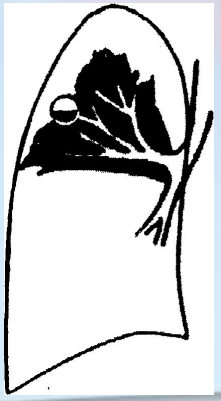
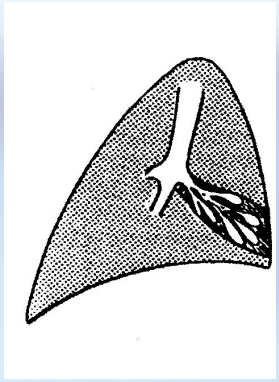
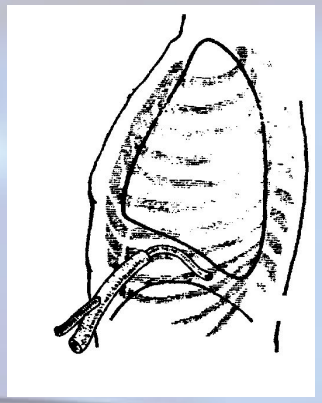
Purulent diseases of lung and pleuras







Professor Youry Vladimirovitch Plotnicov

Classification: on

I. Pathogenesis

II. Character of pathological process

III. Condition gravity

IV. Complications

I. Pathogenesis

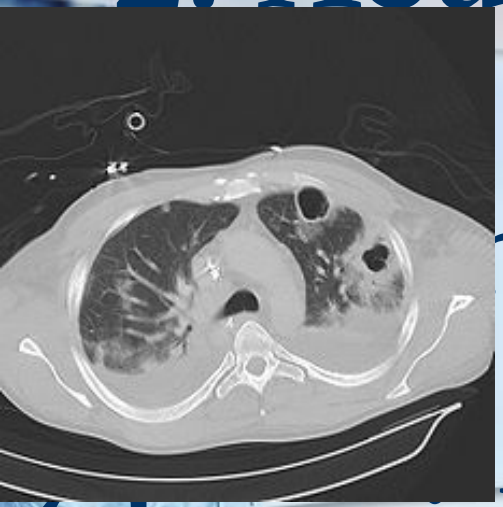
1. Bronchogenic (in-cluding aspirational and obturatio- nal)

2. Hematogenic (including embolic)

3. Posttraumatic

II. Pathological process character (abscess and gangrene only)

1. Acute purulent abscess
2. Acute gangrenouse (the limited ne)



3. Lung gangrene (the widespread gangrene)
4. Chronic abscess

III. Condition gravity

easy

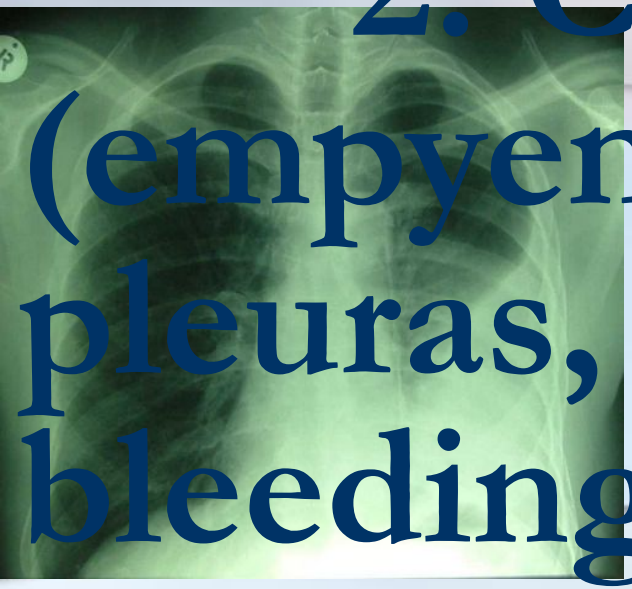
middle

heavy

IV. Complications

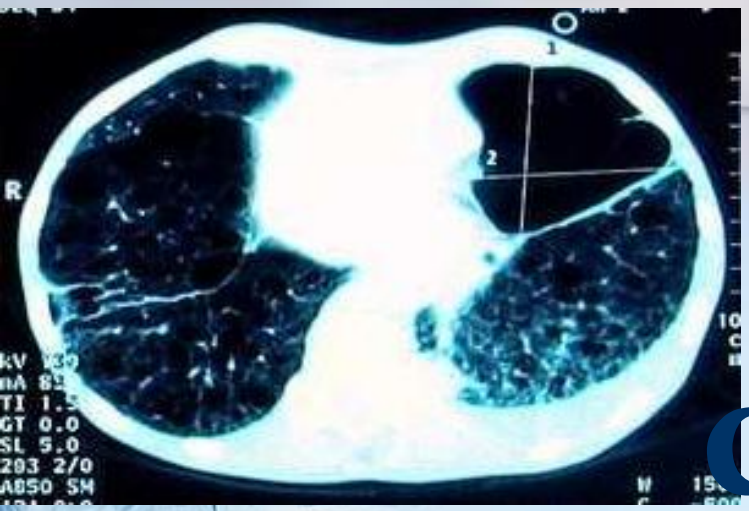
1. Not complicated

2. Complicated (empyema of pleuras, pulmo- nary bleeding, a sepsis, an opposite lung pneumonia etc.)



lung abscess classification

Pathogenesis



Localization

Patient condition gravity

Clinical current

Complications

pathogenesis

postpneumonic

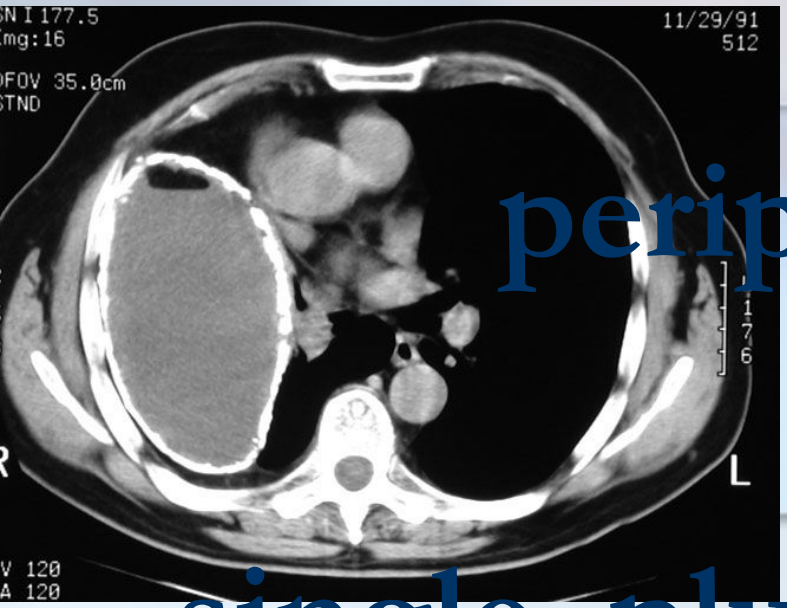
aspirational

hematogenic-embolic

traumatic

localization

segment, lobe, lung



peripheral, central

single, plural, bilateral

Condition gravity

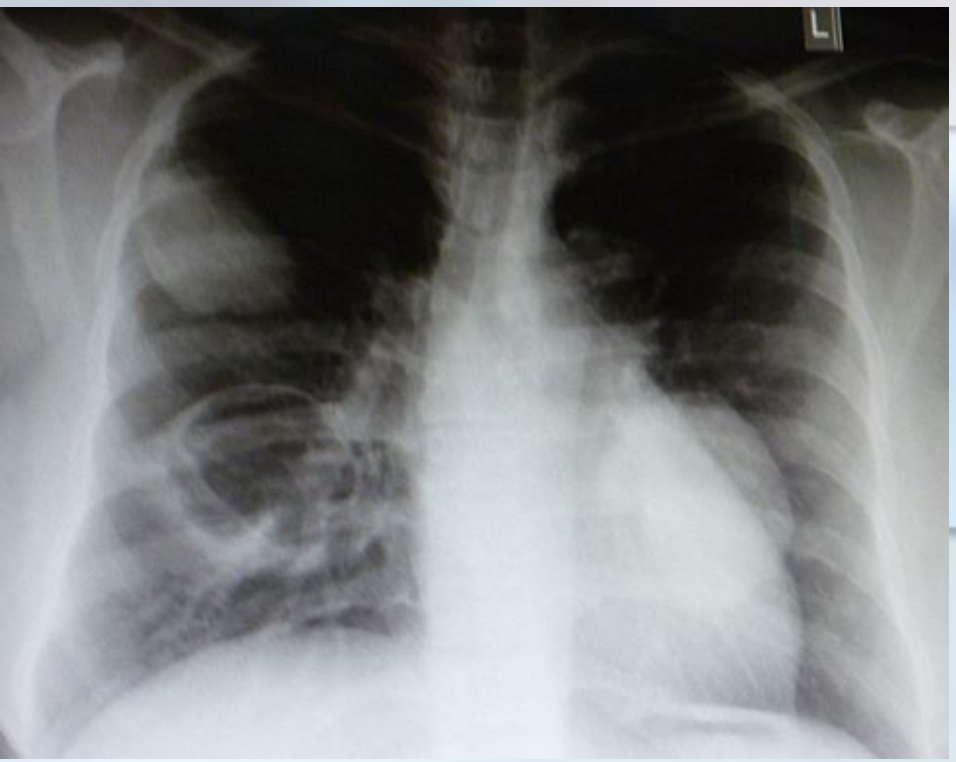
easy

middle

heavy

clinical current

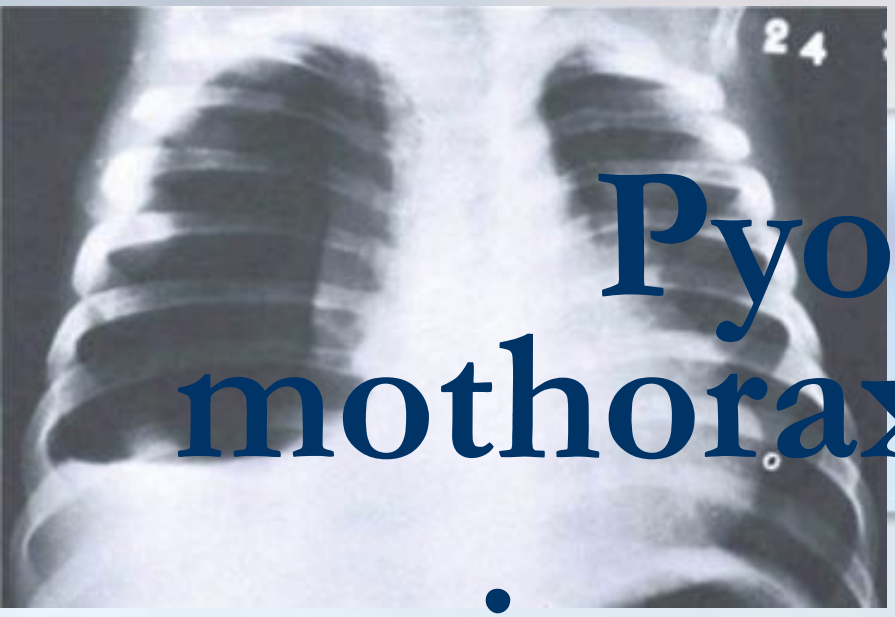
blocked, draining



acute, chronic

complications

Bleeding

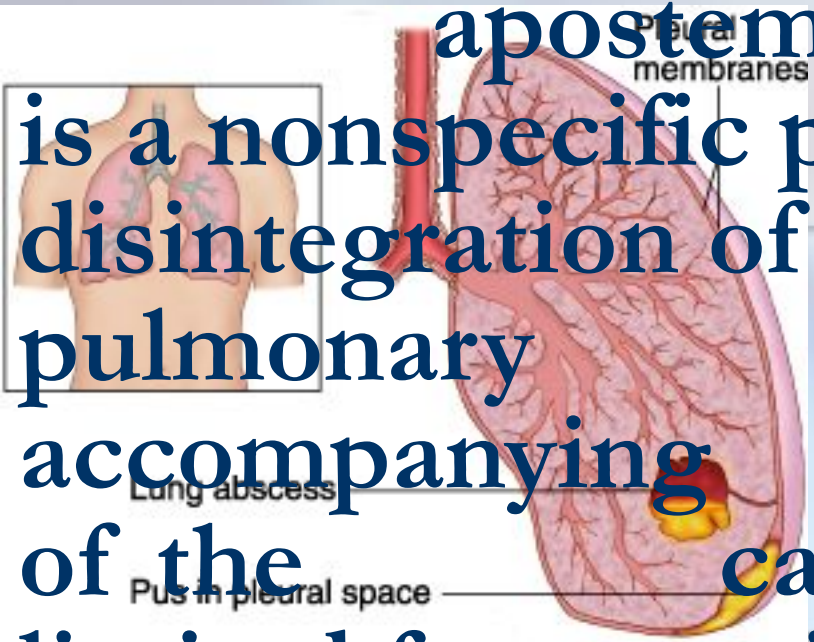


Pyopneu-
mothorax

sepsis

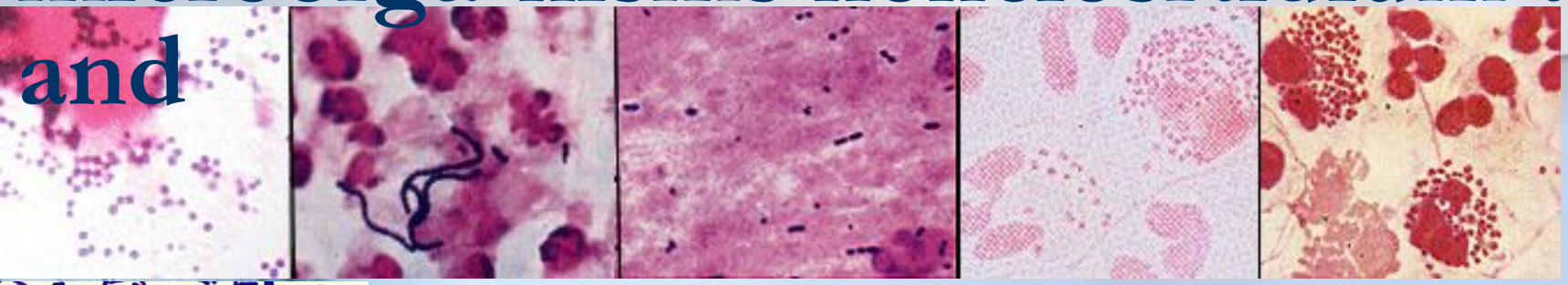
definition

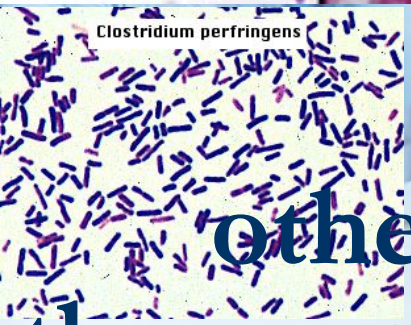
The abscess of lung (a suppuration, apostema, an abscess) is a nonspecific purulent disintegration of the part of pulmonary tissue, accompanying with formation of the cavity filled with pus and limited from environmental tissue by a pyogenic capsule.



exciting cause

More often activators of an abscess is pyogenic cocci, anaerobic microorga-nisms nonclosrtidium type and





others. The combination of those or others anaerobic and aerobic microorganisms is quite often found out

Infections ways

More often the pyogenic infection gets in pulmonary parenchime through aerogenous ways and much less often - hematogenic

Infections ways

Direct infection of pulmonary tissue is possible at penetra-

ting damages. As

stribu- tion process is lung from the neighboring organs and tissue, and also lymphogenic

Infections ways

It is necessary to note, that hit of pathogenic microflora in pulmonary tissue not always results in occurrence of a lung abscess. The situation accompanying with infringements of drainage function of a part of lung is necessary for this purpose

Infections ways

More often it arises at aspiration or mycroas-

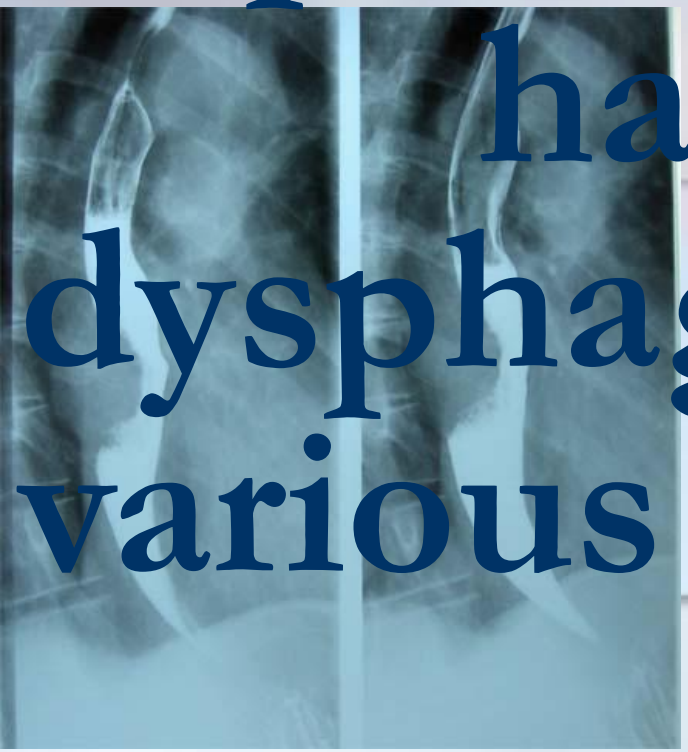
piration of sli-
me, a saliva,
gastric con- tents,
foreign bodies

Infections ways

Aspiration, as a rule, is marked at infringements of consciousness owing to intoxi-cation, epileptic attack, head traumas, and also during a narcosis

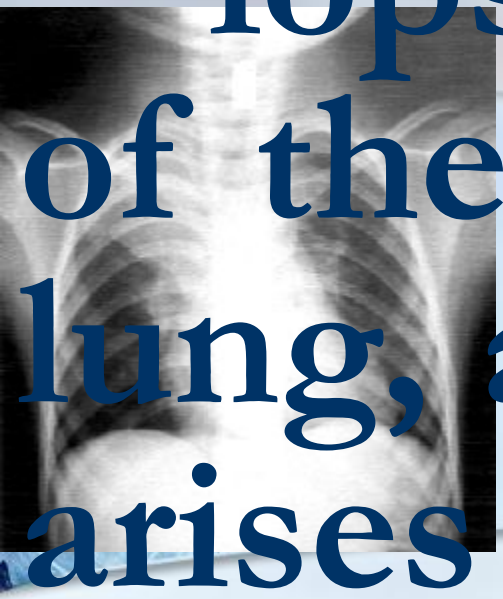
Infections ways

Aspiration at times happens at dysphagias of various origin



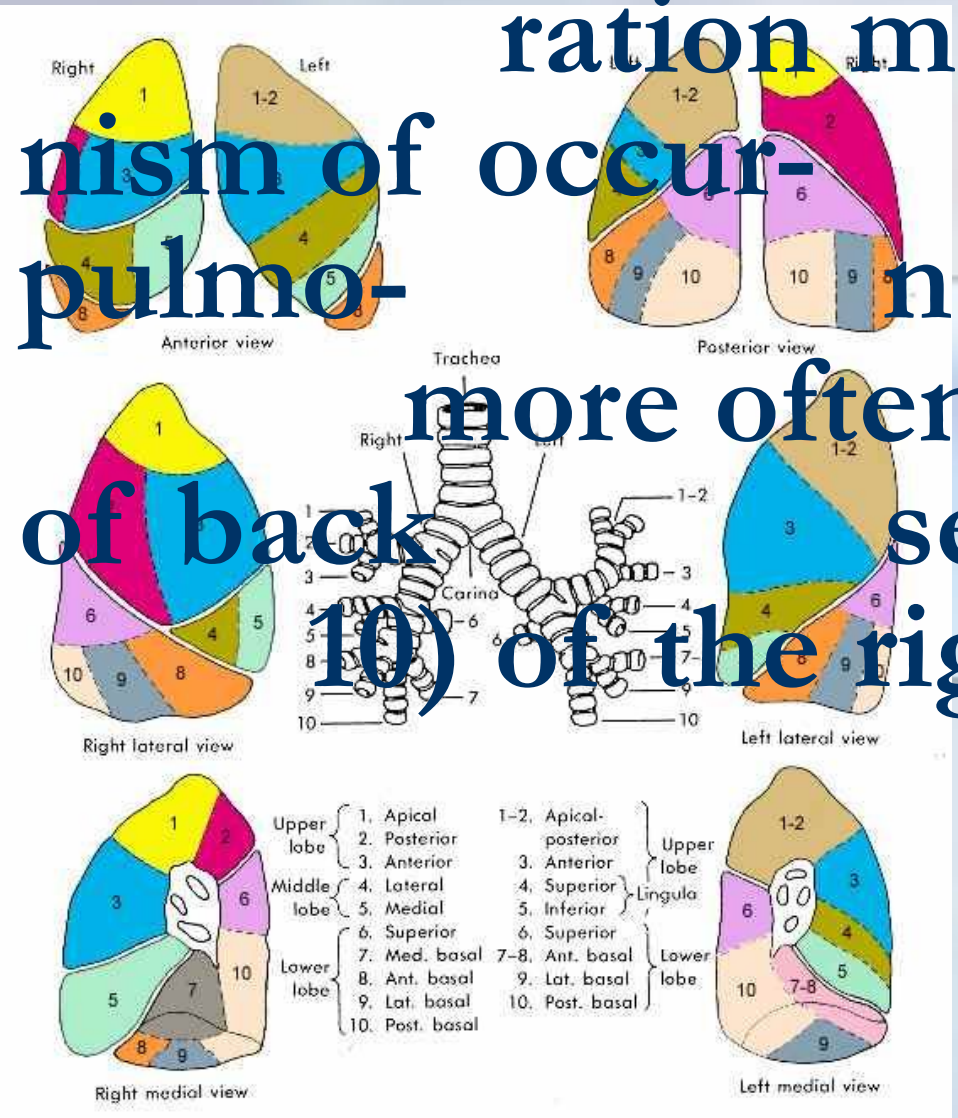
Infections ways

After aspiration deve-lops atelectasis of the part of lung, and then in it arises infectio-us-necrotic process



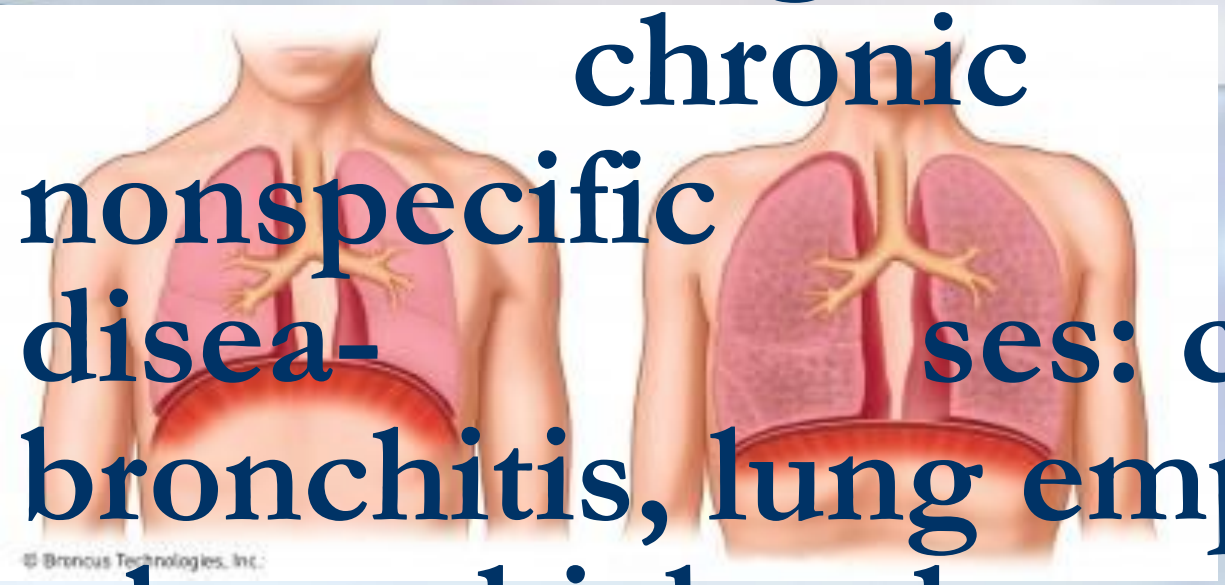
Infections ways

Indirect confirmation of the aspiration mechanism of occurrence of pulmonary abscesses is more often defeat of back segments (2, 6, 10) of the right lung



drainage function

Infringements of drainage function lung are available at chronic nonspecific lung disea- ses: chro-nic bronchitis, lung emphyse-ma, a bronchial asthma, etc.

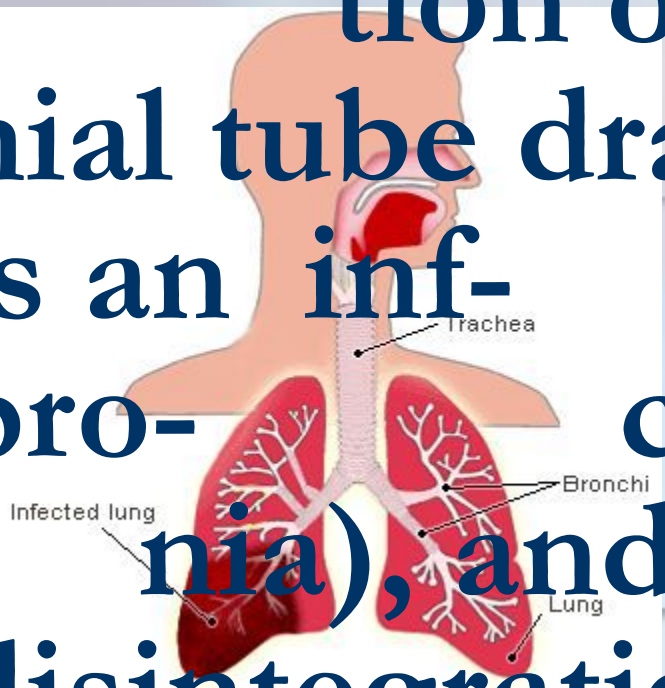


background disease

Therefore, at the certain situations, some diseases promote occur-rence of pulmo- nary abscesses. To a lung abs-cess a grippe and a diabe-tes contribute

drainage function

Thus, owing to acute obstruction of the bronchial tube draining there is an inflammatory process (pneumonia), and then disintegration of a pulmonary tissue part



sepsis

At a sepsis are marked metas-tatic abscesses in lung.

Heavy bruises, hematomas and damages of the pulmonary tissue also in the certain situations may become comp-licated by occurrence of abscesses

causes

Hence, the reasons of pulmonary abscesses are diverse. Nevertheless, at their occurrence interaction of three factors is marked: acute inflammatory process in pulmonary parenchima, infringement of bronchial passability and blood supply of lung part with the subsequent development of necrosis. Each of these factors in the certain situations may have crucial importance.

Clinical picture

Most frequently pulmonary abscesses meet at middle-aged men

60 and more

30-59

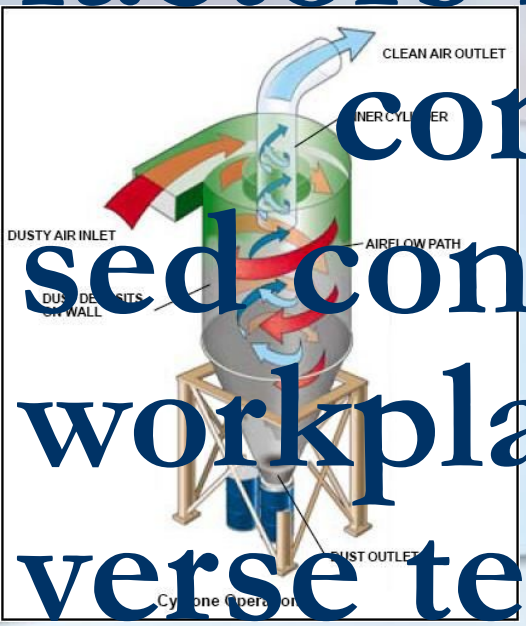
20 and younger

Clinical picture

First of all it is caused by that among them more often there are the persons abusing alcoholic drinks and smokers, suffering a chronic bronchitis

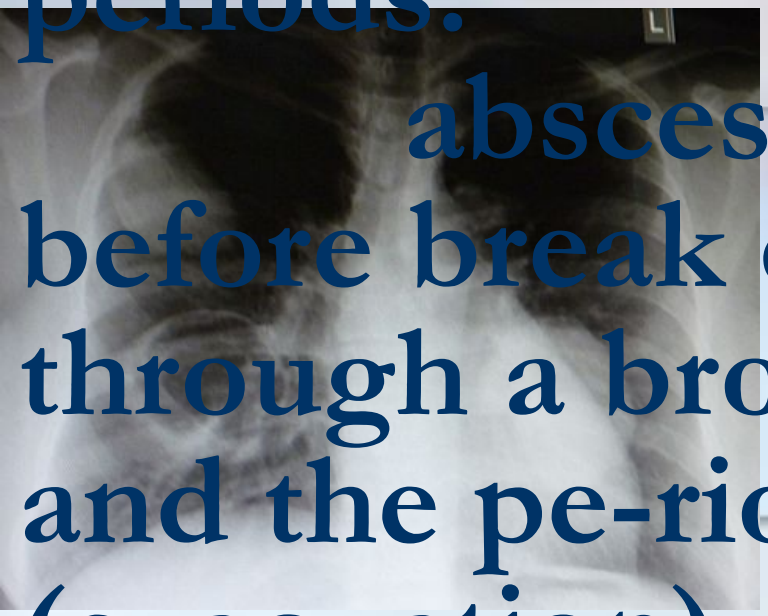
Adverse factors

Besides adverse production factors matter also: the dust content and a gas-sed condition of workplaces, an ad-verse temperature mode etc.



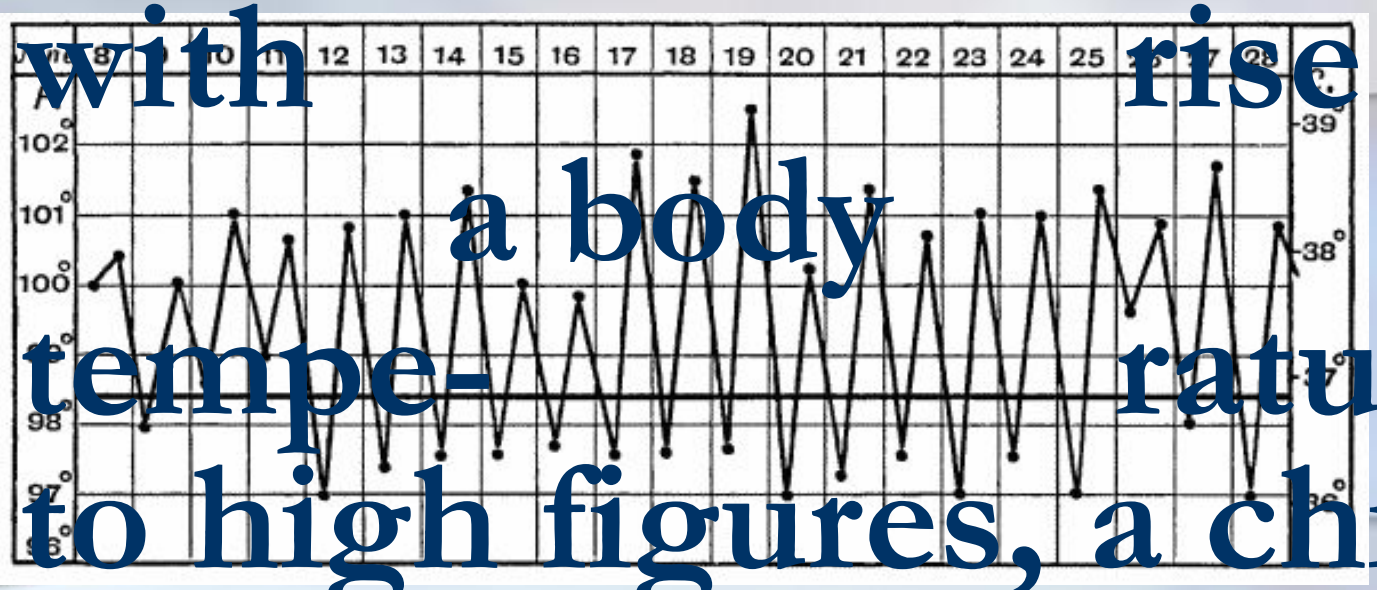
clinical picture

In a clinical picture of lung abs-cess are allocated two periods: the period of an abscess formation before break of pus through a bronchi- al tree and the pe-riod after break (evacuation) an abscess in the draining bronchial tube.



Before break

For the first period is typi-cally acute beginning with a body tempe- rature up to high figures, a chill and plentiful sweat then.



Before break

There may be pains in a thorax on the side of defeat, dyspnoea and cough, as a rule, without sputum

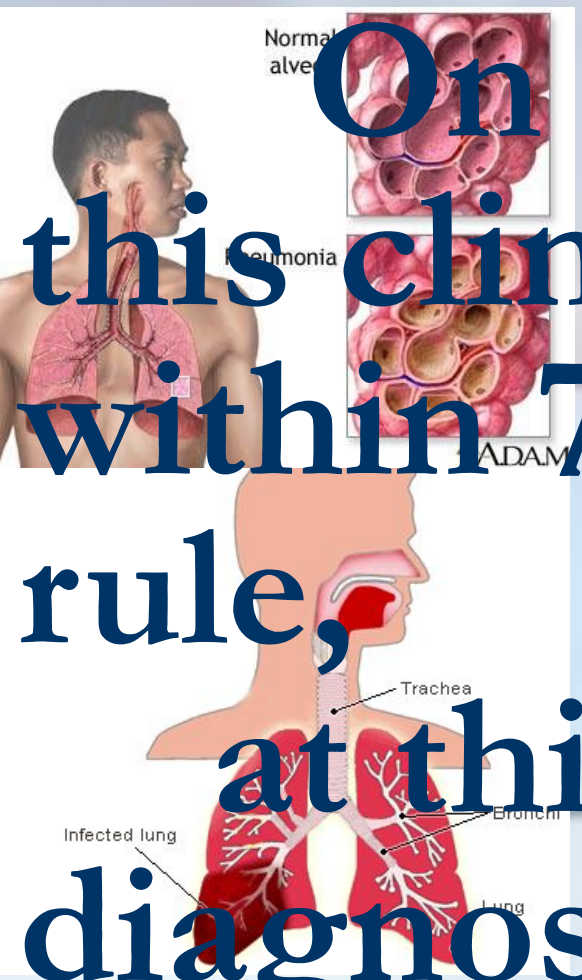
Before break

Infringements of the common condition as a headache, indisposition and weakness are marked also

Before break

The clinic purulent-resorptive fevers is totally marked. At x-ray in this period in lung there is a site of inflamma- tory infiltration, a located more often in 2, 6 in 2, 6 or 10 segment right lung.

Before break



On the average, this clinic pro- ceeds within 7-10 days. As a rule, the pneumonia at this time is diagnosed

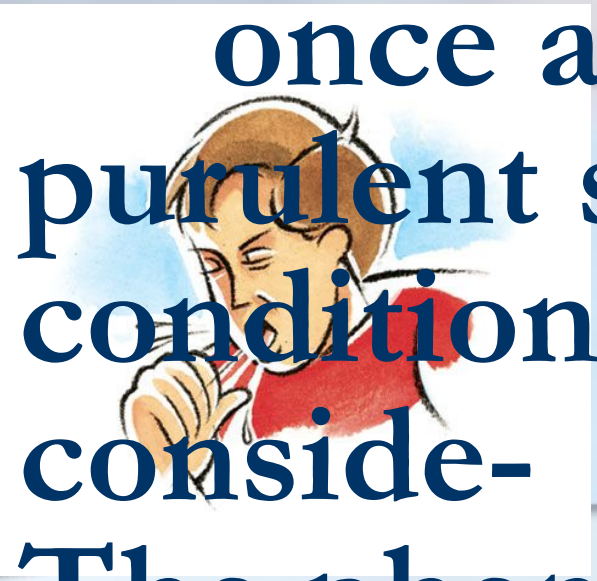
Before break

after break

In the second period when an abs-cess evacuates through a bronchial tree, the clinical pictu- re becomes typical. Sometimes a plenty purulent sputum at once is discharge (a full mouth), is fre-quent with a putrefactive smell.

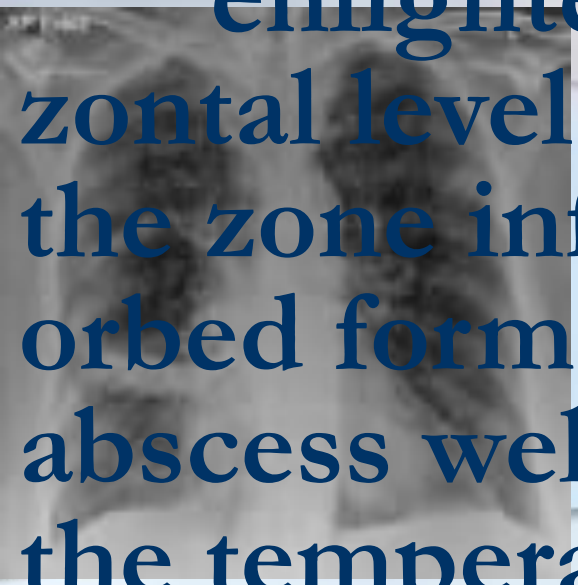
after break

In other cases discharge of sputum occurs gradually. At once after discharge of purulent sputum, the condition of the patient is conside- rably improved. The phenomena of an intoxication are acutely reduced



after break

The x-ray picture becomes typical for an abscess lung: there is a site of an enlightenment with hori-



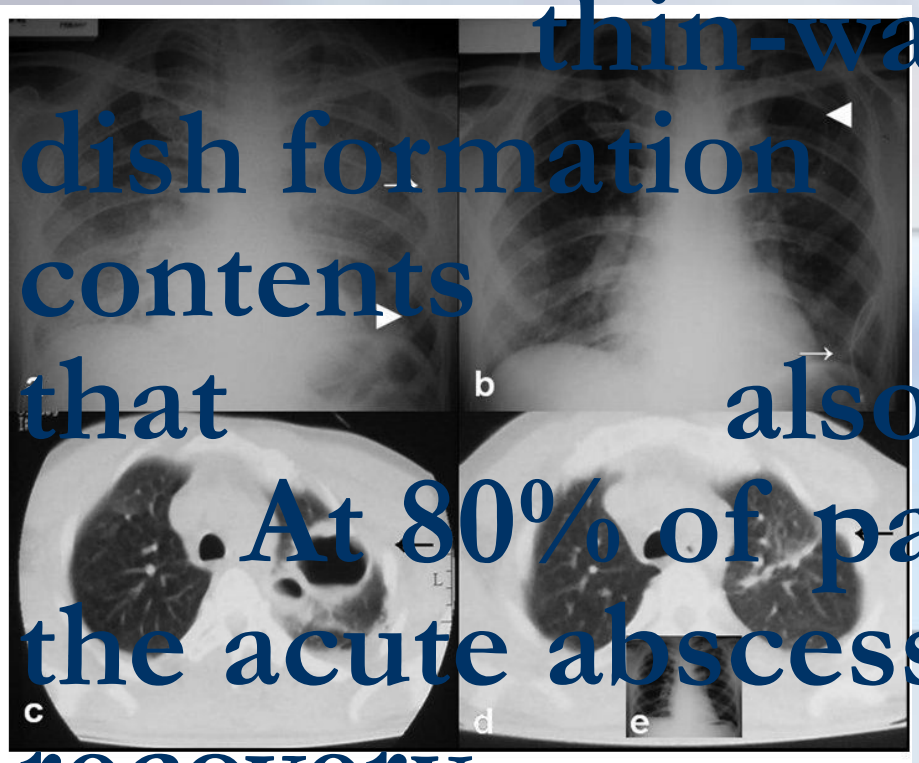
zontal level of a liquid, and the zone infiltration gets the orbed form. If the cavity of the abscess well drained gradually the temperature is reduced also the common condition is normalized

after break

The cavity of an abscess eventually decreases, and in 6-8 weeks it completely may disappear and on its place is formed scar from the connective tissue

after break

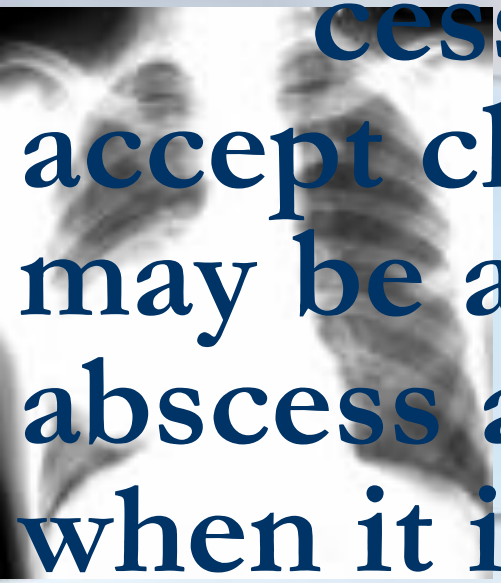
In some situations it is formed thin-walled roun-dish formation without contents – pseudocyst, that also is recovery.



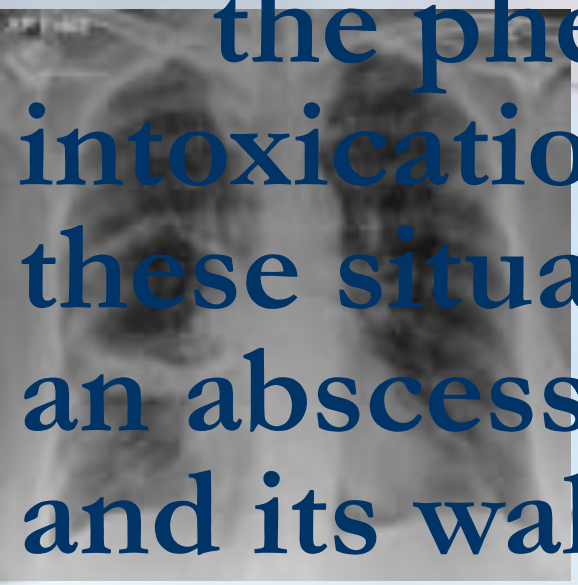
At 80% of patients the acute abscess is finished by recovery

bad draining

In some cases, when it is marked bad draining of the abscess, process may be delayed and accept chronic current. It may be at the big sizes of an abscess and is especial, when it is loca-ted in the bottom parts lung and is inadequate drained



bad draining



Clinically the constant disharge of purulent sputum is marked and the phenomena of an intoxication keep. At x-ray in these situations the cavity of an abscess does not decrease, and its wall thickened. If in this stage it is not possible to unblock an abscess it becomes chronic.

gangrenous abscess

Still allocate the gangreno-us abscess. As a rule, it is a huge abscess in which cavity the-re is a site beco- me lifeless pul-monary tissue (sequestra-tion)

pyopneumothorax

Sometimes the acute abscess of lung may break in a pleural cavity that results in development of pyopneumothorax

Radial methods

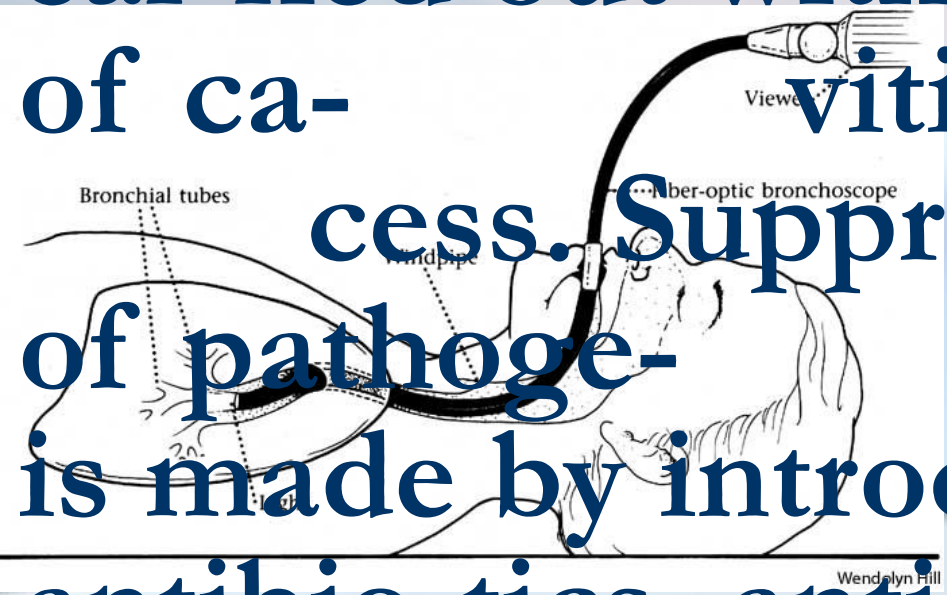
In diagnosis of pulmonary abscesses it is used roentgenography and tomography of lung. Also it is applied computer tomogra-phy and ultrasonic investigation.

Conservative treatment

Conservative treatment of an acute abscess of lung includes three obligatory components: optimum draining a purulent cavity and its sanitation, antibacterial therapy, general improving health therapy treatment and the actions directed on restoration of broken homeostasis

draining

Sometimes bronchoscopy is car-ried out with cateterization of ca- vities of an abs- cess. Suppressi- on of pathoge- nic microflora is made by introduction of antibio-tics, antiseptic tanks and sulfa-preparations.

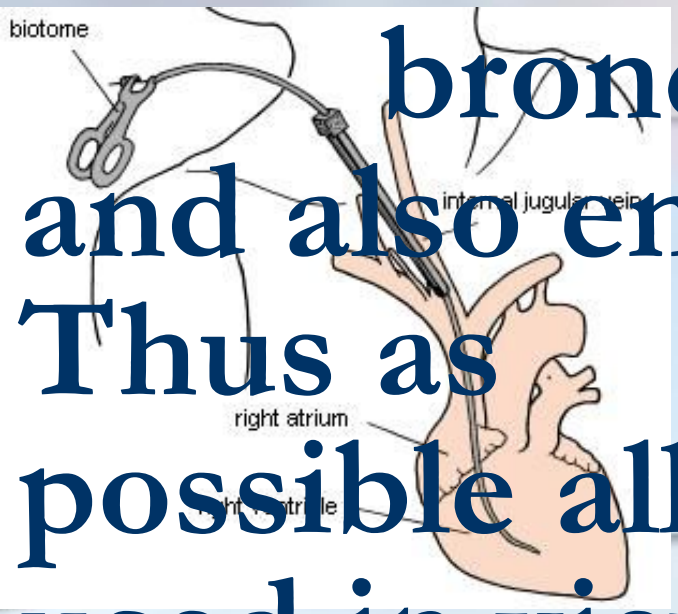


draining

In case of insufficient sanitation with the help of a puncture, it will be carried out transparietal draining of an abscess. Last procedure is better for carrying out under the ultrasonic control with convex detector

antibacterial therapy

Sometimes these preparations are entered in pulmonary and bronchial arteries, and also endolym- phatic. Thus as much as possible allowable dozes are used in view of sensitivity of micro-flora.



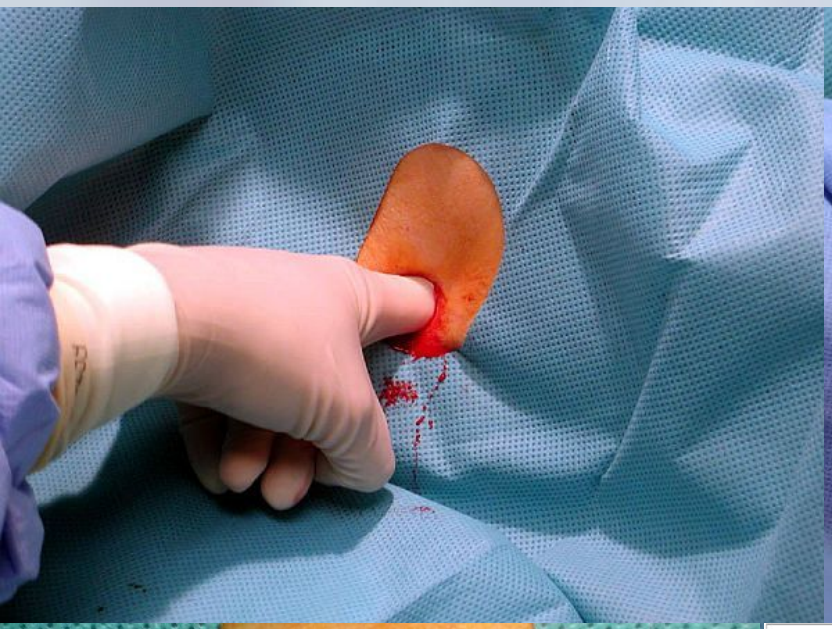
general improving health therapy treatment

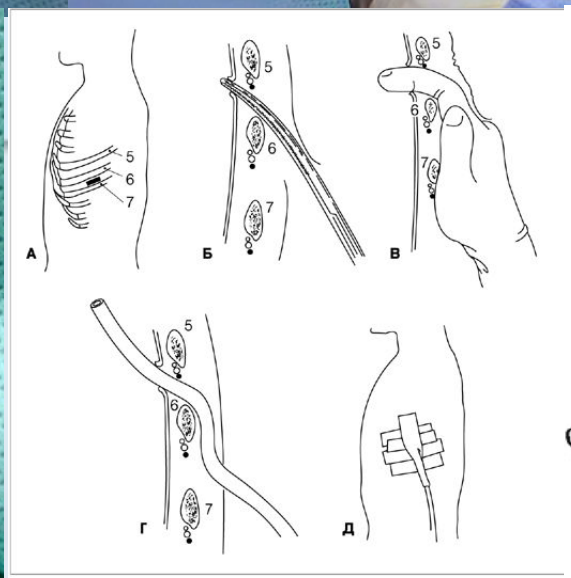
The pharmacotherapy is directed also on stimulation secretolysis and ex-pectorations, struggle with broncho-spasm and an edema of a mucous membrane of a bronchial tube, normalization and improvement of ex-change processes, replacement of immunologic defects etc.

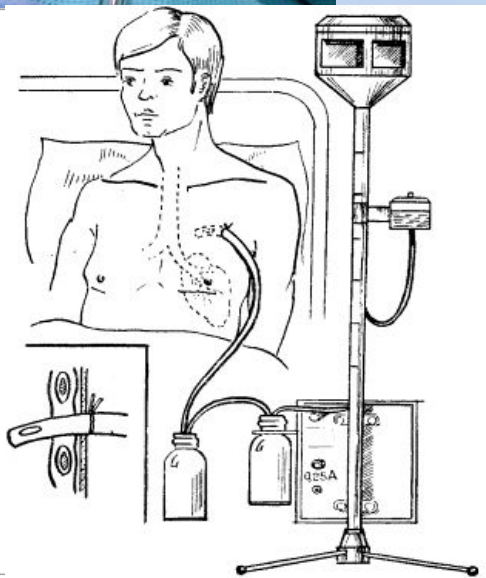
acute abscesses

Hence, acute abscesses, as a rule, are treated conservatively. At occurrence pyopneumothorax it will be carried out draining a pleural cavity

Pleural drainage







Pleural drainage rules (K.Mattox)

1. NEVER just aspirate blood in a trau-matic hemothorax. It just does not work.
2. NEVER use any thrombolytics to try to dissolve a clot in the pleura. It simply does not work.
3. NO REAL need for a CT to confuse you. Decisions regarding chest tubes are made on the basis of the CHEST X-RAY
4. If you can see blood on the chest X-Ray, put in a chest tube.
5. NEVER use a trocar chest tube

Pleural drainage rules (K.Mattox)

6. In teenage patients and adults for trau-matic hemothorax use a 36 French Chest tube with multiple holes in the end, with the last hole interrupting the barium sen-tinel stripe.

7. ALWAYS put in a suture in the skin widely around the chest tube, to be used for an air tight closure when the chest tube is pulled. A LARGE Horizontal Mattress suture. Put in ONE throw of a knot, but do not tie it. Roman saddle it around the tube for many circles and then tie a BIG BOW which can be untied later.

Pleural drainage rules (K.Mattox)

8. ALWAYS connect to suction at about 20 CM negative pressure. ALWAYS

9. ALWAYS use rubber secondary tubes to the bottles, so that the tubes can be MILKED to remove early clot

10. ALWAYS get a post insertion chest X-ray. There will be a malposition many more times than you can ever imaging.

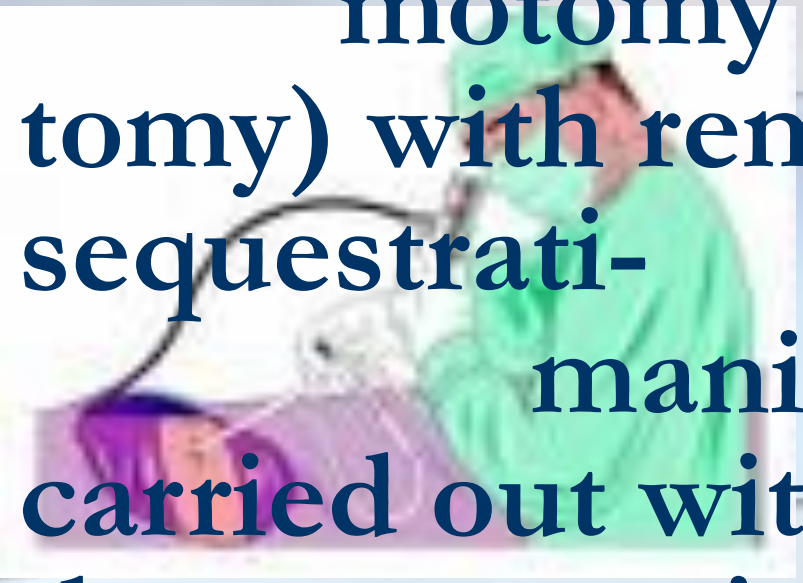
Pleural drainage rules (K.Mattox)

11. ALWAYS have the best person available to insert the tube who is in the hospital at the time either insert it, or personally and physically supervise the lesser person. Chest tubes in acute hemothorax are NEVER a place for a beginning physician, be they surgeon, emergency physician, etc. to learn.

12. NEVER make your decisions based on an acute CT of the chest in acute chest trauma.

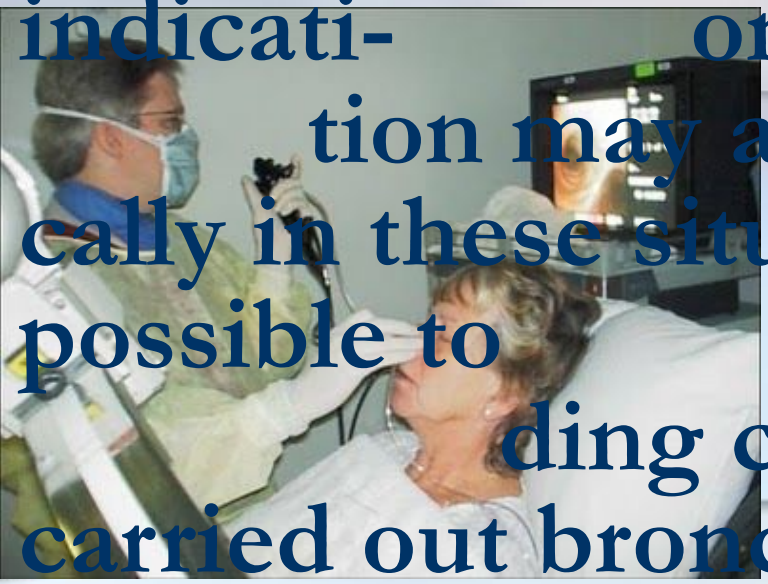
sequestration in an abscess

At the sequestration in an abscess is possible performance of pneumotomy (abscessotomy) with removal of the sequestration. Now similar manipulations are carried out with the help of thora-coscopic interventions



emergency operation

In the extremely rare cases when current of an acute abscess may become compli-cated by the profuse bleeding, indicati- ons to emergency opera- tion may arise. For basi- cally in these situations if not it is possible to stop pulmonary blee- ding conservative means, it is carried out bronchoscopic tamponade of the draining bronchial tube

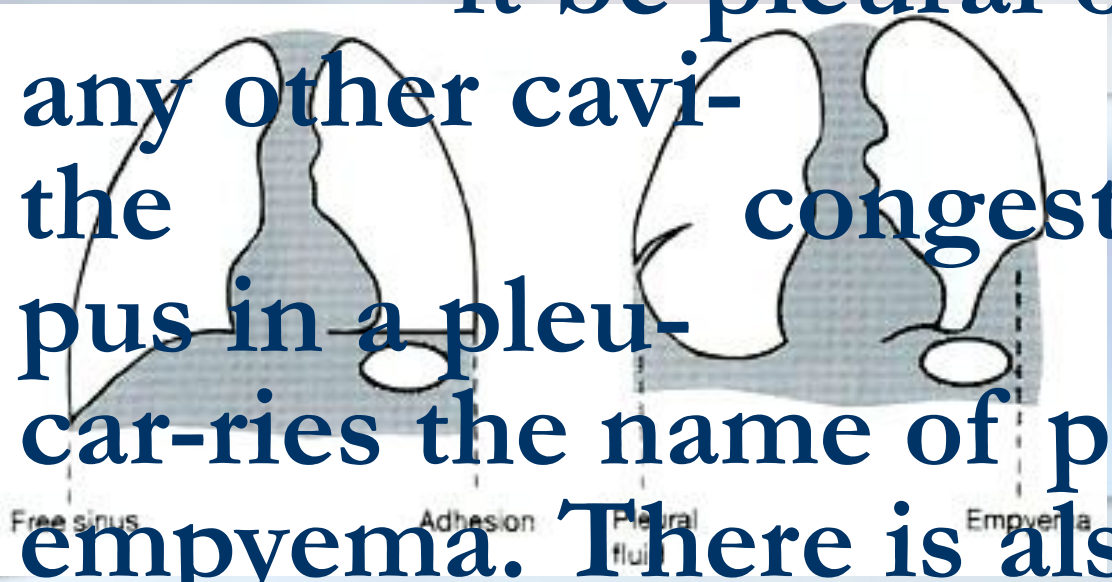


chronic abscess

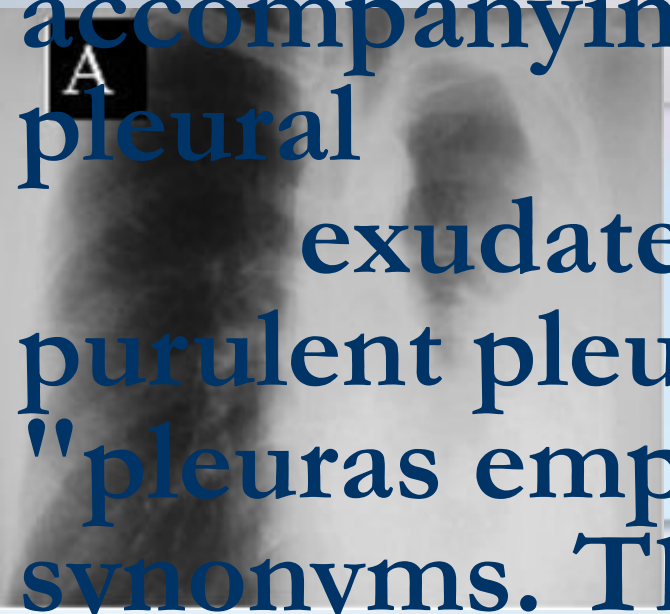
The basic indication to operation is the chronic abscess. The choice of a method of operation depends on volume of defeat pulmonary tissue. It is carried out segmentectomy, lobectomy and in the extremely rare cases bylobectomy.

PLEURAL EMPYEMA

Empyema - a congestion of pus in a natural (anatomic) cavity, whether it be pleural or any other cavity. Hence, the congestion of pus in a pleural cavity car-ries the name of pleural empyema. There is also other term - a purulent pleurisy.



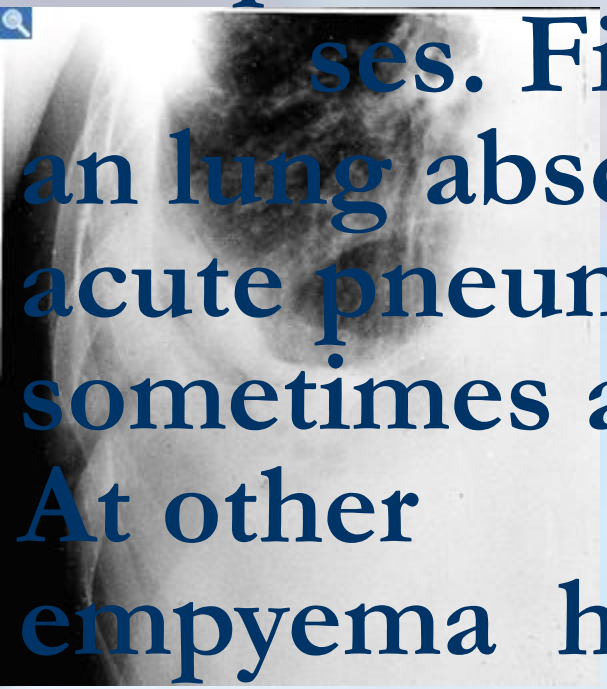
Pleural empyema



The purulent pleurisy is the inflam-mation of pleural lists accompanying exudating in a pleural cavity of the purulent exudate. Hence, terms "a purulent pleurisy" and "pleuras empye- ma" are synonyms. Though at times and till now doctors of various specialities confuse these conditions.

Pleural empyema

Pleural empyema in 90% of cases is complication of purulent lung diseases. First of all it arises at an lung abscess and gangrene, acute pneumonias and sometimes at bronchoectasy. At other patients (10%) empyema happens by consequence of a trauma and outlung processes.



Pleural empyema

To outpulmonary diseases resulting in development of pleural empyema, concern: a pancreatitis, paranephritities and subdiaphragmatic abscesses. Pleural empyema in these cases refers to as sympathetic (concomitant). In these situations in purulent process diaphragm is involved and there is the concomitant inflammation of the pleural leaf, covering diaphragm in a chest cavity

Classification of the pleural empyema

1. On clinical current
2. By the form
3. On pathogenesis
4. On extent
5. A degree of lung compression
6. Acute and chronic

Classification of the pleural empyema

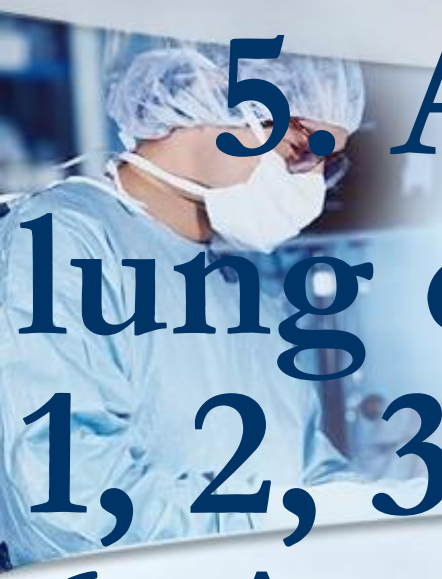
1. On clinical current: the purulent-resorptive fever and exhaustion.

2. By the form: empyema without destruction of the pulmonary tissue or with destruction of the pulmo-nary tissue.

3. On pathogenesis: meta- and parapneumonic, posttraumatic, metastatic and sympathetic.

Classification of the pleural empyema

4. On extent: limited, widespread, total.



5. A degree of lung compressi- on: 1, 2, 3.

6. Acute and chronic

Classification of the pleural empyema

For the characteristic of intensity of purulent process both in lung, and in a pleura, in classification the common typical syndromes deter-mining purulent-resorp- tive fever and very dange- rous condition - the puru-lent-resorptive exhaustion

Classification of the pleural empyema

Limited empyema are in cases of involving in purulent process only one wall of a pleural cavity. At defeat of two or more walls of a pleu-ral cavity empyema is designa-ted widespread

Classification of the pleural empyema

To I degrees are referred those cases, when lung compressed within the limits of one third.

II degree means, that lung compressed within the limits of two third.

At III degree lung compressed within the limits of full lung.

Total refers to an empyema at which all pleural cavity from diaphragm up to a dome is amazed.

Classification of the pleural empyema

Introduction in classification of empyema with destruction and without destruction pulmonary tissue is made to show, what exactly destruction of the pulmonary tissue aggravates current of sup- purative process and renders dominant influence on a condition of the internal environment of an organism

Classification of the pleural empyema

It is separately allocated empyema necessitas (perforans) at which pus acts through intercostal intervals in soft tissue of a chest wall. Clinically the phlegmon of a chest wall is defined.

pathogeny

As a rule, the purulent inflammation of pleura begins from fibrinous pleurisy and arises in two ways: first, owing to direct transition of exudative inflammations with lung on pleura and, second, at break in a pleural cavity of a subpleural lung abscess. The second way of development pleural empyema more often takes place.

Pneumonia and pleurisy

Pneumonias may divide on two groups: exudative type with insignificant defeat of bronchial tubes and necrotic or absceding type. Thus necrotic sites, single and plural, are frequently located subpleural and consequently, as a rule, are complicated a fibrinous-purulent pleurisy. At absceding pneumonias with plural abscesses of polysegmentary localization and their subpleural arrangement, break of an abscess in a pleura cavity is possible with development of empyema.

clinic

Clinical picture. At pleural empyema occur pains in a thorax on the side of defeat, the dyspnea is amplifies. Cough may be dry and with purulent sputum. Are marked the raised body temperature and chills. At percussion marked distinct dull sound, is more often behind on the scapular line. Thus, there are clinic purulent-resorptive fevers and attributes of a collecting liquid in a pleural cavity. Nevertheless, the clinical picture is various. It depends on many reasons.

clinic

The typical answer of an organism to any form of a suppuration including pleural cavity is the purulent-resorptive fever. In its basis three factors lay: suppuration, resorption (absorbing of products of disintegration of tissue and products of ability to live of microorganisms) and the factor of loss. Last factor is caused by losses, which are born with an organism at a purulent inflammation. Clearly, that the degree of purulent-resorptive fevers, no less than intoxications, may be various - beginning from easy and finishing the hardest.

clinic

As it is marked above, frequently by the beginning empyema happens the absceding pneumonia, therefore in some days after its crisis, again there is rigor, a pain in a side, dyspnoea and high temperature. After 3-5 days comes to light dull sound at percussion sound, weakens vocal fremitus and breath in the field of the struck site

clinic

In other cases the clinical picture of deve-lopment pleural empyema proceeds latent-ly. It would seem, safely transferred inflam-mation of lung does not bring expected re- covery and, on the contrary, the dyspnea, fever, pains in a side gradually amplify. Probably paral- lel development of a pneumonia and purulent exudate in a cavity of a pleura. At break of a subpleu-ral abscess in a pleural cavity distinguish three clinical forms: acute, soft and erased.

clinic

At the acute form it is observed con-dition as a shock. Suddenly at per-cussion there is a box sound above a place former dulling. At-tributes of the increasing pneumothorax with total collapsing of the lung are not excluded. The acute form of break of an abscess in a free pleural cavity meets seldom.

clinic

At the soft form, as a rule, an abscess evacuate in closed incapsulated spa-ce. This form is shown by a moderate pain and change of percus- sion and auscultative attribu- tes. At the erased form which meets most frequently, the moment of the beginning of penetration of pus in a pleura is diffi-cultly perceptible.

clinic

The raised body temperature is one of the major attributes of empyema of pleura. Temperature reactions may proceed on remitting type, as wrong waves with the tendency to morning downturn.

However, the temperature, as a rule, is not reduced up to normal or even subnormal figures. Pains in a breast more often are caused by involving in process parietal pleuras. In the same time a pain may be caused by destruction of lung tissues.

clinic

Frequently pains amplify at breath, there-fore patients avoid deep breath. Trying to spare the struck half of breast, patient quite often borrow the compelled posi- tion. Thus they are bent aside pathological process. It should be taken into account at diagnostics. Complaints to headaches are quite often marked. Early there are fun-ctional changes on the part of cardiovascu-lar system, a liver and kidneys. Infringe-ments of clotting systems of blood are possible.

clinic

Restriction of respiratory excursions of a chest is marked on the side of defeat. At widespread and total pleural empyema smoothing intercostal intervals is quite often observed. Thus scapula on the side of defeat rises up slightly and lags behind at breath in comparison with another scapula. At palpation sometimes is marked resistence of soft tissues of chest wall. A characteristic attribute of a con- gestion of a liquid in a pleural cavity is easing vocal fremitus and dullness of percussion sound. At auscultation is marked sharp easing vesicular or bronchial breath. Variegrated moister rattles are listened at empyema, accompanying by destruction of lung tissues more often.

diagnosis

One of the important methods of diag-nosis of the pleural empyema is the x-ray inspection. Thus it is established, whether there is a liquid in a pleu- ral cavity. A classical x-ray at- tribute pleural empyema slan-ting line of Damuaso. There may be a total and subtotal congestion of a liquid with dis-placement of mediastinum in the heal-thy side. In some cases it is defined li-mited (incapsulated) liquid.

diagnosis

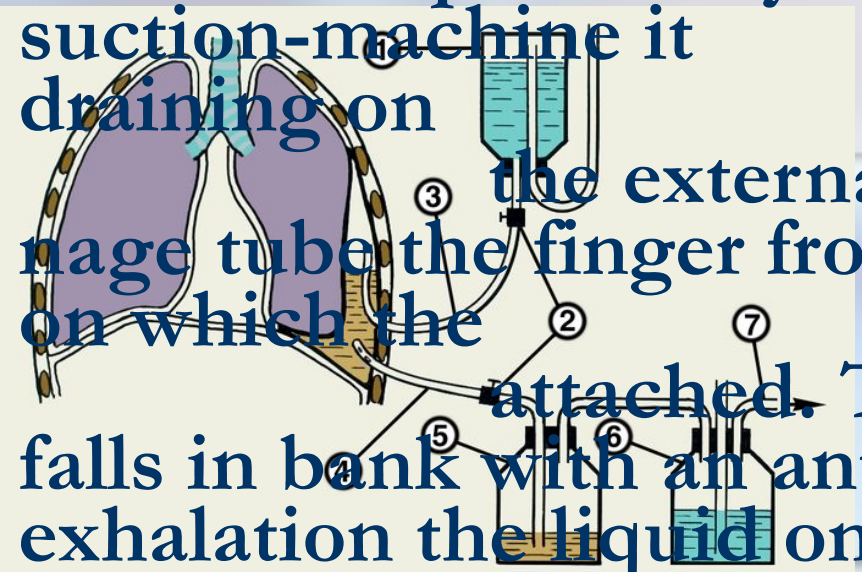
Sometimes x-ray research will be carried out in lateroposition (on one side). Also are applied computer tomography and USI. At chronic pleural empyema it is applied bronchography which estimates a condition of a bronchial tree and a degree of com- pressing of lung tissues. With the pur- pose of specification of the sizes and a configuration of a cavity of chronic empyema is sometimes used pleurography. At external fistulas it will be carried out fistulography. The big value at last years is given to thoracoscopy, which will be carried out also with the medical purpose.

treatment

Treatment begins with a puncture of a cavity empyema. During a puncture con-tents with the subsequent bacteriological and cytologic research leave. The pleural cavity is sanified with the help of antibacterial and antiseptic preparations. However the puncture way more often possible to sanify only local forms. Therefore, as a rule, it will be car-ried out draining a pleural cavity that is better for combining with thoracoscopy.

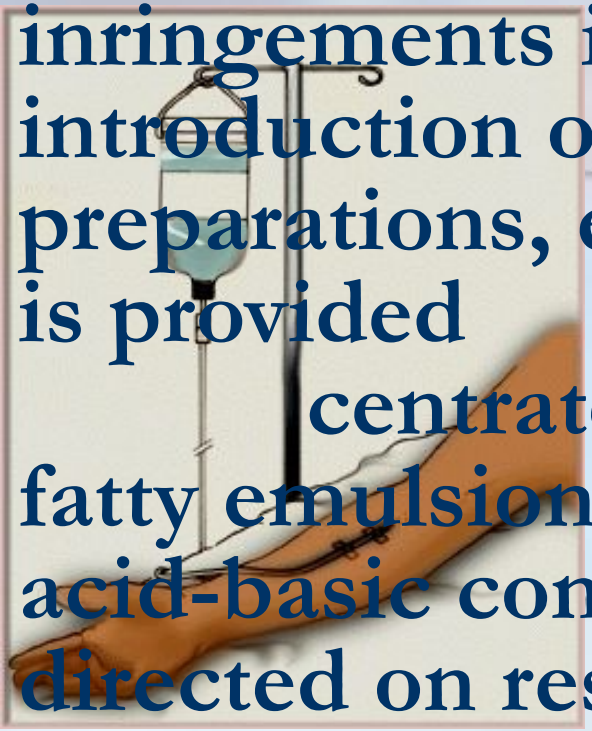
treatment

After pleural cavity sanitation the drainage tube joins system active aspiration. At absence of aspira-tion systems water-jet suction-machine is used. At impossibility of using water-jet suction-machine it is carried out draining on Bulau. For this purpose on the external end of a drai-nage tube the finger from a rubber glove on which the section is made becomes attached. Then this tube falls in bank with an anti-septic liquid. During an exhalation the liquid on a drainage follows from a pleural cavity in bank, and during a breath, due to fall of a rubber finger, the liquid from banks with antiseptic solutions in a pleural cavity does not come back.



treatment

All patient will carry out intensive antibacte-rial treatment in view of sensitivity of micro-flora. Correction of volemic inringements is carried out by introduction of albuminous preparations, elect- rolytes etc. Calorage is provided with introduction of the con- centrated solutions of glucose and fatty emulsion. Necessarily corrected the acid-basic condi- tion. The therapy directed on restoration of a functional condition of cardiovascular system, a liver, kidneys, CNS etc. will be carried out

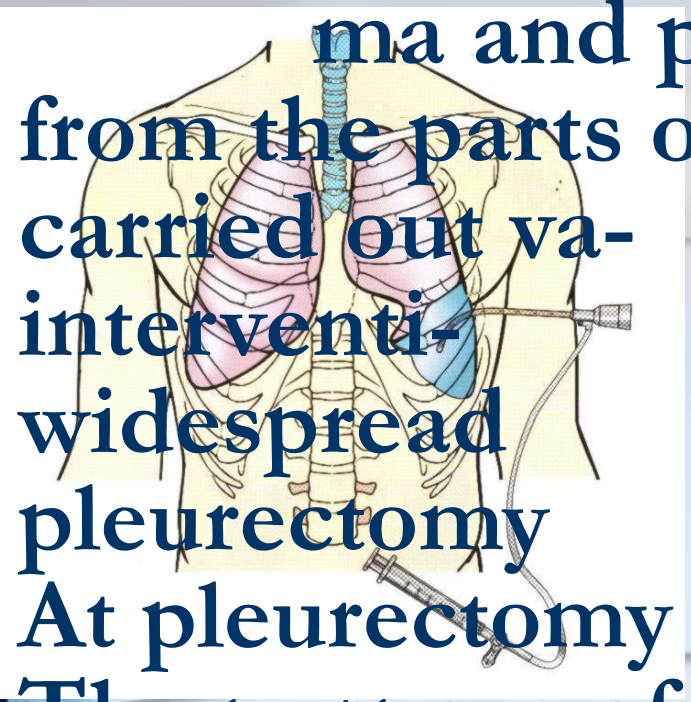


treatment

At destructions of the lung tissues, in necessary cases, bronchoscopic sanitation will be carried out. The duly qualified treatment allows to achieve recovery at the most part of patients with acute empyema of pleura. Nevertheless, at lines of patients develops chronic empyema

chronic empyema

At chronic empyema pleuras operative treatment is shown. On the form empyema and presence of changes from the parts of lung tissues are carried out various operative interventions. The most widespread operation is pleurectomy and lung decortication.



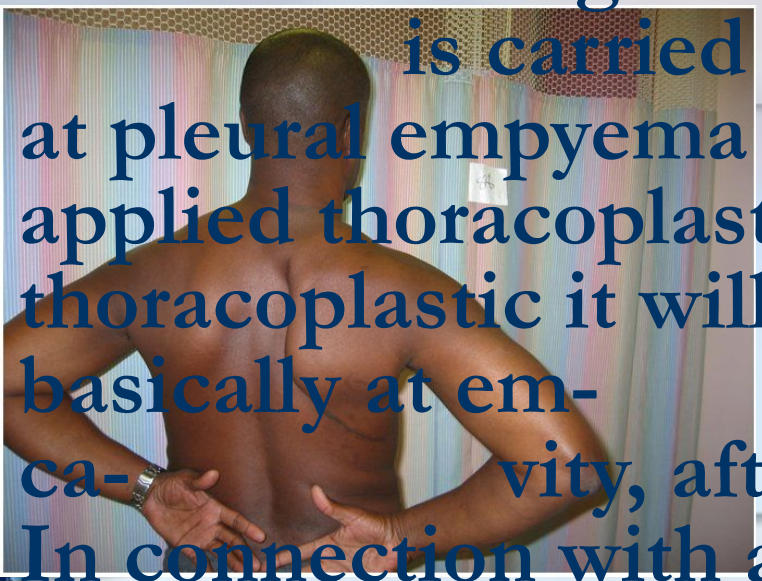
At pleurectomy the bag empyema deletes. The purpose of decortication, offered Delorm in 1894, consists in clearing of lung from cicatricial layer, covering visceral pleura.

chronic empyema treatment

As a rule, both operations (pleurectomy and decortication) are united. Sometimes pleurectomy is combined with removal of a site struck lung tissues. In such cases of operation refer to as: pleurosegmentectomy, pleu-rolobectomy, pleurobilobectomy or

chronic empyema treatment

One of the most hardest operative interventions is pleuropulmonectomy. It is caused by that patients except for chronic pleural empyema have also a total defeat lung. Last years pleuropulmonectomy is carried out seldom. Earlier at pleural empyema it was widely applied thoracoplastic. Now thoracoplastic it will be carried out basically at empyema a residual pleural cavity, after various operations on lung. In connection with a wide circulation lung surgeries complication as empyema a residu-al pleural cavity after removal of a part or all of lung has appeared.



bronchial stump unsufficiency

By the most often reason of a similar sort empyema happens an inconsistency of stump of resected bronchial tube. At chronic empyema residual pleural cavity after pulmonectomy are carried out various operations: transthoracal pleurectomy and suturing of stump of the main bronchial tube, trans-sternal transpericardial occlusion of stump of the main bronchial tube and various kinds of thoraco-plastic.

chronic empyema treatment

Concluding this section, it is necessary to note, that adequate treatment of acute empyema with application in necessary cases thoraco-scopic interventions frequently results pleuras in recovery.

lung gangrene

Purulent-putrefactive necrosis of lobe or all of lung, with absence of a zone of demarcation from the healthy lung tissues, having the tendency to the further distribution and shown by the heaviest common con-dition of the patient

lung gangrene

As a rule, the gangrene is formed owing to putrid disintegration of the massive, beco- me lifeless sites of lung tissues (a lo-be, two lobes or all lung)

lung gangrene

Etiopathogen moments of a gangrene in many re-spects are similar to those at an abscess of lung. However, at de-velopment of a gang-rene they are expressed in an extreme degree.

lung gangrene

It is frequently marked aspira-tion on a background of alco- holic intoxication. The big value has the common condition of the patient with reduction of resis- tence (immunity), and al-so heavy accompanying disea-ses (a diabetes etc.).

lung gangrene

The significant role is played with previous chronic non-specific diseases of lung. More often at a gangrene of lung the microflora in various combinations anaerobic is sowed with aerobic.

Clinic

As a rule, the gangrene of lung begins shar-ply, with significant rise of a body tempera-ture, a dyspnea, be sick in a chest on the si- de of defeat, weakness and sharp dete- rioration of the common conditi- on. Right at the beginning cough may be dry, and then occurs putre- factive fetid sputum. The conditi- on of the patient the heaviest be-comes very fast. At cough it is increased discharge purulent sputum which has dirty-grey, greenish or (from an impurity of blood) chocolate color.

Clinic

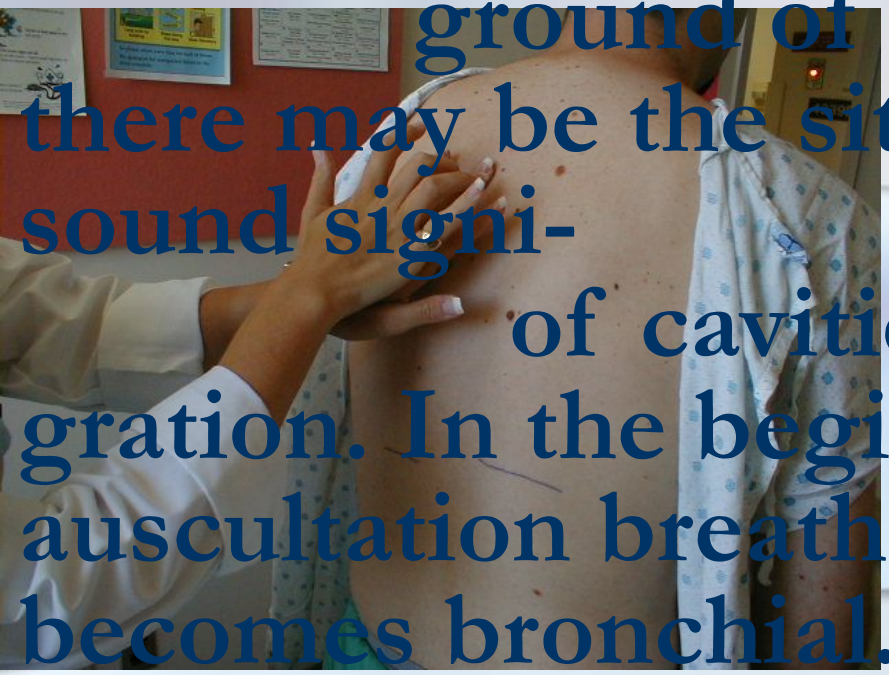
Sometimes cough out small slices lifeless lung tissues. Even being on significant distance from the patient, it is possible to feel an intolerable fetidity coughed out sputum and exhaled air. It is quite of- ten marked hemoptysis, and at times and fatal pulmonary blee-dings

Clinic

Frequently current of a gangrene of lung is complicated by development of empyema pleuras. In connection with sharp intoxication, the septic shock with polyorgan insufficiency develops. Quite often at patients euphoria or confusion of consciousness is marked. Integuments of pale-grayish color with expressed acrocyanosis.

Clinic

At percussion zones of dullness above lung are quickly increased. On a back-



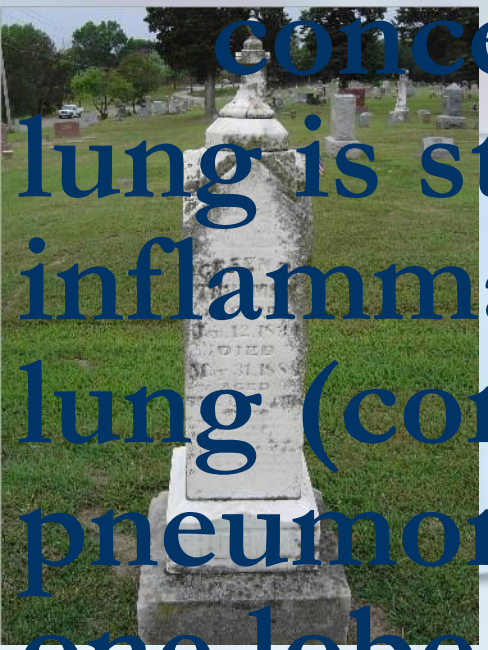
ground of dullness there may be the sites of a high sound signi- ficative of formation of cavities of disinte- gration. In the begin- ning at auscultation breath weakened, and then becomes bronchial. Then dry and damp variegra-ted rattles are listened.

x-ray

At x-ray comes to light diffuse blackout of the struck parts of lung (a lobe, two lobes or lung) with plural cavities of disintegration the various size. Quite often comes to light pleuras empy-ema

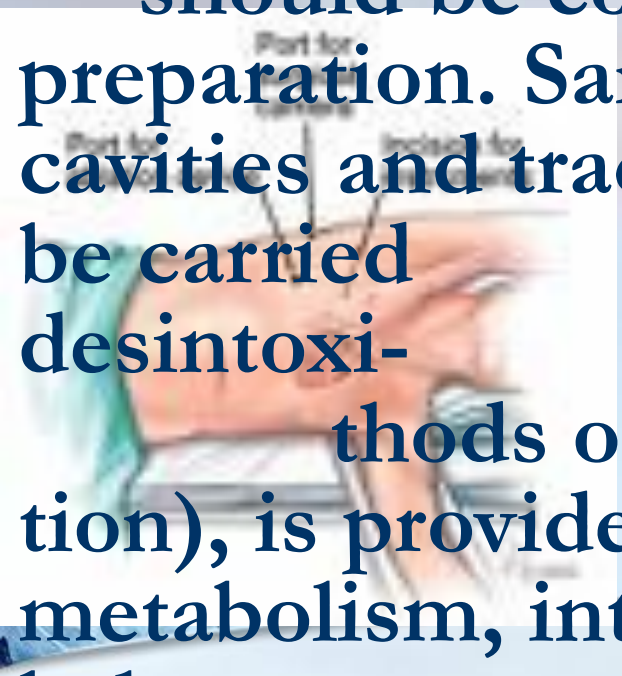
prognosis

The prognosis at a lung gangrene frequently adverse. Especially it concerns cases when all lung is struck and there is an inflammatory process in other lung (contralate- ral pneumonia). At a gan- grene of one lobe of lung the prognosis is more often more favorable.

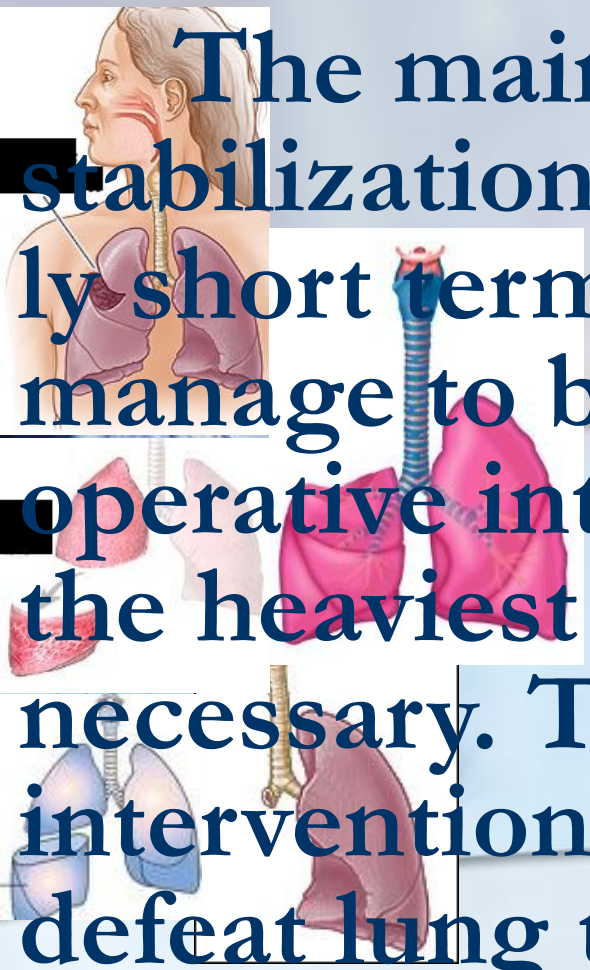


gangrene lung treatment

It should be started with intensive therapy in reanimation department. This treatment should be considered as preope- rative preparation. Sanitation of purulent cavities and tracheo- bronchial tree will be carried out, antibacterial and desintoxi- cation therapy (including me- thods of extracorporal detoxica- tion), is provided maintenance of gas metabolism, intimate activity and power balance, corrected volemic and immune infrin-gements, and also other frustration of metabo-lism.



gangrene lung treatment



The main thing in treatment is stabilization of process in probably short terms. If it does not manage to be carried out, operative intervention, despite of the heaviest condition is necessary. The kind of operative intervention depends on volume of defeat lung tissues. The lobe-, bilob-, or pul-monectomy is carried out.

In 21 century illiterate the one who is not able to read and write is considered any more, and the one who is not able to study, to study up and to be retrained. Elwin Toffler