Secondary TB (of adults)

- **Definition**
- **Pathogenesis**
- **Classification**
- **Epidemiology**
- **Clinical forms of TB**

Department of TB and other lung diseases
д.м.н. Яушев Марат Фаридович

Classification of TB

Classification of TB

1. **TB-cases:**

   - new case of TB, relapse, chronic forms

2. **Pathogenic classification:**

   - primary, secondary

3. **MBT:**

   - SSP (Sputum Smear Positive), SSN (Negative)

4. **Localization:**

   - Respiratory, Non-respiratory

5. **Official classification in RF:**

   - TB intoxication of children & teenagers, Respiratory, Non-respiratory

Classification of TB

1. **TB-cases**

1) **New case of TB**. A patient who has never had treatment for TB or who has taken antituberculosis drugs for less than 1 month.

2) **Relapse**. A patient previously treated for TB who has been declared cured or treatment completed, and is diagnosed with bacteriologically positive (smear or culture) tuberculosis.

3) **Chronic case,** a patient who is sputum-positive at the end of a re-treatment regimen.

Definitions of TB-cases

• **New**. A patient who has never had treatment for TB or who has taken antituberculosis drugs for less than 1 month.

• **Relapse**. A patient previously treated for TB who has been declared cured or treatment completed, and is diagnosed with bacteriologically positive (smear or culture) tuberculosis.

• **Treatment after failure.** A patient who is started on a re-treatment regimen after having failed previous treatment.

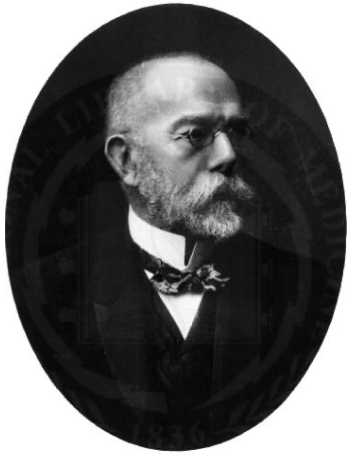
• **Treatment after default.** A patient who returns to treatment, positive bacteriologically, following interruption of treatment for 2 months or more.

• **Other**. All cases that do not fit the above definitions. This group includes **chronic case,** a patient who is sputum-positive at the end of a re-treatment regimen.

INTERNATIONAL STANDARDS FOR TUBERCULOSIS CARE (ISTC), 2006

Post primary (secondary) TB

(TB, developed in patient with LTBI)



- **Age:** adults
- **Localization:** lungs
- **Mantoux Test :** nonnegative
- Detecting : chest X-ray (fluorography)
- Presence of old post TB changes in lungs
- Groups at high risk for TB

Clinical Classification of TB

(Приказ МЗ РФ №109, 2003)

1.1.1. TB intoxication of children and teenagers

1.1.2. Pulmonary TB

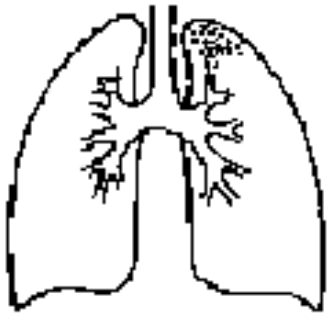
- Primary TB complex
- TB of Intra Thoracic Lymph Nodes
- Disseminated TB
- Milliary TB
- Focal TB
- Infiltrative TB
- Caseous Pneumonia
- Tuberculoma
- Cavern TB
- Fibrosis cavern TB
- Cirrhotic TB

Clinical Classification of TB

- TB Pleurisy (including empyema)
- TB of bronchi, trachea, upper airway
- Pulmonary TB, combined with occupational lung diseases

1.1.3. Non-pulmonary TB

- Central nervous system and meningeal TB
- TB colitis, peritoneal and mesenteric lymph nodes TB
- TB of bones and joints
- Genitourinary TB
- Skin and subcutaneous TB
- TB of peripheral lymph nodes
- TB of the eyes
- TB of other organs

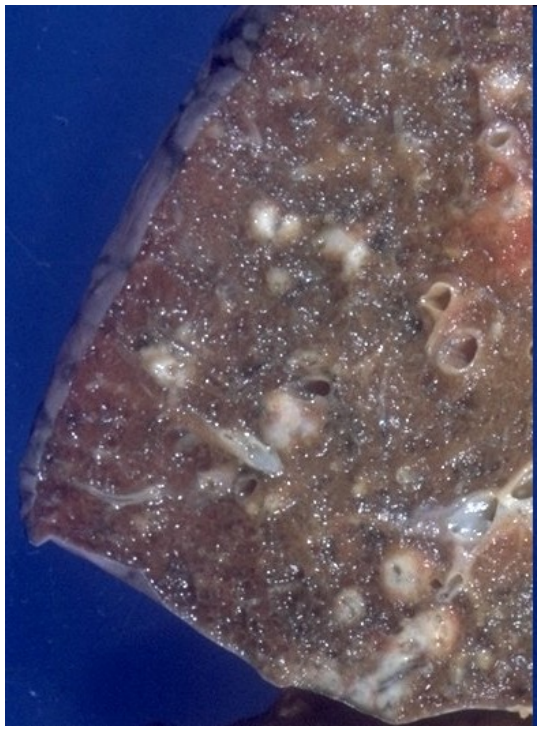


Focal TB of Lungs

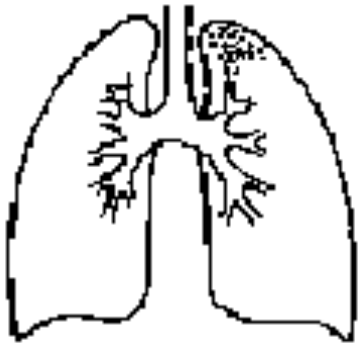
Clinical Form of Respiratory TB for which presence of Group of Small Foci in S1-2 of single or both Lungs and good-quality clinical course is typical

Features of Focal TB:

- *asymptomatic clinical course*
- *detection by Fluorography*
- *domination of productive-proliferative type of inflammation*
- *low frequency of lung destruction (CV+)*
- *high ability to self-healing*
- *low frequency of sputum smear positive patients (<10-15%)*

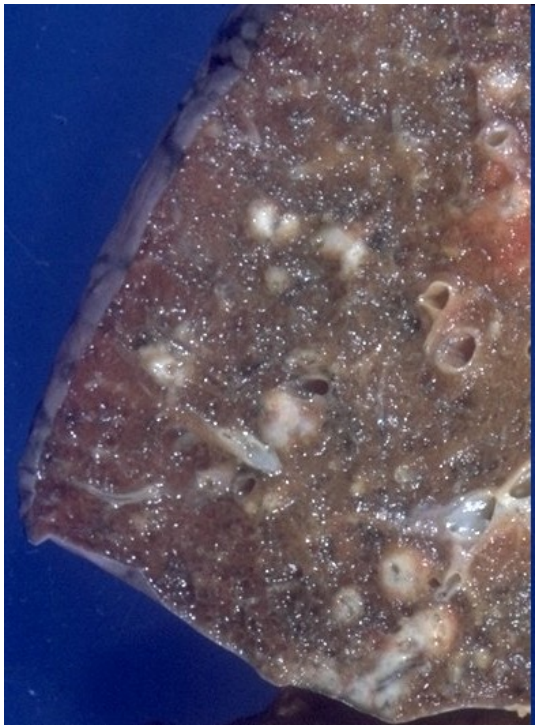


Focal TB of Lungs



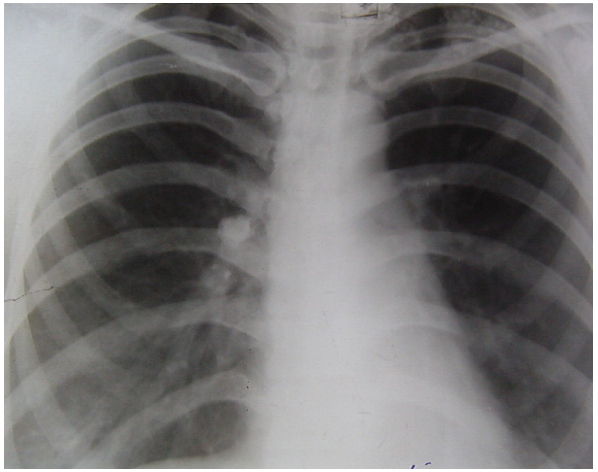
Pathogenesis:

- **Exogenous super infection –** *soft foci*
- **Endogenous reactivation of old foci in Lungs–** *fibrous foci*



Focal TB of Lungs

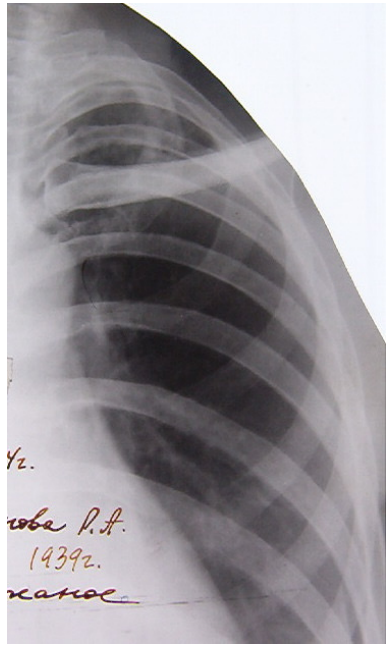
Number of Focal TB patients was decreased since 50-60 yrs from 50-60% to 10-15%



Types of Foci:

- **Active:**
  - *soft-focal TB*
  - *fibrous-focal TB*
- **Non-active:**
  - *group of foci as residual changes after Infiltrative TB or primary TB of Lungs*

Focal TB of Lungs



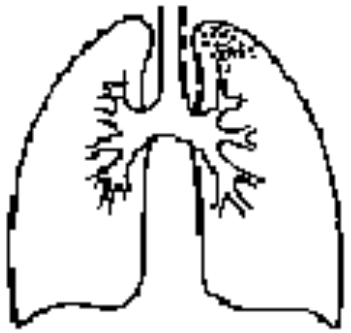
Forms of Focal TB:

- ***Soft-focal TB:***

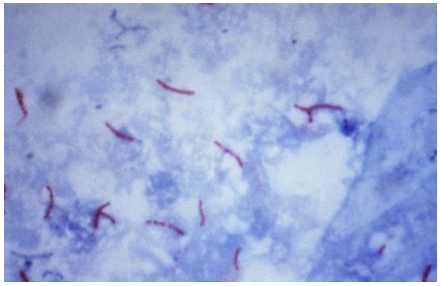
  - fresh process, weak intensity of foci on chest X-ray;

- ***Fibrous-focal TB:***

  - reactivation of old foci, high intensity of foci on chest X-ray



Focal TB of Lungs



Criteria of activity:

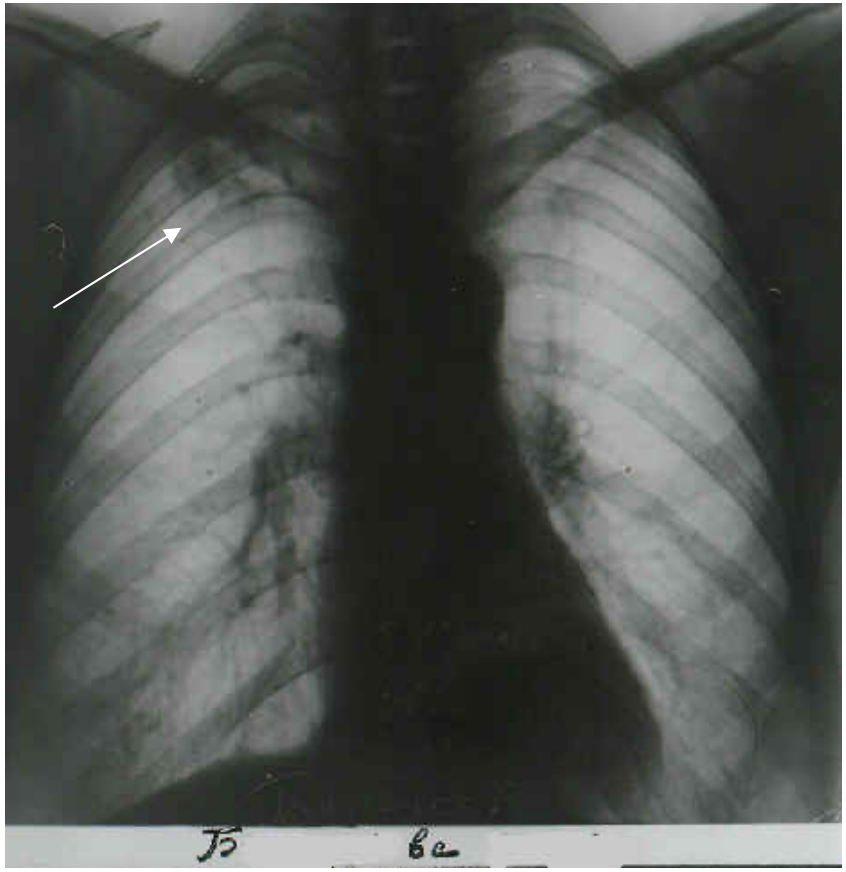
Seldom

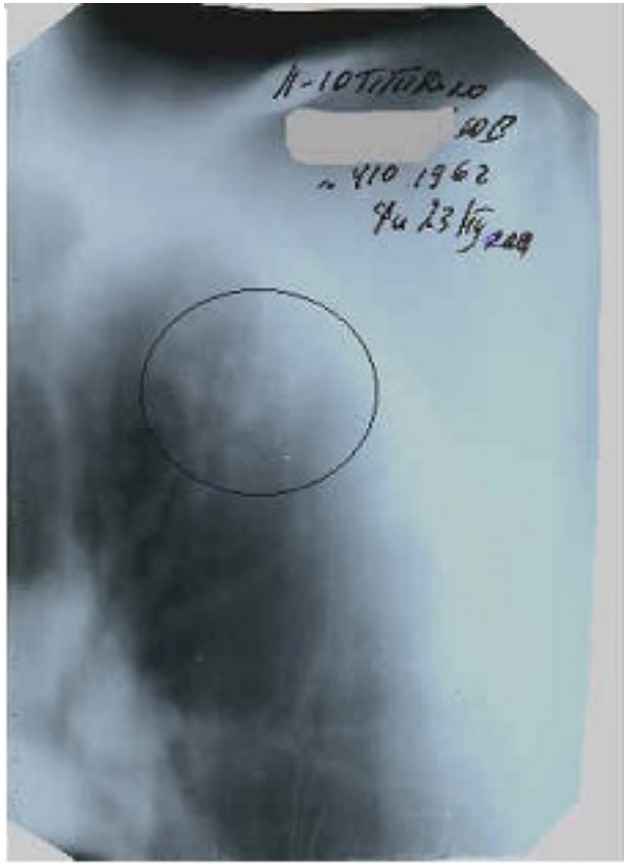
- ***Clinical (~10-15%):*** intoxication syndrome, haemoptysis, productive cough etc.
- ***Sputum Smear Positive***
- ***Diaskintest (+)***

Main

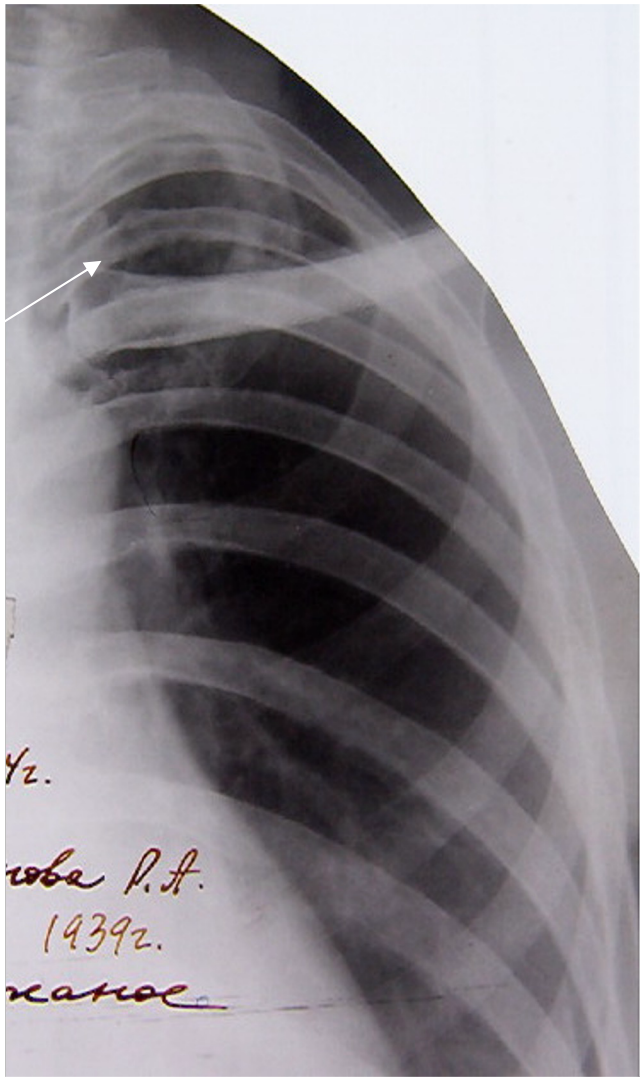
- ***Chest X-ray:*** low intensity of foci, cavity, non-precisely contours, «path to root» wide with non-precisely contours, big size (7-10 mm)
- ***Positive effects of anti-TB treatment (1,5-2 mon.)***

Focal TB of Lungs

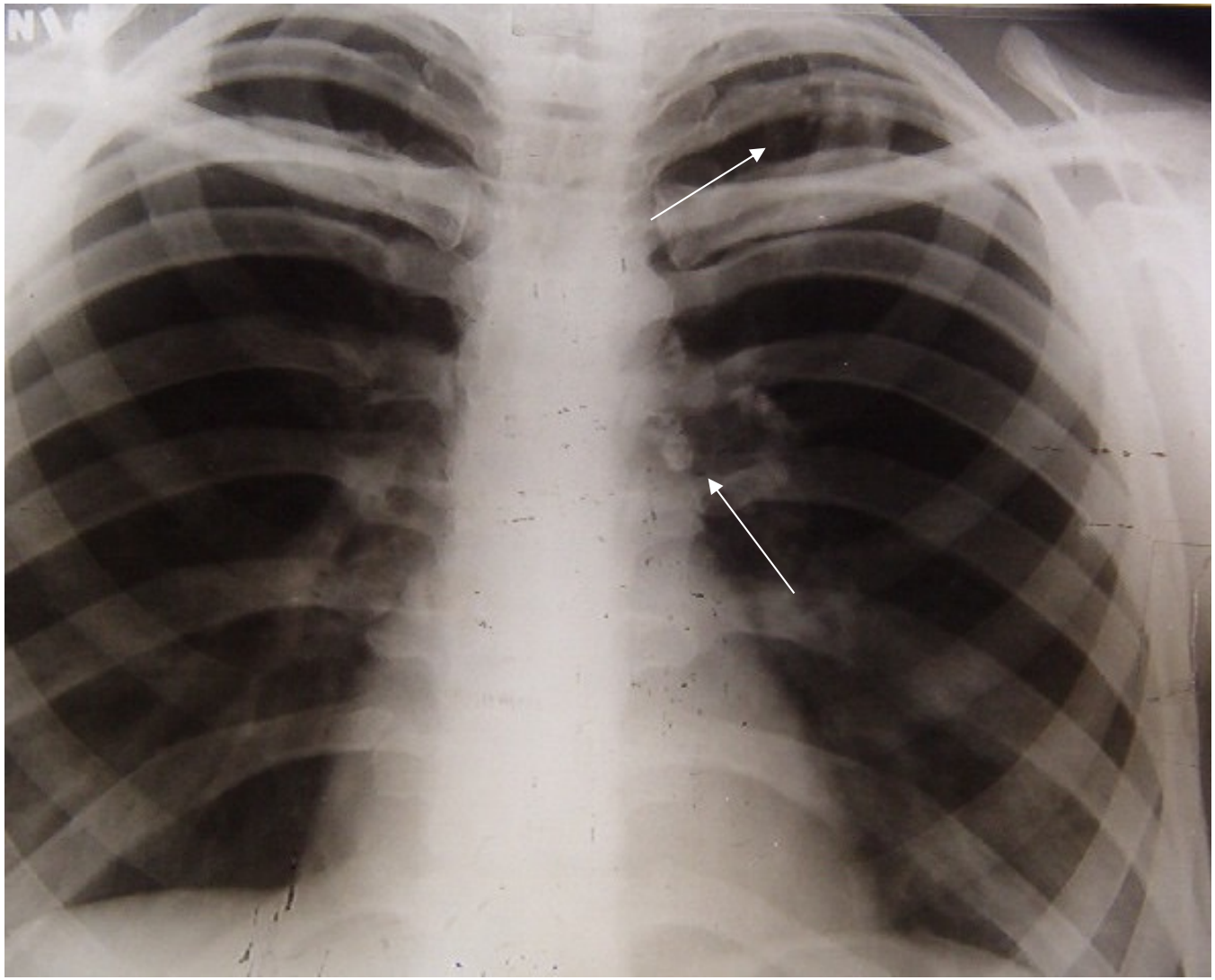




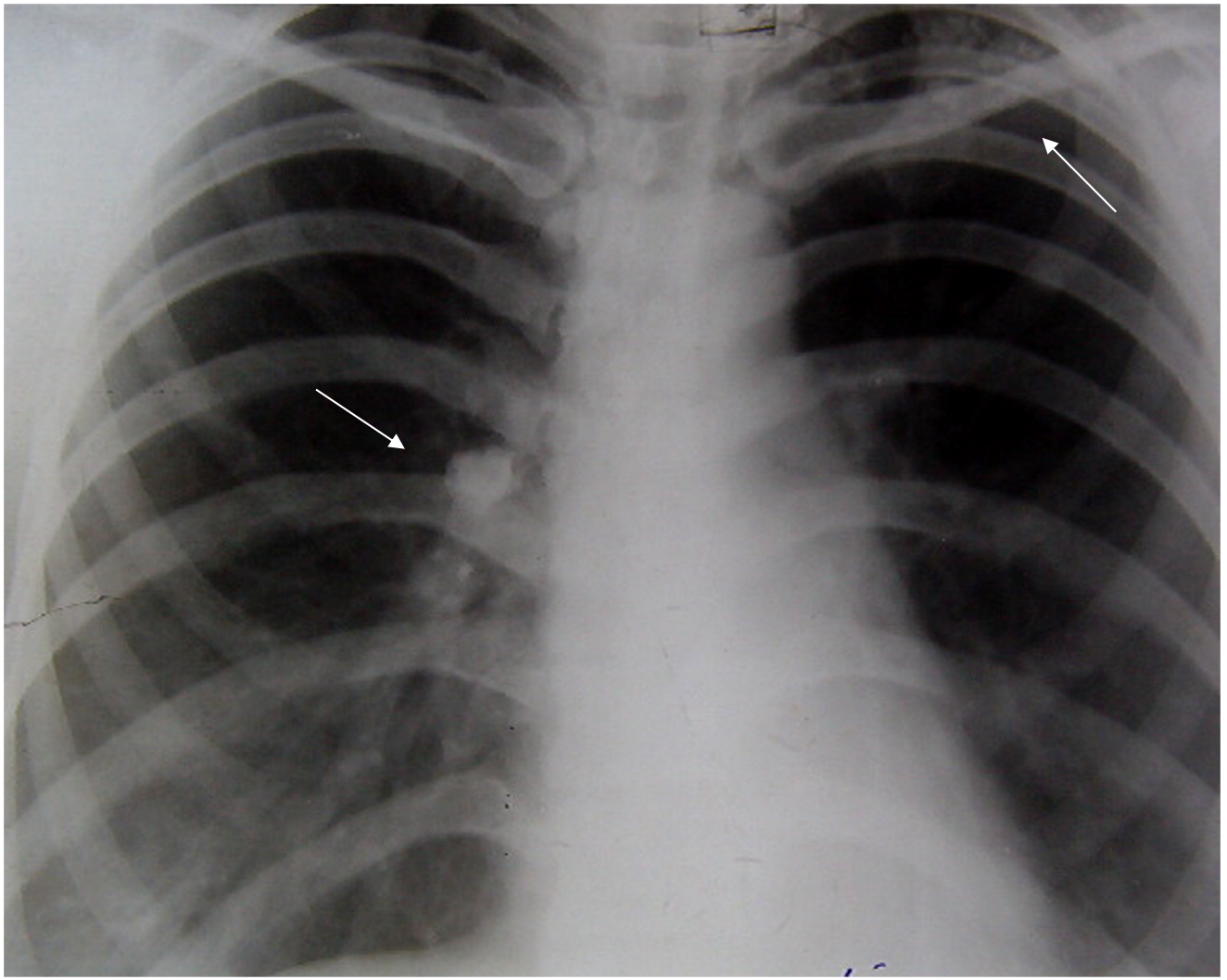
Focal TB of Lungs



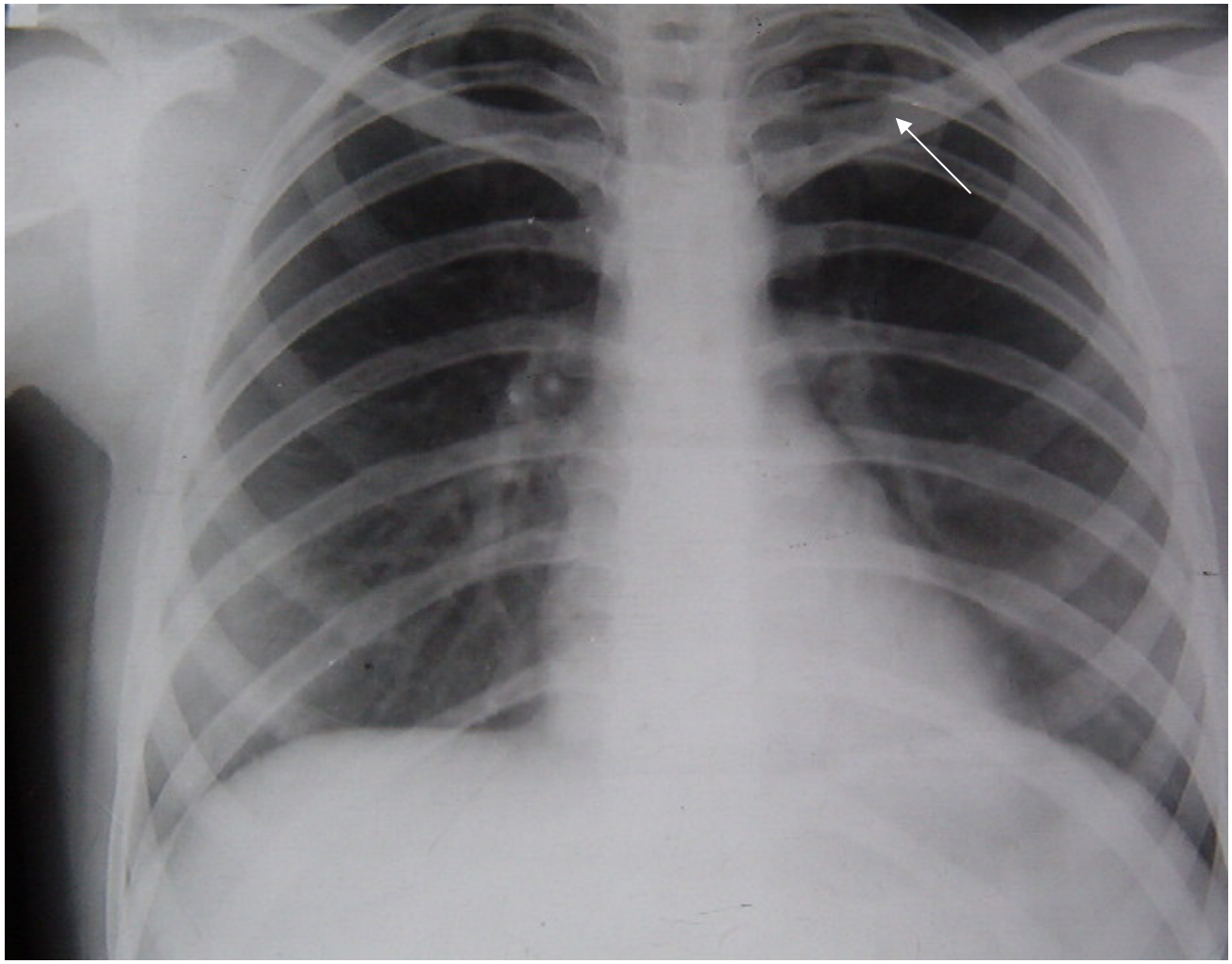
Focal TB of Lungs



Focal TB of Lungs



Focal TB of Lungs

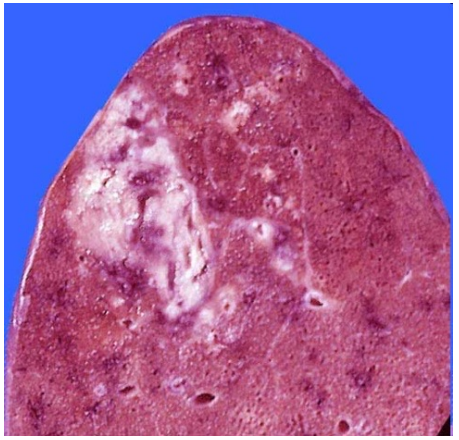


Infiltrative TB of Lungs

Clinical Form of TB, which characterizes by presence of inflammation changes in lung with domination in exudation and caseous necrosis and high positive dynamics to anti-TB treatment

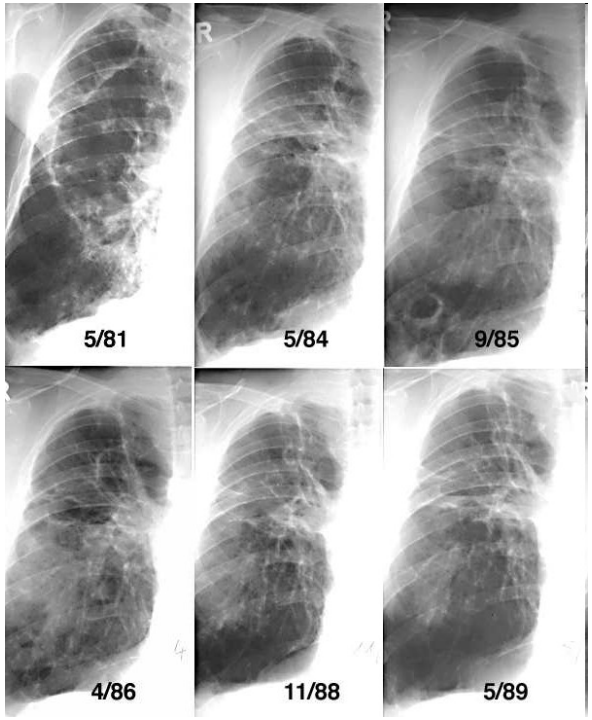
As most widely spread Clinical Form of TB defines clinical image of TB in whole!!!

Infiltrative TB of Lungs



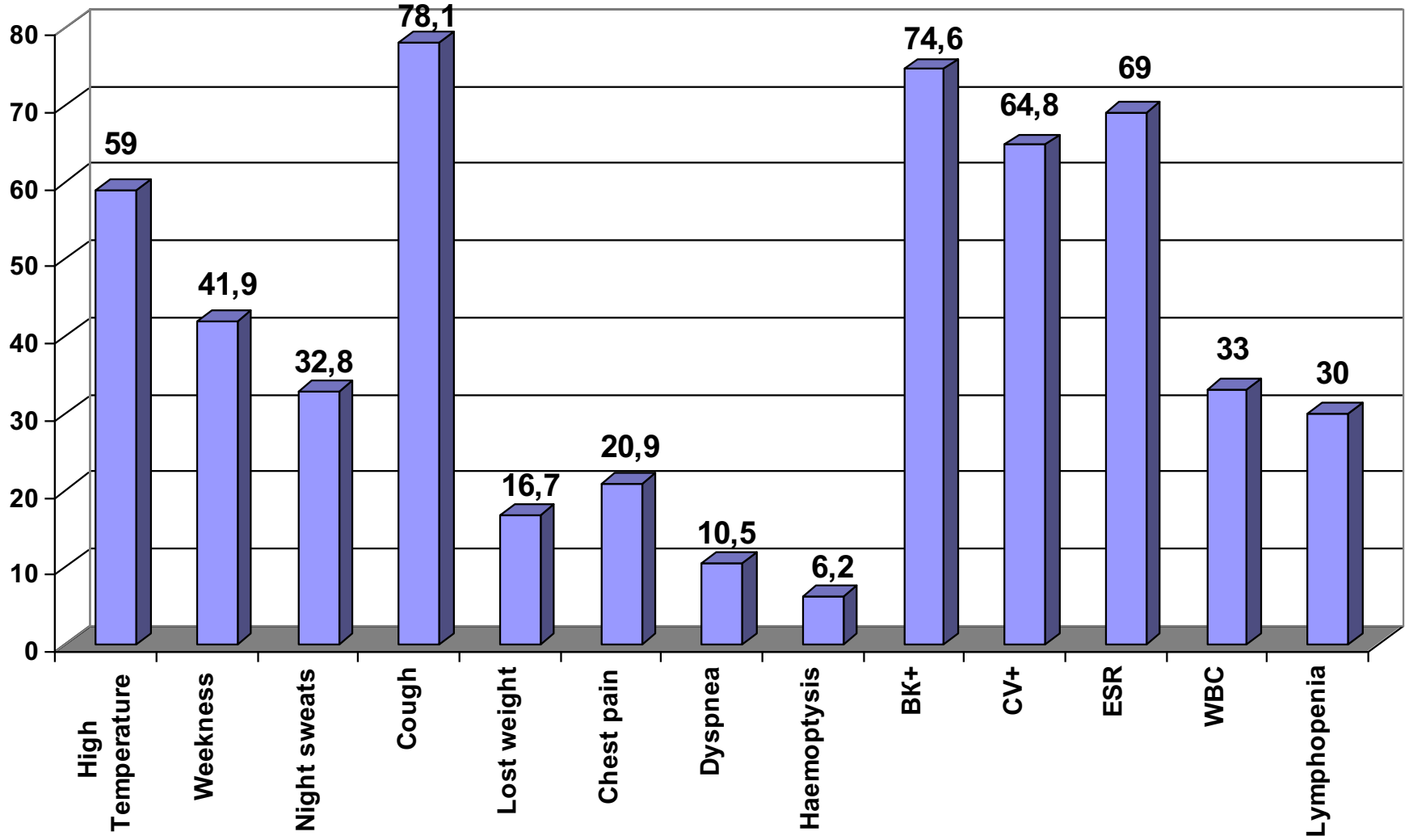
Features in whole:

- Domination of exudation and caseous necrosis
- Clinical manifestations are rather different (from asymptomatic to sharp) and depend on size of TB-process in Lungs;
- Ways of detecting: by visiting the doctor – 50%, by chest X-ray – 50%
- High ability to form the cavity *(60-70% CV+)*;
- High ability to progression (growth, cavity forming, dissemination to intact parts of lung);
- Sputum smear positive >60% patients;
- High reversibility of changes in lungs to anti-TB treatment



Clinical features of Infiltrative TB

(signs & symptoms (%))



Петрунина М.П. Пробл.туб.-1987, № 8 с.24-27

CXR forms of Infiltrative TB

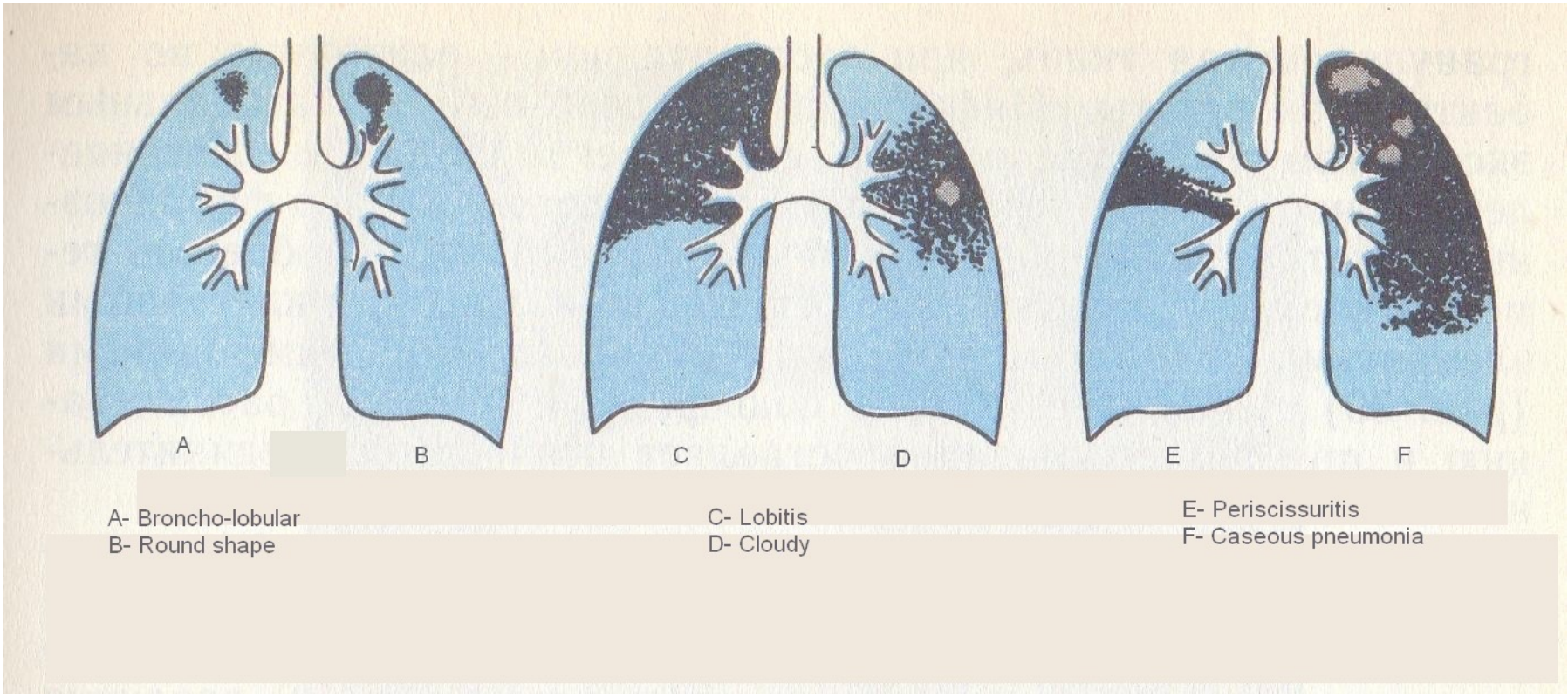
Classical Chest X-ray variants :

- *Broncho-lobular infiltrate*
- *Rounded (oval) infiltrate (Assman's)*
- *Periscissuritis*
- *Cloudy infiltrate*
- *Lobitis*

Other chest X-ray variants:

- *infiltrative-pneumonic*
- *multi-focal*
- *infiltrate-cavern*
- *infiltrate of whole lung*
- *infiltrate of both lungs*

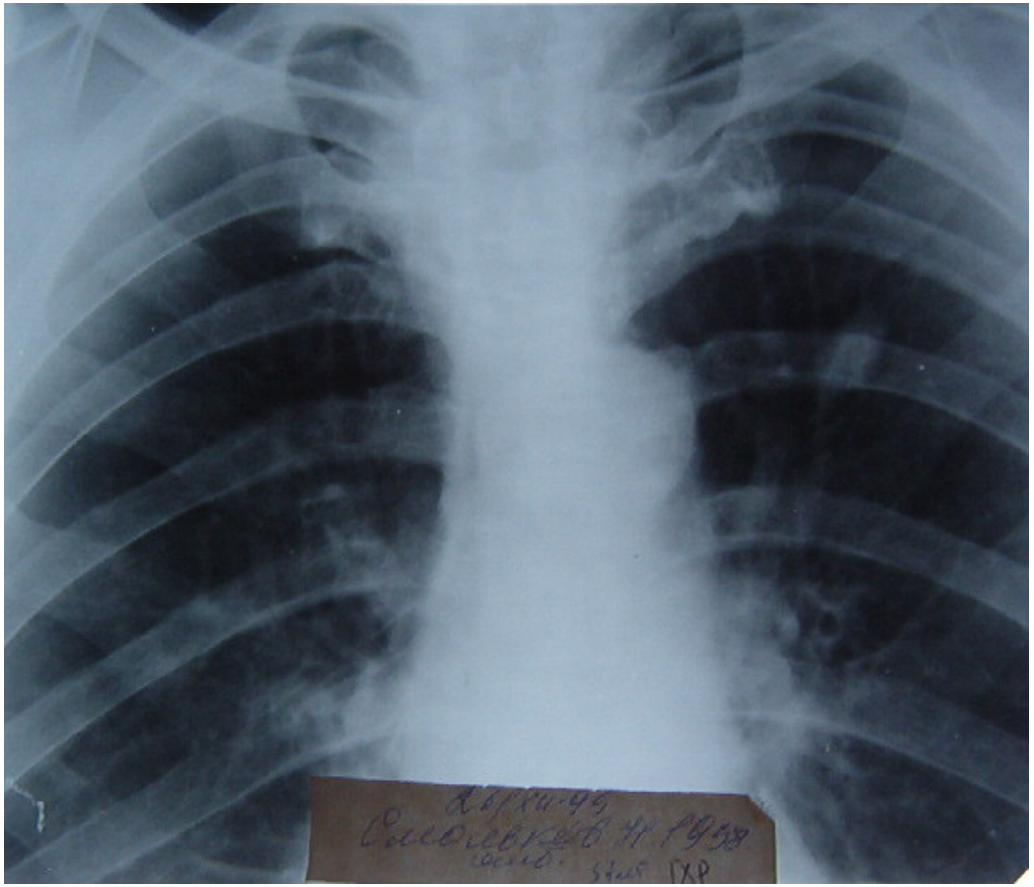
CXR-forms of Infiltrative TB



Broncho-lobular Infiltrate

- the shadow with extended form, size of 1-2 см., non-precisely contour; is related to small bronchi; is a result of growth of small foci

- asymptomatic clinics (acute onset in 10% patients), detection by fluorography, minimal changes in blood, good-quality course

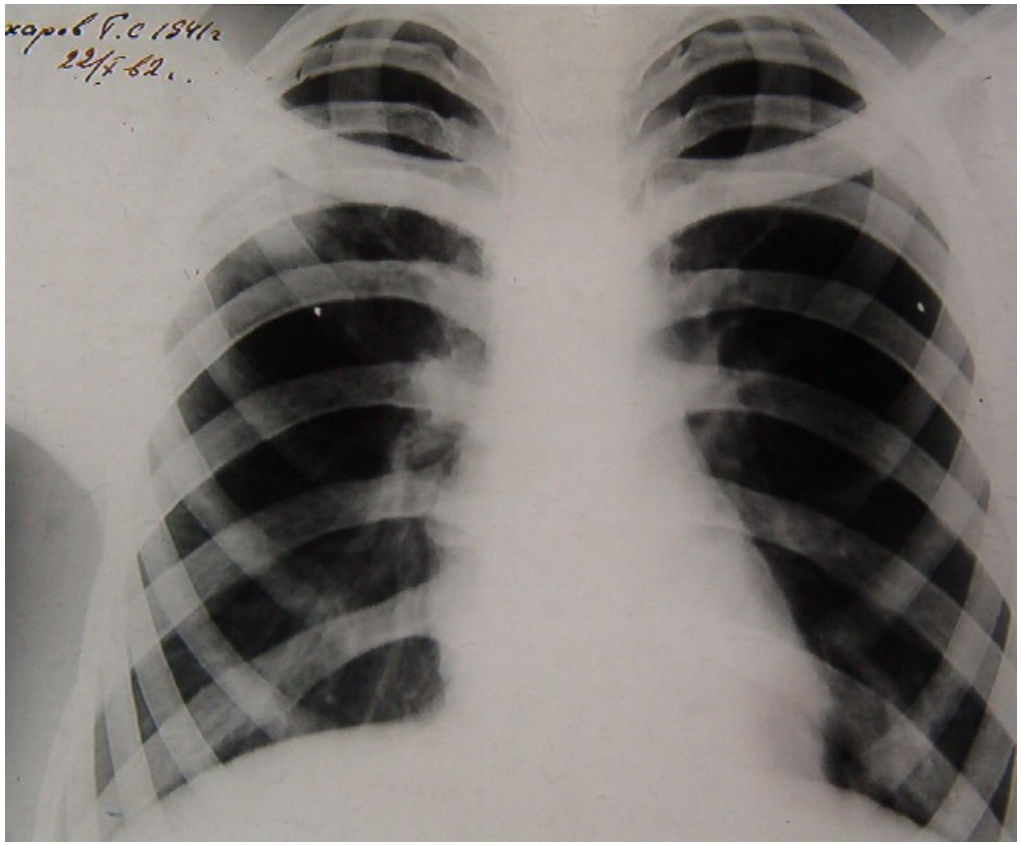


Round shape Infiltrate

(«Assman's Infiltrate»)

- rounded (oval) shadow in S1-2, size 2-5 см., non-precisely contour; may have cavity in the middle (симптом ракетки);

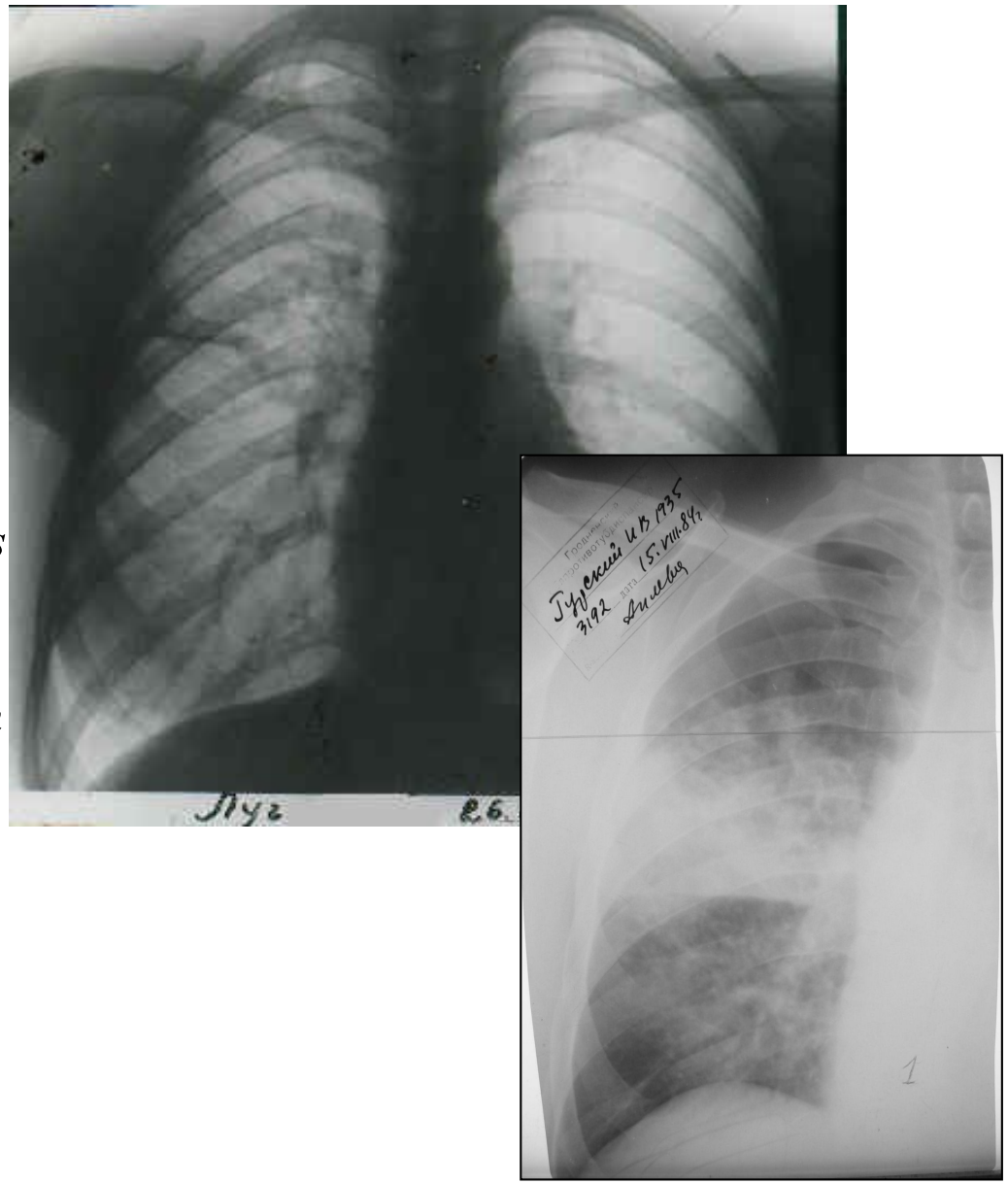
-subacute or asymptomatic clinics, (acute onset in 20% patients), detecting by fluorography, minimal changes in TBC, good-quality course, outcome to tuberculoma



Periscissuritis

- has localization in S2 along major fissure, triangle form shadow with precise low contour тень

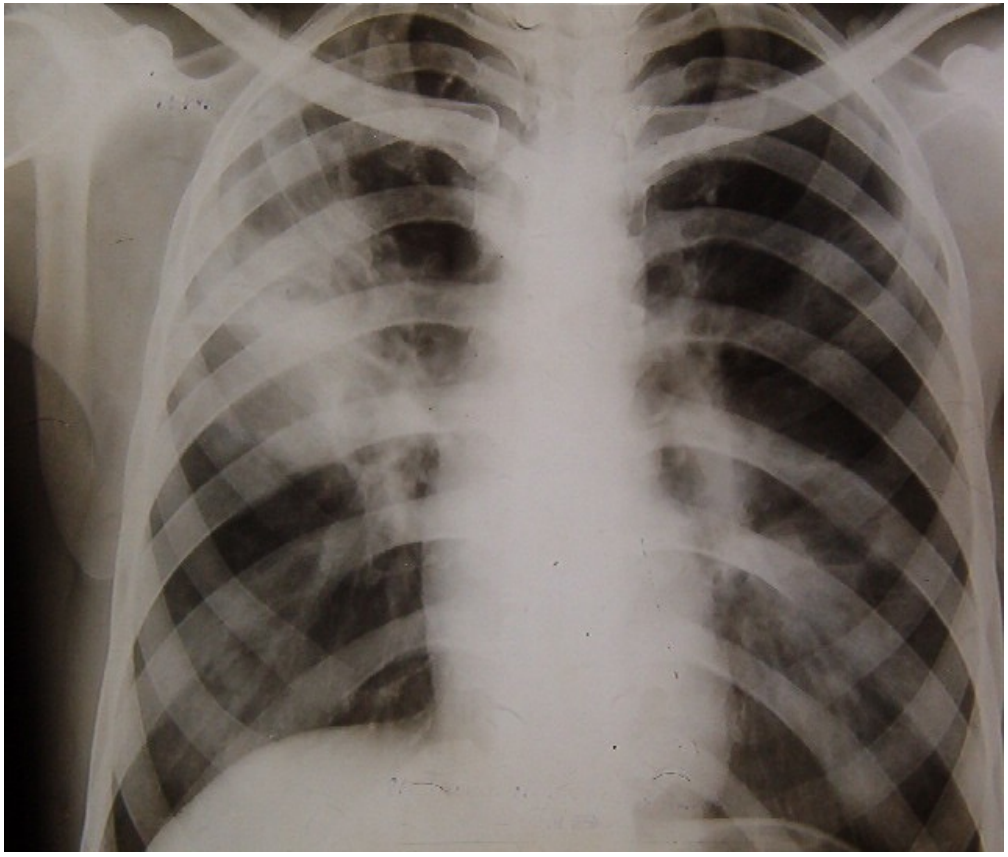
- acute onset in more than 70% patients (like-pneumonia or IRVI clinics); detecting by visiting the doctor; sharp changes in TBC, MBT(+) and CV(+) in >80% patients



“Cloudy” Infiltrate

- shadow with non-regular form, size > 5 cm, localization in S2-6; non-homogenous, low intensity

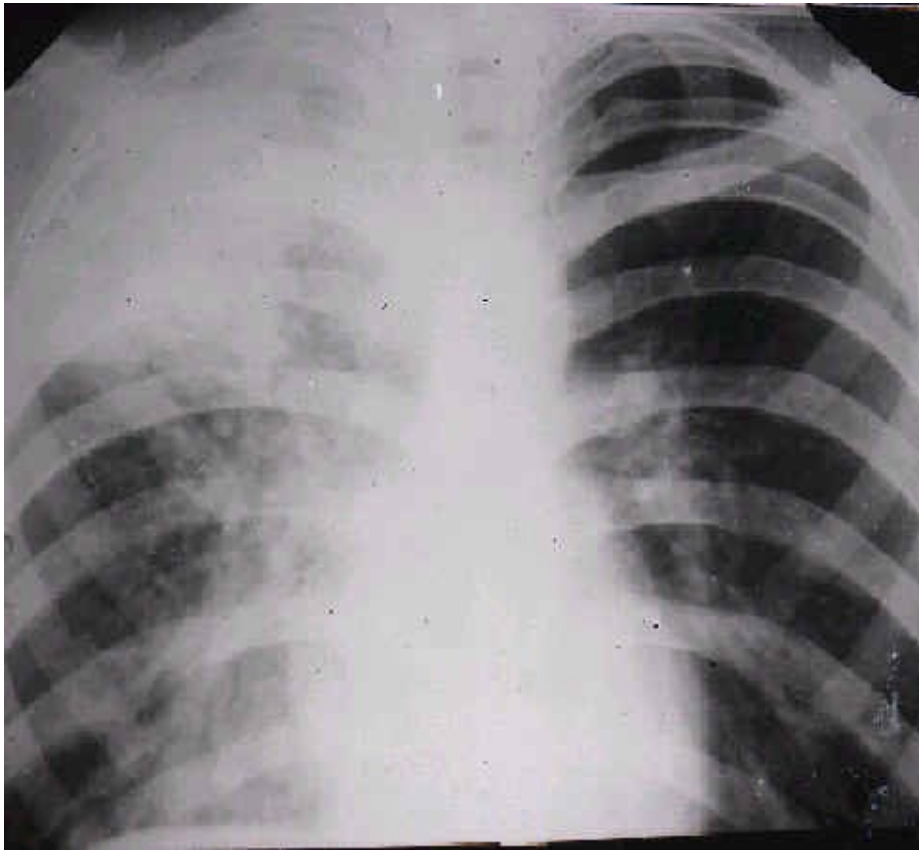
- acute onset in 30% patients, subacute onset in 30% patients, detecting by visiting the doctor; sharp changes in TBC; MBT(+) and CV(+) in >90% of patients



Lobitis

- limited, non-homogenous, weak intensity shadow in upper (78%) or low (22%) lobe (S1-2-3)

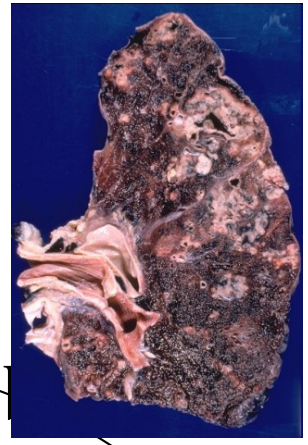
- acute onset in >65% patients, detecting by visiting the doctor; sharp changes in TBC (100%); MBT(+) and CV(+) in >90% of patients



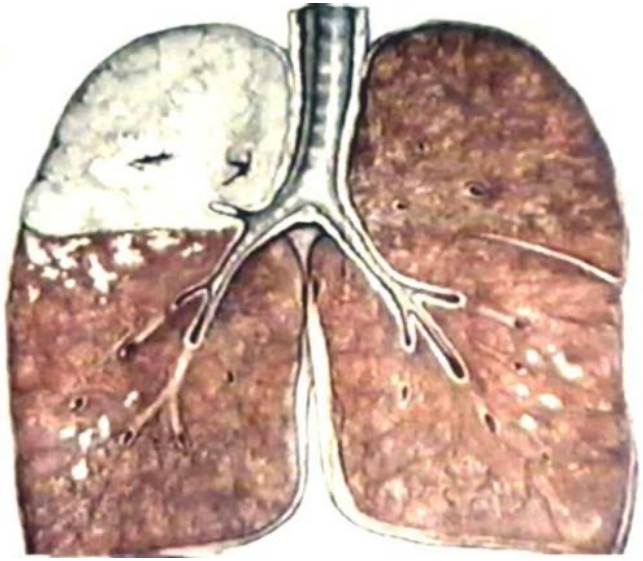
Infiltrative TB
(differential diagnostics)

- Infiltrate TB
  - subacute (asymptomatic) onset
  - detecting by chest X-ray
  - pleurisy (<10%)
  - weak auscultation picture
  - lonely ↑of ESR
  - SSP (60%)
  - Localization in S 1-2-6-8
  - effect from TB chemotherapy (1,5-2 mon.)
- Pneumonia
  - acute onset (ARVI)
  - detecting by symptoms
  - para-pneumon. pleurisy (40-50%)
  - crepitation in Lung
  - ↑of ESR & ↑*of WBC*
  - MBT (-)
  - Localization in S 8-9-10
  - effects from antibiotics

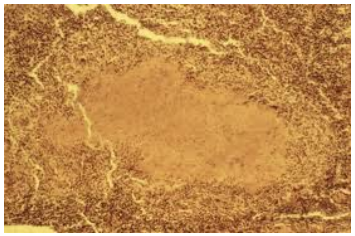
Caseous Pneumonia



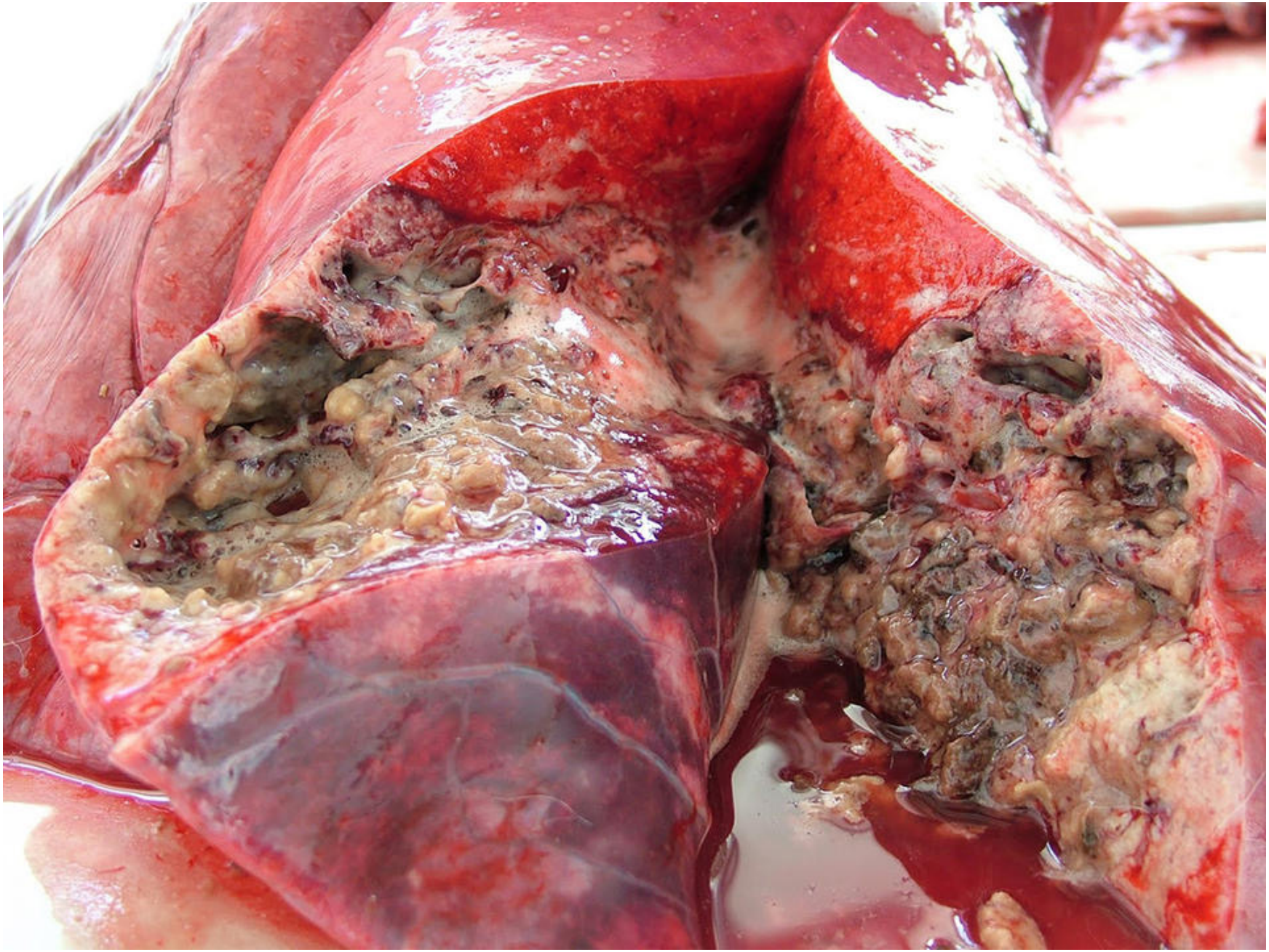
Clinical form of TB, which characterizes by developing of inflammation with domination of caseous necrosis, and caseous foci occupy volume till lobe and more than one lobe



eous Pneumonia = «Galloping consumption»



Caseation (cheesy necrosis)



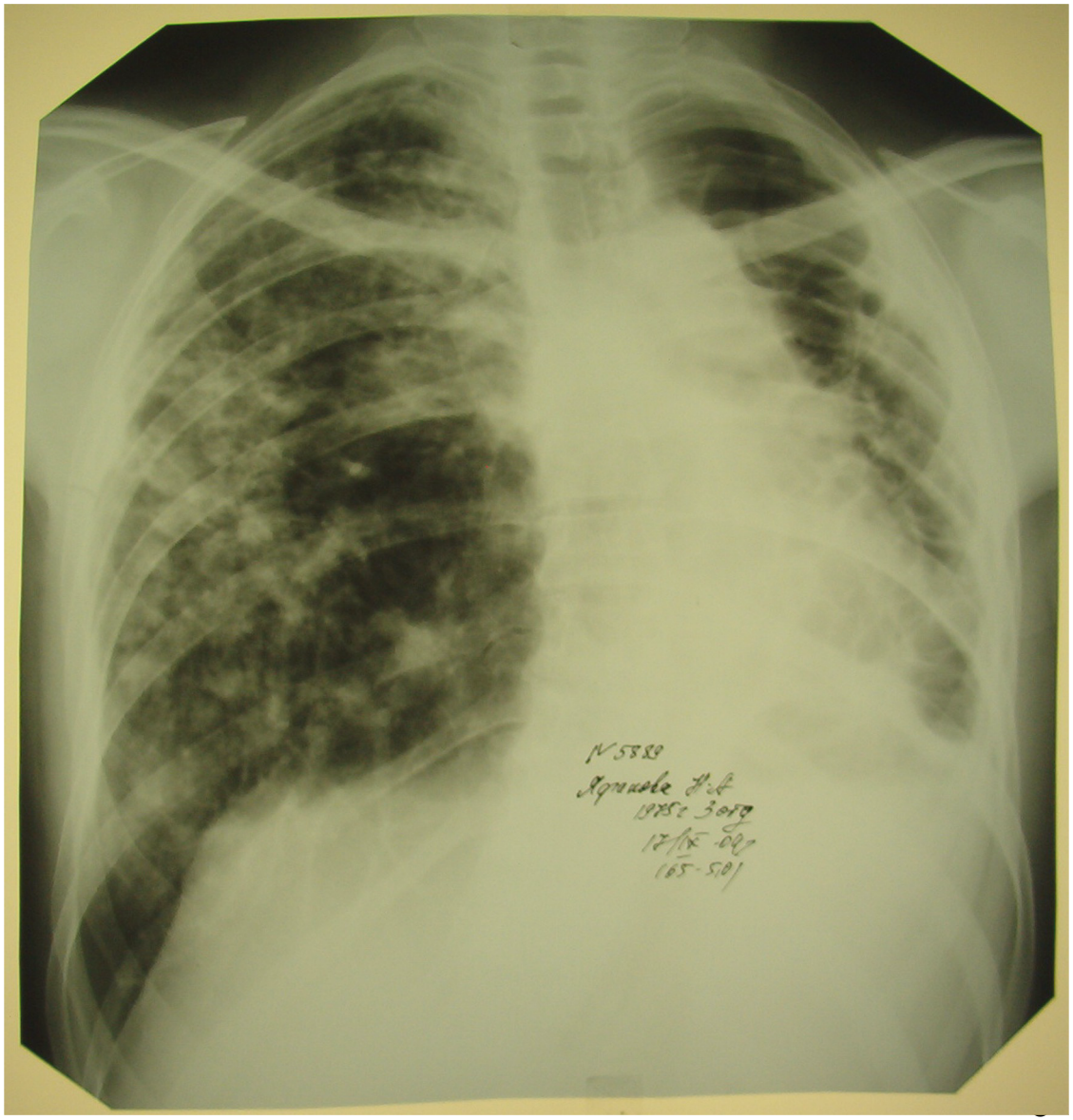
Pat Ya.,1975, was found 3 years before by CXR, but refused to visit TB physician due to pregnancy. This week was admitted to TB Hospital due to acute worsening of general condition. Lost 26 kg of weight for last 6 mo.

D-s: FCT with progression to Caseous pneumonia

- *Symptoms: weakness, dyspnea at rest, hemoptysis, weight loose*

- Blood:
  - ERS= 55 mm/h
  - WBC = 17.700*10^6 /мм^3;
  - Formula: Y/f-11, N-69, E-4, B-0, M-7, Ly-9
- TST – negative

- LFT:
  - Rtot = 0,82 кПа/л/сек
  - TLC = 70,5 % pred
  - RV = 168,0 % pred
  - VC = 32,1 % pred
  - FEV1 = 24,6 % pred
  - FEV1/VC = 65,9%
  - PEF = 20,2 % pred
  - FEF25 = 17,8 % pred
  - FEF50 = 13,8 % pred
  - FEF75 = 14,3 % pred

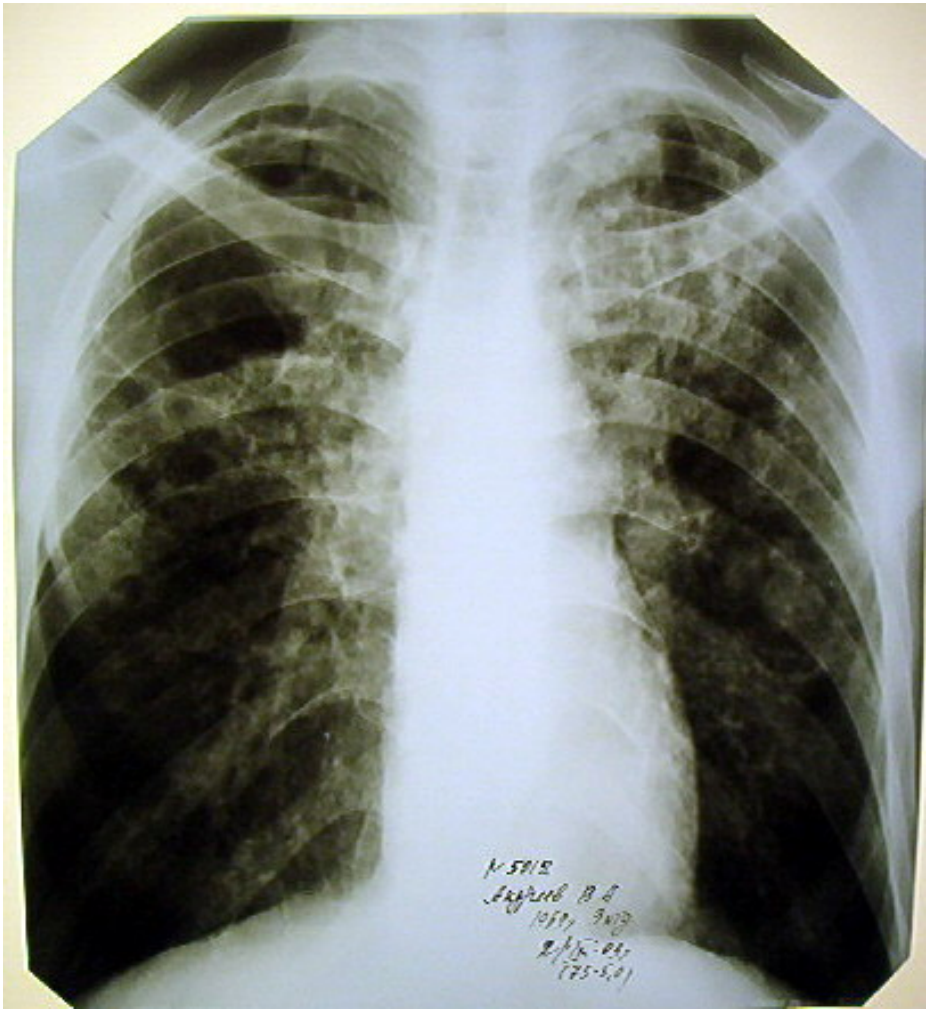


Pat. A., 1969
D-s: Infiltrative TB of both lungs, progression to Caseous pneumonia, MBT(+)

Anamnesis*: was found for the first time 7 mo ago with symptoms of loss of weight, dyspnea, hempoptysis. Dyspnea is present almost 1 year. Didn't passed fluorography for years*

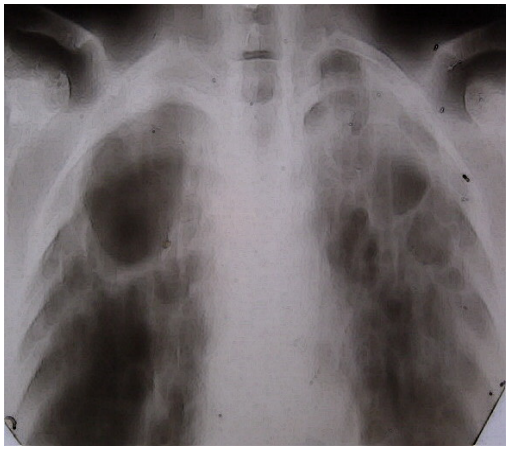
- Blood:
  - ESR=6 мм/h;
  - WBC= 8.500*10^6/мм^3;
  - Formula: Yf-2, N-58, E-6, B-0, M-7, Ly-27

- LFT:
  - Rtot = 0,60 кPa/l/sec
  - TLC = 87,3 % pred
  - RV = 207,3 % pred
  - VC = 46,9 % pred
  - FEV_1 = 32,2 % pred
  - PEF = 21,8 % pred
  - FEF25 = 24,6 % pred
  - FEF50 = 24,4 % pred
  - FEF75 = 21,3 % pred



Caseous Pneumonia

- **Clinical features:**
  - Severe condition, heavy intoxication
  - Severe breathlessness
  - Severe weakness
  - Expectoration a lot of the purulent sputum (>100 ml/day) (patient “expectorates his own lung”)
  - Hemoptysis, lung bleeding
  - Progression of TB process
  - Slow back developing to anti-TB therapy (apneumatosis)



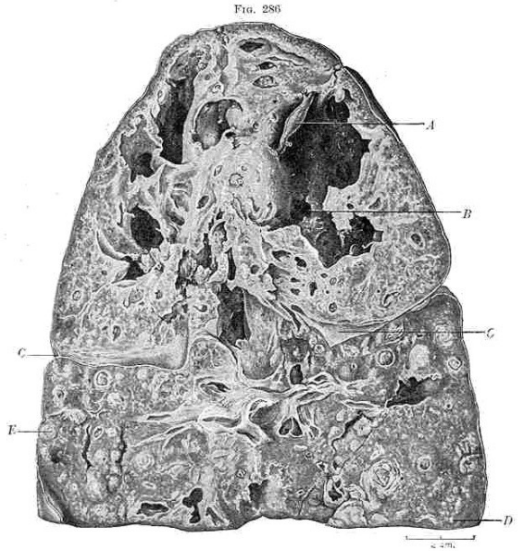
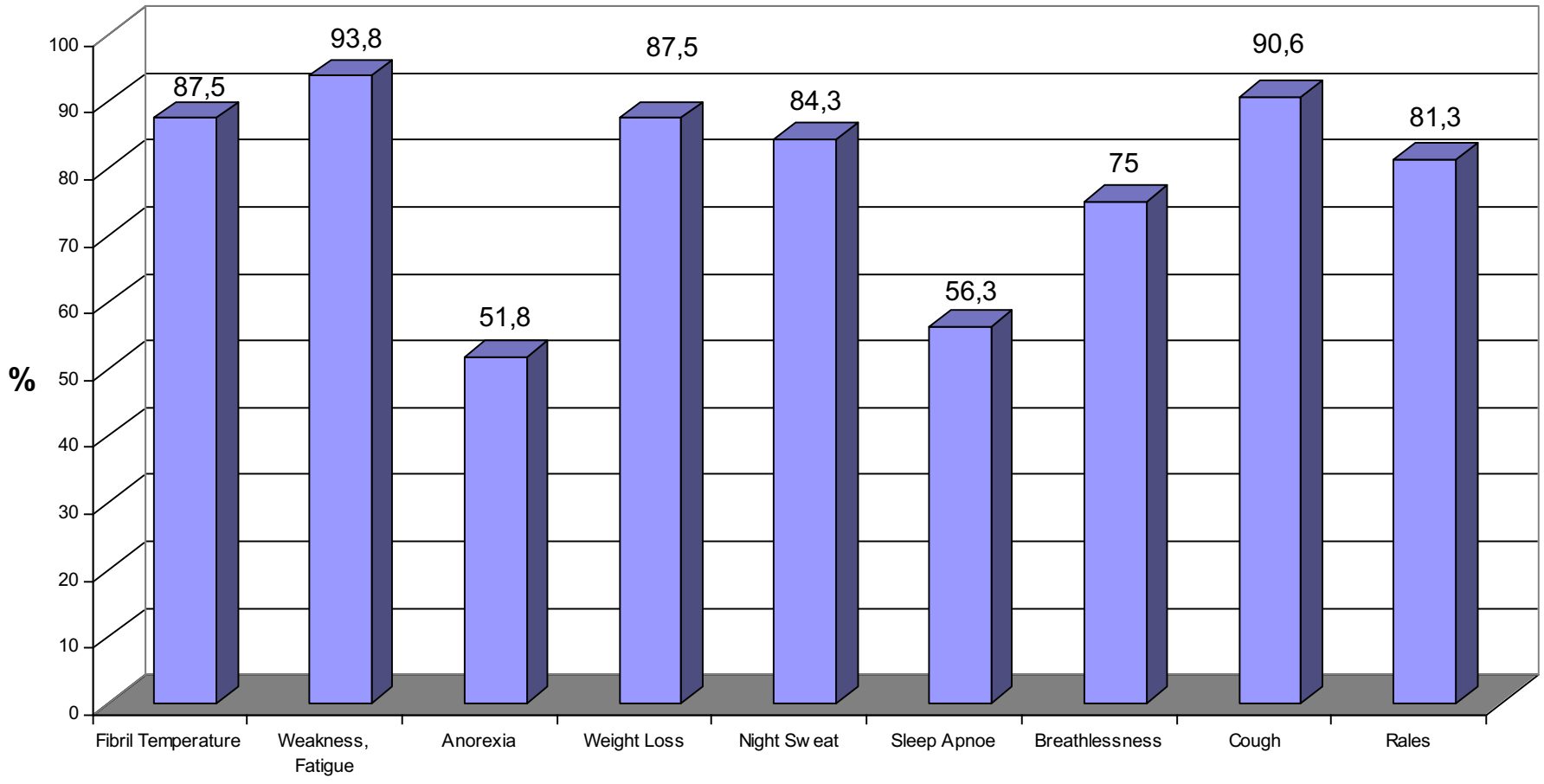


FIG. 286

Left lung, superior lobe, and upper part of lower lobe, the former containing a number of communicating caverns, brought about by tuberculous infiltration, caseation, and evacuation of the contents through the bronchi: *A*, aneurysmal dilatation of an artery spanning one margin of a large cavity; *B*, communication with another cavity; *C*, *C*, thickened and adherent pleura between the two involved lobes. The pleura over both lobes is thickened, and at the autopsy the cavity had been obliterated by universal adhesion; *D*, a small group of tubercles in which caseation is just beginning; *E*, a fused group of tubercles, farther advanced that at *D*. (Hare.)

Caseous Pneumonia

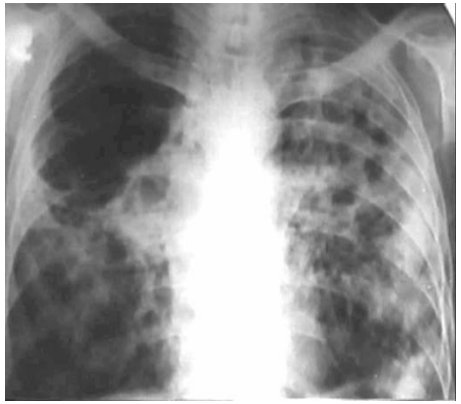
(Symptoms & Signs, % of patients)



Я.В.Лазарева, Г.Б.Соколова, В.А.Корякин, И.П.Соловьева // Consilium Medicum - Т 2, - N 10, - 2000 г

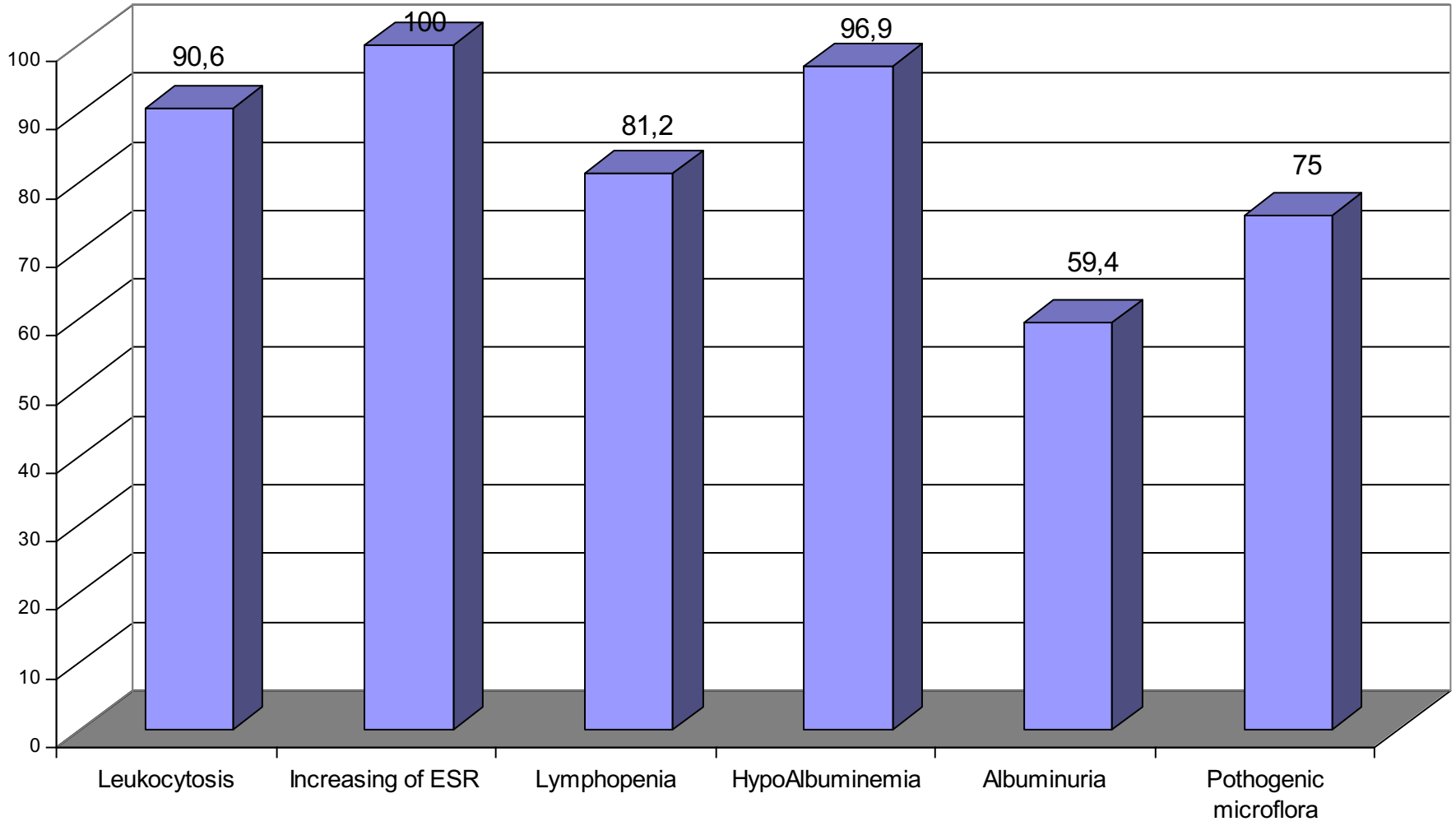
Caseous Pneumonia

- **<u>Features of Anamnesis:</u>**
  - Acute onset, «masks» of pneumonia, ARVI (95%)
  - Detecting by visiting the doctor (98%)
  - asocial persons (without permanent place of living, alcoholism, prisoners)
  - Patients with HIV, Diabetes, COPD, Pregnant and 1 year after birth, ingestion of CS



Caseous Pneumonia

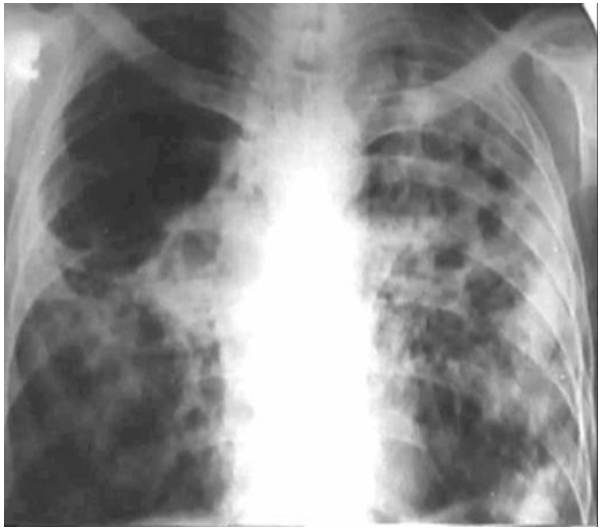
(Laboratory Examination)

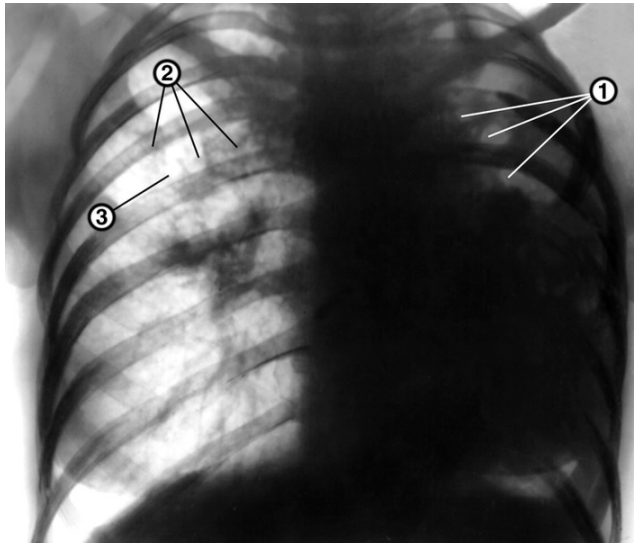


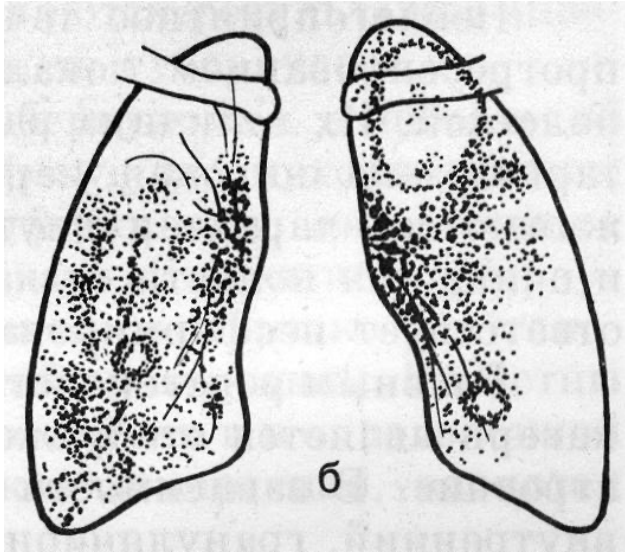
Я.В.Лазарева, Г.Б.Соколова, В.А.Корякин, И.П.Соловьева // Consilium Medicum - Т 2, - N 10, - 2000 г

Caseous Pneumonia

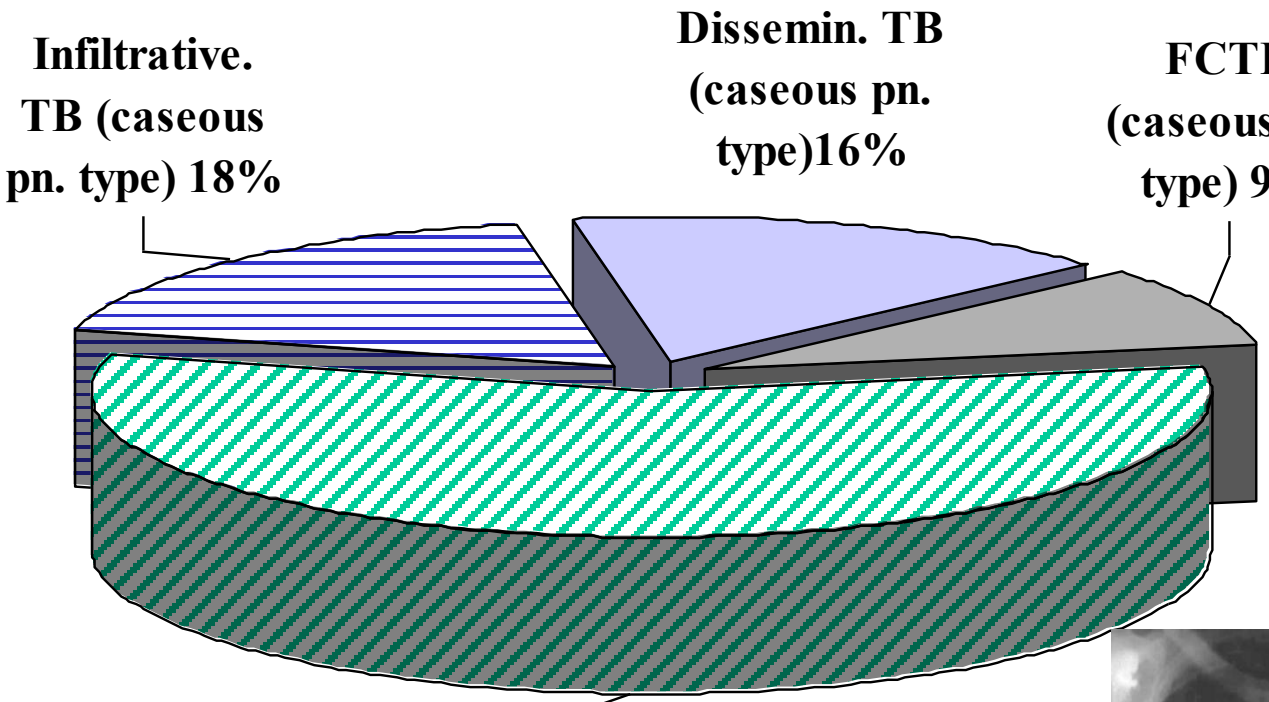
- **<u>Laboratory data:</u>**
  - ESR > 30 мм/h, anemia;
  - Lymphopenia (<1200 Lymp/ml);
  - TST– negative (>85-90%);
  - MBT(+) (>90%);
  - Primary drug resistance of MBT (>90%)

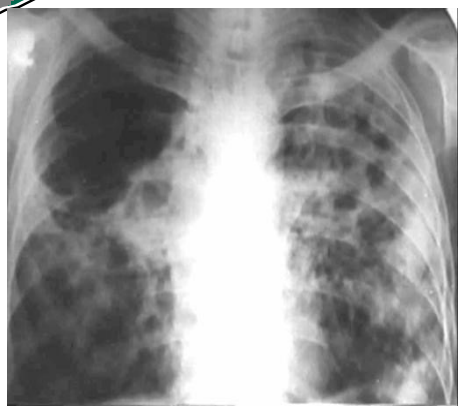






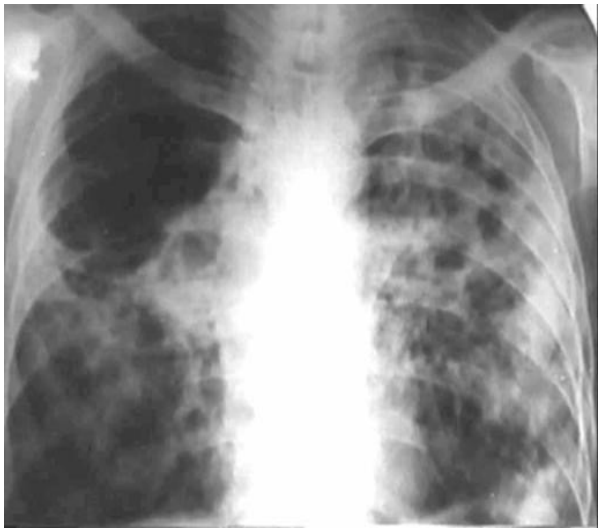
Caseous Pneumonia. Forms

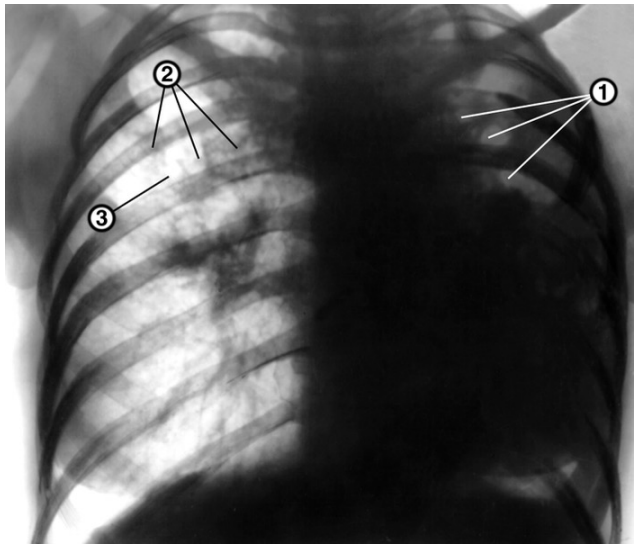


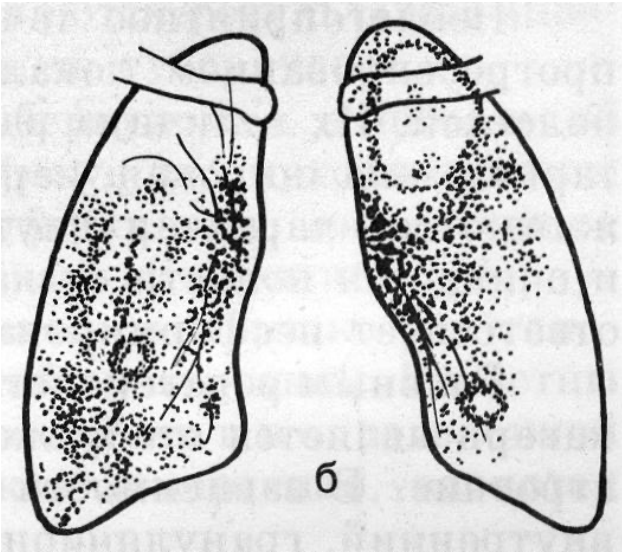


Челнокова О.Г., автореферат к.м.н., «Диагностика и лечение казеозной пневмонии», ЦНИИТ, 2001, данные по г.Ярославль,1992-2000 г.г.

Caseous Pneumonia

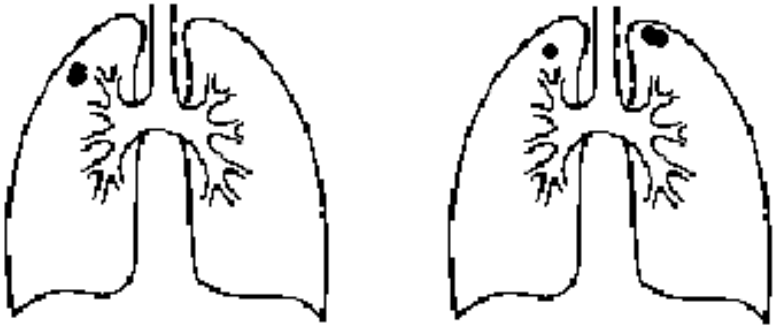


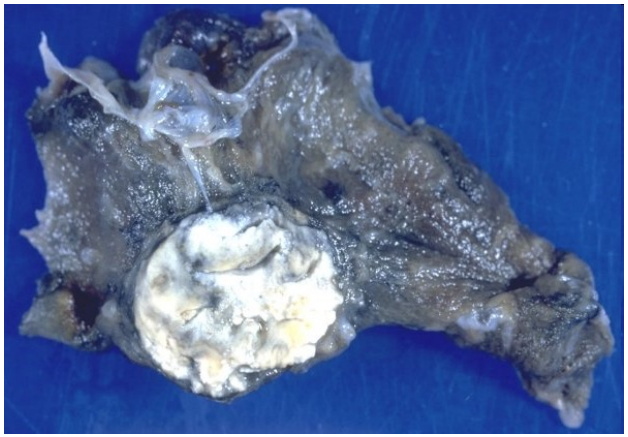




- **<u>Chest X-ray features:</u>**
  - one- or two-sides localization;
  - big Foci united to Infiltrate (limited or diffuse shadow, non-homogeneous)
  - ***Giant Caverns > 5 cm. or system of small caverns***
  - ***apneumatosis*** (displacement of mediastinum)

Tuberculomas of Lung

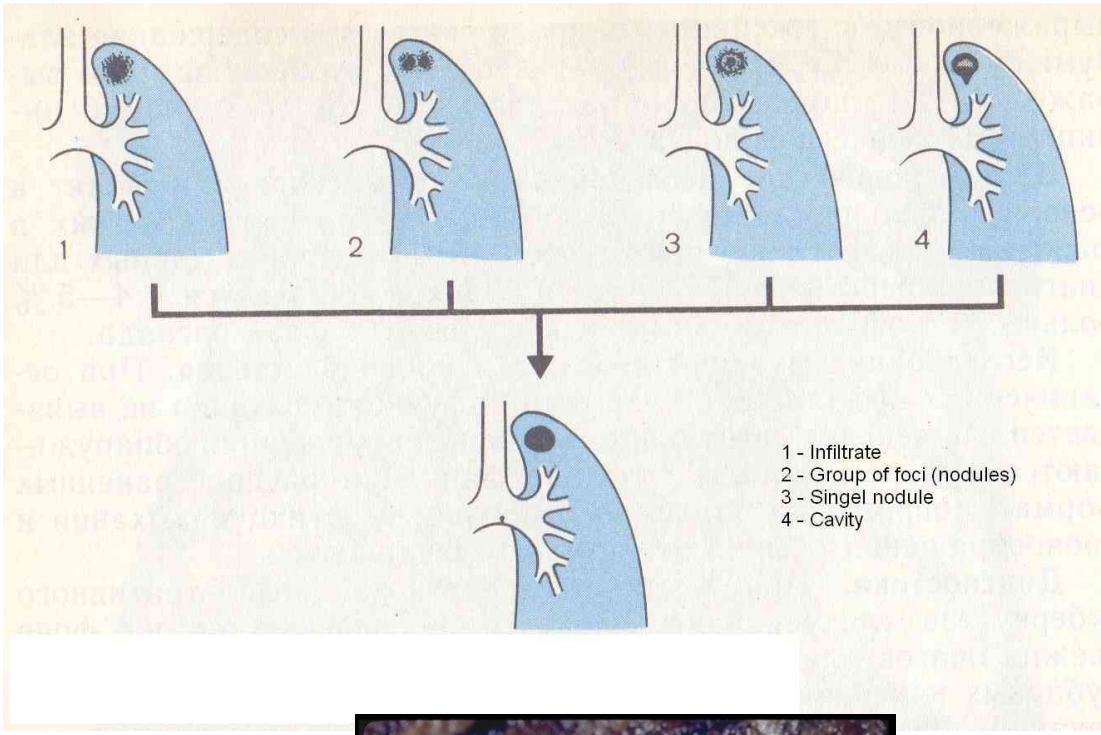


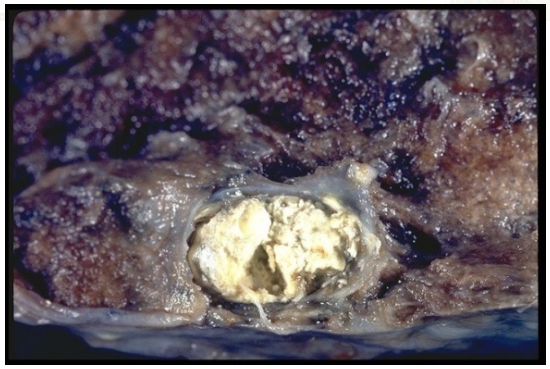


Different, according to their genesis, mass with size>1cm., limited by thin fibrous capsule, with chronic and good-quality course

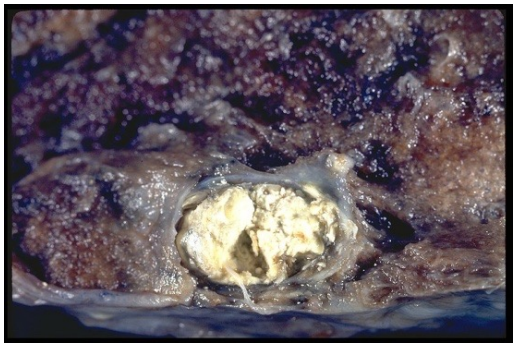
Pathogenesis

- Outcome (residual changes) of Infiltrative TB (Round shape Infiltrate)
- Growth of focus
- Exacerbation of group of foci
- Filling of Cavity by caseous mass and lymph due to occlusion of drainage bronchus



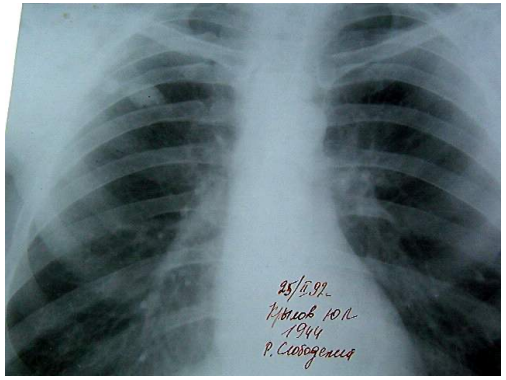


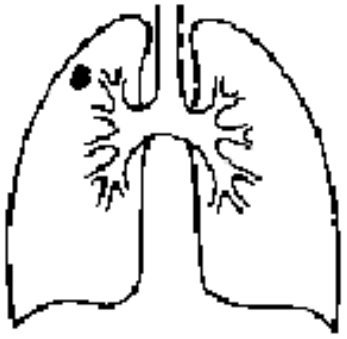
Tuberculomas

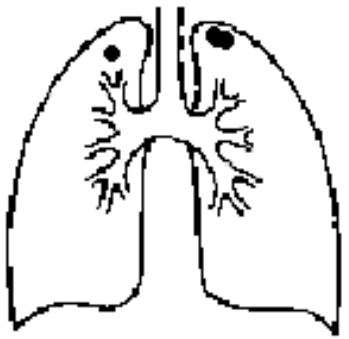


Features :

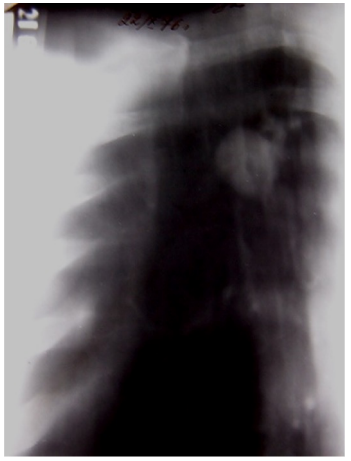
- *asymptomatic clinical course*
- *detecting by Fluorography*
- *domination of productive-proliferation type of inflammation*
- *low frequency of lung distruction*
- *high ability to self-healing*
- *low frequency of sputum smear positive patients (<10-15%)*







Tuberculomas



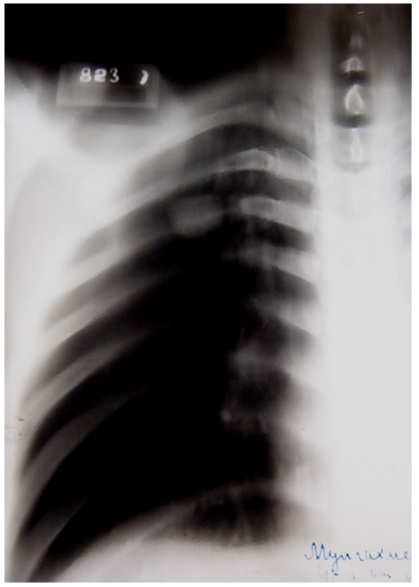
- **<u>Classification according to Pathogenesis:</u>**
  - Caseomes (true Tuberculomes)
  - Infiltrative-pneumonic Tuberculomas
  - False-tuberculomes (filled Cavern)

- **<u>Classification according to Morphology:</u>**
  - solitary (single, multiple)
  - conglomerated

Tuberculomas

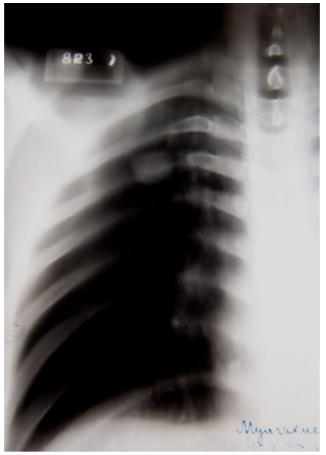
- **Classification according to Clinical course:**
  - stable (without clinics)
  - progressive (intoxication syndrome, growth)
  - regressive (decreasing in size)

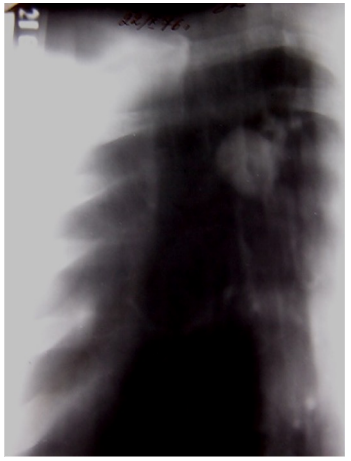
- **Classification according to size:**
  - small (1-2 cm.);
  - average (2-4 cm.);
  - big (>4 cm.)



Tuberculomas

- **<u>Signs of progression</u>**
  - clinical (hemoptysis, intoxication, productive cough)
  - SSP; changes in blood
  - Chest X-ray: non-precise contours, extended with non-precise contours path to root of lung, cavity, growth, size > 4 cm.



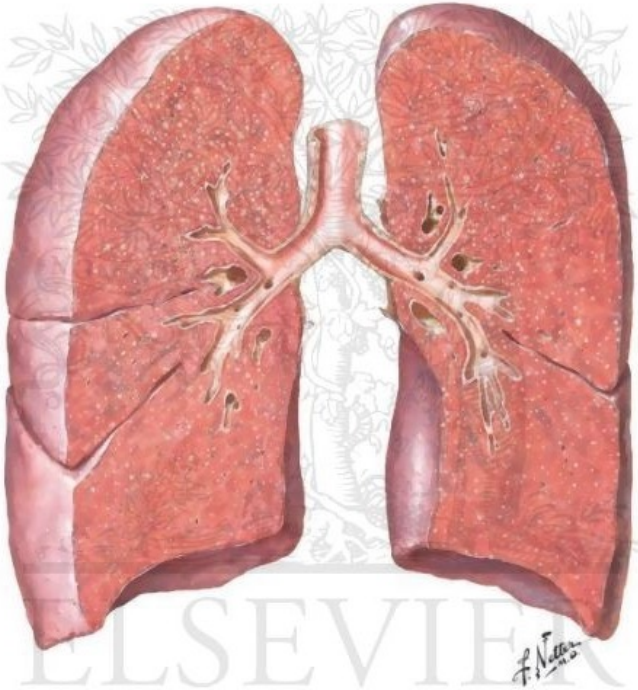


Tuberculomas (differential diagnostics)

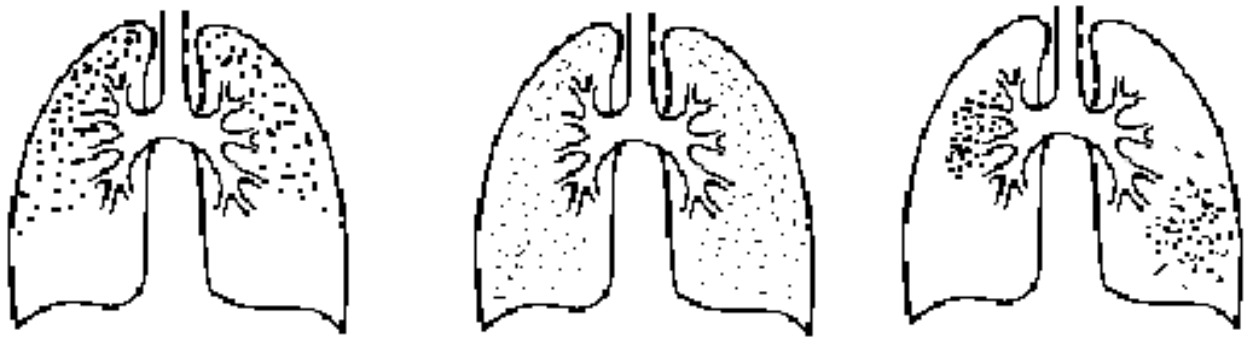
- Tuberculomas
  - *Age 20-50 yrs*
  - *no relation with smoking*
  - *localization in S 1-2-6*
  - *changed background (foci)*
  - *destruction at proximal pole*
  - *absence of growth*
  - *SSP at progression*
  - *TB granuloma (bronchoscope, Open Lung Biopsy)*

- Peripheral Cancer of Lung
  - *age > 40 yrs,*
  - *smoking > 10 yrs*
  - *localization in S 3 (60%)*
  - *intact background*
  - *polygonal contour*
  - *destruction at distal pole*
  - *growth; size of 2 см. after > 2 yrs*
  - *atypical cells (bronchoscope, Open Lung Biopsy)*

Disseminated TB

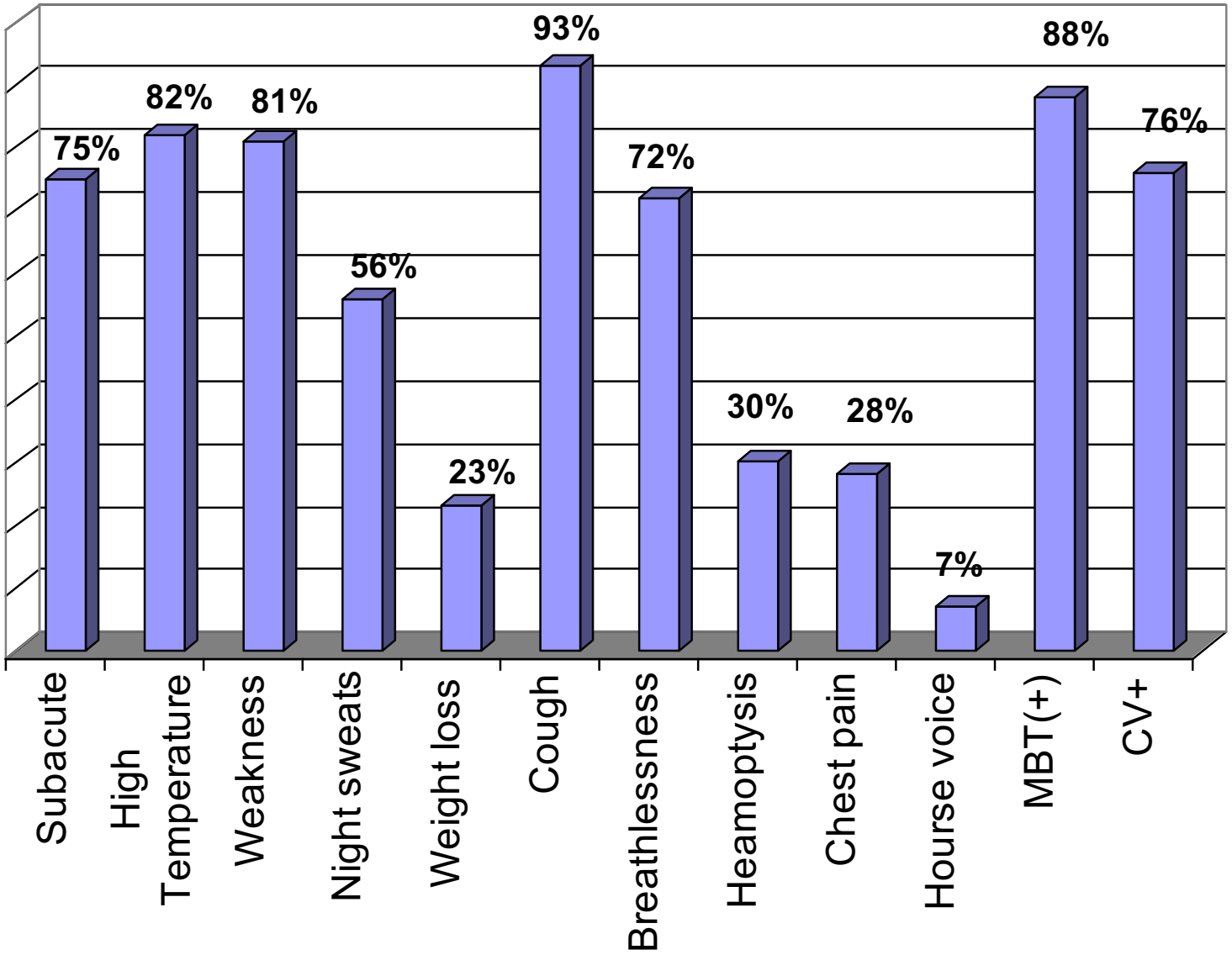


Clinical form of TB, for which dissemination on Chest X-ray is typical. Covers different processes with dissemination throw the hematogenic, bronchogenic and lymphogenic ways



Disseminated TB

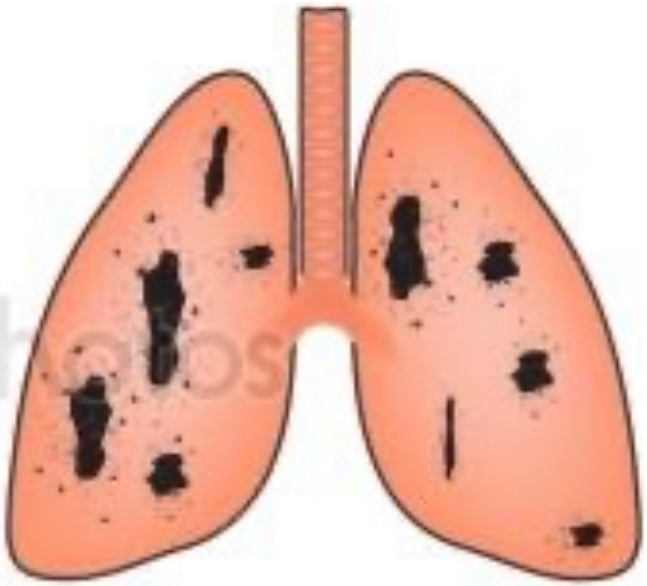
(symptoms & signs (%))



Н.В.Кузьмина, В.Г.Макеева, В.Ю.Мишин // Пульмонология, 2004,№3

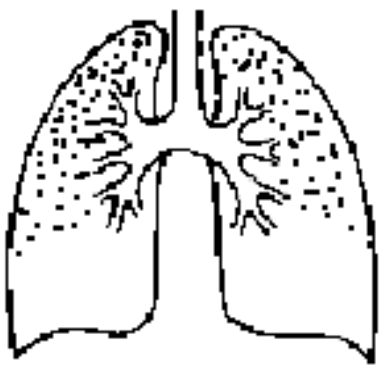
TYPES OF TUBERCULOSIS

Miliary tuberculosis light

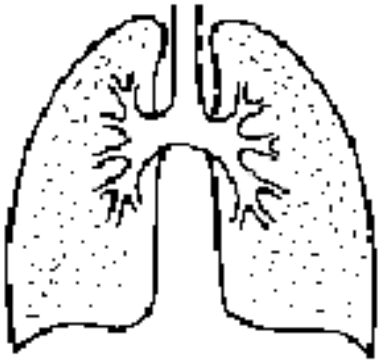


Disseminated lung tuberculosis

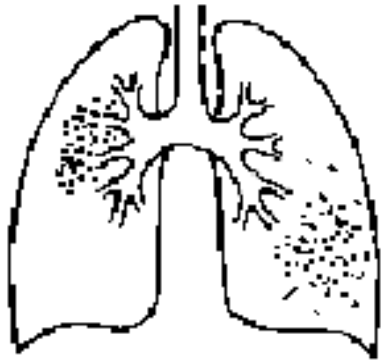
Classification
Final location of nodules



Hematogenic
-symmetric
-both side
-apexes



Hematogenic
-symmetric
-both side
-all parts

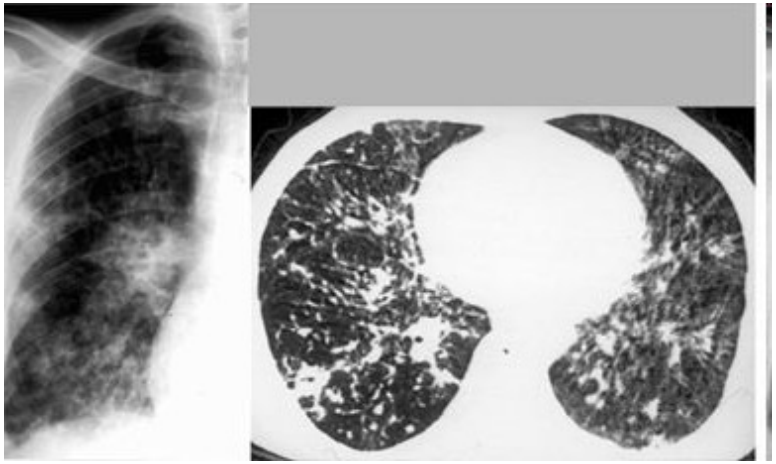


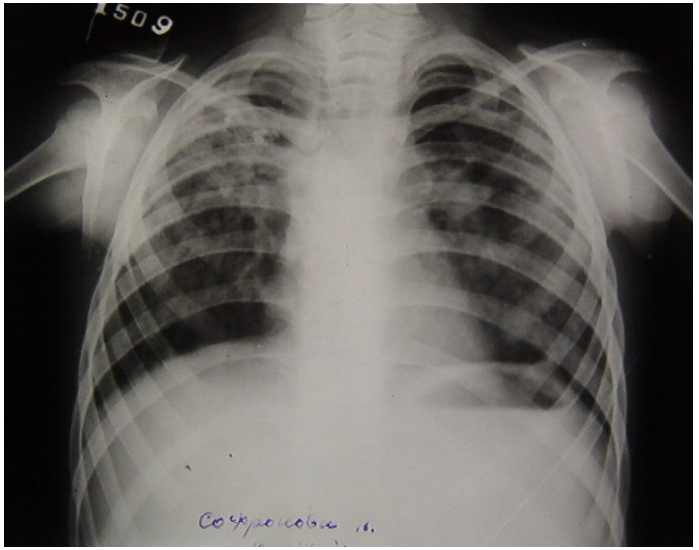
Bronchogenic
Lymphogenic
-one side
-assymetric
-middle, low level

Disseminated TB

Classification according to Clinics:

- ***acute***
  - *respiratory form, typhoid form, meningeal form*
- ***subacute***
- ***chronic***

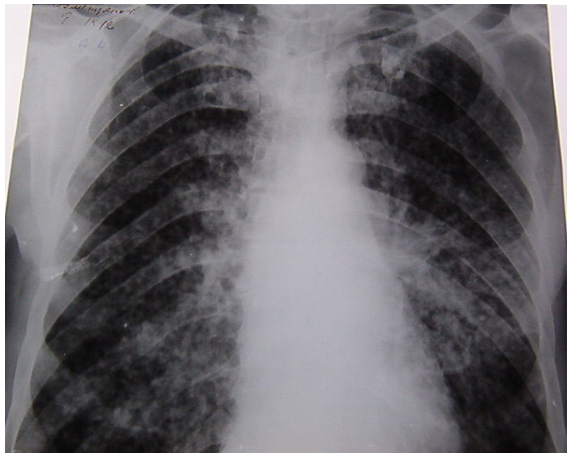




Disseminated TB

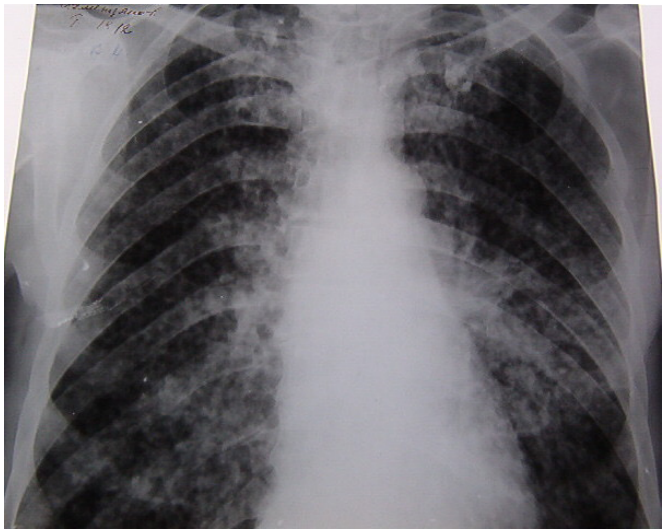
Features in whole:

- Domination of exudation and caseous necrosis
- Gradual onset – 75%, asymptomatic – 15%, acute – 10%
- Ways of detecting: by visiting the doctor – 50%, by chest X-ray – 50%
- High ability to form the cavity *(60-70% CV+)*;
- High ability to progression (growth, cavity forming, dissemination to intact parts of lung);
- Sputum smear positive >60% patients;
- High reversibility of changes in lungs to anti-TB treatment



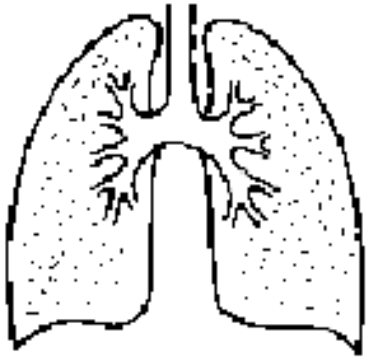
Disseminated TB

(hematogenic)



Acute Miliary:

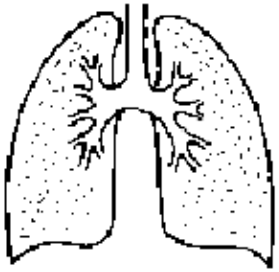
- **Foci 1-2 mm *(capillaries)* in all fields of lungs, two sides, most density in Upper segments**
- **Clinical forms:**
  - Pulmonary (similar to ARVI, pneumonia, dyspnea)
  - Typhoid (intoxication, Infringement of consciousness)
  - Meningeal (meningeal syndrome)



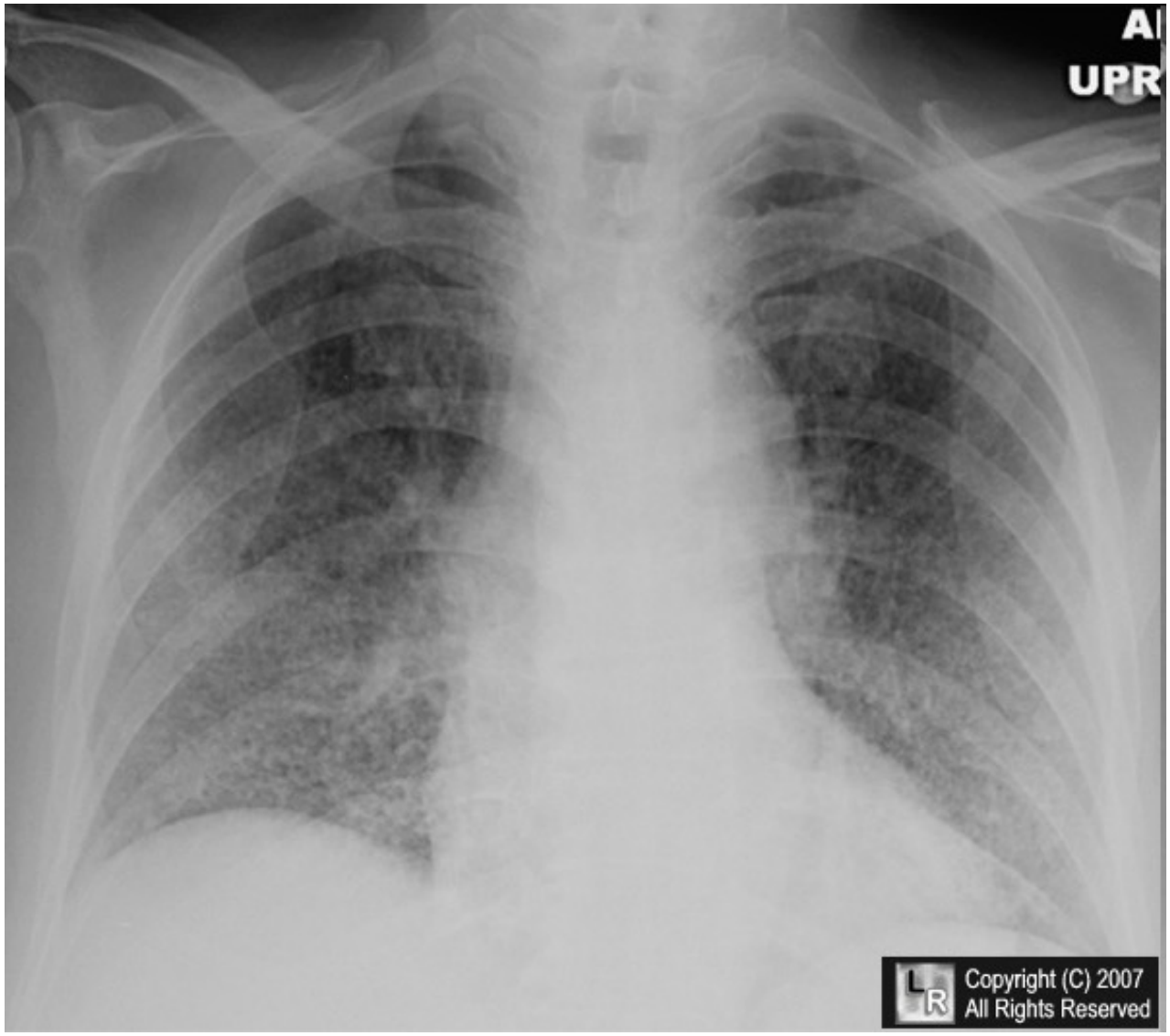
Miliary TB

- **Clinical forms:**
  - **Respiratory** (symptoms of flu, pneumonia, dyspnea)
  - **Typhoid** (severe intoxication, impaired consciousness)
  - **Meningeal** (incubation period, stage of clinical manifestation, stage of cranial nerves disturbance, headache, vomiting, stiff neck, Kernig symptom, Brudsinsky symptom)

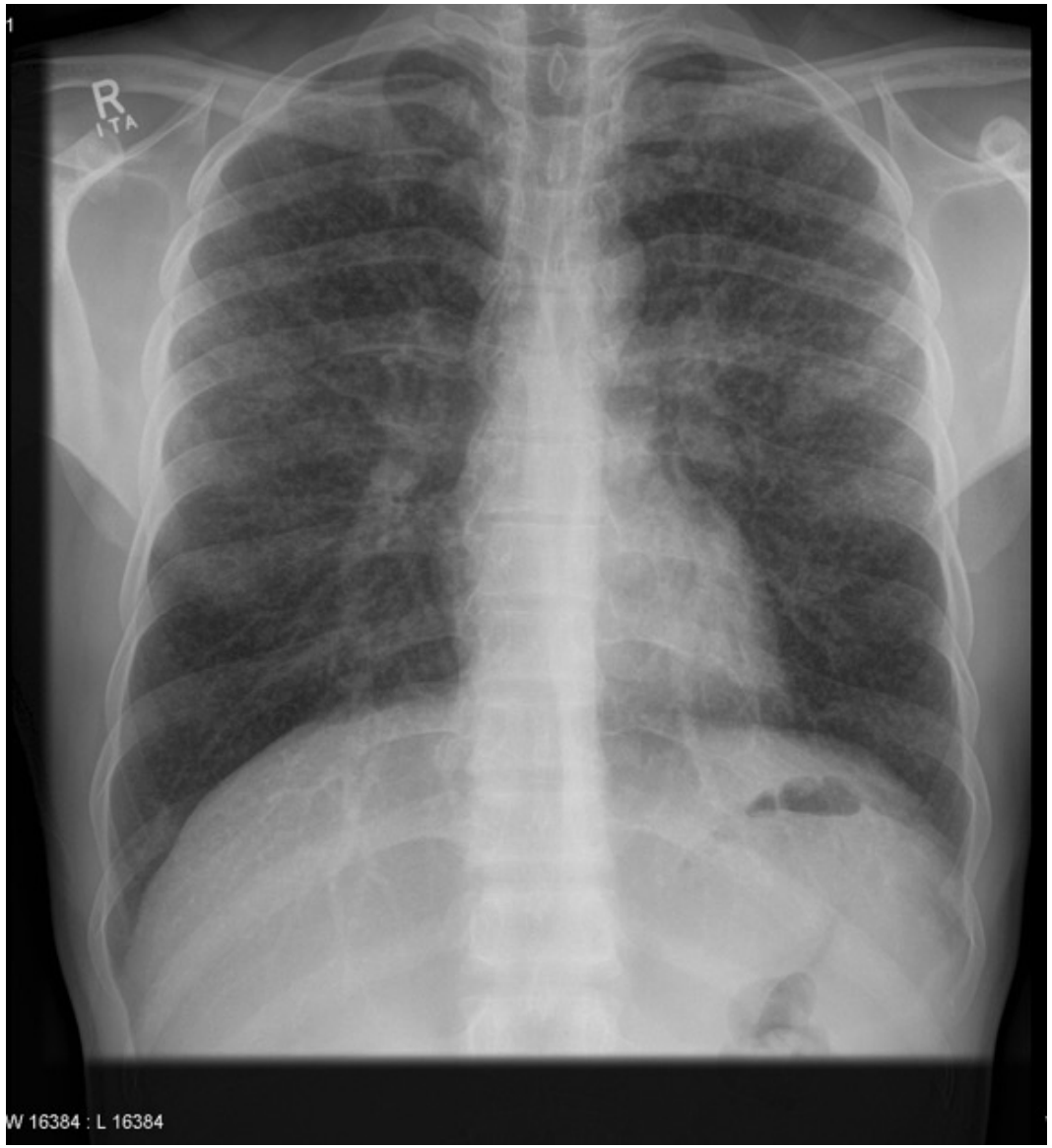
- **Acute onset**
  - The height of the disease in 3-5 days
  - Appearance of dissemination on CXR in 7-10 day
  - Hyperthermia, severe intoxication
  - dyspnea, acrocyanosis, impaired consciousness (stupor, coma)

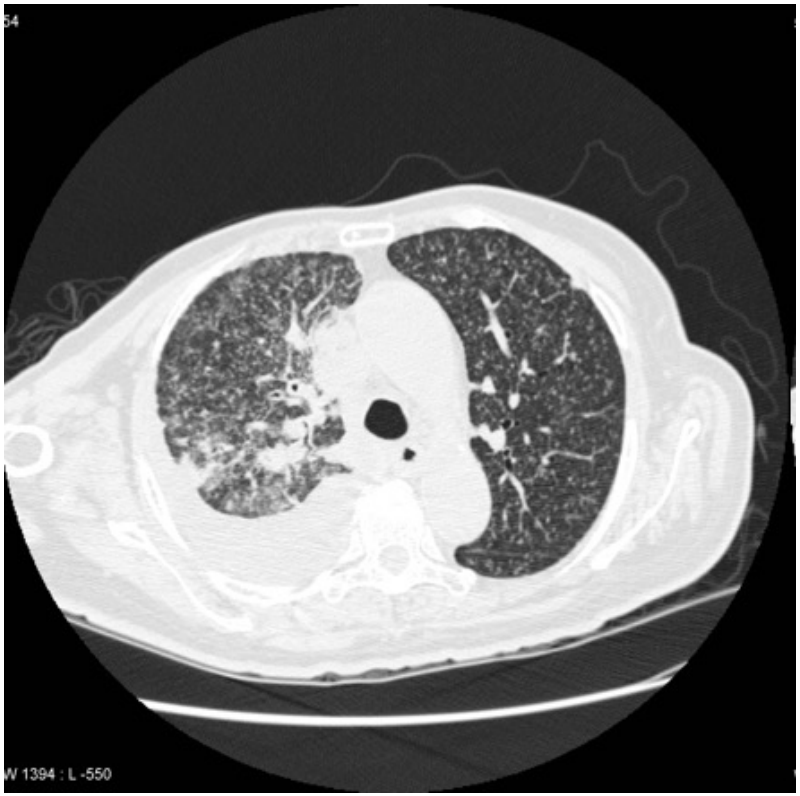


Miliary TB



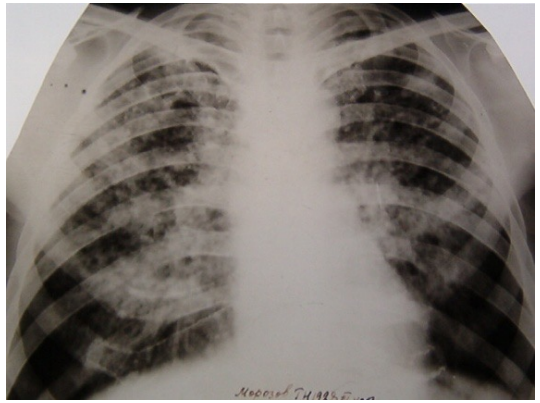
Miliary TB





Disseminated TB

(hematogenic)

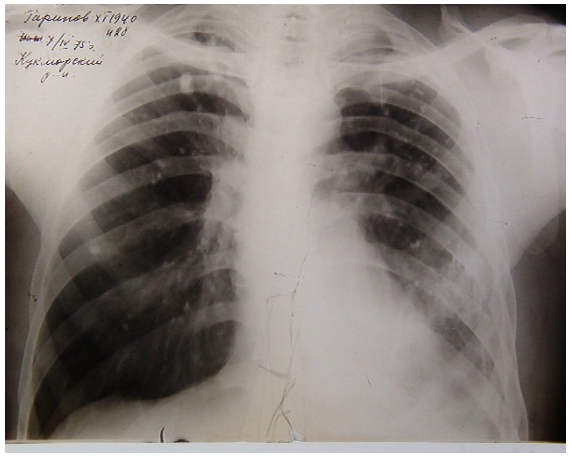


Subacute form:

- Foci 3-4 mm. (venule)
- Subacute onset
- Weak clinics (cough, night sweats, breathlessness)
- detecting: 50% by visiting the doctor, 50% by Chest X-ray

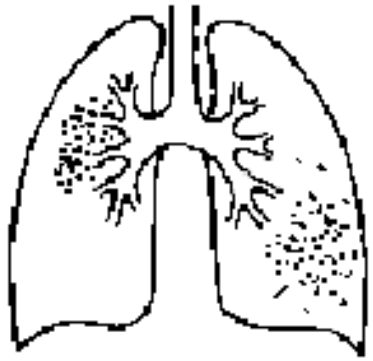
Chronic form:

- tidal course (exacerbation, remission)
- Ro: poli-morphism of foci
  (different size, intensity)



Disseminated TB

(bronchogenic)



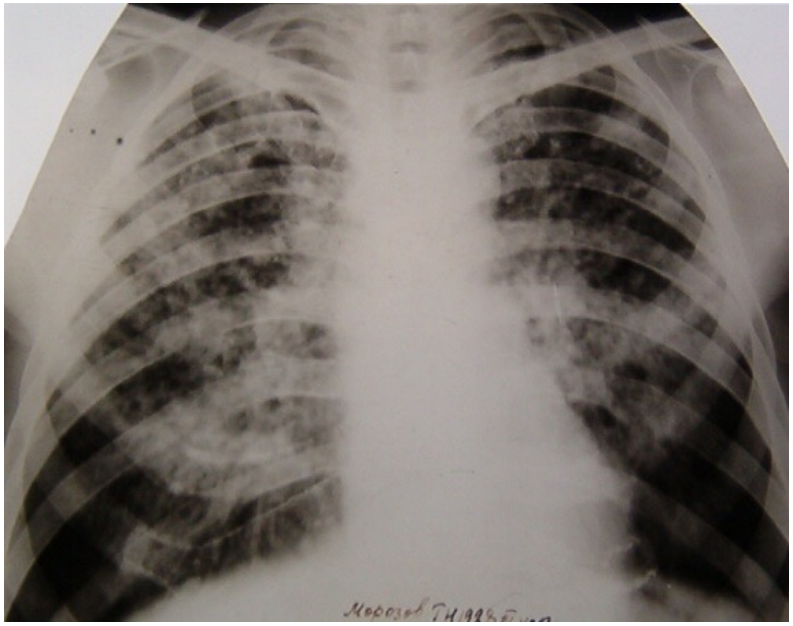
Features:

- **source of dissemination doesn't relates to Lungs (CV-), but relates to bronchial tree**
- **TB of Bronchus (cough, SSP, bronchoscope)**
- **Ro: one side, non-symmetric dissemination usually in middle and low lobe**
- **subacute course, weak clinics**

Subacute Disseminated TB

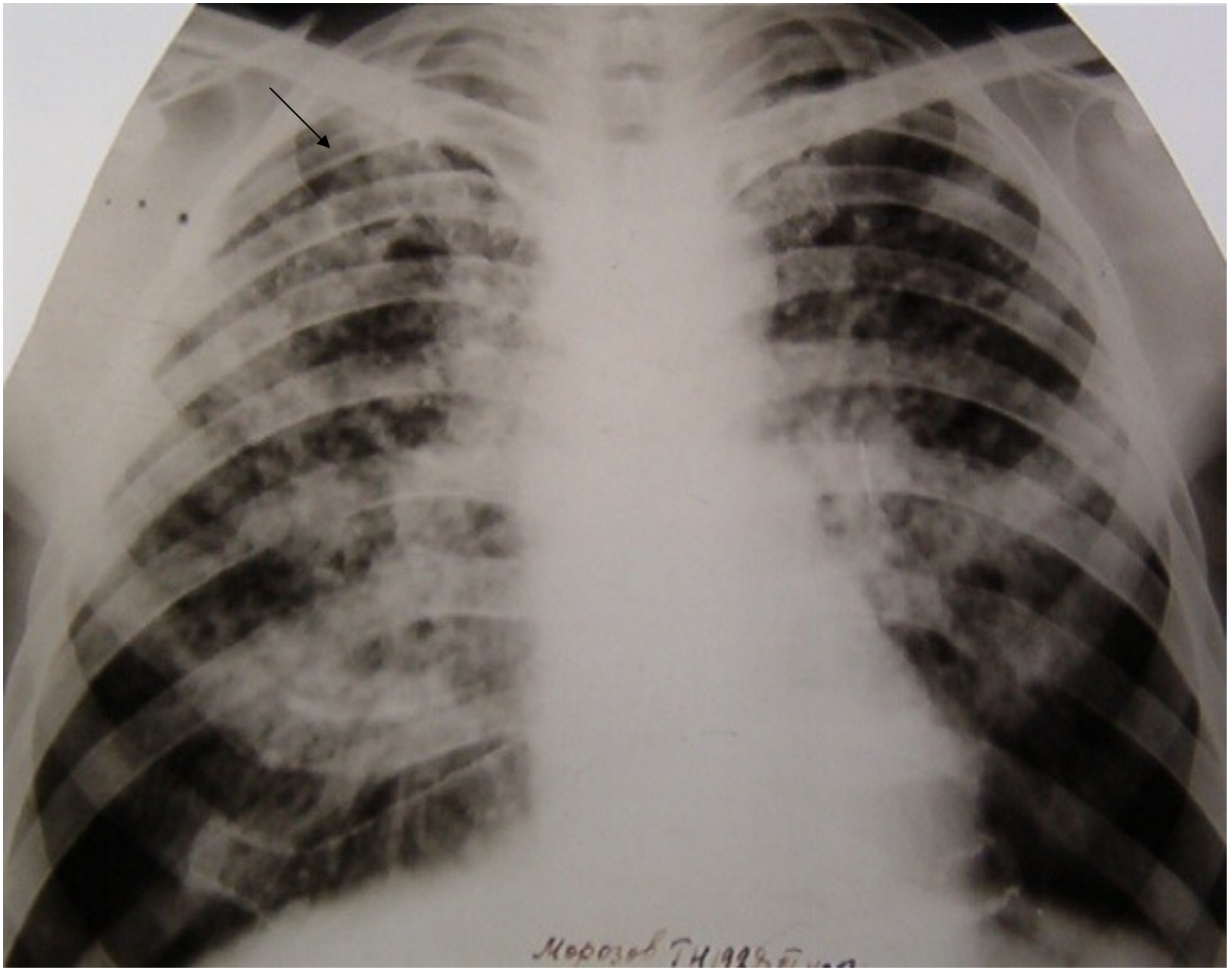
Clinics:

- Gradual onset (75%)
- Satisfactory condition
- Night sweats, loss of weight
- Changes in voice
- Febrile temperature
- Hemoptysis, dyspnea



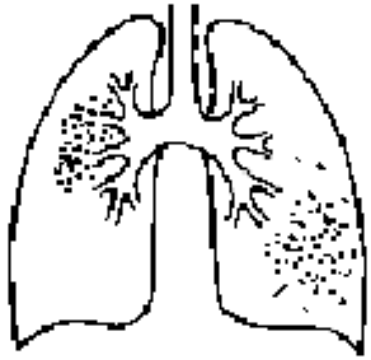
CXR:

- Nodules mean (5-7 mm) or big (8-10 мм)
- «Snow storm» - “flaky” dissemination
- Localization – upper & middle level
- Stamped caverns
- Fusion of nodules to infiltrate



Disseminated TB

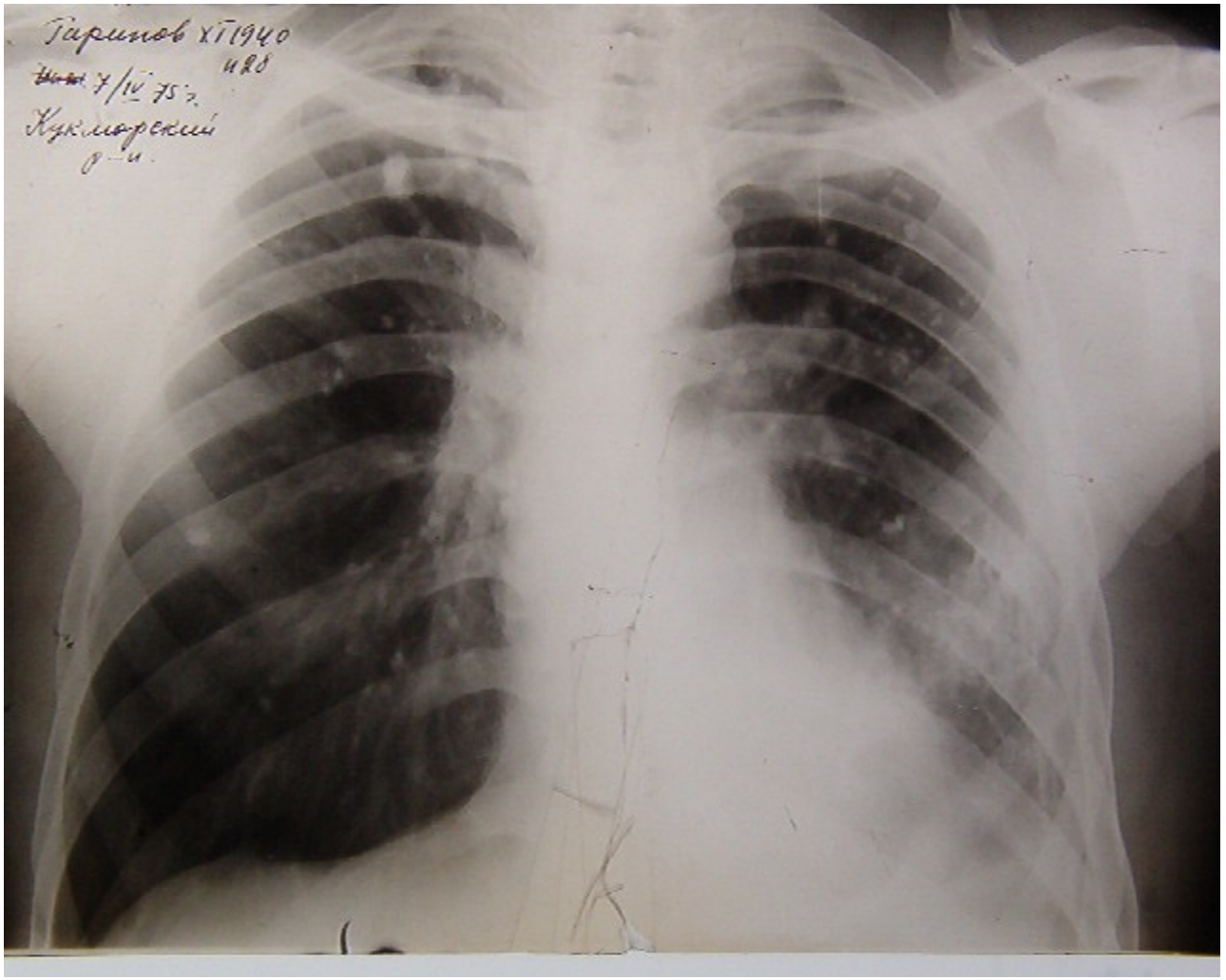
(lymphogenic)



Features:

- **related to deep (peribronchial) or superficial (visceral pleura) lymphatic system**
- **gradual onset, weak clinics**
- **Ro: one side dissemination, non-symmetric in middle or low lobe (subcortical or near hilar)**

Chronic disseminated TB



polymorphism, calcification

Disseminated TB

(differential diagnostics)

Most wide spread diseases :

- **Pneumonia**
- **Canceromatosis of lung**
- **Alveolitis (ILF, EAA, ETA)**
- **Sarcoidosis**
- **Pneumoconiosis (Silicosis)**
- **Diffuse congenital lung diseases**