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Head of Department
d.med.n, Professor _____ I.D.Duzhiy

METHODOLOGICAL RECOMMENDATIONS FOR TEACHERS FOR THE PRACTICAL STUDIES OF PREPARATION FOR PHTHISIOLOGY GENERAL PRACTITIONERS

Academic discipline	Phthisiology
Subject lesson number 3	Specific prevention of tuberculosis, BCG complications. Tuberculosis unidentified location. Tuberculosis intra-thoracic lymph nodes. Primary tuberculous complex. Pathogenesis, pathomorphism, clinic, diagnosis, differential diagnosis. Complications. Current treatment regimens. Peculiarities of tuberculosis in children and adolescents.
Course	4

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Topic № 3: Specific prevention of tuberculosis, BCG complications. Tuberculosis unidentified location. Tuberculosis intra-thoracic lymph nodes. Primary tuberculous complex. Pathogenesis, pathomorphism, clinic, diagnosis, differential diagnosis. Complications. Current treatment regimens. Peculiarities of tuberculosis in children and adolescents.

Currency of the topic

Prophylaxis of tuberculosis is one of the main measures of antituberculosis ones at every stage of the struggle with tuberculosis. Prophylactic measures can be divided in three groups. The measures which are spent among the whole population (BCG vaccination and revaccination, sanitary measures for the defense of the most treatable contingents against infection and super infection). Nowadays the struggle against tuberculosis (TB) timely detection and treatment of earliest manifestation of primary tuberculosis has especial impotent significance because of preventing complications primary tuberculosis can follow by and a development of secondary tuberculosis subsequently. Primary tuberculosis more often manifests as tuberculosis of intrathoracic lymphatic nodes (75-80 % of all primary local forms of TB). So far as primary exogenous infection arrives mainly in a childhood the knowledge of methods of timely diagnosis, treatment and prophylaxis of primary tuberculosis would help a doctor to realize the diagnosis, tratment and prevention of tuberculosis timely in children.

General goal To create the condishions for students to master the methods of diagnosis and treatment of primary tuberculosis. to create the conditions for students supplying the obtaining of the knowledge and skills allowing to master of the main principles of antituberculous measures for the prevention of tuberculosis.

The concrete aims:

1) To analyze Mantoux test results for the diagnosis of primary IBinfection.

2) To explain the difference in pathogenesis between primary tuberculosis and secondary one.

3) To suggest the main methods the patients TB-supposed.

4) To classify different clinical forms of primary TB: tuberculosis of non-established localization, primary tuberculous complex, complications of primary tuberculosis on the ground of investigations and to formulate the diagnosis correctly according to the issues of clinical classification.

5) To inteprete the data of the examination of the patient and carry out the differential diagnosis of primary forms od TB in children and adolescents.

6) To draw the schemes of the changes revealed in the x-ray puctures with tuberculosis of intrathoracic lymphatic nodes (tumour-like and infiltrative variants), primary tuberculous complex; the graph of higher risk to develop tuberculosis in primary infected children in different aged groups.

7)To analyze the patient’s complains, history of the disease, past history, including epidemic anamnesis, data of physical examination and also the results of Mantoux test with 2 TU PPD-L, x-ray examination, bronchiscopy and micribiological investigations and to give proof of the diagnosis of different clinical forms of primary tuberculosis.

8) To compose the plan TB-supposed child’s examination.

9)To define the indications and contraindications for BCG vaccination and revaccination.

10) To diagnose the complications of BCG vaccination and revaccination.

Basic knowledge and skills are necessary for topic studying (interdisciplinary integration)

1.Microbiology To define the causative organism of TB, it's types. To describe the main properties of mycobacterium tuberculosis (MBT), To use the methods of MBT identification

2. Pathological anatomy To describe the peculiarities of path morphological charges in organs in tuberculosis

3. The introduction of pediatrics To have the skills for examination the child suffering from TB (gathering the complains, history of the disease, past history , physical examination)

4. Radiology To describe X-ray syndromes of primary TB in the lungs of children and adolescents

5. Pharmacology To classify anti TB-drugs, to use them in patient suffering from primary TB

4. Tasks for the independent work.

4.1. The list of terms, parameters, characteristics which a student have to master during the preparation for the class

1. Primary tuberculosis Primary tuberculosis a disease which develops in the body previously infected mycobacterium tuberculosis

2. Tuberculosis of non-established localization Tuberculosis of non-established

localization is a clinical form of primary tuberculosis characterized by the symptoms of functional disorders without local manifestation of the disease.

3. Primary tuberculous complex Primary tuberculous complex is a clinical form of primary tuberculosis characterized by specific inflammation of the lung parenchyma (or other organ), regional lymphatic nodes and lymphogitis with the development of corresponding clinical picture

4. Tuberculosis of intrathoracic lymphatic nodes Tuberculosis of intrathoracic lymphatic nodes is a clinical form of primary tuberculosis characterized by specific

inflammation of lymphatic nodes of the roots of the lungs and mediasthinum.

Initial level of knowledge and skills.

To reach the concrete aims of the topic a student have to muster of knowledge and skills as followings:

1. To know about measures preventing tuberculosis.
2. To know about BCG vaccine, the history of its creature.
3. To know the composition of BCG vaccine.
4. To explain the development of BCG immunity.
5. To know about other kinds of prophylaxis of TB.
6. To know the terms of BCG vaccination and revaccination.

Practical tasks doing within the class.

1. The boy at the age of 10 years old visited the doctor with the complains of an decreasing appetite, fatigue, night sweats. Mantoux test last year was negative. The child was BCG vaccinated at birth, but was not vaccinated at the age of 7 years old. A year ago a contact with an uncle suffering from tuberculosis took place. Physical findings: fever – 37,30C, body weigh is lowered, the child is failed in physical development. The skin is pale. Cervical, sub- and supraclavicle, armpit lymphatic nodes are palpated with soft-elastic consistency and size of 0,3-0,7 cm. The lungs and the heart are without pathological changes. The liver and the spleen are slightly enlarged. Blood test: hemoglobin – 98 g/l, leucocytes -9,7·109/l, ESR – 20 mm / hour. Mantoux test with 2 TU – 12 mm. X-ray picture: pathological changes are absent. Make the correct diagnosis

A. Posvaccinal allergy.

B. Conversion of tuberculin test.

C. Tuberculosis of non-established localization.

D. Tuberculosis of intrathoracic lymphatic nodes.

E. Primary tuberculosis complex.

Answer: B

2. The child 6 years old from the contact with TB-patient complains of the cough, fever up to 380C, absence of the appetite. Auscultation: there are moist small-bubbled rales and wreaked breathing at the corner of the right scapula. X-ray picture: there is an infiltrate fused with the shadow of the lung hilum in 5-th segment of the right lung. Blood test: leucocytes - 12·109/l, ESR – 36 mm / hour. MBT in the sputum is not identified by microscopy. Mantoux test with 2 TU – papule with the diameter of 15 mm. Past history: first positive tuberculin test was registered 6 months ago. Make the diagnosis.

Answer: New case of TB (date) of the moderate lobe of the right lung (primary tuberculous complex) Destr.- (phase of infiltration), MBT -, M-, Co, Resisto, O, Kat.1

Content of the topic

Primary TB develops in the body not previously infected by Mycobacterium tuberculosis. Primary infection is confirmed by the conversion of tuberculin test from negative into positive one. Clinical manifestations of primary TB are different. More frequently it realizes in the forms of tuberculosis of non-established localization, primary tuberculous complex and tuberculosis of intrathoraxic lymphatic nodes. Chronic primary tuberculosis is also distinguished. It is possible for primary TB to arise in the form of focal, disseminative processes and also in the form of serousitis and extra pulmonary forms. Tuberculosis of non-established localization of children and adolescents is a clinical form of primary tuberculosis characterized by the symptoms of functional disorders without local manifestations of the disease. The main criterions of the diagnosis of this form of tuberculosis are:

- conversion of tuberculin test;
- presence of the syndrome of intoxication;
- absence of local changes;
- absence of other diseases capable to induce intoxicative syndrome.

Primary tuberculosis complex (PTC) is a clinical form of primary TB characterized by specific inflammation in the lungs, intrathoracic lymphatic nodes and lymphangitis with development of on the corresponding clinical picture. Clinical duration of the PTC can be plain and complicated. When plain duration of PTC clinical symptoms often can be absent. When complicated duration of PTC can start subacute. In acute variant of the disease intoxicative and bronchi-pulmonary syndromes are significant and bronchi-pulmonary syndrome can arise as cough, pain in the chest and breathlessness. Complications are:

- lymph-hematogenous dissemination;
- tuberculous pleural effusion;
- tuberculous bronchitis;
- lymph bronchial fistula;
- segmental or lobar atelectasis of the lung.

Progression of the PTC can lead to primary caseous pneumonia. Xray picture in PTC is characterized by the bipolar syndrome – a focal shadow in the lung and changing shadowing of the hilum due to enlarged intrathoracic lymphatic nodes. In most cases of spontaneous recovery or imperfect treatment residual changes such as fibrosis and calcification in the lungs are formed. Calcified tuberculous lesions can be seen at the hilum of the lungs due to calcification of the lymphatic nodes and in the lung parenchyma (Ghon's lesions). Clinical duration of PTC can be plain (uncomplicated) and asymptomatic. In this case diagnosis is made on the ground of tuberculin test (conversion negative reaction into positive one; hyperergic reaction and so on) and X-ray examination. Differential diagnosis of PTC is spent with pneumonia, eosinophylic infiltrate of the lung and lung cancer. The treatment when plain PTC is carried out according to Category III, when complicated - according to Category 1.

Tuberculosis intrathoracic lymphatic nodes (TILN) is a clinical form tuberculosis characterized by specific inflammation of lymphatic nodes of the lung hilum and mediastinum. So called "small" form of TILN, timorous (caseous-necrotic) and infiltrative (hyper plastic) variants. "Small" form is a clinical variant of TILN manifesting only X-ray signs of the changes of lung hilum shadowing (it's deformation, enriched and increased lymphatic nodes is confirmed by the revealing of enlarged lymphatic nodes during tomography investigation of the organs of the chest. The investigation reveals the enlargement of the mediastinum or hilum lymphatic nodes with clear polycyclic, curved contours. Morphologically caseousnecrotic lymphadenitis is characterized by alteration, sometimes by total necrosis of affected lymph node. When infiltrative variant lung hilum is widened and it's counters are unlearned as a result of the peripheral exudative inflammation reaction around enlarged lymph nodes (hyperplastic form of tuberculous lymphadenitis morphologically). Insignificant parts of caseous necrotic are revealed in the lymph nodes. Hyperplasia is dominant comparing with specific infiltration. In complicated cases of TILN decay and formation of the caver, lymph bronchial fistula, lymph hematogenous dissemination, tuberculous bronchitis, bronchial obstruction, and pleural effusion can appear. In a case of plain duration the activity of the inflammation gradually decreases and the resolving, indurations

and calcification occur. The peculiarity of primary tuberculosis duration in adolescents realizes in infiltrative tuberculosis sometimes complicated by the formation of primary cavern and/or pleural effusion. The treatment of uncomplicated TILN is spent according to Category III, when complicated one - Category 1 is used.

The prevention of tuberculosis includes social, sanitary, specific (BCG vaccination and revaccination) and chemo prophylactic measures. Social prophylaxis direct on the sanitation of an environment, increasing of the level of life of a population, enhancing of its health, performing of the measures against the alcoholism, drug-abusing, tobacco-smoking, HIV-infection.

Specific prophylaxis includes BCG-vaccination and revaccination and is obligate in Ukraine and many other countries. It is performed according the calendar of prophylactic vaccinations/ BCG vaccine was suggested in 1919 by french microbiologist A.Calmette and pediatric S.Guerin/ BCG strain survives I the body, vegetates in it stimulating the development of antituberculosis immunity. During two weeks after vaccination BCG begin to transform into L-shaped form of organisms. In this form BCG can survive in the body during 7 and more years, supporting antituberculosis immunity. Nowadays BCG vaccination is performed in 118 countries of the world and in 64 countries vaccination is obligate in accordance with lows. BCG vaccination in 4-9 times decreases TB morbidity of newborns and their mortality caused by tuberculosis; in 1,5-2 times vaccination increases TB infection among vaccinated children. BCG vaccination blocs hematogenous dissemination of MBT and also significantly diminishes the quantity of MBT in lungs, shortening the terms of TB infection presence in the body, stopping the generalizing of the infection and as a result of this improve the running of primary TB infection in vaccinated persons. Antituberculosis vaccination significantly decreases a development of such severe forms of TB as tuberculous meningitis, military tuberculosis and caseous pneumonia.

The materials for the self-control

1. To draw the scheme of pathological changes in the lungs in case of primary tuberculous complex in the right lung field.

2. Mark what sign of below mentioned list is characteristic for tuberculous infection of primary period?

a) an involvement of lymphatic system;

b) a formation of the cavern

Answer: a)

3. Chose such signs and syndromes which can be the ground for the diagnosis of tuberculosis of non-established localization: 1. a conversion of negative tuberculin test into positive one; 2. a shadow in the lung fusing with the shadow of widening lung hilum; 3. an irritation, fast fatigue; 4. intensification lung hilum shadowing.

Answer: 1, 3.

4. Chose the signs which are characteristic for X-ray manifestation of the pathology in below mentioned list of signs:

1. an intensive segmental shadowing in the lung, without lung hilum reaction;

2. a shadowing in the lung fusing with the of shadowing of widening lung hilum;

3. a round thin- walled cavity in the lung;

4. a round shadow.

Answer: 2.

5. What kind of residual changes is formed during the reducing of primary tuberculosis complex?

1) Ghon's lesion;

2) Calcification in the lung;

3) Ghon's lesion and calcification in the lung.

Answer: 3)

Tasks for the self-control.

1. The child 3 yearned old has lost his appetite, becomes capricious, lifeless. A cough appear fever up t – 37,40. Mantoux test was 5 mm a year ago. The girl is of lowered body weight. The skin is pale. Peripheral lymphatic nodes are palpable in 5 groups (small, soft, elastic, painless). BCG sign is 3 mm. The breathing is weakened and lung sound is shortened over the percussion. Blood test: leucocytes - 12·109/l, sticks. -6%, segm.-74,6%, lymph.- 20%, ESR – 36 mm / hour. Mycobacterium tuberculosis are found microscopically in gastric washings. Plain X-ray picture: right lung hilum widened with clear curved counters.

1) Formulate the diagnosis according to classification;

2) Which variant of TILN corresponds with X-ray picture?

3) Which chemotherapy regimen the child needs?

2. The child is 11 years old. There are complaints of the fever, acute pain in the right side of the chest during breathing. The child was in the contact with his grand father, died from tuberculosis. There is the dullness from 3-th rib and down during the percussion over the right side of the chest.. The breathing is weakened there during the auscultation. Blood test: leucocytes – 10,8·109/l, ESR – 27 mm / hour X-ray picture: right lung hilum 15 widened, it's structure is changed. Homogenous shadowing with slanting upper counter is seen in the lateral part of the right lung. At the age of 10 years Mantoux test was negative. Sputum smear negative (TB-bacilli are not found microscopically).

1) Formulate the diagnosis according to classification;

2) What more accurate investigation is necessary to define the etiology of pleural effusion?

3) Which chemotherapy regimen must be prescribed to the child?

3. Which dose of BCG vaccine is correct?

A. 0,025 mg

B. 0,5 mg

C. 0,25 mg

D. 0,05 mg

E. 0,005mg

4. Which of these contraindications to BCG vaccination is a constant one?

A. Low bodyweight of newborn (less than 2 kg)

B. Purulent and septic diseases.

C. Any acute disease.

D. Postnatal trauma with neurological disorders.

E. Generalized BCG-infection in other children of the family.

5. Which contraindication to BCG vaccination is a temporary one?

A. TB infection or TB in the past.

B. Positive or doubtful reaction towards Mantoux test with 2 TU of PPD-L

C. Complication of previous BCG vaccination.

D. Malignant blood diseases or a cancer.

E. Temporary contraindications are absent among above mentioned ones.

Tasks for the control of current knowledge level on the topic.

1. The healthy infant with body weight of 3 kg is born. His state was estimated as 8 balls according to Apgar's scale. His father suffering from "open case" of TB is a t home.

What is the pediatrics' management of this case?

A. To vaccinate the child with BCG-1 and discharge him from maternity home.

B. To vaccinate the child with BCG-1, discharge him from maternity home and carry out a course of chemoprophylaxis.

C. To vaccinate the child with BCG-1 and delay the discharge of the child in maternity home for 1 month.

D. To vaccinate the child with BCG-M and discharge him from maternity home.

E. To vaccinate the child with BCG-1, discharge him from maternity home and to send father to anti-TB hospital.

2. The adolescent at the age of 14 years old resides with his parents and his grandfather. The grandfather suffers from an "open case" of TB. The adolescent is in a persistent contact with his grandfather. The adolescent undergoes BCG-vaccination.

Which BCG vaccine dose of ones below mentioned has to be done?

A. 0,5 mg.

B. 0,05 mg.

C. 0,25 mg.

D. 0,025 mg.

E. 0,001 mg.

3. There are five children in different three families. They were tested with Mantoux test with 2 TU of PPD-L. The results obtained are as following: first child – papule with the diameter of 10 mm, second one – 4 mm with the vesicle in the centre, third one – 3 mm, forth one – hyperemia only, fifth one – injected reaction only.

Which child can be BCG-revaccinated?

A. The child with the reaction - papule of 10 mm.

B. The child with the reaction - papule of 4 mm with the vesicle in the centre.

C. The child with the reaction - papule of 3 mm.

D. The child with the presence of hyperemia only.

E. The child with injected reaction only.