

Ministry of Health of Ukraine

Danylo Halytsky Lviv National Medical University

Department of Oral and Maxillofacial Surgery

**Emergency Aid Rendering**  
**In Oral Surgery Practice**  
(methodological instructions)

Lviv — 2014

The methodological instructions have been discussed and approved at the meeting of Oral Surgery and Maxillofacial Surgery Department and Methodical Committee of Stomatologic Disciplines (minutes No. 2 of 02.04.2014) within Danylo Halytsky Lviv National Medical University.

**Authors:**

R. Ogonovsky, Professor, DMS, MD

Y. Vares, Professor, DDS, MD

Kh. Pohranychna, Assistant Professor, DhD, MD

**Reviewers:**

A.Kordiyak, DDS, MD, Professor

N. Chuhray, PhD, MD, Associate Professor

L. Smolska, PhD, Associate Professor

**A person in charge of publication:** Professor Yan Vares

## **Foreword**

The alarm condition cases can occur in oral surgery and maxillofacial surgery practice. Thus, a dental practitioner shall promptly disclose a disease, deliver efficient medical care and avert the critical condition.

The practical policies have been elaborated to help the students studying medicine to master necessary professional skills for providing appropriate cardiopulmonary and encephalitic resuscitation when needed. The first aid practical procedure complies with the Order issued by the Ministry of Health of Ukraine No. 24 of 17.01.2005 “Approval of Medical Care Protocols in the field “Medicine of Emergency”, No. 436 of 03.07.2006 “Approval of Medical Care Protocols in the field “Cardiology”, No. 5081-VI of 05.07.2012 “On Emergency Medical Treatment”, No. 34 of 15.01.2014 “Approval and Implementation of Medical and Technological Documents in Emergency Medicine Standartization”.

# Providing Patients with Oral Surgery Emergency Care

**1. Unconsciousness** (delirium, faintness, syncope, loss of consciousness) is an abrupt short-term clouded state caused by acute cerebrum ischemia.

Precaution: taking into account the anamnesis and psycho-emotional state of a patient, assuring close compliance with deontology guidelines especially where children are concerned, as well as considering appropriate psycho-pharmacological preparation for surgical intervention and pain free treatment.

Clinical symptoms and signs: loss of consciousness preceded by a debilitating feeling, sicchasia, eyesight dimout, hidrosis, buzzing in ears, seeing spots, a sense of “vacuity” in the head and the numbness of extremities. Faintness emerges acutely. During revision the symptom expression of syncope, shallow breath, skin pallor, decrease of temperature, presumable cyanosis, hidrosis and relaxation of skeletal muscles are revealed. Pulse is either slow or frequent and of poor volume (very fine and scarcely perceptible). The decrease in arterial tension is observed. Tendon and papillary reflexes are preserved.

## Medical treatment procedure:

Put the patient in a recumbent position, remove a tie, unloosen collar and waistband, allow for air passage.



Take reflex actions on the respiratory and cardiovascular centers (inhale 10% of ammonia spirit solution and use it for rubbing in temporal fossa, sprinkle face and thorax with some cold water, give point Zhengzhou massage in reflex excitability areas (at a 1/3 distance between the nasal septum and vermilion upper lip border and gen-zuzian massage (in the center of jaw incisure).



If lack of efficiency, the following measures are to be taken: inject 10% caffeine solution, sodium benzoate — 1ml SQ, later — 5% ephedrine solution— 1 ml SQ or 1% mezatonum— 1 ml SQ, in cases of brachycardia — 0.1–0,5% atropine sulfate— 1 ml SQ.



After recovery assure clear airway, tranquility, oxygen therapy, hot tea and EKG.

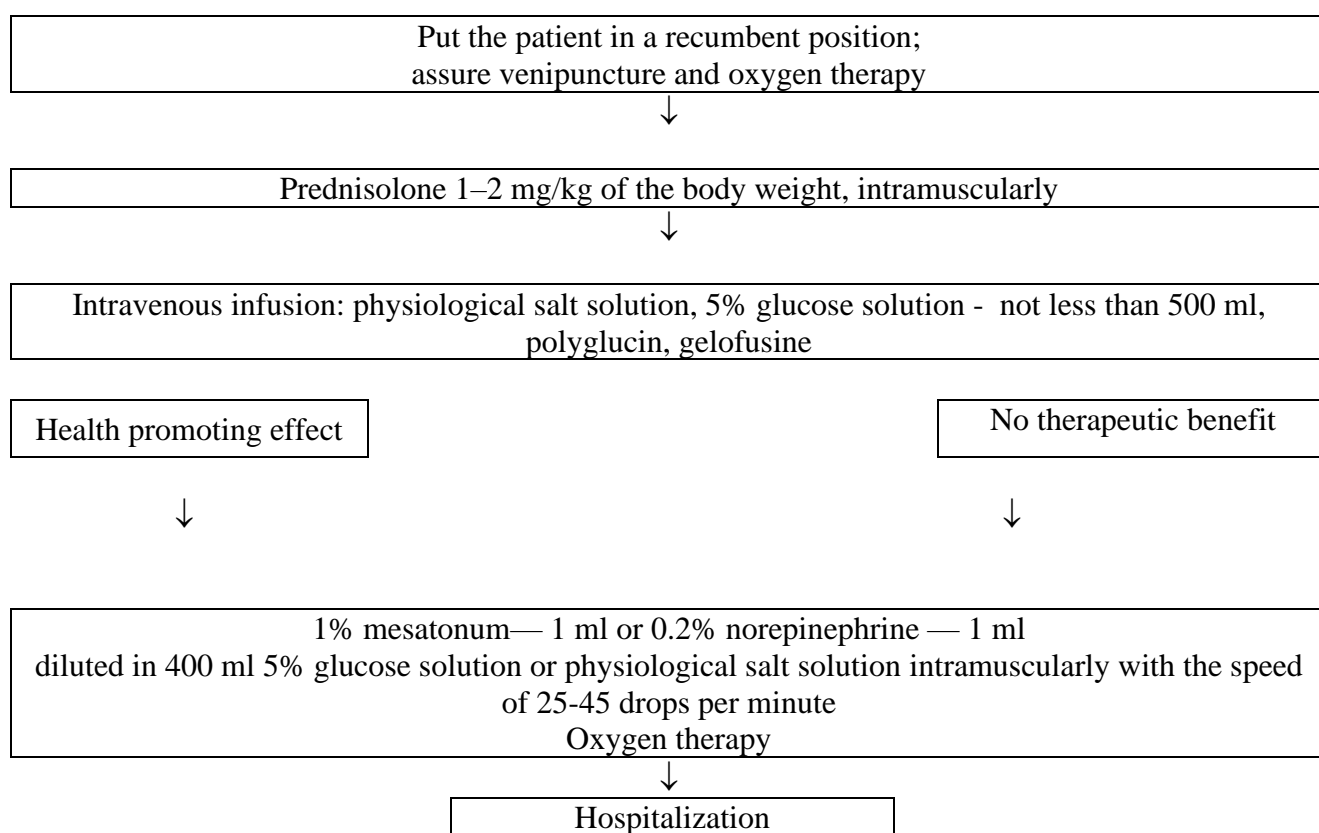
**2. Collapse** is a vasogenic shock caused by vasorelaxation that leads to the terminable distortion of blood stream capacity and total blood volume ratio.

Precaution: surgical intervention preceded by medication (psycho-pharmacological preparation, appropriate anesthesia, systemic and anti-inflammatory

therapy). Blood and blood substitutes, as well as transfusion facilities shall be arranged in advance to avoid collapse in case of risk factors.

Clinical symptoms and signs: skin integument is very cold and pale and with cyanotic discoloration and colliquative sweat. Sharp decrease of arterial tension (80 mm Hg, systolic blood pressure), hypoxia, as well as peripheral blue vessel devastation are observed. The patient is still conscious suffering from abrupt atony and exhaustion. Heart tones are hardly audible with an accent on *a. pulmonalis*. Shallow breath or apneusis (Cheyne-Stokes and Biott-Kussmaul respiration) is discovered while examination.

Medical treatment procedure:



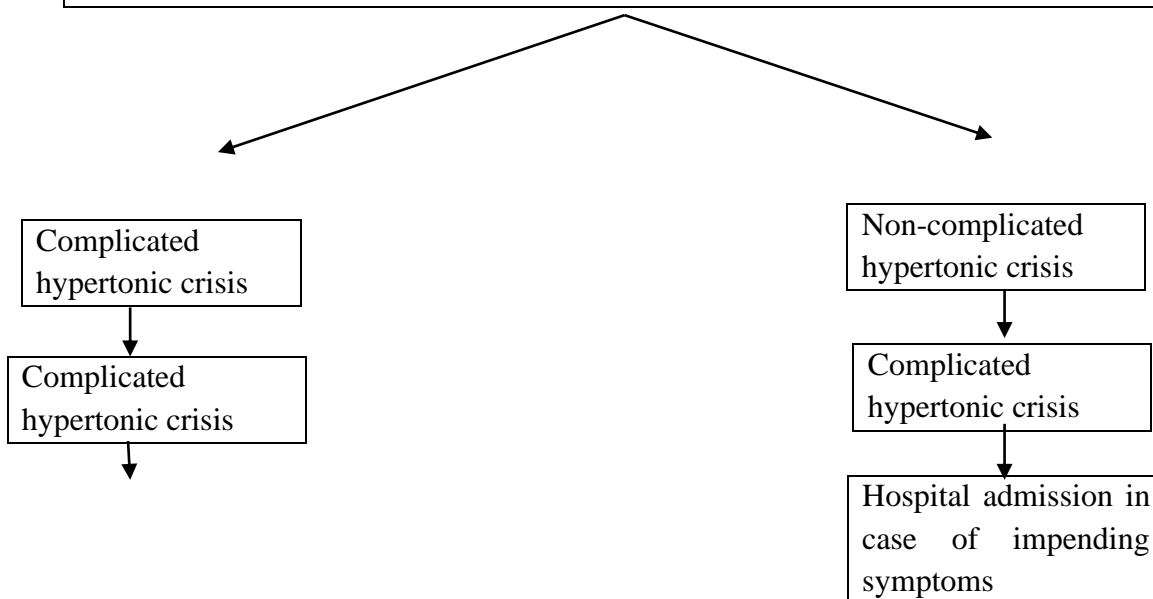
**3. Hypertonic crisis** is a clinical syndrome showing the symptoms of abrupt increase in arterial pressure and dysfunction of vitals

Precaution: consultation services provided by a therapist, surgical intervention shall be made under the action of tranquilizers and the medical drugs with analgesic end point and relaxing effects are to be introduced into the pre-anesthetic medication, for example, baralgin.

Clinical symptoms and signs: the abrupt and considerable increase in arterial tension.

# THE TACTICAL STRATEGY TO BE APPLIED IN CASES OF HYPERTONIC CRISIS

**First aid**  
(ambulant therapy)  
Clonidine – orally or parenterally  
Captopril – parenterally or sublingually  
Nifedipine - orally or sublingually  
Propranolol – orally or sublingually  
Nitroglycerin – sublingually  
Dibazol – parenterally  
Furosemide – orally or parenterally  
Torasemide – orally or parenterally



Intravenous infusion:  
Nitroprusside sodium  
Labetalol  
Nitroglycerin  
Trimetaphan  
enalaprilat

## Medical treatment procedure:

intravenous injection 0.5% Dibazol — 5 ml; intravenous administration of lasix — 20mg;  
clonidine — 1–2 morsuli (sublingually)  
5% pentamine — 0.2–0.5 ml based on glucose (intravenous administration)

Hospitalization

# Hypertensive Crisis

110-115

## Complicated

reduce arterial blood pressure at  
1/4 of the initial indicator

1. Hypertensive encephalopathy or

focal neurological signs

- furosemide - 2.0-2.4 (intravenously)

- 25% magnesium sulfate - 10.0

(intravenously)

**alternative:** lacardia intravenously

-piracetam - 10.0 - 2.0 intravenously

**alternative:**

aminophylline up to 10.0 intravenously

2. Acute subcoronal syndrome -  
as per Protocol No. 11

3. Congestive heart failure -  
as per Protocol No. 13

wheelbarrow hospitalization

to the neurology department, cardiovascular care unit

or internal curative unit (depending

on symptoms and signs)

## Non-complicated

1. Tachicardia

anapriline - 20-40 mg per os or

metoprolol - 25-50 mg per os

2. Norm-and brachycardia:

nifedipine (farmadipine, starting

with 3-6 drops, corinfar or

fenigidine - 1 pill per os

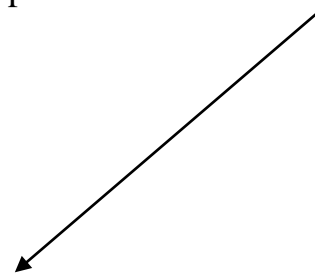
3. Possible combination of

nifedipine and beta blockers

**alternative:** lacardia intravenously

4. Additional tabloid anti-

hypertensive slow-release drugs



**4. Anaphylactic collapse** is the state of hypersensitivity caused by a repeat injection of foreign protein, serosity and drugs after insect bite. Anaphylactic collapse can be induced by oral, parenteral, epicutaneous or mucosal injection of a medicine, for example, anesthetic agent. Gas dispersoid inhalation followed by sensibilization can also provoke allergic shock.

Precaution: taking into consideration exposure to the local anesthetics specifically to alcohol esters, and the allergic response that might be caused by the latter, anesthetic testing and allergist advisory are required.

Clinical symptoms and signs: general weakness, cephalaea, sharp breast bone and alvus pain, abrupt acute blanching are **the shock premonitory symptoms**. The patient stays conscious showing the signs of tachycardia, probable Quincke's edema, brochial spasm, respiratory disturbance, hyperemia and even cyanosis, labored breathing and sibilant exhalation. The patient is restless and complains of intense itching and fervecence which may be followed by hypotension, renal disease and even death.

*Anaphylactic collapse forms:*

Subacute form: occurs in 1-2 seconds after the contact with an allergen and presenting in fainting, spasmodic strictures, papillary dilatation, lack of photoharmose, decrease in arterial pressure, rough breathing, muffled heart sounds and even total cancellation. Death may occur in 8-10 minutes.

Nasty form: occurs in 5-7 minutes after the contact with an allergen and presents in burning, rough breathing, cephalalgia, muffled heart sounds, decrease in arterial blood pressure and papillary dilatation.

Moderately severe form: occurs in about 30 minutes after the contact with an allergen. The skin shows the signs of hives and pruritus. There following types of moderately severe anaphylactic collapse can be developed:

- Cardiogenic type with the evidence of myocardial ischemia and peripheral microcirculation disorder;
- Asthma-like or asphyxia type presenting in bronchial spasm, laryngeal edema and oxygen deficiency;
- Encephalitic type displaying the signs of psychomotor agitation, spasmodic strictures, loss of consciousness, cardiopulmonary arrest and respiratory stand still;
- Transabdominal type showing the symptoms of "acute abdomen".

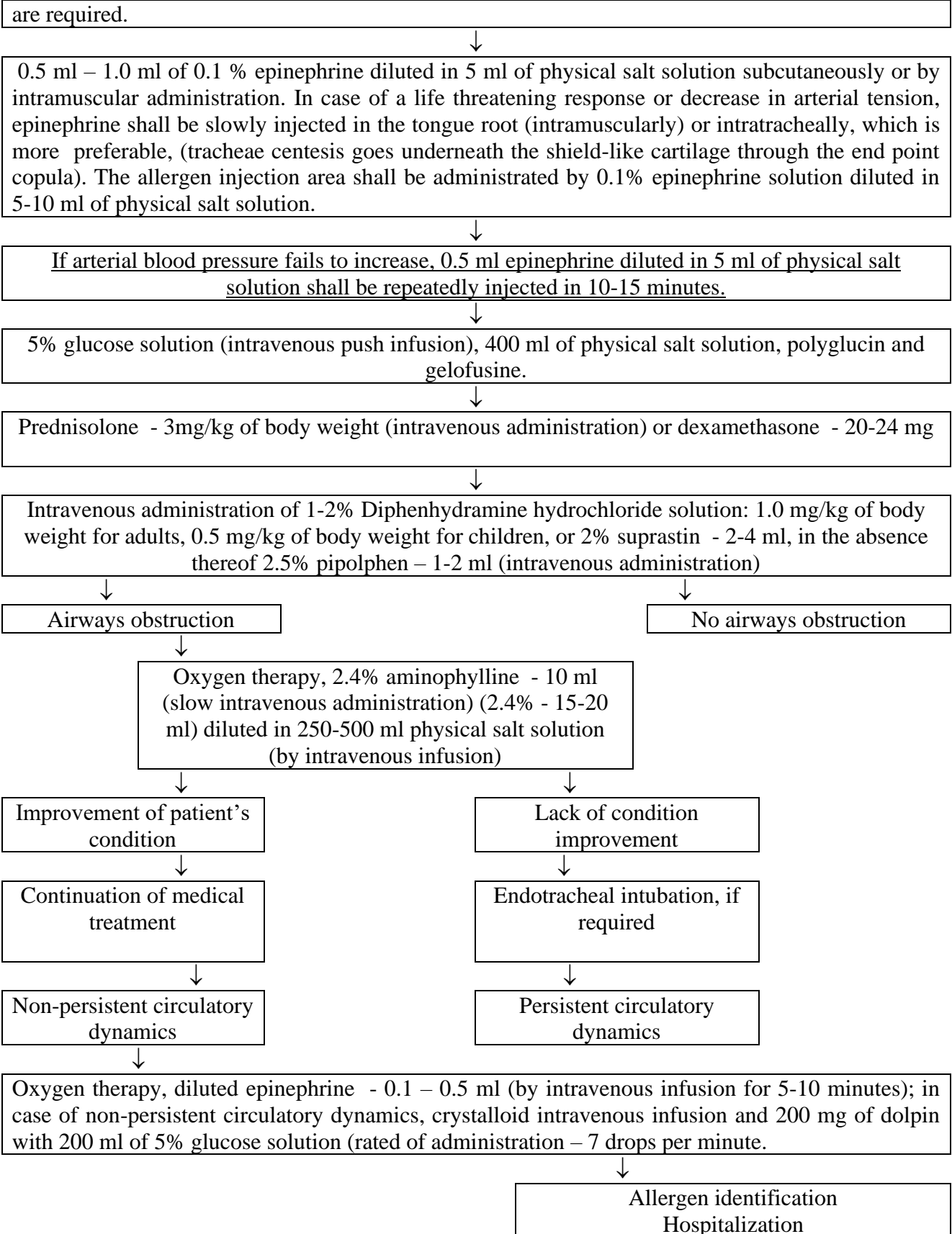
Medical treatment procedure:

Cease the injection of drugs inducing anaphylactic collapse



Put the patient in a recumbent position with his/her lower limbs slightly raised. In case of apsychia the lower jaw shall be jut forth to prevent from tongue swallowing and asphyxia. Dental prosthesis (if any) are to be removed. Humidified oxygen inhalation and vein puncture in two peripheral veins





**ALLERGIC RESPONSE**

**L 23 - L 25, L 27**

**ABC, Oxygen, artificial ventilation**



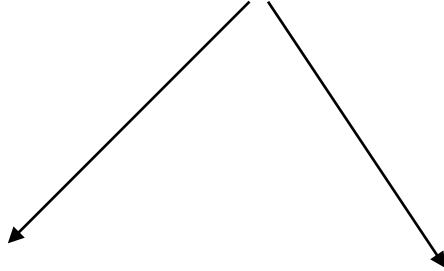
Systolic arterial tension >90 mm HG with appropriate perfusion

---

Yes

No

Dyspnoea



Yes

No

1. Solutions for intravenous administration for a quick achievement of systolic tension >90 mm HG
2. ECG control
3. EPINEPHRINE - 0.5 mg 1:10,000 intravenously
4. DEXAMETHASONE - 4-8 mg intramuscularly

1. Vein contact
2. ECG control
3. EPINEPHRINE - 0.3-0.5 mg 1:1,000 intravenously
4. DEXAMETHASONE - 4-8 mg intramuscularly

1. Vein contact
2. DEXAMETHASONE - 4-8 mg intramuscularly

---

**URGENT HOSPITALIZATION**

**For children:**

- EPINEPHRINE - 0.01 mg/kg (0.1 ml) 1: 10,000 intravenously  
EPINEPHRINE - 0.01 mg/kg not more than 0.3 mg (0.3 ml) 1:1,000 subcutaneously  
DEXAMETHASONE - 8 mg intravenously
-

**5. Quincke's edema** is a kind of hypersensitivity reaction causing cutaneous and subcutaneous edema and swollen mucosa.

Precaution: detailed history taking, allergist consultation, preventive injection of desensitizing agents.

Clinical symptoms and signs: rapid and abrupt occurrence of non-pitting pain-free palpebral, labial and nasal edema. Laryngeal edema is accompanied by hoarseness, barking cough and heavy breathing. Facial skin coloration impulsively changes from blue to pale. Inspiratory dyspnea is followed by inspiratory-expiratory grunt and asthmatic evidence. No mark is left after finger pressure in case of Quincke's edema.

Medical treatment procedure:

intramuscular administration or intravenous infusion of 1% diphenhydramine hydrochloride solution - 1-5 ml (0.02–0.05 g of diphenhydramine hydrochloride in 75-100 ml of physical salt solution)



intravenous injection of 10% chloride of calcium solution - 5-15 ml or slow infusion of 5% ephedrine hydrochloride - 1 ml



0.1% atropine solution subcutaneously, intramuscularly or intravenously - 0.25 - 1 ml



In case of asphyxia symptom augmentation: prednisolone - 3-5 mg/kg of body weight (intravenous) or dexamethazone - 20-24 mg

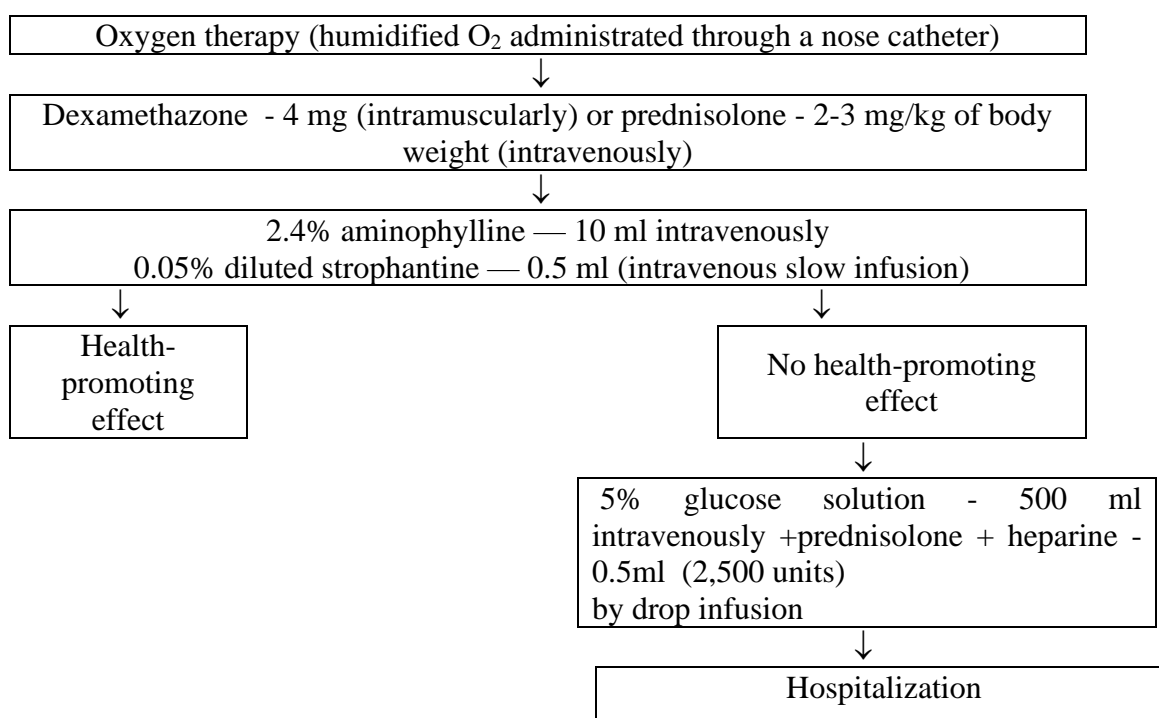
If no health-promoting effect, immediate tracheotomy is applied

**6. Bronchial asthma** is a disease with a core symptom of abrupt and recrudescing asthma attacks lasting for the extended period of life. The attack can be provoked by any gas dispersoid agent in a dentist's room.

Precaution: scrupulous history taking and preanesthetic medication. A dental interference is allowed only during non-attack periods and under the effect of broncholytic, sedating and cardiac medication as per therapist's recommendations. Bronchial spasmolytic inhalation device is required in the case.

Clinical symptoms and signs: abrupt nasal rheum, sneezing, non-productive cough accompanied by asphyxia, stentorous with heavy expiration and hissing respiration, restlessness, specific sitting position leaning on arms, cyanosis and tachycardia are the signal symptoms of the attack.

Medical treatment procedure:



In accordance with the Order issued by the Ministry of Health of Ukraine No. 128 "Approval of Care Delivery Protocol in the Field: "Pulmonology", and to clause 9 of the Order issued by the Ministry of Health of Ukraine No. 751 of 28.09.2012, the following treatment procedure has been defined:

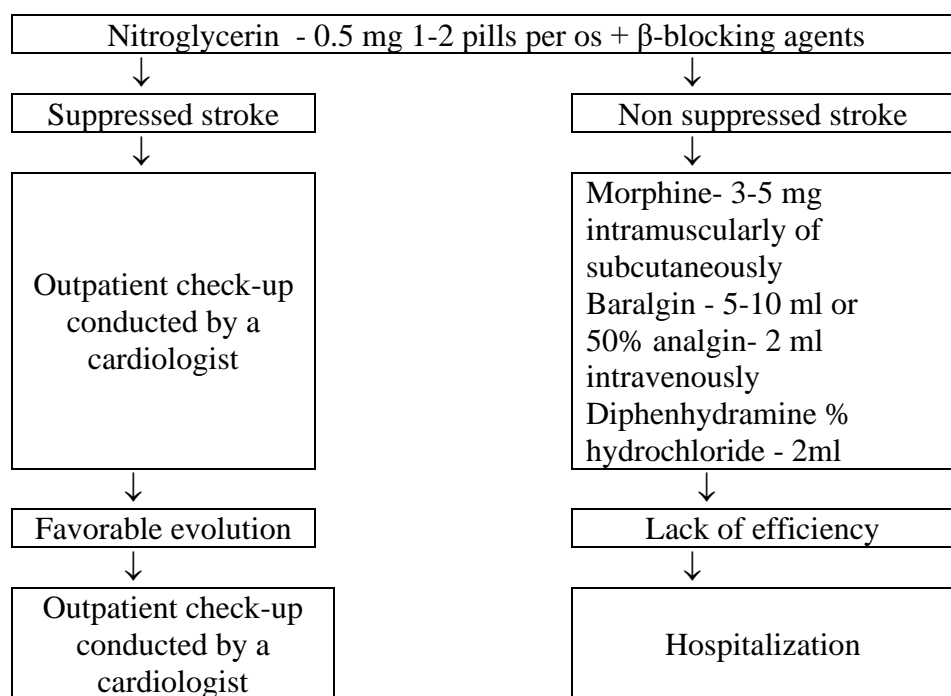
- central vein catheterization — oxygen therapy,
- fluid resuscitation (Ringer's solution combined with 5% glucose),
- for better rheology - rheosorbilactum,
- heparinization (15,000–20,000 per 24 hours),
- inhalative B<sup>2</sup> agonists + anticholinergic drugs,
- methylxanthine (2.4% aminophylline 5–6 mg/kg during the first 20 minutes),
- gluco-corticosteroid — 25% magnesium sulfate solution (10–20 ml),
- in case of obstructive acute respiratory failure and hypoxia, artificial pulmonary ventilation is required.

**7. Heart stroke** shows the evidence of pain in the breast bone area caused by the coronary circulation inefficiency and myocardial ischemia.

Precaution: stress coping, scrutinous history taking in order to reveal the signs of arterial sclerotic disease of coronary vessels, hypertensive disease, syphilis and diabetes mellitus.

Clinical symptoms and signs: gripping breast bone pain irradiating into left brachium, left parts of cervix and face, lower jaw bone, auris sinistra and bladebone. Pain is accompanied by the feeling of weight, shortness of breath, anxiety, general weakness, hidrosis and tenesmus. The stroke usually lasts for 1.5-5 minutes or longer. Several strokes may arise with the interval of 10-15 minutes. Should the breast bone pain last more than 20-30 minutes, myocardial infarction might occur.

Medical treatment procedure:



**8. Epileptic seizure** can occur during a dentist visit.

Precaution: detailed history taking, prediction of epileptic seizure caused by a craniofacial injury or psychological constraint, neurologist's consultation before the dental visit, anti-epilepsy drug administration.

Clinical symptoms and signs: syncope, tetanic convulsions followed by clonic spasms, face redness or blanching, mydriasis, decurrence of corneal reflex, tachysphygmia and engorged pulse, substantial salivation ("foam"), facial, extremity and corpus tension, spasm of respiratory system musculature and apneusis. Epileptic seizure can last from a few seconds till a few minutes being followed by coma, semicoma or soaper and result in complete amnesia.

Medical treatment procedure:

Put the patient in a lateral position preventing from traumatizing.



Slow intramuscular administration of % seduxen solution - 2 ml + 40% glucose solution - 20 ml

**9. Asphyxia** stands for acute respiratory failure. There are a few kinds of asphyxia: *aspiration asphyxia* showing the evidence of mucus, blood and omitting matters in airways; *dislocation asphyxia* - tongue swallowing caused by a lower bone injury; *valvate asphyxia* - occurrence of a valvule made of posterior veil of soft palate grafts and other oral pharynx tissues; *obturative asphyxia* - airway obturation caused by foreign objects; *stenotic asphyxia* - respiratory pipe compression or diminution brought about by allergic or inflammatory edema, as well as hematoma, etc.

Precaution: Quincke's edema prevention and early treatment, appropriate healing of maxillofacial traumas (operative exploration of oral cavity as the valvule might fail to be early disclosed); prevention of vomiting matter aspiration and tongue impaction during end-of-life situations (head edgewise position with the juttet jorth submaxilla); paying meticulous attention to dental procedures and tooth removal (taking into consideration the probability of small dental appliances aspiration during the full inspiration that may be caused by restlessness and the startle recruiting displayed by children). Dental office shall be equipped with tracheostomy and laryngeal catheterization sets, as well as with air distributor. A dentist is expected to master at least the cricothyrotomy techniques.

Clinical symptoms and signs: impulsive, gradual or attack-like development. Spasmodic breathing, tachypnoe or bathypnea are symptoms of sudden acute asphyxia. The progression of asphyxia associated with convulsions may lead to apneusis. Stentorious and hissing inspiration is revealed, tachysphygmia is followed by bradysphygmia, excitatory state develops into apsychia, mydriasis is disclosed, and sporadic full inspirations are resulted in cardiopulmonary arrest. Cyanotic discolouration, exophthalmos, open mouth, protruded tongue and fear in years are observed.

Clinical performance during the asphyxia insidious onset is not so evident. The process may be balanced by appropriate positioning (head tipping forward, etc)

#### Medical treatment procedure

Treatment order depends on the asphyxia pattern and implies the removal of its cause: fluid exsufflation from airways and hemostasia (if bleeding) is applied for treating *aspiration asphyxia*.

Tongue ante-position (underrunning at the distance of 1 cm from the tongue edge and alongside its line or pin centesis), its fixation in an extended position, reposition and immobilization of mandibular bone fragments are applied for the treatment of *dislocation asphyxia*.

In case of *valve asphyxia* the soft tissue grafts are stitched together.

In the event of *obturation asphyxia* the foreign objects either fall out while upside down and coughing reflex or are extracted. Some *special techniques* may be also applied:

1) a few pushes in the interscapular area;

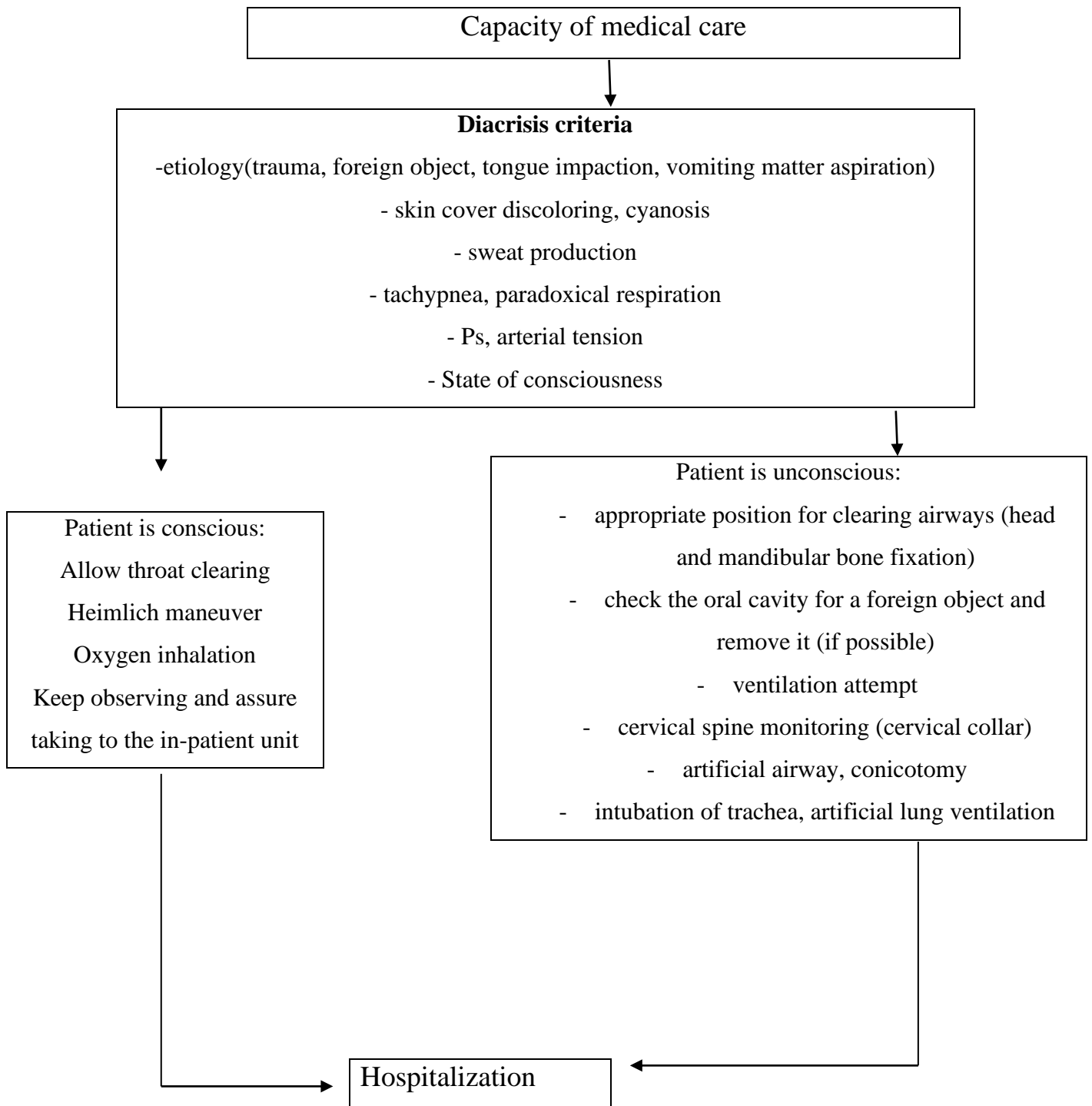
2) abrupt bottom-up compression made by a medical aid provider with his/her arms thrown around the patient from the dorsum and with his/her hands bridged to be put under the ensisternum.

Edema locus dismemberment and hematoma abolition is applied for *stenotic asphyxia* curing. Diuretics are effective during the slow asphyxia course.



# RESPIRATORY OBSTRUCTION

R-00

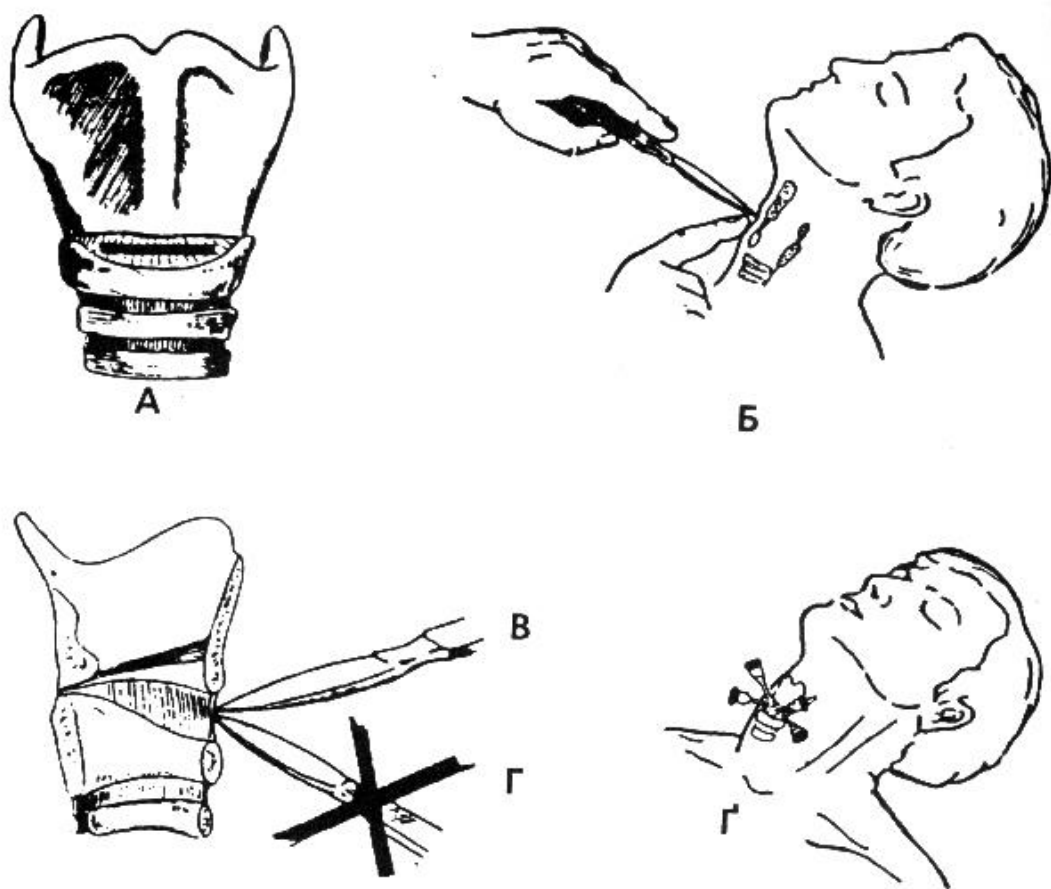


If the stated above practices showed lack of efficiency, tracheotomy, conicotomy or tracheostoma (if required) are applied. Oral pharynx tamponage preceded by tracheotomy is allowed in cases of hemorrhage of undefined origin.

**Conicotomy** is the opening of larynx by means of shield-like annular (conoid) ligament discussion. It is applied for treating asphyxia caused by the lack of air access in gula when tracheotomy is counter-indicative and intubation is impossible. Though, conicotomy is a short-term measure and tracheostoma is still required after breathing management.

Conicotomy procedure:

- left hand fingers are used to fix the thyroid cartilage of a patient in a dorsal position with his/her head thrown back;
- fossa between the annular cartilage brim and the thyroid cartilage foot is to be palpated;
- a single-step vertical skin and shield-like annular ligament incision is made in fossa along the cervix midline (after infiltration anesthesia, if possible).
- When hissing respiration, the wound edges shall be dilated by means of a pinch clamp.



**Figure.** Conicotomy

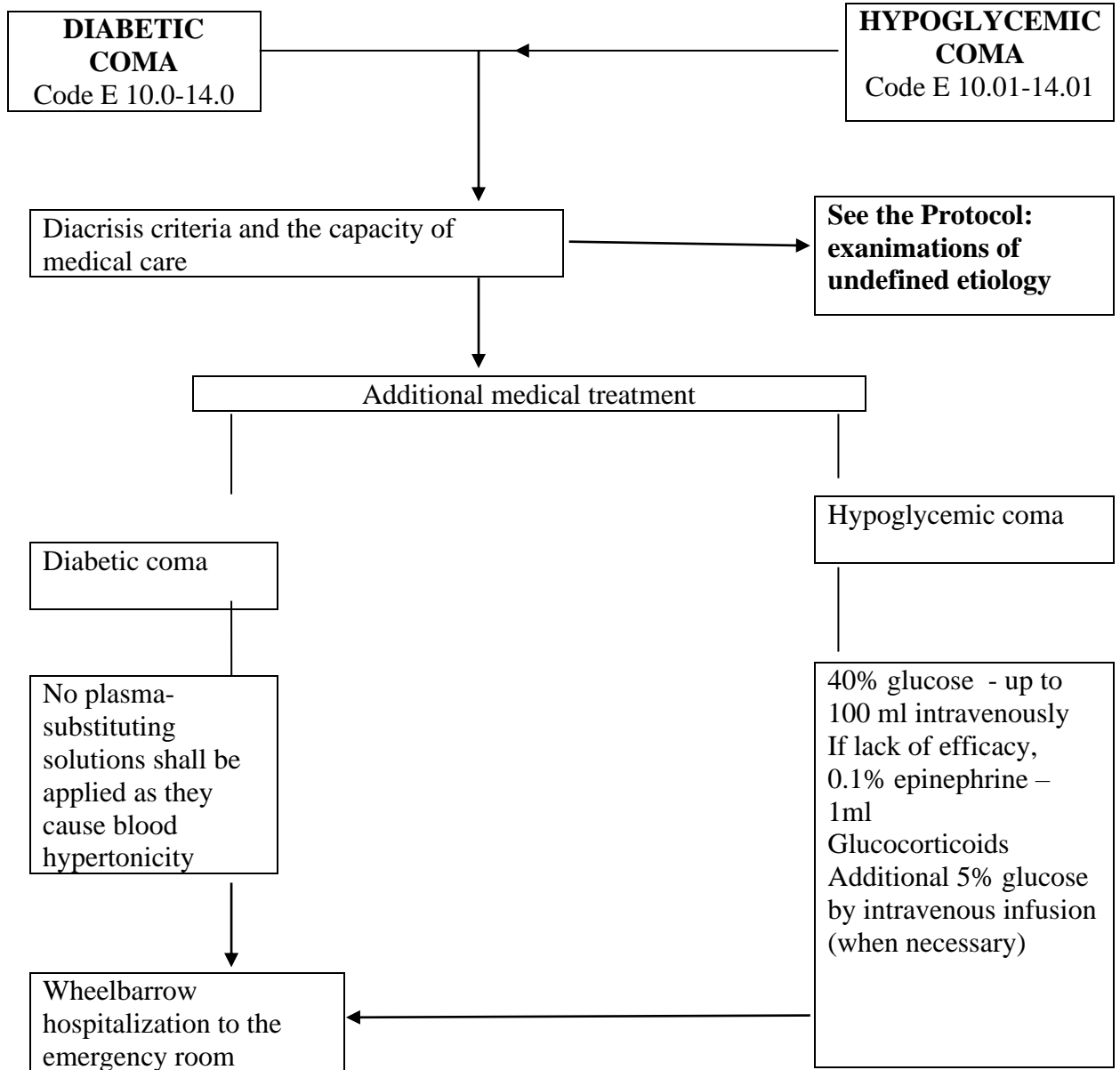
**10. Hyperglycemic (diabetic ) coma** stands for diabetes aftertrouble showing the evidence of rapid leveling of blood sugar (exceeding 5.5 mmol/L).

Clinical symptoms and signs: slow disease course except for the single cases of its impulsive occurrence during 1-2 hours (at a young age). The symptoms of consciousness disorder, sometimes a dead faint, acidotic breathing (Kussmaul's respiration), probable acetone breath odour, dry skin and mucosa, eye bulb flaccidity, tachycardia are revealed. Arterial hypotension and hyperglycemia (test strips) are displayed.

**Hypoglycemic coma** is the diabetes aftertrouble occurring when blood sugar level is lower than 2.8 mmol/L, and in most cases is caused by external factors presenting in impulsive apychia and convulsions.

Clinical symptoms and signs: keen hunger, hidrosis, cephalgia, restlessness, tachycardia, increase in arterial blood pressure, delirium or neurological symptoms, unconsciousness and hypoglycemia.

# DIABETES EXANIMATIONS



Note:  
Children shall be administered by normal saline – 200-400 ml and 40% glucose solution – 20-25 ml

**11. Cardiopulmonary arrest** is a reflectory state (may be caused by anaphylactic collapse).

Clinical symptoms and signs: arteria carotis acrotism, mydriasis, lack of photoharmose responsiveness, no heart tones or breathing.

**Symptoms of circulation stagnation:** apsychia, apneusis, mydriasis, arteria carotis acrotism, femoral artery acrotism, grayish and pale, cyanochroic skin and mucosa (if respiratory standstill and cyanosis precede), skeletal muscles atony (may be preceded by a short-term convulsive attack).

The presence of any three of the four dominant signs (apsychia, mydriasis, acrotism or apneusis) allows for revealing circulation stagnation and requires cardiopulmonary resuscitation. No more than 8-10 seconds can be spent for arriving at the diagnosis and the application of intensive care measures!

#### CARDIO-PULMONARY AND ENCEPHALITIC REANIMATION STAGES

(as per P. Safar)

P.Safar divided the set of cardio-pulmonary and encephalitic reanimation into 3 stages, each having its objectives and in-successive steps.

Pursuant to new recommendations provided by ERC-2010, the cardiopulmonary and encephalitic reanimation procedure (ABC) was modified into CAB.

**I stage:** life sustainment (*basic life support*).

Objective – immediate oxygenation.

##### **sub-stages:**

**C** (*circulation his blood*) — assisted circulation

**A** (*airway open*) — airway management

**B** (*breath for victim*) — artificial lung ventilation

**II stage:** life sustaining treatment (*advanced life support*).

Objective — reactivation of spontaneous circulation.

##### **sub-stages:**

**D** (*drug*) — drug therapy

**E** (*ECG*) — electrocardiography or electrocardioscopy

**F** (*fibrillation*) — defibrillation

**III stage:** long-term life sustainment (*prolonged life support*).

Objective — encephalitic reanimation and postresuscitation intensive treatment.

**Sub-stages:**

**G** (*gauging*) — state assessment (disclosing and excluding the cause of circulation stagnation) and providing life worth living taking into consideration the central nervous system damage level.

**H** (*human mentation*) — ideation restoring

**I** (*intensive therapy*) — intensive treatment aimed at the restoration of organ and system appropriate performance.

# CARDIO-PULMONARY AND ENCEPHALITIC REANIMATION SET OF MEASURES

## I stage: Basic life support

### *Sub-stage C. assisted circulation (circulation his blood)*

**Chest compression.** Low cardiac output (30% below the line) resulted from chest compression is a crucial point of assisted circulation. The appropriate compression leads to the systolic pressure of 60-80 mm Hg, while diastolic pressure rarely exceeds 40 mm Hg causing low cerebral blood flow (30-60% below the norm) and coronary circulation (5-20% below the standard). During chest compression coronary perfusion pressure increases gradually and decreases after each standstill used for mouth-to-mouth ventilation. Nevertheless, a few additional compression attempts allow for restoring the initial level of cerebral and coronary infusion.

In respect of the mentioned above facts, the chest compression procedure has undergone significant changes. The correlation rate of compression and breathing 30:2 has been proved to be more effective than 15:2 ratio and has been confirmed to assure the balance for circulation and oxygen delivery. Thus, the following modifications have been made to the ERC-2005 Guidelines: **30:2 is the established correlation rate between compression and artificial inspiration to be followed by both resuscitators** (Figure 1).



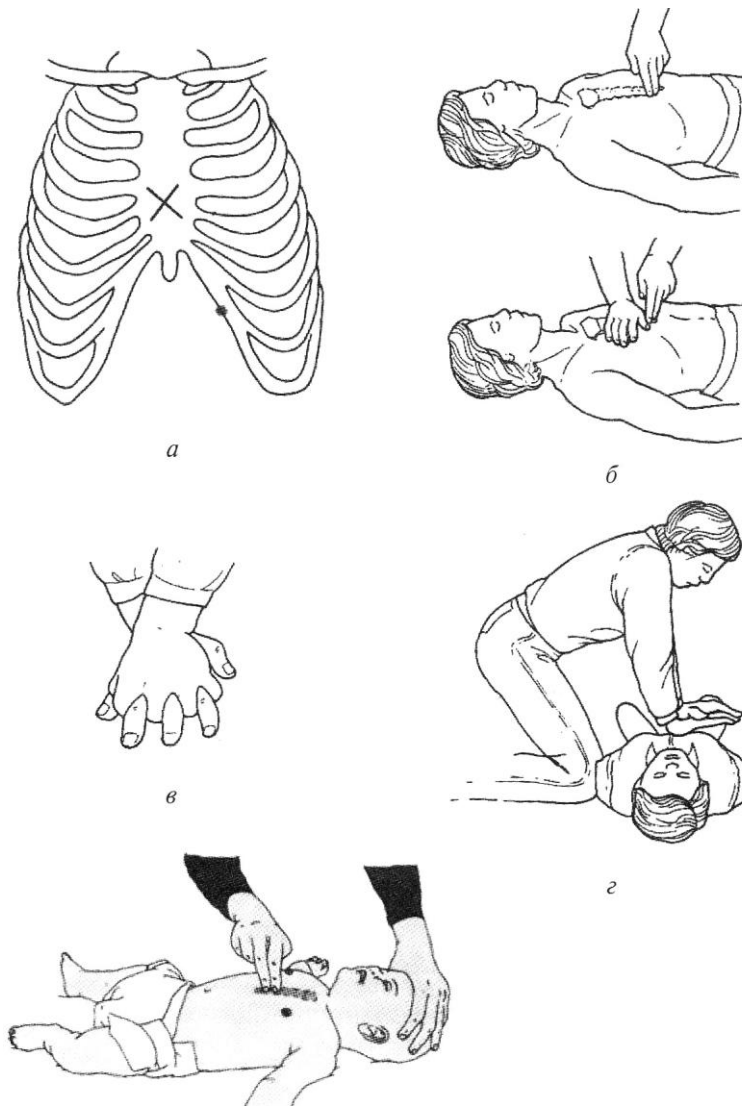
30 chest pressing attempts

2 inflation attempts

**Figure 1.** Chest compression and inflation correlation

*Chest compression techniques.* A patient shall be put on a **smooth and firm** surface. After that a compression point is to be defined by means of palpating ensisternum and moving up at two fingers width (fig. 2, a). Hand palms on top of each other shall be put at the boundary of middle and lower third of breast bone (with fingers parallel to sterna ribs) (fig. 2, б). Palm-lock grip is also possible (fig. 2, в). Compression is made with straight elbow joints applying some of body mass





(fig. 2, г).

**Figure 2.** Chest compression techniques

Compression rate shall be 100/minute (about 2 compression attempts per second) and 4-5 cm deep pausing for artificial ventilation (no mouth to mouth during chest compression is allowed for patients having not undergone intubation of trachea as it may lead to gastric airing).

In case of airway protection (intubation of trachea or a laryngeal mask airway), chest compression frequency shall be 100/minute and ventilation rate is to be 10/minute (at that, chest compression accompanied by synchronous lung inflation increases coronary perfusion pressure).

Pulse wave on main and peripheral arteries is a result of efficient and appropriate chest compression.

In order to determine a possibility of spontaneous circulation return, a 5 second standstill is required after every 2 minutes of cardio-pulmonary resuscitation to check

for arteria carotis pulse.

As far as kids of 10-12 years old are concerned, only one hand is used for chest compression and the correlation rate between compression and inflation shall be 15:2. Chest compression for newborn and nursing infants is made with two finger tips at the rate 100-120/minute.

***Sub-stage A. Airway management (airway open)***

Airway obturation caused by tongue root and epiglottis in the laryngopharyngeal area having resulted from the atonia of muscles (fig.3) is the key problem for unconscious patients. Airway obturation may occur in any pose (even in ventricumbent position) and in each case of head ventriflection (100%). That is why establishing the fact of unconsciousness (shouting “What’s the matter?”, “Open your eyes!”), as well as tapping on the cheeks and shoulders, etc. are the first things to do. Unconsciousness having been confirmed, airway clearing shall be achieved.



**Figure. 3.** Airway clear: a — airway obturation caused by tongue root and epiglottis, б —head throwing back, в — opening of mouth, г — mandibula jutting forth.

Safar triple airway maneuver and intubation of trachea is the gold standard for airway clearing.

### **“Triple airway maneuver”**

P. Safar introduced “triple airway maneuver” including **head throwing back, opening of mouth and mandibula jutting forth**. The maneuver implies stretching of ventral cervix muscles leading to tongue protrudence and elevation above the posterior pharyngeal wall, thus, opening up trachea.

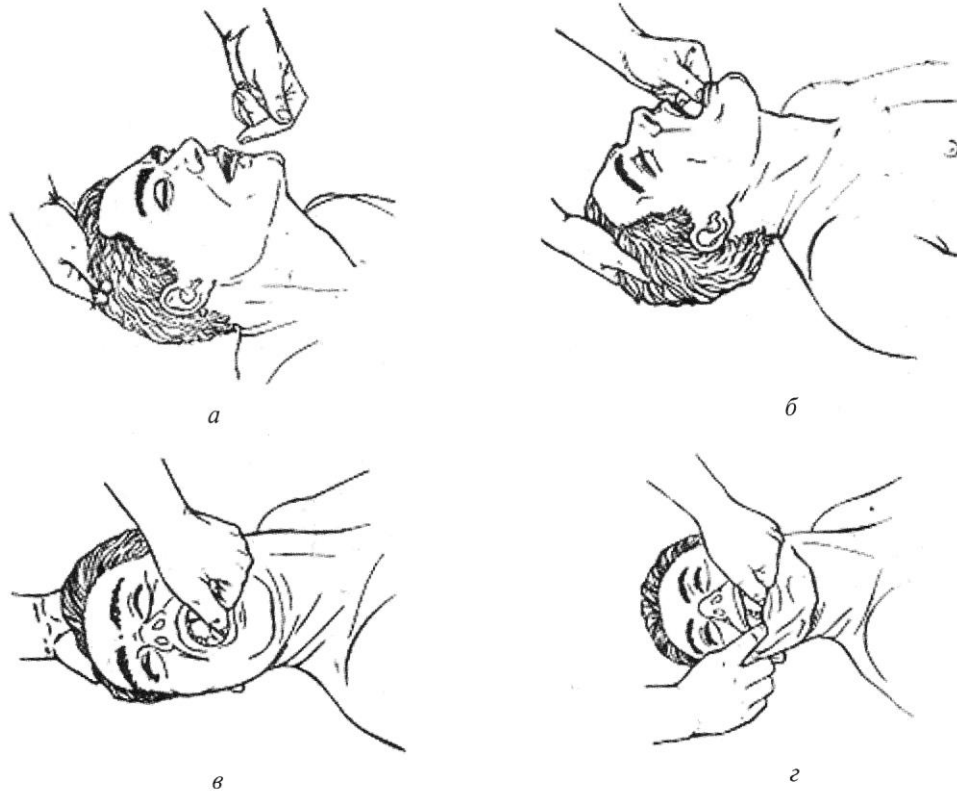
One shall bear in mind the risk of cervical spinal injury while airway procedures! **Cervical spinal injury is the most expectable** in two cases:

- 1) road accidents** (hit by car or staying in a car while crashing);
- 2) falling from height** (specifically while diving).

No cervix bending forward or head sideway twisting is allowed in these cases. One shall pull the head and keep it in plane with neck and breast avoiding cervix hyperextension while conducting triple airway maneuver. Minimal throwing back of head together with synchronous mouth opening and mandibula jutting forth shall be provided. Cervical collar fixating neck regions is to be applied during first aid measures.

***Forced opening of mouth and oral cavity operation exploration.*** Throwing back head does not guarantee airway clearing. By this means, the atonia of muscles leads to the exhalation interlocking of nasal passages caused by posterior veil of soft palate acting like a valvule. In addition, a need might arise to extract a foreign body (blood clots, vomiting matters, tooth splinters, etc) from the oral cavity. Thus, oral cavity of a post-traumatic patient requires immediate clearing. One of the following methods may be applied for opening the mouth:

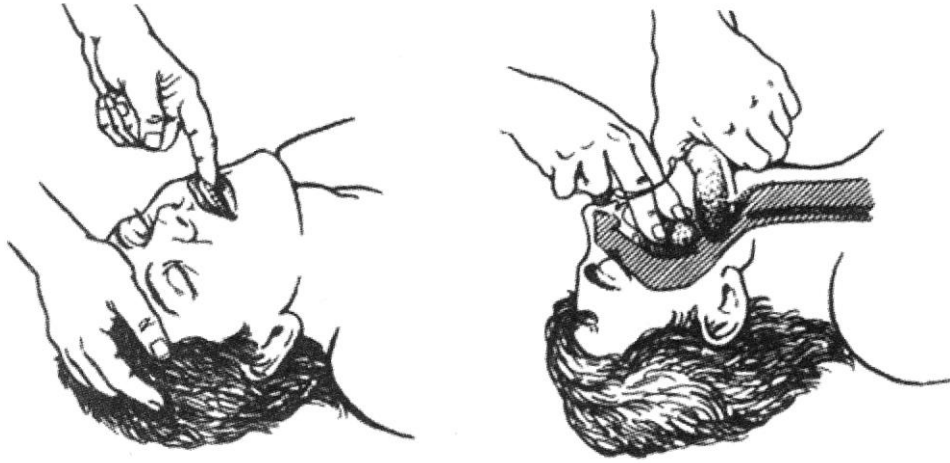
*1. Decussated finger method* is applied in cases when mandibular is moderately relaxed. A resuscitator shall stand at the cephalic end or sidewise the patient’s head (fig. 4, a). The pointer finger shall be inserted into the sufferer’s angle of mouth and press the upper teeth. Then the thumb is used to press the lower teeth (opposite the pointer finger) (fig. 4, б). Mouth is forced to open.



**Figure 4.** Forced opening of mouth with decussated fingers

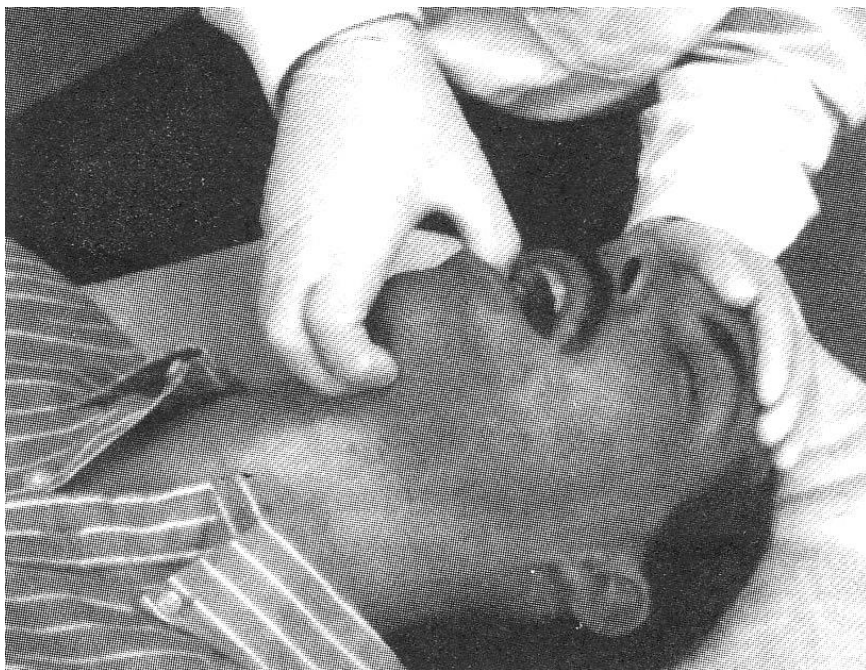
In such a manner, an effort is made to open the mouth and explore the oral cavity. All the foreign bodies shall be extracted, which implies twisting head to the right without left hand fingers reposition (Fig. 4, б). A right pointer finger is used to pull the right angle down releasing oral cavity fluid drain (Fig. 4, в). One or two fingers folded in a handkerchief or any other piece of material are used to clear oral cavity and pharynx.

2. “*Finger beyond teeth*” is applied in cases of strangulated jaws. Left pointer finger is put beyond the molar teeth to open the mouth with a right hand on the patient’s forehead leaning on his/her head (Fig. 5, а). Solid foreign bodies are extracted with pointer and long fingers imitating approximating forceps or with a pointer finger curved like a hook (Fig. 5, б).



**Fig. 5.** Forced “finger beyond teeth” opening of mouth

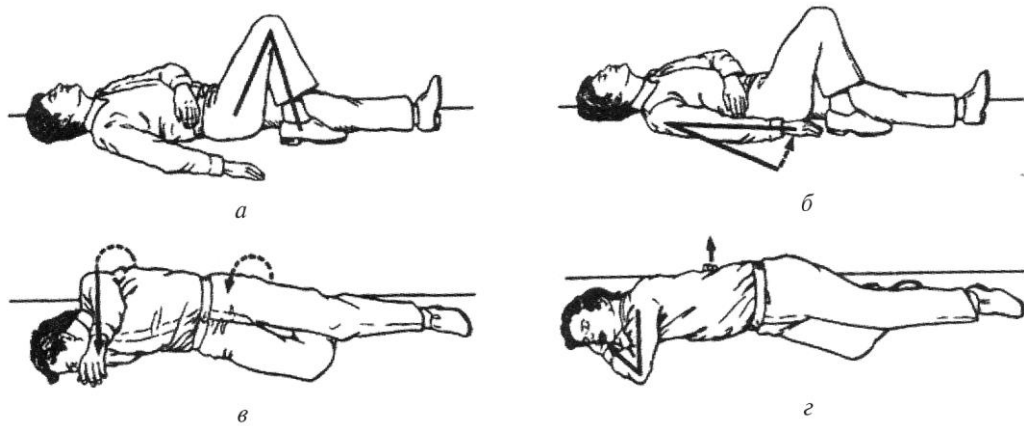
3. *Tongue and jaw bone rising.* If the jaw bone is completely relaxed, a left thumb is inserted in the mouth to raise the tongue root. Other fingers are put round the submaxilla near the chin to jut it forth. (Fig. 6).



**Fig. 6** Forced opening of mouth by means of tongue and jaw rising

**Fixed edgewise position.** Airway maneuver for unconscious patients with pulsation and appropriate spontaneous breathing is made in a lateral position to avoid the aspiration of gastric contents that may be caused by vomitus or reflux. (Fig. 7). The patient’s leg shall be curved from the direction of the aid provider (Fig. 7, 6) with his/her hand under the clunus at the same side (Fig. 7, 6). Then the sufferer’s head is to be carefully twisted to that side facing down (Fig. 7, B). The patient’s other hand shall be put under the cheek to avoid procumbent position (Fig. 7, r). At that, the

first hand (lying under the clunis) prevents from recumbent posture. .

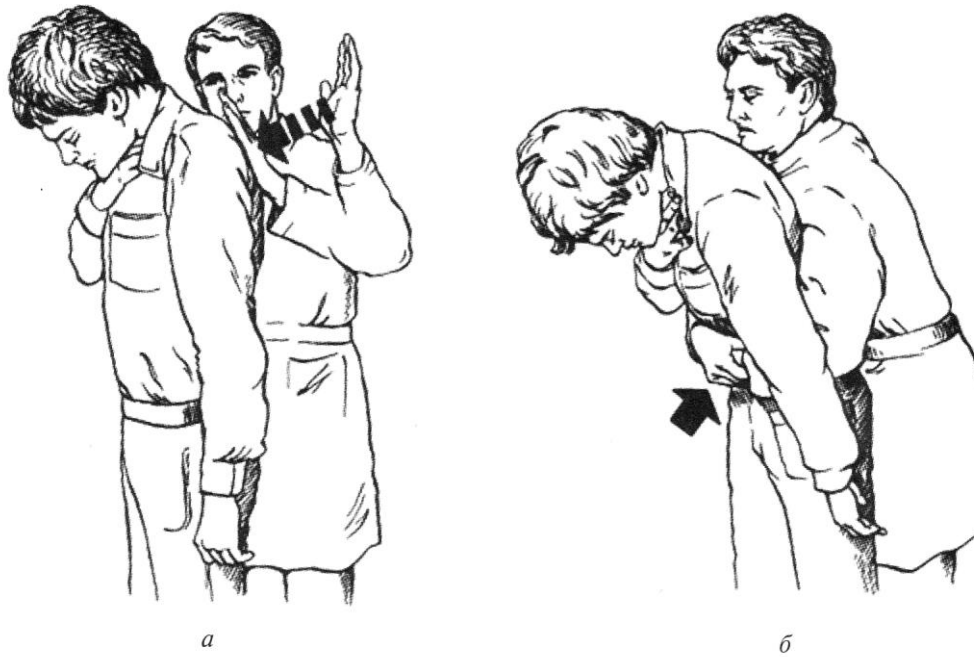


**Figure. 7.** Fixed lateral position for unconscious patients

**Medical treatment procedure in cases of airway obturation caused by a foreign body.** No immediate interference is required for **incomplete airway obturation** (normal skin cover stain, ability to talk and cough efficiency).

**Complete obturation** (failure to talk, lack of cough efficiency, dyspnoea augmentation, cyanosis) care is provided subject to patient's state of consciousness:

a) **awake patients** — 5 manual percussions in the scapular region (Fig. 8, a) or 5 abdominal compression attempts (Heimlich maneuver) — Fig. 8, б). The resuscitator shall stand at the sufferer's back, knuckle his/her hand and put it (at thumb side) on the patient's alvus along the midline between omphalus and ensisternum. After that the aid provider shall press the alvus upwards with his/her first hand wrapped around the fist. Heimlich maneuver must be replaced with chest compression for pregnant women and fatty patients;



**Fig. 8.** Treatment procedure applied for awake patients suffering from airway obturation caused by a foreign body: a — manual percussion in the scapular region, б — Heimlich maneuver

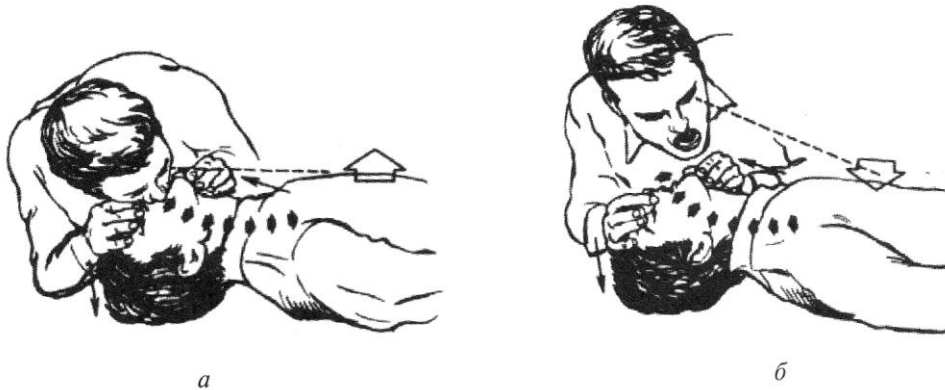
**б) unconscious patients** — cardio-pulmonary resuscitation:

- Opening of mouth and extracting a foreign matter (using fingers);
- Spontaneous breathing is to be diagnosticated (by means of observance, sensing and attentive listening);
- Foreign body can be easier extracted with high pressure resulted from chest compression and being more efficient for negating respiratory obstruction than manual percussion in scapular region or Heimlich maneuver which are not recommended for unconscious patients;
- 30 compression attempts have been made, the mouth is to be open for extracting a foreign matter and 2 artificial inspirations are required.
- At the end, treatment efficiency shall be estimated by means of defining spontaneous circulation. Chest compression and/or artificial ventilation are to be continued, if needed. In case no efficiency, the whole cycle must be repeated (items 3-4).

***Sub-stage B— Artificial lung ventilation (breath for victim)***

Loss of lung compliance is observed after circulation stagnation and during cardio-pulmonary resuscitation. It leads to the increase in pressure required for

respiratory air injection and to the decrease in pressure needed for opening occlusor muscle and, thus, bringing about gastric airing, as well as raising the risk of reflux and aspiration of gastric contents. That is why, no forcing is allowed while "mouth to mouth" ventilation. More than 1 second is required for the inspiration to achieve the appropriate breathing capacity. At that, a resuscitator shall made a full inspiration before each breath to enhance efficiency of O<sub>2</sub> concentration in exhaling air, as concentration of the latter is only 16-17% while CO<sub>2</sub> concentration is 3.5-4%.



**Fig. 9** "Mouth to mouth" artificial ventilation

"Triple airway maneuver" has been completed, the resuscitator shall put his/her hand on the patient's forehead assuring head throwing back and nose holding. The aid provider blows in air with his/her mouth tightly pressed on the sufferer's mouth watching chest excursion (Fig. 9, a). Shall the patient's thoracic cage rose, his/her mouth is released to allow a full inactive exhalation (Fig. 9, б).

Breathing capacity shall be 500–600 ml (6–7 ml/kg of a body weight) and respiration rate is to be 10/minute. No hyperventilation shall be allowed during cardio-pulmonary resuscitation as it causes the increase in thoracic pressure, reduces venous circulation towards heart and cardiac output leading to low survival value.

In case of gastric airing (epigastrium evagination), air shall be deflated. For that purpose, the patient's head and shoulders shall be twisted sideward to avoid aspiration of gastric contents. The gastric area between the sufferer's breast bone and cupula of the diaphragm shall be pressed by the resuscitator's hand. Oral cavity and larynx clearing (if required) is followed by "triple airway maneuver" continuing "mouth to mouth" ventilation.



**Supplement 1. Intensive care of acute respiratory failure of different genesis**

<b>Acute respiratory failure</b>	<b>Measures</b>	<b>Performance</b>
Tongue impaction while apsychia	Head throwing back*	<ul style="list-style-type: none"> <li>• jaw jutting forth, cervix protraction, keeping mouth half open;</li> <li>• putting a hand under the patient's neck (alternative method)</li> </ul>
Tongue impaction of an unconscious patient	Recovering position	<ul style="list-style-type: none"> <li>• tilt the patient at the resuscitator's side;</li> <li>• put the sufferer's hand under his/her clunis at the resuscitator's side;</li> <li>• pose the patient at that side;</li> <li>• tilt the patient's head keeping it facedown with his/her hand under the cheek to avoid aspiration*</li> </ul>
Tongue swallowing	Triple airway maneuver	<ul style="list-style-type: none"> <li>• throwing back of head;</li> <li>• opening of mouth;</li> <li>• jutting forth of jaw</li> </ul>
Foreign bodies in oral pharynx	Oral cavity clear	<ul style="list-style-type: none"> <li>• putting a pointer finger beyond the molar teeth (with tight jaws);</li> <li>• II–III fingers after pressing tongue (with relaxed jaw)</li> </ul>
Foreign matters in oral pharynx/ larynx	Dorsum knocks	<ul style="list-style-type: none"> <li>• in case of consciousness, bend the patient's head and make 3-5 abrupt pushes in interscapular region with a palm bottom;</li> <li>• in case of apsychia, the patient shall be put in a lateral position and knocked in the way described above (oral pharynx shall be cleared with fingers and rescue breaths are to be made after each 6-10 knocks);</li> <li>• as for kids, their cervix and head shall be kept facing down on the resuscitator's knee and one hand with the other hand slightly pushing the interscapular region.</li> </ul>
Foreign matters in oral pharynx/ larynx	Abdomen compression (Heimlich maneuver)	<ul style="list-style-type: none"> <li>• a resuscitator must put his/her arms round the awake patient with the fist below ensisternum pushing rapidly upwards;</li> <li>• a resuscitator shall make rapid upward pushes below the unconscious patient's ensisternum along the midline (every 6-10 compression attempts trying to clear oral pharynx and provide rescue breaths);</li> <li>• the resuscitator shall lay kids face down on his/her brachium slightly pushing thoracic cage with two fingers.</li> </ul>

Foreign bodies in oral pharynx	Promoting inspiration/coughing	<ul style="list-style-type: none"> <li>• an awake patient shall be promoted for full inspiration and expectoration</li> </ul>
Water in airways	Water extraction**	<ul style="list-style-type: none"> <li>• slight raise of pelvis for ventricle and airway clear;</li> <li>• lateral position with head thrown down (after cardio-pulmonary resuscitation has been successfully accomplished)</li> </ul>
Upper airway obstruction	Airdirector	<ul style="list-style-type: none"> <li>• Wedel orotracheal tube shall be applied till appropriate air flow;</li> <li>• Safar's endotracheal tube shall be applied in the same way.</li> </ul>
Obturation/laryngeal edema	Cricothyroid ligament centesis	<ul style="list-style-type: none"> <li>• Is applied as an alternative to conicotomy providing short-term appropriate ventilation (for 15-30 minutes) by means of a few thick acuses (Dufour needles)</li> </ul>
Obturation/laryngeal edema	Conicotomy	<ul style="list-style-type: none"> <li>• Midline transverse incision of cricothyroid ligament and inserting a tube with a diameter of 4-5 mm; lower airways may be open by means of skin and ligament incision (if needed)</li> </ul>

### Notes:

\* — if cervical spine injury is suspected, the patient's head, cervix and thoracic cage shall be put in plane providing moderate (not maximum) head bending by holding jaw;

\*\* — as for pregnant women, fatty patients and small kids, chest compression is performed with palm in the lower part of breast bone (like heart massage).

### LITERATURE:

1. Vares Y., Ogonovsky R., Pohranychna Kh. Principles of Dental Local Anaesthesia and Teeth Removal (An illustrated methodological guide) – Lviv, 2007. – P. 31-36.
2. Panchyshyn M., Hot I., Masnyi Z. “Medical Emergency for Dental Patients” — Lviv city: publishing house Galdent, 1998. — 32 pages.
3. Hlushko L.V., Voloshynskyi O. V., Titov I.I. “Emergency Care Procedure” — Vinnytsia city, 2004. — 208 pages.
4. Guideline policies in oral surgery for the unique state procedure-oriented examination training / Hot I.M. and coauthor – Lviv city, 2006. – 62 pages.

5. “Anesthesiology and Intensive Treatment: manual / Hlumcher F.S, Chepkyi L.P., Usenko L.V., Moskalenko V.F. and others — Kyiv city, publishing house BCB “Medicine”, 2010. — 336 pages.
6. Usenko L.V., Tsariov A.V., Kobeliatskyi Y.Y. “Cardio-Pulmonary Resuscitation” — Dnipropetrovsk city, 2011 — 69 pages.
7. Lomnytskyi I.Y., Netliukh A.V., Mokryk O.Y. “Practical Procedures Applied in Oral Surgery” — Lviv city: publishing house Galdent, 2011. — 60 pages.
7. Order issued by the Ministry of Health of Ukraine No. 24 of 17.01.2005 “Approval of Medical Care Protocols in the field “Medicine of Emergency”.
8. Order issued by the Ministry of Health of Ukraine No.34 of 15.01.2014 “Approval and Implementation of Medical and Technological Documents in Emergency Medicine Standardization”.