue it will convert to heat or chemical interaction. The heat will vaporize the cells or it will make chemical reaction with the cell, for example, make damage to the cell membrane or denaturant the protein. So some types of laser produce heat, the time with needed to dissipate 50% of the absorbs heat this called Thermal relaxation time. On another way, if the Thermal relaxation time of the mucosa is 3 sec , and you apply the laser for less than 3 sec, that mean you are not exceeding the thermal relaxation time, that will not produce a heat in the tissue. Where there is no heat in the tissue there is no lateral thermal damage or coagulation. But if you exceed theThermal relaxation time 4sec you will produce lateral thermal damage which will lead to coagulation necrosis . So it you want to **cut and coagulate** you need to exceed theThermal relaxation time. And if you want to cut only like superficial effect like in leukoplakia and we will not exceed the Thermal relaxation time .

The final effect that achieve by the laser will be control all the previous factors.

So if you want deep penetration we will increase power density, energydensity, focused spot size, and exceeding theThermal relaxation time if coagulation is needed.

And if I want to make ablation for superficial area I will decrease thepower density ,energy density ,defocused spot size, with or without exceeding the Thermal relaxation timeif the coagulation is needed.

So if we want to make gingivictomy I will make cut. So I need laser with increasingpower density, energy density ,focused spot size, and exceeding the Thermal relaxation time.

But if we want to make gingivoplasty (resurfacing and re contouring of the gingiva), so I need laser with decrease power density ,energy density ,defocused spot size, with exceeding the Thermal relaxation time ( maybe some capillaries there)

Note : Homeostasis only achieve in using co2 laser for capillaries less than 0.5 mm. but more than 0.5 mm will need electro coagulation and other method like ligation for the capillaries.

ER:YAG laser is chromospheres for tissue containing water. And has also a unique effect which is a bactericidal so it is suitable for periodontal application and RCT to sterilize the canals, but the depth of penetration is less than CO2, for that reasons it is not good in providing homeostasis

ND:YAG laser : specially for tissue containing melanin and hemoglobin , like pigmented or vascular lesion. The co2 laser is faster than ND:YAG laser but with less depth of penetration. The ND:YAG laser has the highest depth of penetration among all the lasers.

The port wine stain distributed over specific nerve so we apply argon laser on it.

If you are not exceeding the thermal relaxation time the sample will be appropriate for histopathology .

The laser can cut and seal in mucosa, how we can seal by exceeding the thermal relaxation time.

Sometimes the orthodontics refer to expose the impacted canine. but the apically position flap to preserve the attach gingiva is better than excise the gingival by laser

The crown lengthening is one of imp. surgery in periodontics , full mucoperiosteal flap, deep curettage ,reposition the gingiva and cut the gingiva to specific length .

For premalignant lesion , resurfacing or ablation by the use of specific laser with decrease the power density ,energy density ,defocused spot size, without exceeding the Thermal relaxation.

TMJ lesion , diskotomy>> remove the disk .. diskoplasty >> reshape the disk… synovictomy >> to remove the synovial membrane posterior attachment contraction.

We open two incisions one for endoscope with camera and the other for laser.

Also with mucoseal,

Operculectomy to excise the operculum one for treatment modalities for pericorinitis but it always fail so the best treatment is to extract the wisdom .

Epulus fissuratam ,the surgical will lead to high expose area that will lead to heal with secondary generation and will be inconvenient for the patient ,so you can cut these fissure and cut them in the same time and it will be more convenient to the patient.

Laser in dental implant. we can use it in two main areas.

First: to treatment failing implant by sterilization of the implant.

Second : in second stage implant, before we put the gingival former we cut the tissue that cover the implant by laser.

Note :two stage implant, we put the implant in the bone then we suture in after two month we tale a radiograph and see if we have osteointegration ,if yes we cut the gingiva and but what we called gingival former to reshape the gingiva.

The laser can affect the lesion and can affect your eye or any tissue or can stimulate any gases specially Nitrous oxide or nitrogen gases in order not to stimulate by the laser.

You have to wear goggles or eye glasses to protect your eye .

It is better to specify one operator for the machine. To minimize the risk for other and get more experience.

 **The best management is the PREVENTION of medical emergencies**; because it’s difficult to deal with medical problems, we have to do our best to prevent their occurrence.

 How to prevent?

1. By identifying the patients who are at risk and assessing the severity.

2. By preparing the patient well, otherwise, you are considered negligent medico-legally. **The patient has to be prepared in relation to the type of procedure intended to be performed and disease status.**

You have to take a good history from the patient. **Every single part of history could be of medical significance.**

A diabetic patient should eat his breakfast and take his medication prior to the dental appointment. Keep in mind that this is **not** applicable for all patients; meaning that, this could work in simple extraction cases or **any procedure that will not interfere with the normal oral intake**. In the morning, the patient takes his hypoglycemic drug or long-acting insulin as well as his carbohydrate intake (breakfast), after the extraction procedure, **the effects of both insulin and carbohydrates are still there, thus no complications will be encountered**. On the other hand, when performing extensive procedures for a diabetic patient, such as, extraction of 10 teeth, the patient will **not** be able to eat well after the procedure **no carbohydrate intake, BUT the hypoglycemic drug/insulin is still acting!** **In the evening, the patient will become hypoglycemic.**

**Local/General anesthesia should never be administered UNLESS the patient is in a SUPINE POSITION.** This position allows the blood to reach the brain even if there is pooling of blood in the skeletal muscles, thus, minimizing the incidence of medical emergencies, particularly the ***vasovagal syncope; simple faint.***

NO oxygenated blood reaching the brain for more than 5 minutes Death.

 The patient should never be left unattended.

Before performing any stressful procedure, **a medical emergency kit** should be present, which contains: oral and nasal airways, clear face-masks, large suction tips, IV cannula, IV fluids and variety of drugs:

- Flumazenil: specific benzodiazepine receptor antagonist.

- Atropine: reversal of sedative agents Simple faint cases.

- Glucose, which is available in many different forms; unconscious patientIV/IM.

- **Adrenaline: the drug of choice for many diseases especially in (1) cardiac arrest, (2) asthma and (3) anaphylactic shock** **LIFE-SAVING****.**

- Hydrocortisone Anaphylactic shock.

- Diazepam

- Glyceryl TriNitrate (GTN)Angina patients

**(Automated external defibrillator (AED)** **The gold standard for treating patients with cardiac arrest****.)**

**COLLAPSE**

**A sudden, generalized loss of strength without loss of consciousness.**

 Loss of the muscular tone.

 The initial phase of any emergency.

It can be followed by a loss of consciousness, which could be as a result of:

**1. Vasovagal syncope = Simple faint.**

**2. Diabetes = Hypoglycemia.**

**3. Anaphylactic shock.**

**4. Adrenal crisis.**

(1-4 are the most common causes of collapse in the dental practice)

In any emergency; maxillofacial trauma, infections…etc, you must perform the ABC’s:

**A: Airway**

**B: Breathing**

**C: Circulation**

 Maintain an **intact airway** and the **normal breathing and circulation**.

 **NOT stable?** **Support them** 

Example: a patient collapsed in your clinic, his medical history says that he is fit.

 The first thing that should come to your mind is the ***vasovagal syncope*** (the most common cause of any medical emergency in the dental practice). **And your management should be placing the patient in a supine position (unless the medical history contraindicate that, e.g. heart failure, severe asthma.)** within minutes the patient should recover.

 NO recovery or any improvement Reconsider your diagnosis ***Hypoglycemia*** (the second most common cause of any medical emergency in the dental practice). **Gluco-Chek****.**

A. Conscious patient Sweets

B. Unconscious patient IV Dextrose or IM Glucagon

**(Supine position + No signs of improvement** **the cause is NOT vasovagal syncope.)**

 The patient is not hypoglycemic; normal blood glucose levels then it is either ***adrenal crisis or anaphylactic shock*** (each one of the two has its specific features which will indicate the diagnosis.)

How to approach a patient with a medical emergency?

**1.** Check the **vital signs;** pulse, blood pressure, respiration and temperature.

**2.** When all the vital signs check normal, progress to identifying the etiology of emergency. If one or more of the vital signs are not normal, you must support them. **ABC’s have to be supported and stabilized first, only then you may proceed to the identification of the etiology; because they are far more important in saving the patient’s life!**

**VASOVAGAL SYNCOPE (SIMPLE FAINTING)**

**Most of the vasovagal attacks are neurally-mediated; caused by neural excitation which could be due to stress or phobia.** Phobia from a specific stimulus sympathetic action vasoconstriction + decreased blood pressure.

It may be caused by a **vascular problem**, e.g. hypotension Pale mucosa (white tongue and pale skin) + the patient is cold and sweaty + **tachycardia; to compensate for the sudden drop in the blood pressure.**

 Treatment of choice: place the patient in a supine position in order to allow the blood to reach the brain and to prevent cerebral hypoxia from happening.

 **Most of the patients are conscious unless the patient was not managed then loss of consciousness occurs.**

 You, as a dentist, should NOT panic. Follow the general guidelines for the management of medical emergencies.

**ANAPHYLACTIC SHOCK**

A reaction between an antigen (allergen) and an antibody (**IgE** on mast cells). Degranulation of mast cells release of inflammatory mediators Edema; **laryngeal edema and constriction. (Very significant!)**

**Anaphylactic shock = bronchoconstriction (wheezing) + laryngeal edema.**

 **Type I hypersensitivity reaction.**

 **The most common antigen in the dental practice is Penicillin.**

 10% of people allergic to Penicillins are allergic to Cephalosporins.

 2% of people allergic to Penicillins are allergic to NSAIDS.

If Cephalexin is the only antibiotic present, should it be given to the patient?

Yes, you can give it to the patient although there’s a cross hypersensitivity reaction, this is considered a malpractice, but you can justify such an action only if the patient’s history suggests that his allergy is **mild,** then the likelihood of developing an anaphylactic shock after taking Cephalexin is low. On the other hand, a patient with a history of **severe** anaphylactic shock, should NOT be given Cephalexin.

 You should be careful before prescribing any medication to patients allergic to Penicillins or any drug, e.g. **asthmatic patient** **high susceptibility to hypersensitivity reactions to medications.**

**The most common drugs involved in hypersensitivity reactions:**

**1. Penicillins**

**2. Muscle relaxants**

**3. NSAIDS**

 Anaphylactic shock could be mild, moderate or severe. **The faster the onset of the anaphylactic shock, the more severe it is**; within seconds severe and life-threatening, within half an hour very mild.

 The drug of choice is: **Epinephrine** Life-saving!

WHY? Because it is a **bronchodilator**.

HOW? **IM by using an Epi-Pen;** Epinephrine auto-injector**.**

(Why not IV? It might lead to contraction of the heart muscle leading to a cardiac arrest and IM injections a more easily administered using the Epi-Pen.)

WHERE? In the **anterolateral aspect of the thigh** ***Vastus Lateralis*** muscle, WHY? Because it is **bulky and highly vascularized**.

 Give the patient epinephrine, **corticosteroids to relieve the laryngeal edema**, as well as, antihistamines, e.g. Chlorphenamine.

 The patient **should be admitted to the hospital for at least 24 hours**; because hepatic recirculation of the drug might occur leading to another anaphylactic shock.

 As was mentioned, prevention is always better than the cure and taking a good history is a must before any treatment.

 Patient with risk of allergy **avoid any contraindicated medications and anything that might induce an anaphylactic shock**.

 **Anaphylactic shock****Supine position + Epinephrine** (The drug of choice; life-saving.)

**CARDIAC ARREST**

The heart stops doing its function.

Signs and symptoms:

**1. Loss of consciousness**

**2. No circulation (pulse)**

**3. No breathing**

(Always keep in mind that if there was NO breathing for more than 4-5 minutes then there is NO circulation.)

**The most common cause is Ischemic Heart Disease (IHD),** such as, history of myocardial infarction or angina, and prosthetic heart valve, **which causes Ventricular Fibrillation (VF).**

The gold standard for treating such patients is by using **the defibrillator**.

Steps of management: (the sequence is important)

**1. Check the responsiveness of the patient. (Shake and shout)**

If the patient was irresponsive, then you have to check the breathing, if it was adequate, you position the patient in the recovery position, if not, check the circulation, if it is present, then perform mouth-breathing and recheck the pulse. If there was no circulation no blood reaching the brain, very dangerous shout/call for help, because the faster a defibrillator is brought, the more there is a chance in saving the patient’s life.

Note: Unconscious + NO breathing + CirculationNOT A CARDIAC ARREST.

2. **Confirm** that the patient is having a cardiac arrest.

**3. Call/shout for help immediately.**

In specific situations, we need to perform one minute of resuscitation (CPR) before calling for help, such as in children with a trauma or drowned patients, but why? Because in the case of a drowned patient, you can get rid of the water in the lung, and in trauma situations you can relieve the obstruction/foreign body. **Thus, solving the problem lies in getting rid of the cause, and in these cases the cause is obvious and manageable. But in the cases that are caused by IHD and VF the gold standard for the treatment is the defibrillator, that’s why you have to call/shout for help first.**

**4. Try to restore the normal function**. Circulation and breathing can be brought back to normal by following the basic life support guidelines. Start by **compressing the chest and ventilating the patient** (30 compression : 2 ventilation) until you are exhausted or help is reached. **However, if you perform that optimally, you will not achieve more than 20% of the normal circulation.**

- Aim for 100 compressions/min.

- While performing mouth-breathing, **close the patient’s nose**, otherwise, what you are doing is pointless. Is there a risk of Hepatitis or HIV transmission? There is, but it is **negligible**. It is preferable to take precautions.

5. Advanced life support is similar to basic life support but with more advanced measures; instruments and devices that address the circulation (**defibrillation, if shockable**) and breathing (**endotracheal intubation**). Once help is reached, they use the ECG to check the rhythm of the heart and detect if it is shockable or not.

**HYPOGLYCEMIA**

Blood glucose is below the normal reference range. ( **< (55-60) mg/dL** )

Causes:

1. Missed meal.

2. Excessive medication (insulin).

3. Increased caloric need due to exercise.

4. Combination of the above.

You can prevent hypoglycemia by avoiding the predisposing factors. The patient should take his medications and have an adequate carbohydrates intake.

**It is easy manageable, yet very dangerous and might lead to death.**

Signs and symptoms:

**1. Hypotension.**

**2. Aggressiveness and agitation.**

Due to low sugar levels in the brain excitation.

**You can give the patient glucose in any available form, if conscious. If unconscious, give the patient IV dextrose or IM glucagon.** 9

**ACUTE ASTHMATIC ATTACK**

The patient already has an asthma.

Asthma could be mild, moderate or severe. **Severe asthma is life-threatening.** How can you tell if the patient has a severe asthma?

**1. Medication itself might suggest the severity** **Corticosteriods = severe.**

**2. Loss of consciousness.**

**3. Inability to speak one full sentence.**

**ALWAYS treat the patient in an UPRIGHT POSITION.**

**The drug of choice is Epinephrine**. Can be supported by **Hydrocortisone**.

Never treat the patient unless his inhaler is present, because stressful events may induce an asthmatic attack.

**FOREIGN BODY ASPIRATION**

= FOREIGN BODY RESPIRATORY OBSTRUCTION = UPPER AIRWAY OBSTRUCTION

Instruments, such as files, or even bridges can be inhaled/swallowed.

Aspiration of sharp objects increases the likelihood of developing complications.

If **any sign** of airway obstruction was seen, you have to **immediately stop your procedure**.

Management:

1. Open the mouth widely.

2. Suction the oral cavity.

3. Clear the airway.

4. **If you see the foreign body try to grasp it by your hand, if that wasn’t possible, push the chest up (Heimlich maneuver) to induce a cough reaction to clear the airway, if that wasn’t helpful, you go for an endoscopy.**

 **No persistent cough + No agitation** **the object is in the esophagus.**

 **Severe persistent cough** **the object reached the nasopharynx, in the lung** **might need a bronchoscopy or even deep chest surgery.**