



Poisoning, chemical injuries, emergencies in children, emergencies in psychiatry.

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# POISONING

- Signs and symptoms due to intoxication
- Toxicological definition:
  - Any substance is a poison, intoxication depends on dose and way of administration
- Legal definition:
  - exactly says, which substances are meant to be poisons



# POISONING

- Adults:
  - medicaments
    - antidepressants (tricyclic)
    - paracetamol
    - $\beta$ -blockers
  - methanol and ethylene glycol
  - organophosphates (insecticides)
  - CO
  - cyanides
- Children:
  - medicaments
  - acids, alkalis



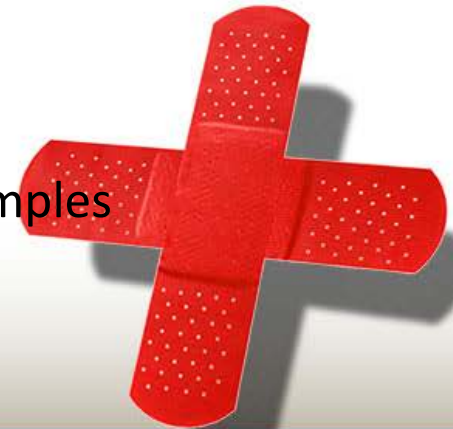
# POISONING

- Accidental poisoning:
  - mostly children (average age – 3 y)
  - chemicals mistaken for food and drinks (incorrectly signed bottles...)
- Suicidal attempt:
  - 95% of adult poisoning
- Other causes:
  - drug overdosing
  - iatrogenic
  - food poisoning (mushrooms)
  - chronic poisoning
    - mercury, lead
  - intentional poisoning
    - murder, mass attack, terrorism



# POISONING - examination

- Absolute priority is securing vital functions
- Poison type
- Poison dose
- Poisoning time
- Poison sample (bottle, package, mushrooms, vomits,...)
- Anamnesis (which drugs has the patient access to, psychiatric disorders, previous suicide attempts)
- Clinical examination:
  - complex
  - blood – biochemistry, hematology
  - toxicology – blood, urine, stomach content, poison samples



# POISONING - therapy

- Prevention of further poison absorption
- Support to failed organ systems
- Increased elimination of the poison
- Specific and nonspecific antidotes



# POISONING - therapy

- Prevention of further poison absorption
  - Inhaled poisons
    - fresh air
  - Poisons absorbed through skin
    - skin washing
    - contaminated clothing removal
  - Snake / insect bites
    - compressive bandage
    - limb immobilization
  - Ingested poisons
    - vomiting
    - not in uncooperative persons
    - not in small children
    - not in unconscious
    - not when corrosive chemicals ingested (acids, lye)
    - not when organic dissolvent ingested (petrol, diesel)



# POISONING - therapy

- Support to failed organ system
  - Most important part of therapy
  - Support to vital organs
  - Replacement of vital organs function
  - Care for unconscious patient
  - In intensive care:
    - mechanical ventilation
    - circulatory support
    - homeostasis, body temperature, nutrition...





# POISONING - therapy

- Elimination of the poison
  - in severe poisoning
  - not in first aid
  - in intensive care:
    - hemodialysis, hemoperfusion
    - forced diuresis



# POISONING - therapy

- Antidotes
  - Mitigate the onset, duration or effect of a poison
  - Medicinal charcoal
    - nonspecific antidote
    - binds a variety of substances due to large absorption surface
    - 10 – 20 tablets crushed and mixed with water (in adults)
    - 2 – 5 tablets for children
    - administration within 2 hours of poisoning
  - Specific antidotes – example
    - ethanol: methanol and ethylene glycol poisoning



# POISONING – first aid

- Prevention of further absorption
- Vital functions evaluation
- CPR – if needed
- Recovery position – if possible
- Call professional help
- Securing samples of the poison



# Sedative substances

- may cause excessive sedation, unconsciousness and depression of the breathing
- benzodiazepines – Diazepam, Neurol, Lexaurin
- opioids – Morfin, Heroin
- first aid – maintaining of airways, ventilation and circulation
- overdosing with opioids is typical for i.v. drug abusers – high risk of acquiring diseases, like hepatitis or HIV, for the saviour



# Ethanol

- = alcohol
- impairment of CNS functions – unconsciousness, hypothermy, gastric content aspiration, airway obstruction



# POISONING

- TIS: Toxikologické informační středisko (Toxicological Information Centre)
  - Department of Occupational Medicine, 1st Faculty of Medicine, Charles University in Prague
  - [www.tis-cz.cz](http://www.tis-cz.cz)



# CHEMICAL INJURIES

- Corrosion
  - chemical burn
- Severity depends on:
  - type and concentration of corrosive substance
  - extent and location of affected area
- Chemical burn of skin
  - work accidents
- Chemical burn of oral cavity
  - accidents at home
  - small children



# CHEMICAL INJURIES

- Acids
  - coagulative („dry“) necrosis
  - sharp edged defect
  - pink in centre, black at edges
  - reminds boiled meat
- Alkalis
  - lye, ammonia, lime
  - colliquative (liquefactive, „wet“) necrosis
  - fuzzy edged defect
  - tends to spread to surrounding area and depth
  - yellowish-beige colour
  - more serious injury





# CHEMICAL INJURIES

- In place of chemical burns
  - inflammation
  - swelling
  - redness
  - entrance for infection
- Corrosion of esophagus
  - perforation may be present
  - cause of life threatening mediastinitis!



# CHEMICAL INJURIES

- Signs:
  - Skin chemical burns
    - similar to burns
    - 3 degrees
  - Mucous membrane chemical burns
    - severe pain
    - inability to swallow
    - increased salivation



# CHEMICAL INJURIES

- First aid:
  - Interrupt further corrosive effect
  - Rescue persons from effective range of chemicals
  - Removal of contaminated clothing
  - Rinse with running water
    - shortest route of water from affected surface
    - not with chemicals in dry form: just dust off!
  - Mucous membrane chemical burns:
    - no vomiting
    - no liquids orally
    - quick transport to hospital



# CHEMICAL INJURIES

- Medical treatment:
  - burned area of greater than about 7 cm in diameter
  - burns of 2<sup>nd</sup> and 3<sup>rd</sup> degree
- Emergency medical service called when:
  - vital organ function failure
  - burned area of large scale
  - burns in the face and eyes
  - burns in GI / respiratory tracts
  - next associated injuries



# CHEMICAL INJURIES

- Prevention:
  - staff training
  - proper labeling
  - keeping out of reach of children



# CHEMICAL INJURIES

- Acids

- batteries ( $\text{H}_2\text{SO}_4$ )
- photo chemicals
- fertilizers
- disinfection (Persteril)
- leather preparation processings
- inorganic acids in chemical research and industries

- Alkalis

- bleach
- detergents
- drain cleaners
- ammonium compounds
- lime



# Emergencies in children

- Differences between children and adults
  - The child is not just a miniature of an adult
  - Anatomical, physiological and psychological differences
  - Airways
    - narrow
    - easily get to obstruction
    - imperfect cough reflex
  - Respiration rate
    - newborn: 40 – 60 / min
  - Heart rate
    - newborn: 150 – 180 / min
  - Rapid hypoxia development
    - bradycardia up to sudden cardiac arrest



# Emergencies in children

- Differences between children and adults
  - Secondary cardiac arrest usually due to suffocation
  - Cardiac output ensured by sufficient heart rate
  - Lower BP
  - Higher relative blood volume
    - newborn: 80 – 85 ml / kg
  - Easy development of hypovolemic shock:
    - blood loss
    - fluid deficiency (diarrhea, vomiting, fever, inadequate intake)
  - Hypothermia:
    - relatively larger BSA
    - respiratory depression
    - arrhythmias





# Emergencies in children

- many of sudden accidents in children have similar symptoms as in adults, difference is in more rapid onset and more rapid worsening
- some of the emergencies are more specific for children



# Emergencies in children

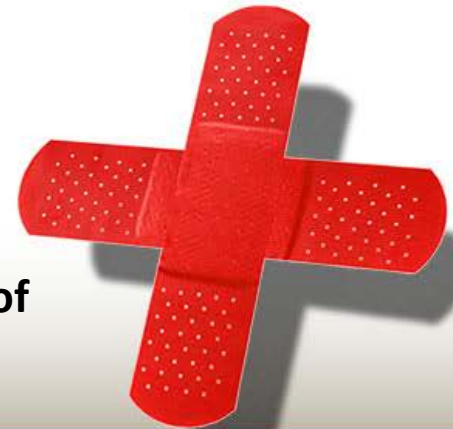
- Suffocation and breathlessness
  - Relatively common
  - obstacle in upper airways – epiglottitis, laryngitis, foreign body aspiration
  - obstacle in lower airways – asthma, bronchiolitis, pneumonia
  - pneumothorax or trauma are rare in children



# Emergencies in children

- Suffocation and breathlessness
  - Choking
    - objective signs of increased respiratory effort
    - tachypnea ( $> 50/\text{min}$  in infants, more than  $25/\text{min}$  in children 1-6 years)
    - jugular retractions
    - gasping
    - moving nostrils during breathing
    - accustic phenomenons: grunting, wheezing, gurgling, whistles, squeaks
    - cyanosis
  - Dyspnoea
    - subjective feeling of respiratory distress

**Sudden calming or lethargy of suffocating child can be warning sign of critical asphyxia!!!**



# Emergencies in children

- Dyspnoea, choking:
  - Inspiratory
    - large airway obstruction (foreign body, swelling, secretions)
    - stridor, barking cough
    - **Acute subglottic laryngitis, Acute epiglottitis**
    - **Allergy**
    - **Foreign body aspiration**
  - Expiratory
    - lower airways diseases
    - whistles, squeaks, prolonged exhalation
    - **Bronchial asthma**
    - **Bronchitis / Acute bronchiolitis**
  - Inspiratory-expiratory
    - **Bronchopneumonia**



# Emergencies in children

- Foreign body aspiration

- Signs:

- rapid onset
    - afebrile
    - significant inspiratory stridor
    - nonproductive cough
    - cyanosis

- First aid:

- encourage to cough
    - repeated strikes between shoulder blades
    - upper abdomen compressing (not for children under 1 y – only chest compressions)
    - ABC: removal of foreign body (not blindly) → 5 artificial breaths → CPR



# Emergencies in children

- Acute laryngitis
  - acute viral disease
  - children between 6 months and 5 years
  - Signs:
    - rapid onset
    - dry barking cough
    - expiratory stridor
    - typically increased body temperature (37 – 38°C)
    - lying position doesn't worsen symptoms
    - no swallowing troubles
  - First aid:
    - early medical care
    - hospitalization
    - cool moist air

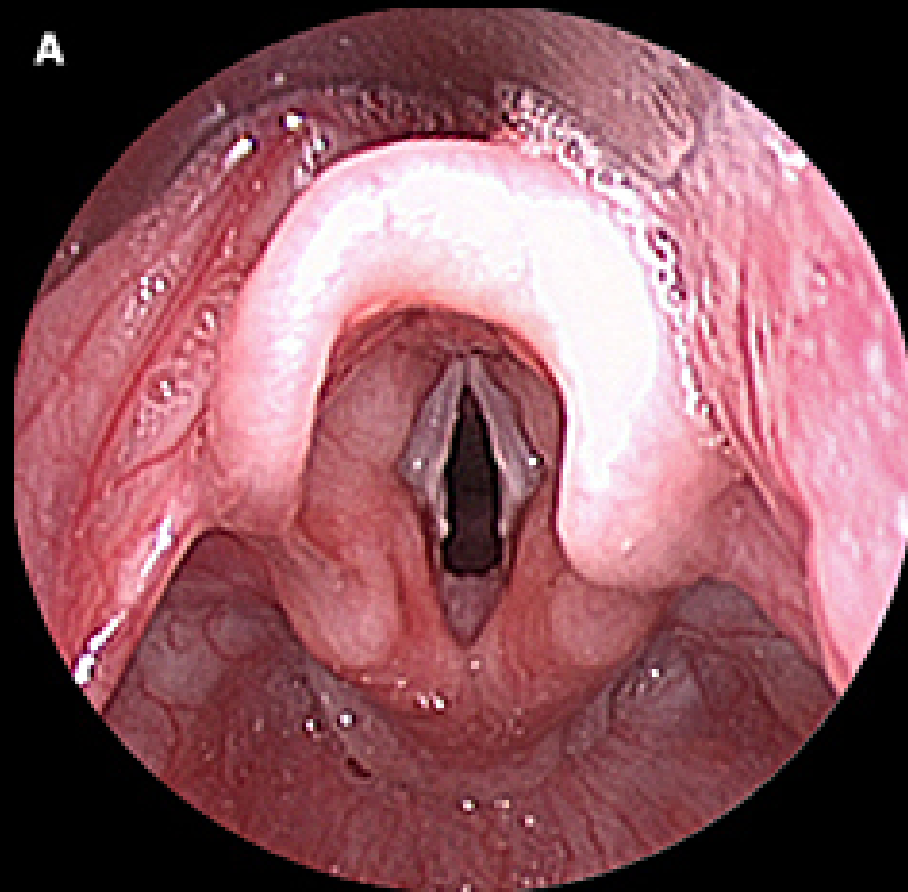


# Emergencies in children

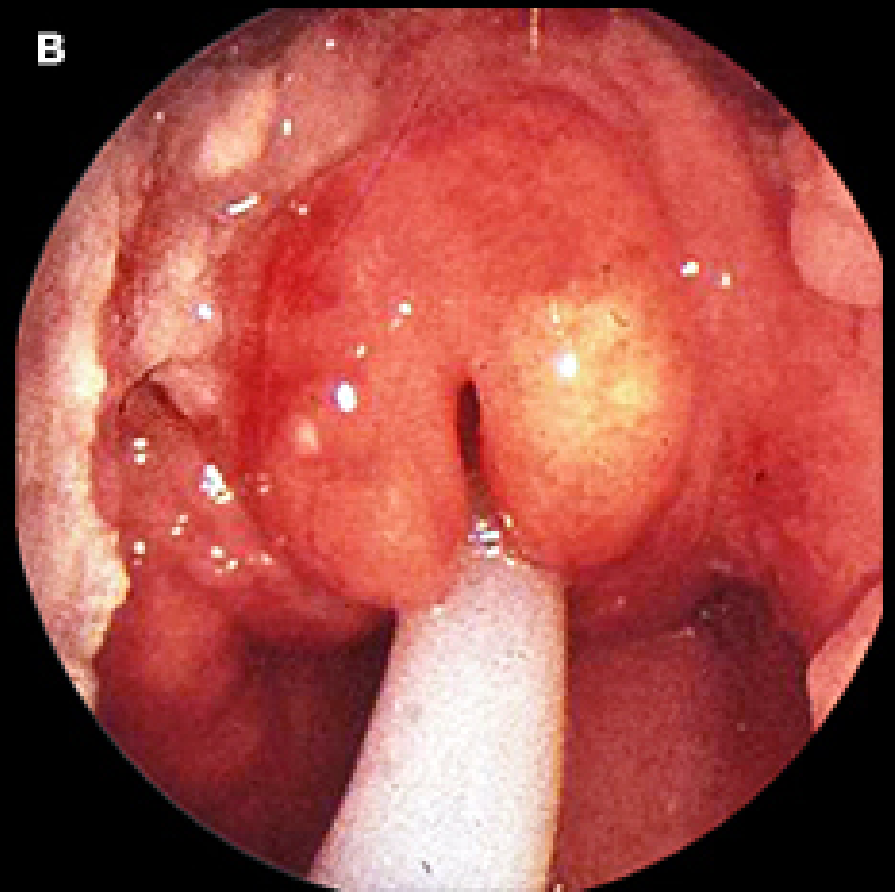
- Acute epiglottitis
  - bacterial infection
  - fever, body temperature around 39°C
  - inexpressive cough
  - exhaustion
  - sore throat
    - pain when pressure on the neck
    - pain when swallowing
    - saliva leaking from the child's mouth
    - noticeable gurgling sound during inspiration and expiration (retained secretions)
  - sitting position, bend over
  - terrified expression
  - noticeable calm



A



B





# Emergencies in children

- Acute epiglottitis – first aid:
  - serious condition
  - critical airway obstruction threatening
  - do not lay into supine position!
  - immediate emergency medical service transportation to hospital
  - if necessary urgent airway securing
  - ATB
  - thanks to mandatory vaccination in Czech republic, this condition is rare



# Emergencies in children

- Allergy
  - immune system management failure
  - allergens:
    - plant pollens
    - cow milk protein
    - food ingredients (walnuts, eggs, fish, fruit)
    - medicaments
    - animal poisons
  - entrance into the body:
    - blood
    - parenterally: muscle / (sub)cutaneous injections, insect bites, snakebites
    - inhalant allergens
    - contact allergens
    - ingested allergens



# Emergencies in children

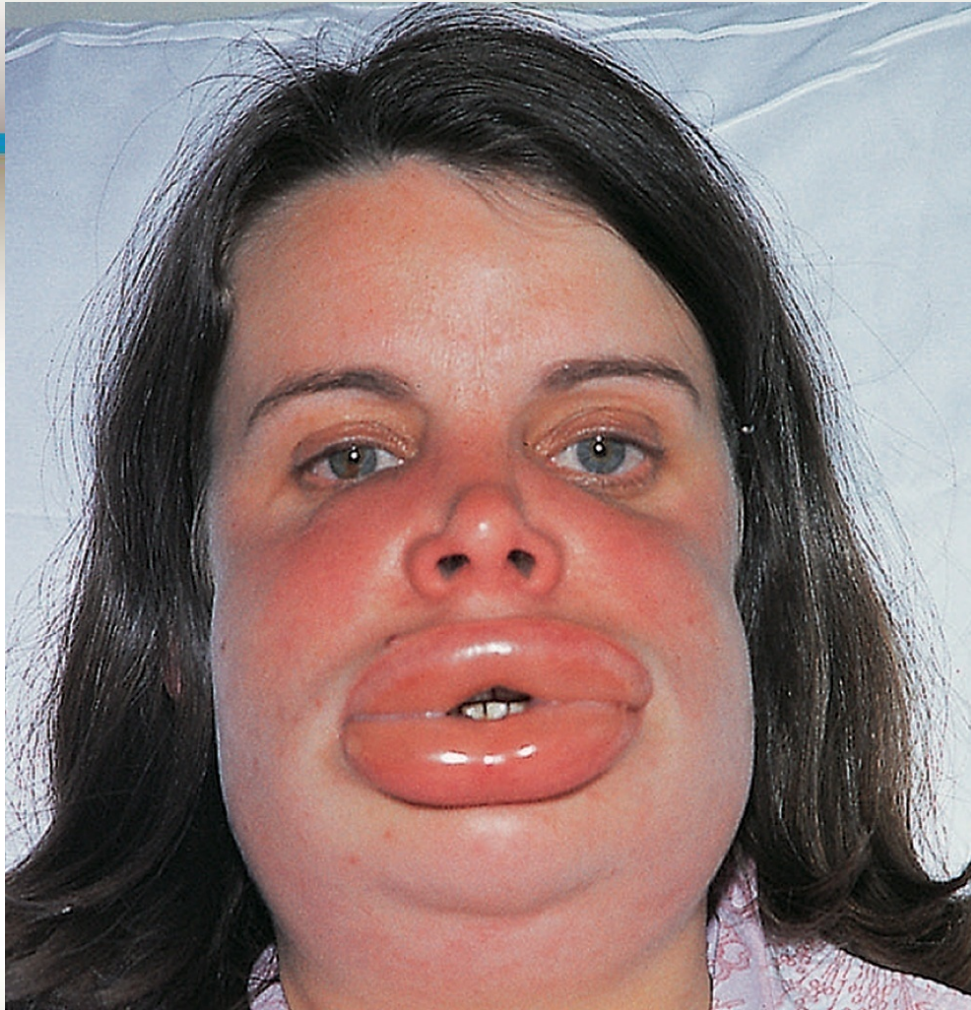
- Allergy
  - sign
    - on skin
      - eczema, hives
      - itchy reddish spots, large areas
    - on mucous membranes
      - congestion, redness, swelling
    - increased secretion from respiratory tract
      - hay fever, burning eyes, tearing
    - overall
      - chills, shivering, hot flushes, joint pain, nausea
    - serious
      - bronchospasm
      - laryngeal edema (Quincke edema)
      - anaphylactic shock:
        - » hyperacute allergic reaction to the allergen
        - » laryngeal edema and other allergy symptoms
        - » distributive shock











# Emergencies in children

- Allergie – PP:
  - Get rid of the allergen
  - mild reactions
    - antihistaminics – local or general application
    - Alerid, Analergin, Cerex, Cetirizin, Claritine, Fenistil
  - severe reactions
    - call professional medical help
    - adrenalin (epipen)
    - bronchodilators



# Emergencies in children

- Bronchial asthma
  - chronic airway inflammation, hyperreactivity
  - hypersecretion, mucosal edema
  - bronchoconstriction
  - provocation – chemicals, exertion, cold air, stress, excitement
  - episodic occurrence
  - sudden onset





# Emergencies in children

- Bronchial asthma – signs:
  - Rest period
    - no symptoms
  - During attack
    - dyspnoea
    - difficult prolonged exhalation
    - audible whistles and squeaks
    - sitting position
    - auxiliary respiratory muscles involvement
    - strenuous inhalation and exhalation



# Emergencies in children

- Bronchial asthma – first aid:
  - People with known diagnosis have their medicines
    - (Ventolin, Berotec, Berodual spray etc.)
  - Sitting position, resting
  - 2 – 4 medication doses application
  - repeat application till relief
  - Following 2 doses every 4 hours in next 24 hours
  - If no relief – transport to the hospital





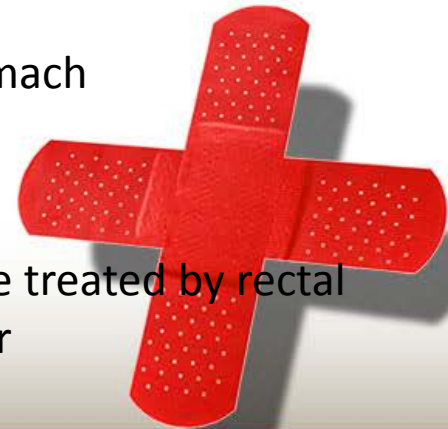
# Emergencies in children

- Seizures and unconsciousness
  - seizures = involuntary contraction of muscles
  - with fever:
    - febrile seizures
    - CNS infections (meningitis, encephalitis)
  - without fever:
    - epilepsy
    - injury
    - intoxication
    - metabolic causes (diabetes mellitus, hepatic and renal failure)
    - hypoxia
    - tetany
  - types of seizures:
    - tonic
      - overall rigidity of the body, body arcuation, patient ceases to breathe
    - clonic
      - repeated muscle spasms
    - tonic-clonic



# Emergencies in children

- Febrile seizures
  - convulsions brought on by a fever in children usually between 3-5 years
  - signs and symptoms
    - fever over 39, unconsciousness and convulsions on both sides of the body
    - duration is usually 1-2 minutes
  - first aid
    - to prevent accidental injury
    - to prevent choking – place the child on the side or stomach
    - never put anything into the mouth during convulsions
    - decrease body temperature (ibuprofen, cold dressing)
    - children with known diagnosis of febrile seizures may be treated by rectal application of Diazepam as a prevention during high fever



# Emergencies in children

- Seizures – first aid:
  - Secondary injury prevention
    - fall injury
  - Follow the duration of convulsion / coma
  - During and after seizures
    - ABC
    - recovery position
    - restrict surrounding noise
    - emergency medical service
    - diazepam:
      - 5 mg up to 15 kg
      - 10 mg over 15 kg
    - antipyretics
      - in febrile seizures



# Emergencies in children

- Fever and dehydration
  - Fever
    - over 38°C
    - viral respiratory disease
  - Hyperpyrexia
    - over 41 °C
    - Serious bacterial infection – sepsis, epiglottitis, meningitis, bronchopneumonia, otitis media...
  - Risks:
    - seizures
    - Consciousness disturbances
    - dehydration
      - Augmented by diarrhea and vomiting!
      - Hypovolemic shock development!



# Emergencies in children

- Fever and dehydration – first aid:
  - Daily fluids intake
    - by age and weight
  - Antipyretics
    - paracetamol: Paralen, Panadol
    - ibuprofen: Ibalgin
  - Cold dressing





# Emergencies in psychiatry

- Acute psychotic disorders
- Acute intoxications (alcohol, stimulants, hallucinogens)
- Withdrawal from addicting substances
- Acute manic episode
- Suicidal intentions
- Awareness disorders
- Emergencies caused by psychiatric medication



# Emergencies in psychiatry

These emergencies usually occur in public or at patient's home. It is critical to recognize them and to choose right approach to the patient.

Not all of these situations require acute psychiatric treatment or hospitalization.

Patients usually don't agree with suggested actions.



# Why are these situations dangerous?

- Patients are endangered by somatic complications
  - Intoxications, withdrawal reactions, consciousness disorders
- Patients endanger themselves by their actions
- Patients endanger public or relatives by their actions

People with severe depression have 500 times higher risk of committing suicide than healthy people.



# Anxiety and aggression

- Anxiety – patients with disorganized psychomotor activity, caused by mental or physical disorder
- Aggression – impulsive, unfriendly, dangerous behavior, which can cause harm to other people
  - Verbal aggression
  - Brachial aggression – against objects or people
  - Auto aggression – suicidal attempts, auto mutilation

Anxiety and aggression may be caused also by non-mental disorder (CNS infections, temporal epilepsy, hypoglycemia, pain, ...) which has to be excluded before they are hospitalized at psychiatry.



# Approach to an aggressive patient

Approach should be professional, calm and direct.

- Talking about their problem, offer them appropriate solution.
- Hallucinations and delusions (psychotic symptoms) should not be disproved, just accepted.
- Always think of your own safety – always be close to the escape route than patient.
- Always should be at least 5 people against one aggressive patient.
- Restrain them only if necessary.
- If the situation is dangerous, always call police.



# Suicide actions – risk evaluation

## SAD PERSONS SCALE

- Sex (M1, F0)
- Age between 20 and 44
- Depression

## Evaluation

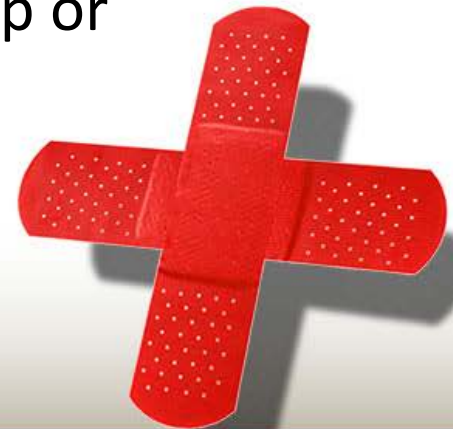
- 0-4 points – low risk
- 5-6 points – medium risk
- 7-10 points – high risk – should be hospitalized at psychiatry

- Previous attempt
- Ethanol or drugs abuse
- Rational thinking loss
- Social connections
- Organized suicidal plan
- No hobbies or activities
- Severe chronic disease



# Approach to a suicidal patient

- Create a connection
- Be calm
- Evaluate the situation, identify suicidal plans, evaluate the risk of suicide (created plan, chosen place and way of committing a suicide, „good-bye“ letter)
- Don't moralize, don't judge, show interest
- Try to lower the risk of danger (put away guns, pills, ...)
- Identify motivation to live, offer them your help or solution
- Make an „anti-suicidal“ contract



# Approach to a suicidal patient

- If the risk of suicide is high, patients must be hospitalized even if they refuse it.





# Psycho-social crisis

- Crisis is one of most frequent reasons, why someone seeks psychiatric help.
- When someone in his life meets an obstacle, which he is unable to get over (conflicts with partner, at work, death in family, disease, ...).
- Usually can be managed without pharmacotherapy.
- Crisis phone line – Psychiatric hospital Bohnice, Prague.  
284 016 666 (non-stop)
- Center for crisis intervention – Psychiatric hospital Bohnice, Prague.
- Crisis center RIAPS – Prague.



# Withdrawal from alcohol

- Simple – starts 24 hours after withdrawal, lasts for 3-5 days
  - Symptoms: tremor, sweating, anxiety, insomnia, nausea, vomiting, tachycardia, hypertension.
  - May be complicated by EPI paroxysms, hallucinations
- Severe – delirium tremens – starts 24-72 hours after withdrawal
  - Symptoms – loss of awareness, inversion of sleeping hours, hypo/hyperactive periods, visual and tactile hallucinations, disorientation by time, place and situation.
  - Life threatening condition, requires intensive treatment by high doses of benzodiazepines, monitoration of vital functions and supportive therapy at ICU.



# Panic attack

- Attack of anxiety, lasting several minutes
  - People are afraid of death, disease
  - Typical is hyperventilation, tachycardia, sweating, nausea, chest pain
  - Panic attacks are unpredictable and they are not started by any specific situation





# Crisis intervention in panic attack

- Create a connection to the patient.
- Try to calm them down, to force them breathe normally.
- If available, use some benzodiazepines (Neurol, Lexaurin, Diazepam).
- To prevent another attack, patients should get regular antidepressant medication.

If first panic attack, ECG and physical examination should be done.







Thank you for your attention!!