

Acute pneumonia

Department of Pediatrics

Definition

Definition: *acute pneumonia* is an infectious inflammatory process of pulmonary parenchyma with affection of alveolar structures and/or of interstitium.

Etiology: pneumococcus, staphylococcus, mycoplasma pneumoniae, chlamydia pneumoniae, streptococcus.

Classification

Clinico-morphologic variants

- focal (lobular) bronchopneumonia
- pneumonia with confluent foci
- lobar pneumonia
- segmental pneumonia (with atelectatic component)
- interstitial pneumonia

Complications

- pleuresy
- pulmonary destruction
- abscesses

Complications

- pleuresy
- pulmonary destruction
- abscesses
- atelectasis
- pneumothorax
- piemic complications
- toxico-infectious syndrome
- disseminated intravascular coagulation (DIC) syndrome
- toxico-infectious anemia
- cardio-vascular insufficiency
- toxic nephritis, toxic hepatitis
- paralytic ileus

Clinical picture

- rhinopharyngitis manifestations
- febrile syndrome, subfebrility
- dry cough, then productive
- tachypnea
 - suckling < 2 months ≥ 60 respirations/minute
 - suckling 2-12 months ≥ 50 respirations/minute
 - child 1-5 years ≥ 40 respirations/minute
- retraction of thorax in suckling and infant
- retraction of intercostal spaces in preschool and school age children
- percutor submatity in the region of pulmonary condensation
- dullness in pneumonias with pleural effusion
- reduced vesicular murmur in affected segments
- localized humid rales (bullous by small caliber, crepitant)
- toxic manifestations (somnolence, acrocyanosis, vomiting)

Investigations

- *hemogram*: leukocytosis, neutrophilia, shift to the left (in purulent complications), increased ESR (>20 mm/hour)
- *pulmonary radiography*: micro- and macronodular confluent, segmental opacities, pleural affections, pleural effusion, pulmonary destructions.
- *bacteriologic examination*: sputum, tracheal aspirate, pleural exudate.

Clinical forms

Focal (lobular) pneumonia

Diagnostic criteria

- bronchoalveolitis at the level of pulmonary lobules
- etiology: Chlamydia, Mycoplasma, pneumococcus
- catarrhal respiratory manifestations: cough
- soft dyspnea, intercostal retraction, seldom – thorax retraction
- bilateral (seldom unilateral) bronchopulmonary data with minimal expression (harsh respiration, dry or bullous polymorphous rales) or absence of local stethoscopic or percutor symptoms
- soft, moderate toxico-infectious syndrome
- radiologically – micro- and macronodular opacities with the diameter until 2-3 cm, and localized bilaterally disseminated and paravertebral
- complications – seldom
- favorable evolution, healing in 3-4 weeks

Confluent pneumonia

Diagnostic criteria

- massive pulmonary unilateral infiltration, with affection of a few segments, lobar or of integral lung
- etiology: staphylococcus, pneumococcus, Haemophilus influenza
- severe toxico-infectious syndrome
- dyspnea, tachypnea, respiratory moan, thoracic pain
- thoracic, supraclavicular retraction
- physically – attenuated respiration, localized, crepitant rales, submatity in affected pulmonary areas
- major risks of pleuropulmonary complications
 - pulmonary destructions, abscesses
 - exudative pleurisy, pleural empyema
 - pyopneumothorax, pneumothorax

Diagnostic criteria (continuing)

- hemoleucogram: marked leukocytosis, neutrophilia, shift to the left, significant increasing of ESR, toxico-infectious anemia
- radiologically: massive, confluent pulmonary opacities, destruction bullae, abscesses, pleural effusion
- evolution:
 - favorable with healing in 1-2 months
 - risk of mortality in suckling babies, infants, in septicemias
 - risk of chronic evolution (pneumofibrosis, bronchiectasis), pleural sequelae, pleural adherences (in pleuro-pulmonary complications)

Lobar pneumonia (croupous, pneumococcal)*Diagnostic criteria*

- lobar infiltration with fibrino-leucocytary and hemorrhagic alveolitis
- etiology: pneumococcus
- toxico-infectious syndrome: headache, agitation, irritability, anorexia
- suffering aspect of face, labial herpes
- severe febrile syndrome
- extrapulmonary symptoms: abdominal pain, meningism
- irritative cough, thoracic pain
- physically: diminished respiration, “tube” breathing, crepitant rales, crepitation, submatity in affected lobe

- complications:
 - para- or metapneumonic pleurisy
 - pulmonary destructions
- radiologically: triangular homogeneous opacity, subcostal, by medium intensity, with topographic respecting of segment, affected lobe, pleuro-pulmonary complications
- evolution: favorable using the treatment with penicillins

Segmental pneumonia

Diagnostic criteria

- inflammation of one or a few segments, which are in state of atelectasis due to inflammatory obstruction of affected segmental bronchus
- pulmonary and general minor clinical manifestations
- bronchoobstructive syndrome in the onset of disease
- physically: attenuated respiration, submatity on affected pulmonary area
- radiologically: triangular opacity with atelectatic component
- evolution:
 - prolonged, 4-8 weeks
 - risk of segmental pneumofibrosis, chronicization
 - middle lobe syndrome

Interstitial pneumonia

Diagnostic criteria

- affection of pulmonary interstitium, viral etiology, develops in newborn infant, suckling baby
- pronounced dyspnea, intercostal and thoracic retraction
- intensive, tormenting, dry cough
- physically: attenuated respiration, bullous rales by small caliber, fine (can be absent)
- radiologically: diffuse interstitial inflammatory images without pulmonary opacities
- favorable evolution with healing

Treatment

General measures

- rest in bed or reducing of motor activity on febrile period
- optimal hydric regime
 - teas, warm juices, electrolytic solutions
- sparing alimentary regime
- in febrile syndrome:
 - physical methods (opening of teguments, wiping of teguments with humid pad)
 - paracetamol ($t > 38,5^{\circ}\text{C}$) oral, rectal
 - lytic mixture (analgin, pipolfen, aminazin) in rebellious febrile syndrome
- alkalino-saline inhalations, aerosol therapy
- kinetotherapy, postural drainage

Antibacterial treatment

uncomplicated pneumonia

- empiric antibioticotherapy
 - for suckling baby, little infant, preschool age children – *amoxicillins*, protected amoxicillins
 - for school age children – *macrolides* (clarythromycine, azythromycine), *amoxicillins*, protected amoxicillins
 - reserve antibioticotherapy – *cefalosporins* oral (cefalexin, cefachlor, cefixim)

complicated pneumonia

- parenteral penicillins (benzylpenicillin, ampicillin, amoxicillin)
- parenteral cefalosporins (cefazolin, cefuroxime, ceftriaxone, cefataxim)

Symptomatic treatments

- mucolytics and expectorants
 - ambroxol, bromhexin
 - carbocystein, acetylcysteine
 - phytotherapeutic remedies (bronhipret)
- Bronchodilators (in bronchoobstructive syndrome)
 - β_2 agonists, anticholinergics, metylxantines
- Symptomatic treatment
 - in meteorism, vomiting, dehydration (rehydron, prokinetics, probiotics)
 - in convulsive syndrome (diazepam, aminazin, natrium oxibutirate)

Recovery treatment

- curative gymnastics, kinetotherapy, massage
- aeroionotherapy, speleotherapy
- vitaminotherapy (aevit, group B vitamins, picovit)
- correction of background states in suckling babies and little infants (antianemic, antihelminthic remedies, vitamin D)
- balneary treatment (at 4-6 months after healing)
- immunoprophylaxis
 - topic bacterial lysates (IRS 19, Imudon)
 - systemic lysates (Ribomunil)

Criteria of antibacterial treatment efficacy***Complete efficacy***

- reducing of febrile syndrome
 - 24-48 hours in uncomplicated pneumonias
 - 3 – 4 days in complicated pneumonias
- improvement of general state, of appetite
- reducing of dyspnea, thorax retraction
- positive dynamics in pulmonary physical status (stethoacoustic, percutor)
- reducing of leukocytosis, neutrophilia

Therapeutic tactics

- the administration of antibiotic will be continued during 3-5 afebrile days

Incomplete efficacy

- febrile (subfebrile) syndrome 3-5 days
- partial improvement of general symptoms
- stabilization of bronchopulmonary manifestations

Diagnostic tactics

- pulmonary radiography
- hemoleucographic evaluation

Therapeutic tactics

- antibacterial treatment is not modifying in the case of absence of paraclinical aggravation
- initial antibioticotherapy is continuing 2-3 days again with clinical reevaluation and in the absence of complete therapeutic effect – the antibioticotherapy is modifying

Therapeutic inefficacy

- persistent fever more than 4 days, rebellous febrile syndrome, toxico-infectious manifestations
- aggravation of general state
- progressing of pulmonary symptoms
- majoring or appearance of pleural exudation, cytolysis increasing
- intensifying of hemoleucogram inflammatory reaction (leukocytosis, neutrophilia, shift to the left, ESR increasing)

Diagnostic tactics

- repeated radiography
- hemoleucographic evaluation
- pleural puncture

Therapeutic tactics

- substitution of antibiotic after 24-48 hours on large action spectrum antibiotic
- aimed antibioticotherapy (at bacterial stem identifying)

Follow-up

- repeated visit for clinical reevaluation at family doctor – after 3 days, ulterior the visit at doctor – every 5 days at favorable evolution until complete healing
- the treatments in stationary conditions of children with uncomplicated pneumonia is performing the obtaining of sure clinic-paraclinical efficiency
- the repeated pulmonary radiography is indicated in:
 - in pneumonias with pleuro-pulmonary complications is performing after 7-10 days
 - in long-term evolution – after 2-3 weeks
 - the pneumonias with favorable evolution don't need the control pulmonary radiography

References

The sending of patient to pulmonologist

- complicated pneumonias
- pneumonias with long-term evolution
- severe associated pathology

Admission at hospital

- children until 2 months with pneumonia
- severe pneumonia
- pulmonary complications: destructions, pleurisy, atelectasis, pyothorax, pyopneumothorax, pneumothorax
- extrapulmonary piemic complications: meningitis, osteomyelitis, otitis, enterocolitis, abscesses by different localization
- toxic complications: toxico-infectious encephalopathy, convulsive syndrome, respiratory and cardiovascular, hepatic toxic insufficiency toxic nephritis, paralytic ileus
- pneumonias associated with advanced malnutrition, severe anemia, immunodeficiency, congenital malformations
- children from not co-operant families, bad socio-economic conditions

Evolution

- favorable with complete healing
- reserved – in children with severe associated diseases, congenital malformations, primary and secondary immunodeficiencies

Pneumococcal pneumonia (*Streptococcus pneumoniae*)

Lobar pneumonia

Clinical variants

1. Lobular pneumonia – in suckling baby and infant

- toxico-infectious syndrome: irritability, somnolence, fever, vomiting, loss of appetite, sometimes convulsions, circulatory collapse
- respiratory signs: tachypnea (60-80 respirations), intercostal, thorax retraction, short expiration, respiratory moan, cough, cyanosis, piston-like movement of head
- physical syndrome of pulmonary condensation: localized submatity, bronchophonia, blowing respiration, localized crepitant rales

2. Lobar, segmental pneumonia – in preschool, school age children (is complicating with para- and metapneumonic pleurisy)

- general manifestations: headache, anorexia, agitation, irritability, fever, thoracic, abdominal pains
- pulmonary physical examination: attenuated respiration, crepitant rales, matity, submatity, blowing respiration
- pleural affection with pleural effusion: dullness, decreasing of vesicular murmur, pleuritic sounds

Complications

- toxico-infectious syndrome
- parapneumonic, metapneumonic pleuresies, pleural plague
- pulmonary destructions (serotype 3, 1, 9, 15)

Explorative diagnosis

- *pulmonary radiography*: condensation syndrome (nodular, segmental, lobar, confluent opacities), pleural effusion
- *hemoleucogram*: leukocytosis, neutrophilia, elevated ESR (maximal in pleuresies)

Etiologic treatment

- first line antibioticotherapy: amoxicillin, and protected amoxicillins (clavulonic acid) per os, ampicillin i/m, benzylpenicillin i/m
- reserve antibioticotherapy: cefalosporins, generation 2 or 3, macrolids

Symptomatic treatments

- antipyretics (in febrile syndrome)
- mucolytics, expectorants (bromhexin, ambroxol)
- broncholytics (salbutamol, euphyllin)
- aerosoltherapy

Staphylococcal pneumonia (Staphylococcus aureus)

Epidemiology: predominates in suckling babies, can be nosocomial

Favoring factors: little age, pre- and dismaturity, malnutrition, congenital malformations, preexistent viral infections, convulsive cough, immunodeficiency

Clinical picture

General manifestations: very severe state, high fever, shivers, marble skin, lethargy, agitation, generalized cyanosis

Respiratory manifestations

- tachypnea, expiratory moan, thorax retraction, thoracic pain
- cough, purulent expectorations
- pulmonary physical signs: syndrome of pulmonary condensation (dullness), decreasing of vesicular murmur, crepitant rales, bronchophonia

Digestive manifestations: vomit, loss of appetite, dynamic ileus, diarrhea

Explorative diagnosis

- *radiography*: disseminated nodular opacities, rarer lobar opacities, microabscesses, pleural effusion, pneumothorax
- *hemoleucogram*: leukocytosis ($>20 \times 10^9 / l$), neutrophilia with the shift to the left, ESR >30 mm/hour, hypochrome anemia
- *pulmonary echography*: confirming of pleuresies, quantitative evaluation
- *bacteriologic examination*: tracheal aspirate, sputum culture, hemoculture, pleural liquid

Complications

- empyema, pneumothorax, pulmonary abscedation
- myocarditis, pericarditis
- brain affection by toxic, infectious origin

Evolution

- lent favorable
- in destructive processes – chronicization, bronchial deformations, pulmonary fibrosis
- decease in children with malformations, with preexistent diseases, prematures

Etiologic treatment

- first line antibioticotherapy: semisynthetic penicillins (ampicillin, oxacillin)
- reserve antibioticotherapy: cefalosporins, aminoglicosids

Pneumonia with *Haemophilus influenzae*

Epidemiology

H. influenzae is etiologic factor in 10-25% of pneumonias in children
high incidence – in 1-3 years old children

Clinical picture

General signs

- febrile syndrome
- toxico-infectious syndrome

Respiratory symptoms

- cough with pertussis-like character, tormenting, prolonged
- purulent sputum, intensively colored in green
- wheezing, expiratory dyspnea
- auscultatively signs of bronchiolitis (small, crepitant bullous rales),
attenuated respiration in areas of condensation

Explorative diagnosis

- *radiology*
 - lobar, segmental, nodular disseminated opacities
 - images of abscedation, bullae of emphysema
 - pleural effusion, pleurisy
- *hemoleucogram* – leukocytosis ($10-15 \times 10^9 / l$)
- *bacteriologic examination*: hemoculture, bacteriology of sputum, of cerebrospinal fluid with *H. influenzae* identifying

Complications

- pleuresy, abscesses, emphysema bullae
- meningitis,
- septic arthritis
- pericarditis

Evolution

- favorable with treatment and healing
- prolonged evolution with long-term course, bronchiectasis

Etiologic treatment

- first line antibioticotherapy: amoxicillin, ampicillin i/m
- reserve antibioticotherapy: cephalosporins resistant to β -lactamases (cefuroxime, cefotaxime, cefaclor, ceftriaxone, ceftazidime)

Pneumonia with gramnegative germs

Etiology: *Klebsiella pneumoniae*, *E. coli*, *Pseudomonas aeruginosae*, *Proteus*, *Serratia*

Frequency: 4-5% from bacterial pneumoniae, have nosocomial character

Favoring factors

- care in intensive care units
- explorative invasive techniques
- long-term endovenous perfusions
- malnutrition
- prematurity
- congenital bronchopulmonary, cardiac malformations
- bronchiectasis
- cystic fibrosis
- primary and secondary immunodeficient states
- spread burns
- oncologic pathology
- surgical interventions, traumatismes, plagues

Clinical picture

- general signs are very marked (severe toxico-infectious syndrome)
- pronounced respiratory insufficiency (tachypnea, intercostal, thorax retraction)
- polymorphous, a little prominent pulmonary physical examination

Radiologic picture

- bilateral, confluent, spread, polymorphous opacities
- pronounced interstitial reactions
- destructive bullae, pneumatocele
- purulent pleurisy (80% of cases)
- pulmonary thromboses and infarctions

Etiologic treatment

In pneumonia with *Klebsiella*

- aminoglycoside + cephalosporins by III generation

In pneumonia with *E. Coli*

- aminoglycoside + ampicillin or cephalosporin

In pneumonia with *Pseudomonas*

- aminoglycoside + cephalosporins by III generation (ceftazidim, ceftriaxone), carbenicillin, ofloxacin

In pneumonia with *Proteus*

- aminoglycosides, cephalosporins, cloramfenicol, carbenicillin, ciprofloxacin, cefoperazon

Pneumonia with *Chlamydia*

Epidemiology

- new-born, little suckling with intrauterine, intranatal, neonatal infection
- signs of *Chlamydia* infection in mother (during pregnancy, after birth)

Clinical picture

- uni- or bilateral conjunctivitis
- nasal obstruction
- dry, tormenting, sometimes in accesses cough
- tachypnea
- intercostal, thorax retraction
- at auscultation normal or harsh, sometimes with crepitant rales
- wheezing, coarse crackles, prolonged expiration
- failure to thrive
- soft toxico-infectious syndrome

Explorative diagnosis

- *Pulmonary radiography*
 - interstitial diffuse infiltration
 - obstructive, generalized emphysema, hyperinflation
 - subsegmental atelectasis
- *Hemoleucogram*
 - leukocytosis, eosinophilia
- *Immunologic tests*
 - increased IgM, IgG
 - anti-IgM *Chlamydia pneumoniae* in diagnostic titer

Evolution

- *favorable*: complete healing in classic terms
- *persistent evolution*: 4-8 weeks, with tachypnea, unproductive cough
- *severe forms*: respiratory distress syndrome with functional respiratory sequelae

Etiologic treatment

- first line antibioticotherapy with macrolides (clarithromycin, azithromycin, erythromycin)
- sulfonamides (cotrimoxazol)

Pneumonia with *Mycoplasma*

Epidemiology

- new-born, little suckling with intrauterine, peripartum infection
- Children 5-15 years

Clinical picture

- toxico-infectious syndrome: indisposition, anorexia, headache, somnolence, myalgias
- persistent febrile syndrome, sometimes high fever
- strong cough, paroxysmal, productive
- diminishing of vesicular murmur, diffuse bronchial rales, subcrepitant, crepitant (sometimes normal physical data)
- wheezing, persistent severe bronchoobstructive syndrome
- hemoptysis (sometimes)
- thoracic pain
- otalgia
- cutaneous eruptions

Explorative diagnosis

- *radiologic*: subsegmental opacities with unclear contour, moderate intensity, reticulo-nodular infiltrates, lamellar atelectasis, spread infiltrates, pleural effusion, pleural plaque
- *serologic*: increasing of IgM and IgG-anti-Mycoplasma (ELISA, passive hemagglutination)

Evolution

- favorable: clinically 2-3 weeks, radiologically 3-9 weeks
- complications
 - *pulmonary*: pulmonary abscesses, pleurisy, acute pulmonary edema, interstitial emphysema, pneumatocele, mediastinal emphysema, respiratory insufficiency, McLeod syndrome
 - *hematologic*: hemolytic autoimmune anemia, thrombocytopenic purpura, medullar aplasia
 - *neurologic*: meningitis, encephalitis, myelitis, poliradiculoneuritis, cranial nerves paralysis
 - *cardiovascular*: myocarditis, pericarditis, Raynaud syndrome, Stiven-Johnson syndrome

Etiologic treatment

- *Macrolides*: clarithromycin, azithromycin, erythromycin
- *Sulfonamides*: cotrimoxazol

Viral pneumonia

Etiology

- syncytial-respiratory virus
- grippal A virus
- paragrippal virus
- adenovirus
- rugeolic virus
- varicella virus

Clinical picture

- *severe forms*: fever, severe toxico-infectious syndrome, respiratory distress, spread pulmonary affection, signs of bronchiolitis, radiologically- interstitial infiltrations, intensive hilar reactions, pulmonary hyperinflation, pleural reactions
- *soft forms*: fever, running nose, tachypnea, soft general signs, physical signs are minimal or absent, radiologically – micronodular opacities, perihilar, peribronchial infiltrates, interstitial accentuation

Grippal pneumonia

Clinical peculiarities: severe toxico-infectious syndrome, febrile convulsions, physical bronchopulmonary signs are minor or absent, is complicated with bacterial pneumonias, radiologically – accentuated interstitial picture, lobular hyperinflation

Pneumonia with adenoviruses

Clinical peculiarities: severe respiratory distress, forming of hyaline membranes, is complicating with pleural effusion, neurotoxicosis, gastrointestinal disorders, obliterant bronchiolitis, pulmonary fibrosis, bronchiectasis.

Pneumonia with respiratory syncytial virus

Clinical peculiarities: the signs of pneumonia are associating with severe bronchiolitis, radiologically – generalized obstructive emphysema

Rugeolic pneumonia

- *rugeolic interstitial pneumonia:* appears in catarrhal or eruptive period
- *atypical rugeolic pneumonia:* pneumonia in immunized children
- *pneumonia with giant (Hecht) cells:* in immunocompromised children (cystic fibrosis, leucemias, histiocytosis)
- *pneumonias through bacterial superinfections:* (pneumococcus, staphylococcus, gram-negative germs) is developing in children with biologic disabilities

Varicella virus induced pneumonia

- *viral pneumonia:* appears in the first days of disease, is developing in pupils
- *pneumonia through bacterial superinfection:* appears tardy, affects little child with immune deficiencies, malformations, minor physical symptoms, radiologically – disseminated micronodular opacities, hilar accentuation

Mycotic pneumonias

Aspergillosis

***Etiology:** Aspergillus*

Morphopathology

- I type of reactions - edema, infiltration of mucosae with granulocytes and eosinophils (rhinitis, aspergillar bronchial asthma)
- II type of reactions - pulmonary infiltrations with eosinophils, forming of antiaspergillar precipitines
- III type of reactions - primary or secondary aspergilloma (granulation tissue, with histiocytes, plasmocytes, eosinophils)

Favoring factors

- preexistent diseases: leukemia, pulmonary destruction, hepatitis, bronchiolitis, prematurity, infection with cytomegalovirus
- lesions of teguments and mucosae, tracheal aspiration, surgery
- antibioticotherapy, corticotherapy

Clinical picture

aspergillar respiratory allergy

- bronchial asthma
- coryza spasmodica

intracavitary aspergilloma (in bronchiectasis, cysts, emphysema bullae, tuberculous cavernae)

- non-abundant hemoptysis
- radiologically – round opacity with aeric semi-moon, nodular opacities, bands of sclerosis, areas of condensation
- complications: severe hemoptysis, fungic tumors

Clinical picture (continuing)**Diffuse (invasive) pulmonary aspergillosis in leukemia, Hodgkin disease, diabetes mellitus**

- Severe respiratory infection with fever, cough, respiratory insufficiency
- Physically – dullness, diminishing of respiration, crepitant rales
- Radiologically – opacities, , macro-, micronodular images, adenopathies
- Evolution: unfavorable (septicopyemia), chronic evolution

Explorative diagnosis

- Identifying of microorganism in different gathered produces
- Intradermal reaction to aspergillar extracts
- Serologic precipitation reactions

Treatment

- Antifungal medication: amphotericin, ancotil, ketoconazole, fluconazole
- Surgery in pulmonary aspergilloma
- Endoscopy (instillations, transthoracic punctures with amphotericin instillations)

Candidosis

Etiology: Candida albicans

Epidemiology

Candida becomes pathogene in favorable circumstances

- perinatal infections (prenatal transplacental contamination of fetus, vaginal contamination at birth)
- postnatal infections (contamination in favorable circumstances – prematurity, congenital immunodeficiencies, antibioticotherapy, corticotherapy, prolonged perfusions)

Clinical picture

- respiratory allergy: rhinitis, spastic cough, bronchial asthma, clinical and biological atopic background
- respiratory infections

Larngo-trachea-bronchial candidosis: otitis, mastoiditis, laryngitis, bronchitis

- banal functional symptomatology
- radiologically – pulmonary hyperinflation (bronchial obstruction)

Bronchopulmonary candidosis

Favorable consequences

- bucco-pharyngeal candidosis
- pharyngeal microaspiration
 1. acute form (in premature babies – unfavorable prognosis)
 2. subacute form – presents the aspect of tuberculosis or pulmonary abscess, radiologically – bilateral micronodular opacities

Explorative diagnosis

- positive Candida cultures in bronchial secretions, smears
- cutaneous tests (immediate, semi-tardy, tardy evaluation)
- immunologic tests (immunoelectrophoresis, immunofluorescence)

Treatment

- antifungal: fluconazole, mycosist, ketonazole
- aerosolotherapy with antifungal suspensions

Prophylaxis

- local medication in severe forms with Candida in vagina
- local treatment of stomatitis in suckling babies with antifungals

Histoplasmosis

Etiopathogenesis

Histoplasma capsulatum

- The spores are developing in grounds with favorable humidity
- The gate of human infecting – respiratory system (spores inhalation)
- Affects often the little suckling baby

Clinical picture

1. Primary pulmonary infection

- general signs: moderated, persistent fever, asthenia, failure to thrive
- non-productive cough
- negative physical pulmonary examination
- complications: atelectasis and localized emphysema from extrinsic obstructions in mediastinal adenopathies
- ulcerations of teguments and mucosae
- Endocarditis, myocarditis and pericarditis
- Acute abdominal syndrome with diarrhea, hemocolitis
- Bone destructions
- Suprarenal insufficiency (Addison disease)

Clinical picture (continuing)

2. Generalized form

- severe infection with grave febrile syndrome, pallor
- ponderal loss
- hepatosplenomegaly
- Bronchopulmonary signs
- generalized adenopathy
- cutaneous hemorrhagic eruptions

3. Tertiary fibrocaseous form – athelectasis of adult

Explorative diagnosis

- Bacteriology of sputum, blood, cephalo-rachidian fluid
- Histopathologic studies of hepatic biotates, lymph nodes
- Serologic and cutaneous tests with histoplasmin
- Hemogram: anemia, thrombocytopenia, reticulocytosis, elevated ESR
- Radiologically: disseminated diffuse, micronodular pulmonary infiltrations, miliar pulmonary calcifications, mediastinal adenopathies, wich can produce athelectasis, localized emphysema

Differential diagnosis

- Pulmonary tuberculosis: epidemiologic circumstances, sputum to BAAR – positive, Manthu test – positive
- Tuberculous meningitis
- Acute meningitis

Treatment

- Antifungal antibiotics: ketoconazole, fluconazole, amphotericin

Pneumonia with *Pneumocystis carinii*

Etiology: *Pneumocystis carinii* – unicellular organism from fungi group

Favoring factors

- prematurity
- dystrophy
- malignancies
- immunosuppressive therapy
- long-term corticotherapy
- leukemia
- chronic diseases
- tuberculosis
- infections with cytomegalovirus

Clinical picture

- *General signs:* subfebrility, fever, loss of appetite, failure to thrive, vomiting syndrome
- *Respiratory manifestations:* pronounced tachypnea (60-80 resp/min), expiratory moan, thorax and intercostal retraction, cyanosis
- Physical respiratory examination – minimal or negative, subcrepitant rales
- Cerebral signs (convulsions, coma)
- Myocarditis (tachycardia, cardiac failure, acute cor pulmonale)

Explorative diagnosis

- *Pulmonary radiography*: parenchymatous diffuse infiltration with aspect of “mate window”, alveolar emphysema, pneumothorax, pneumomediastinum
- *Acido-basic state*: hypoxia, hypercapnia, respiratory acidosis, mixt acidosis
- *Bacteriology* of sputum, tracheoalveolar lavage with parasitic cysts identifying
- *Seroimmunologic tests*: circulatory specific antibodies

Differential diagnosis:

febrile tachypnea, acute laryngitis, interstitial pneumonia of suckling baby, Wilson-Mikity syndrome, pulmonary hemosiderosis

Treatment

cotrimoxazol (biseptol) i/v

piremetamine + sulfadiazine + sulfadoxine

Prophylaxis

cotrimoxazol in immunocompromised children, from risk groups

Evolution, prognosis

- often in suckling babies (50-80%)
- immunocompromised children (100%)