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Late neurosyphilis in a patient with pulmonary tuberculosis

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The article reports a lethal case of a patient who rapidly developed clinical manifestations of late neurosyphilis, being on conservative and surgical treatment for fibro-cavernous pulmonary tuberculosis. The death was caused by neurosyphilis. The attending doctors, including phthisiatricians, surgeons, neurologists, and even a counseling dermatovenereologist did not relate the patient's seropositivity to developing neurological symptoms. The late diagnosis of ischemic stroke and delayed onset of specific treatment resulted in the poor outcome. We draw attention of the aforementioned medical specialists to the fact that an expert pathological study and histological validation of specific injuries to the brain and other organs and tissues involved in the specific process is highly important. Treponema pallidum was detected in lesion sites by special staining techniques, which validated the etiology of the disease. The article emphasizes the advisability of more extensive use of histologic and etiologic validation of the diagnosis, which is not commonly used in the Russian Federation.

Keywords: *combination of tuberculosis and tertiary syphilis, late neurosyphilis, tuberculosis and syphilis.*

Tuberculosis (TB), HIV, and syphilis — each of these three infections seriously complicates and shortens people lives. The severity and wide prevalence of these infections in the world and in Russia are demonstrated by the following brief data.

According to WHO, TB is one of the 10 leading causes of death in the world. In 2015, 10.4 million people became sick with TB, and 1.8 million people (including 0.4 million people with HIV) died of the disease. Over 95% of TB deaths occur in low- and middle-income countries. According to WHO estimates, 480,000 people worldwide developed multidrug-resistant TB (MDR-TB) in 2015 [1]. In Russia, the incidence rate of TB decreased from 85.4 to 59.5 cases per 100,000 population in the period between 1999 and 2014, but the absolute number of patients with the combination of TB and HIV increased about 50-fold [2, 3].

The epidemic of HIV infection has rapidly developed in Russia since the early 2000s. According to the statistical data from the Federal Scientific and Methodological Center for Prevention and Control of AIDS, the absolute number of people living with HIV in Russia increased 3-fold between 2003 and 2013, reaching about 800,000 people. Over the same period, the incidence rate of HIV infection increased 2.4-fold (from 22.3 cases per 100,000 population in 2003 to 54.3 cases in 2013). The total number of people living with HIV (prevalence) amounted to 479 cases per 100,000 population [4].

In the 1990s, the incidence rate of syphilis was characterized by an epidemic rise with the peak in 1997 (277.3 cases per 100,000 population), followed by a gradual decrease. In the last 10 years (2005— 2015), the incidence rate decreased 3-fold: from 68.8 to 23.5 cases per 100,000 population [5, 6]. The morbidity pattern has changed significantly: early disease forms were dominant in the 1990s; at present time, late disease forms predominate, which are significantly more serious in terms of both diagnosis and prognosis.

The most serious problems accompany the combination of these infections in one patient. In recent years, there have been reported many clinical cases of various variants of similar co-infections (syphilis + HIV infection; TB + HIV infection) [7—10]. There are also reports of the combination of TB and syphilis, but these publications refer to the 1930s [11, 12].

Below, we present a clinical case of tertiary syphilis with dominating symptoms of nervous system involvement in a patient who suffered from active pulmonary TB and died of late meningovascular neurosyphilis.

Clinical case

A male patient *A.* was born in the Orenburg region in 1959. He grew and developed normally, worked as a farm machinery operator, and served as an armor crewman for 2 years. Since the age of 25 years, he lived in Moscow and worked as a roofer. Since 2015, he did not work. He lived in a family with his wife; adult children lived separately. He smoked up to 1.5 packs of cigarettes a day and irregularly took alcohol. The patient denied drug abuse. There was no information on contact with TB patients. He had not had TB. He had not been in prison. He underwent

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the latest fluorography more than 15 years ago: there were no pathological changes and calling for control.

In June 2016 in the Orenburg region, he was examined for pain in the right shoulder joint. Pulmonary TB was suspected; in this regard, the patient was advised to return to Moscow and consult a TB doctor. On 23.06.16, he was diagnosed with infiltrative tuberculosis of the upper lobe of the right lung. He was hospitalized to the Moscow City Research and Practical Center for Tuberculosis Control. On 30.06.16, inpatient treatment was started under the chemotherapy regimen I (CTR I). Later, the treatment was switched to another regimen (CTR IV, an intensive phase) due to drug resistance.

Serological tests for syphilis (01.07.16): microprecipitation reaction (MPR), 4+; enzyme-linked immunosorbent assay (ELISA), (*IgG* + *IgM*); positive cutoff index (COI), 16.3; passive hemagglutination test (PHAT), 4+.

Esophagogastroduodenoscopy (EPGD) of 07.16: superficial gastritis and type 2 axial hiatal hernia.

Fibrobronchoscopy (FBS) of 07.16: no pathological changes were detected.

Ultrasound examination of the abdominal cavity and kidneys of 07.16: diffuse changes in the pancreas and liver, gallbladder deformity. Otolaryngologist's examination of 06.16: deflected nasal septum.

Ophthalmologist examination of 07.16: **anisocoria**; retinal angiopathy.

EchoCG of 07.2016: mitral regurgitation, +; tricuspid regurgitation, +; moderate pulmonary hypertension; minor left ventricular hypertrophy; areas of wall motion abnormality were not clearly defined.

Consultation with a dermatovenerologist of 29.07.16 (non-treponemal and treponemal tests of 01.07.2016), diagnosis: A53.0 «latent syphilis, unspecified as early or late» (spinal puncture was not performed due to a severe general condition).

Treatment prescribed: ceftriaxone 1.0 i/m, 1 course for 20 days; after 2 weeks, the 2nd course for 10 days.

The treatment was performed from 30.07.16 to 15.09.16.

Computed tomography (CT) of the chest of 07.07.16 **(Fig. 1)**.

X-ray CT (control) of 16.09.17: there was resorption of perifocal infiltration; formation of multiple tuberculomas in the upper lobe of the right lung was completed, in one of which destruction appeared. Due to suspicion of the combination of tuberculosis and cancer, the patient was referred to a pulmonary commission. On 19.09.16, the patient was transferred to the Thoracic Surgical Department No. 2. An extended meeting of the Central Medical Board on Antituberculosis Chemotherapy of 23.09.17: Chest radiography findings (20.09.16). No changes were revealed: multiple tuberculomas remained in the upper lobe of the right lung, with signs of destruction being present in one of them. The sinuses were free. The heart shadow was not enlarged and located medially. There were no osteodestructive changes. MTB, +; MDR (SHRE), multidrug resistance. Impression: surgical treatment (right upper lobectomy) was recommended. On 03.10.16, the patient underwent right upper lobectomy **(Fig. 2)**.

Postoperative period (October 2016): the patient complained of weakness, dizziness, and episodes of loose stool. There was coordination impairment. Moderately grave condition. Breath was bronchial, weakened in the right lower lung fields; there were no rales. Blood pressure was 120/80; the heart rate was 110 beats per minute; the body temperature was 37.5 °C. X-ray findings: the right lung was expanded almost completely; there was a small gas cavity in the dome. An operated pleural cavity (OPC) on the right was punctured under fluoroscopic control: 5 mL of gas and 1 mL of fibrinous fluid were aspirated; the OPC was washed with novocaine, and 1.0 cefotaxime in 5 mL of 1% dioxidine was introduced.

Laboratory findings: leukocytosis; increased ESR, urea, and creatinine; hypoalbuminemia. Treatment prescribed: ceftriaxone 2.0 intravenously (i/v) twice a day for

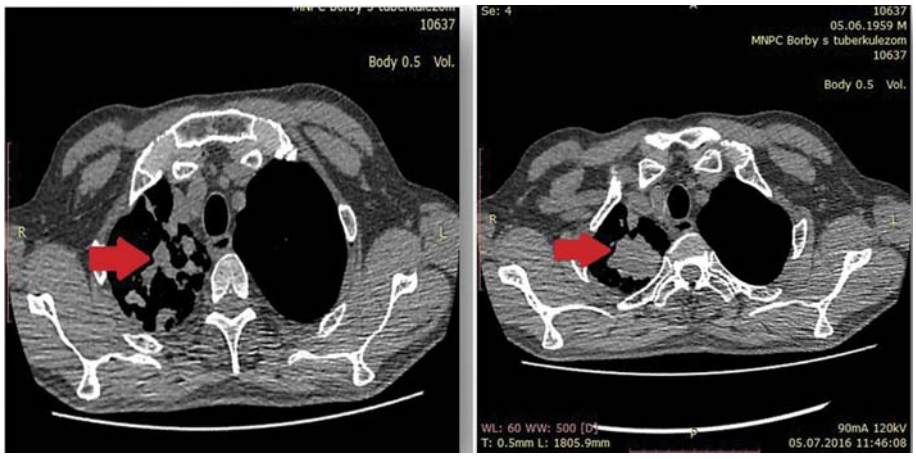

Fig. 1. **X-ray picture is more consistent with infiltrative TB of the upper lobe of the right lung with transformation into multiple tuberculomas and destruction.**

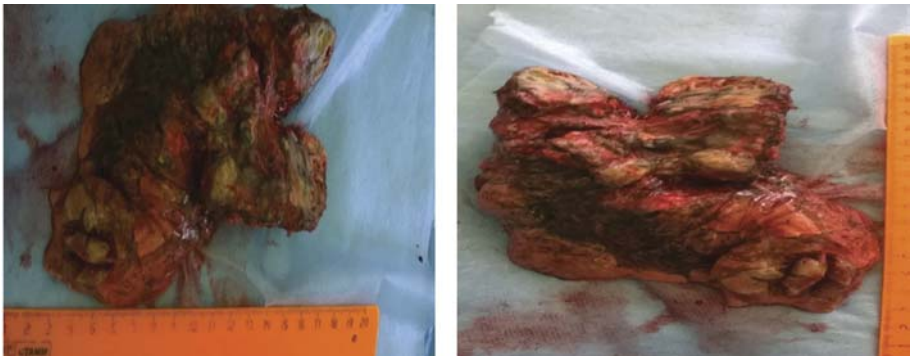

Fig. 2. **Specimen slice. A macroscopic picture of a cavern filled primarily with putty caseous necrosis, large caseous foci, and bullous emphysema with fibrosis. Histological examination reveals pulmonary tuberculomas at a slight progression stage.**

10 days; metronidazole 0.5 i/v twice a day; 500 mL of 10% glucose with 1.0 ascorbic acid i/v; 200 mL of 5% glucose with 10 mL of pentoxifylline i/v twice a day; 1,000 mg of pentasa 3 times a day; probifor 2 capsules 3 times a day.

Specialty consultations

Consultation with a psychotherapist (27.10.16): the patient complained of **weakness, dizziness, staggering when walking**, poor appetite, and impaired mood.

Objective status: the patient **walked with difficulty** due to dizziness. There was staggering and falling to the side. There were no positive mental symptoms.

Consultation with a neurologist (07.11.16): full range movements; staggering in the Romberg; pronounced oral automatism symptoms.

Diagnosis: psychoorganic syndrome with subdepression; severe cognitive impairment.

Conclusion of the extended meeting of the Central Medical Board on Antituberculosis Chemotherapy of 11.11.16: surgical treatment (posterosuperior thoracostomy) was recommended.

Fluoroscopy findings (16.11.16): the OPC size decreased; the lung tissue was sufficiently translucent. In coordination with the Deputy Chief Physician for Thoracic Surgery, it was decided to postpone the planned thoracostomy and continue OPC drainage.

Complete blood count: ESR, 115 mm/h; leukocytes, $23.1 \cdot 10^9$/L; stab cells, 12%; lymphocytes, 15%; other indicators were normal. Blood chemistry: aspartate aminotransferase, 61 U/L; urea, 12.7 mmol/L; other indicators were normal. Common urine analysis: protein, 0.14 g/L; nitrates, 0.08; hyaline and granular cylinders, 0—1 per field of view. No other changes were revealed.

Comorbidities: in the setting of weight loss, the patient was detected with a 5.5×7.5 cm lesion located in soft tissues of the chest wall on the right at the X rib level, along the scapular line, which had a clear even contour, a rounded shape, and a smooth surface and was mobile and painless. Diagnosis: chest wall lipoma on the right. On 14.12.16, the patient underwent resection of the chest wall lipoma on the right. Histological diagnosis: lipoma.

The extended meeting of the Central Medical Board on Antituberculosis Chemotherapy of 20.12.16 recommended surgical treatment (posterosuperior thoracomyoplasty of the OPC) with the intraoperative decision on the advisability of resection of the middle lobe in the bronchopleural fistula area.

Worsening of the patient's condition (26.12.16). The patient complained of poor health, difficulty in forming phrases, and feeling of **a heavy head**.

The patient's condition was satisfactory. Breath was bronchial, weakened in the right lower lung fields; there were no rales. Blood pressure was 120/80; the heart rate was 100 beats per minute; the body temperature was normal. The abdomen was soft and non-tender. Stool and diuresis were normal. There was no edema. The only neurological symptoms were **speech disorders**. There were no focal symptoms and meningeal signs. The disorders were assessed as potential side effects of cycloserine; the drug was discontinued. Due to tachycardia, a therapist prescribed verapamil at a dose of 80 mg, 3 times a day.

Fluoroscopic findings: the right lung was expanded across available space; there were pleural thickenings in the dome, including a gas cavity.

The OPC on the right was punctured under fluoroscopic control; 5 mL of gas and 1 mL of a fibrinous-hemorrhagic exudate were aspirated; 5 mL of 1% dioxidine with 1.0 kanamycin, 2.0 ceftriaxone, and hixozide was introduced.

The patient consulted a thoracic surgeon (29.12.16). Conclusion: the issue of surgical treatment (posterosuperior thoracomyoplasty of the OPC) with the intraoperative decision on the advisability of resection of the middle lobe in the bronchopleural fistula area would be resolved after 09.01.17.

Changes in the patient's condition (30.12.16): the patient complained of **poor health**, **feeling of a heavy head**, and **headache**. The patient's condition was of moderate

severity. The patient **poorly coordinated his movements**, **was swaying in the Romberg position**, **and had poor balance when walking**. Breath was bronchial, weakened in the right lower lung fields; there were no rales. Blood pressure was 100/60; the heart rate was 100 beats per minute; the body temperature was normal. The abdomen was soft and non-tender. Stool and diuresis were normal. There was no edema.

The patient was referred for brain CT scan **(Fig. 3)**.

The patient consulted a neurologist. Diagnosis: **ischemic stroke** of the left basal temporal lobe of **27.12.16**; there were no indications for neurocritical care.

Due to deterioration in the condition, the patient was transferred to the Anesthesiology and Critical Care Department to continue treatment according to the neurologist recommendations. On 01.01.17, the patient was examined due to abdominal pain. The diagnosis of antibiotic-associated colitis was made. By 04.01.17, the patient's condition worsened; **recurrent stroke was suspected**.

The patient was transferred to the **Neurocritical Care Department** where a clinical diagnosis was made: ischemic stroke of the left basal temporal lobe of 27.12.16. There was circumscribed chronic empyema with a bronchopleural fistula on the right.

04.01.17. At admission on 04.01.17: the patient was in a serious condition, but had no complaints due to severity of his condition; the body temperature was 37.8 °C. Consciousness: the patient was sluggish and adynamic. Sensorimotor aphasia. The patient was able to open his eyes and fix his gaze as well as irregularly execute instructions. OD = OS; photoreactions; corneal reflexes were preserved. There were no meningeal symptoms. Right-sided hemiplegia, Babinski's symptom on the right.

The patient was normosthenic and undernourished. The skin and visible mucous membranes were of gray color. Soft tissue tone was reduced. Sanitation of the tracheobronchial tree was accompanied by discharge of excessive purulent sputum. The cardiac border was normal. Heart sounds were rhythmic and muted. The heart rate was 110 beats per minute. Blood pressure was 130/80 mm Hg. Pulse was of satisfactory volume and strength. The patient was admitted with a nasogastric tube and a bladder catheter. A catheter was placed in the right subclavian vein.

The patient received the following treatment: ciprofloxacin, metronidazole, amikacin, fluimucil, heparin, cardiomagnyl, quamatel, paracetamol, omeprazole, mexidol, vancomycin, and ceftriaxone 2.0 i/v once day for 14 days. On 06.01.17, the patient was connected to artificial lung ventilation (ALV).

Laboratory tests and specialty consultations

Complete blood count of 04.01.2017: leukocytes, $28.1 \cdot 10^9$/L; lymphocytes, 11%; granulocytes 86.6%.

ECG of 04.01.17: sinus rhythm; heart rate, 100 beats/min. the QRS axis was normal. There was intraventricular conduction abnormality.

Brain CT scan of 04.01.17: there were signs of ischemic stroke of the left temporal-parietal-occipital region. There were signs of sphenoiditis, mastoiditis, and bilateral otitis media.

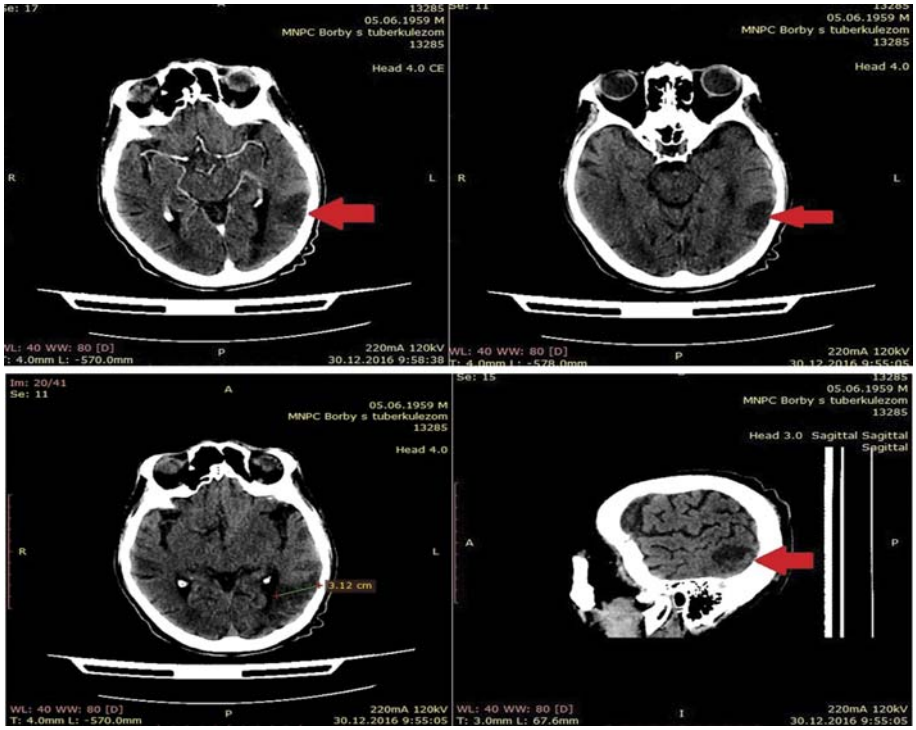

Fig. 3. **Left-hemispheric ischemic stroke in the temporoparietal region.**

Ultrasound of the brachiocephalic arteries (BCAs) of 04.01.17: atherosclerosis of the BCA; stenosis of the left common carotid artery (40—45%); stenosis of the left carotid bifurcation (25—30%); stenosis of the left internal carotid artery (15—20%); stenosis of the left external carotid artery (15—20%).

EGD of 05.01.17: type 2 axial hiatal hernia; chronic reflux esophagitis; atrophic gastritis; superficial duodenitis.

Ultrasound of the abdominal cavity of 05.01.17 and 24.01.17: hepatomegaly. Diffuse changes in the liver and pancreas. Suspension in the gallbladder; small amount of free fluid in the abdominal cavity.

Serological tests for syphilis and hepatitis of 10.01.17: MPR was negative; ELISA (*IgM* + *IgG*) was positive; *IgG* ELISA was positive; *IgM* ELISA was negative. HBsAg and aHCV were not detected.

Consultation with a **dermatovenereologist of 13.01.17: diagnosis — FSPRs, further examination**.

X-ray of the chest of 16.01.17: bilateral polysegmental pneumonia. Atelectasis of the right lung. EchoCG: slight mitral and tricuspid valve insufficiency, degenerative changes in the aortic root and aortic valve cusps without impairment of function.

Consultation with an infection disease doctor: secondary purulent meningitis. Exclude neurosyphilis (!).

Doppler ultrasound of the lower limb veins of 17.01.17: occlusive thrombosis of the left soleal vein without flotation signs.

17.01.17 and 24.01.17. **Bacteriological test of cerebrospinal fluid: microflora was not found.**

20.01.17. Cerebrospinal fluid: cytosis, 348/3; protein, 0.4 g/L; glucose, 3.5 mmol/L; lymphocytes, 9.3%; neutrophils, 89.6%,

23.01.17. Cerebrospinal fluid: cytosis, 173/3; protein, 0.3 g/L; neutrophils, 67.3%; lymphocytes, 33.6%.

31.01.17. Cerebrospinal fluid: cytosis 24/3, protein 1.8 g/L; glucose, 1.8 mmol/L; lymphocytes, 70.8%; neutrophils, 27.9%

02.02.17. Cerebrospinal fluid: immunofluorescence reaction, 4+; Treponema pallidum immobilization test (TPIT) 54%. 02.02.2017. Blood: immunofluorescence reaction, 3+; TPIT, 48%.

06.02.17. The patient was disconnected from the ventilator, further, the patient's condition was stable.

09.02.17. Repeated consultation with a dermatovenereologist; diagnosis: neurosyphilis, meningovascular form. The patient was prescribed 2.0 ceftriaxone i/v for 20 days.

25.01.17. The patient had a long-distance consultation with specialists of the Moscow City Research and Practical Center for Tuberculosis Control of the Moscow City Health Department; conclusion: there was no indication for tuberculosis reactivation. In the case of a successful rehabilitation period after stroke, consultation with a thoracic surgeon was planned.

21.02.17. Consultation with an ophthalmologist: OD=OS; OU initial cataract; retinal angiosclerosis.

07.03.17. Consultation with a cardiologist: hypertension stage III; arterial hypertension grade III, risk IV.

10.02.17. Consultation with a psychologist: pronounced diffuse dysfunction of the subcortical brainstem structures; dysfunction of the left frontoparietotemporal region. Pronounced disorders of mental neurodynamics. Total aphasia.

The patient was **discharged home** with outpatient follow-up with a neurologist, a physician, and a surgeon at the place of residence (**08.03.17**).

At discharge: in the neurological status, there were no significant changes in focal neurological symptoms. The patient was conscious. He lay with open eyes, actively following the doctor. When directly addressed, the patient moved his lips, trying to speak. **Sensorimotor aphasia. The patient was not to be capable of productive contact.** There were no meningeal signs. The palpebral fissures were symmetrical. Photoreactions were preserved and symmetrical. Eyeball movements were not restricted. There was no nystagmus. The face was asymmetrical; the right nasolabial fold was smoothed. There were no clear signs of tongue deviation. **Right-sided hemiplegia. There were minimal movements in the left limbs.** Tendon reflexes D>S. Babinski's symptom on the right. Coordination and sensitivity could not be verified; in the somatic status, the patient's condition was of moderate severity. The liver was at the costal arch edge. There was a **deep bedsore** in the sacrum area; spontaneous breathing; **tube feeding**.

The patient died at home on 10.03.17.

Autopsy study of 11.03.17.

Final clinical diagnosis. Primary disease: neurosyphilis, a meningo-vascular form, residual effects of a stroke with deep tetraparesis, severe speech disorders, and pelvic dysfunction.

Complications: lower tracheostomy of 06.01.17. Secondary purulent meningitis.

Secondary diagnosis: Coronary heart disease. Atherosclerotic cardiosclerosis. Chronic obstructive pulmonary disease. Bronchitic type in the unstable remission stage. Diffuse metatuberculous pneumosclerosis. Condition after upper lobectomy on the right for fibro-cavernous pulmonary tuberculosis (03.10.16). Gastroesophageal reflux disease: type 2 axial hiatal hernia. Chronic reflux esophagitis grade 1. Lower extremity varicose vein disease. Moderate normochromic anemia. Grade 3 or 4 bedsore in the sacral area. Bilateral tubootitis. Chronic idiopathic rhinitis in the remission stage. Deep vein thrombosis of the lower extremities.

Surgical material: pulmonary tuberculoma in the organization phase **(Fig.4, 5)**.

Brain, a gross specimen **(Fig. 6)**.

Lytic lesion of the brain matter, a slide **(Fig. 7—9)**.

Meningovascular lesion **(Fig. 10)**.

Skull sinuses **(Fig. 11)**.

Microscopic examination of aortic tissues — syphilitic mesaortitis **(Fig. 12)**.

Histological examination of the liver **(Fig. 13, 14)**.

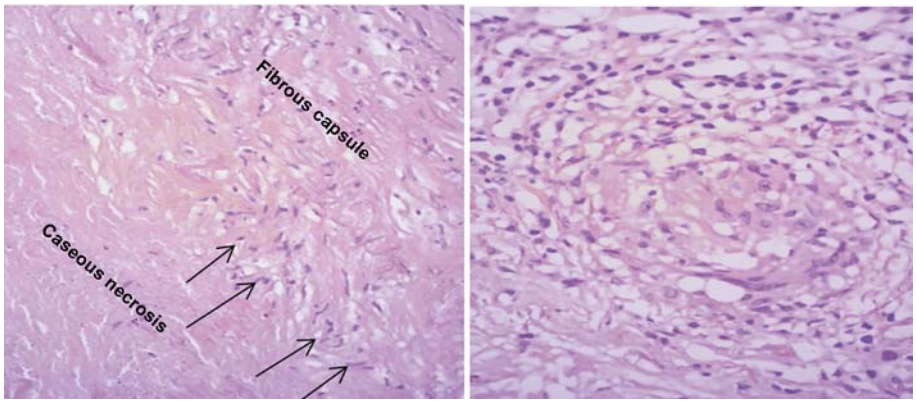

Fig. 4. **Surgical material: pulmonary tuberculoma in the organization phase. The margin of a caseonecrotic lesion is represented by a formed fibrous capsule; there are rare epithelioid cells along the necrosis margin (indicated by arrows). Right, a small organized pulmonary granuloma.**

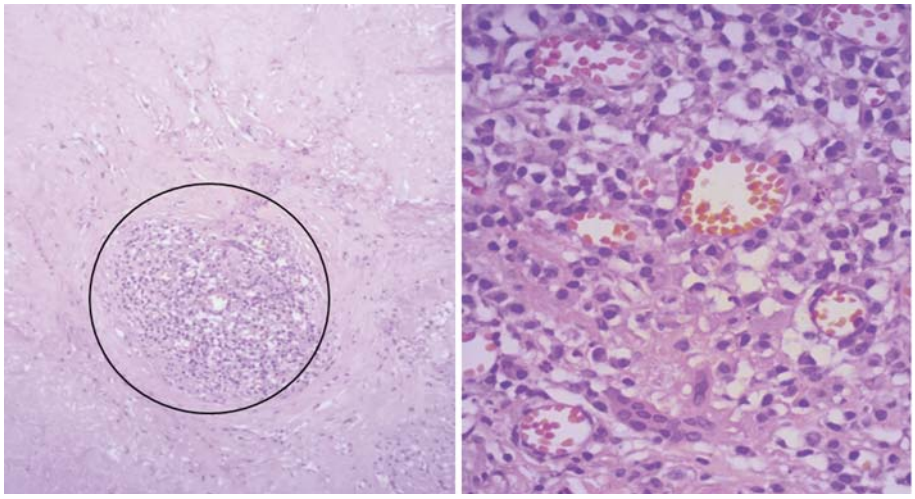

Fig. 5. **Surgical material: pulmonary tuberculoma in the organization phase. There is a single small focus of plasma-cell infiltration (encircled). Right, plasma-cell infiltrate (fragment).**

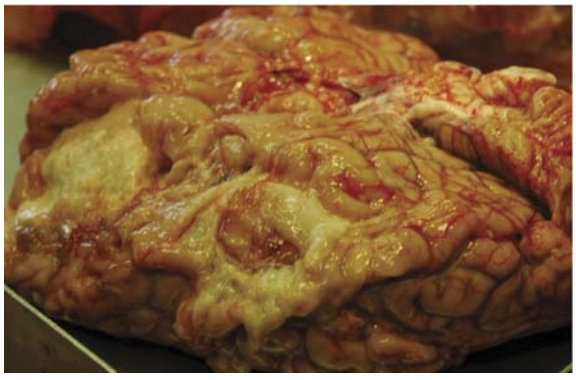

Fig. 6. **Brain (gross specimen). There is a large destruction focus represented by pulp-like masses without clear boundaries.**

Histological examination of the myocardium **(Fig. 15)**.

Pathologic diagnosis. Syphilis, tertiary period (visceral syphilis). Neurosyphilis with extensive ischemic cerebral infarction with involvement of the frontal, parietal, and temporal lobes and subcortical nuclei of the left hemisphere; proliferative vasculitis of the skull base vessels; productive meningoencephalitis; productive inflammation of the choroid plexus of the lateral ventricles. 02.02.17; the histobacterioscopic examination with Warthin-Starry staining revealed spirochete clusters in the affected brain areas. Cardiovascular syphilis: syphilitic mesaortitis of the aortic arch; productive inflammation of the coronary arteries. Small syphilitic gummas of the liver; productive hepatitis. Productive inflammation of the mucous membranes of the skull sinuses. Complications: edema and swelling of the brain. Bilateral polysegmental microfocal fibrinous-purulent pneumonia with

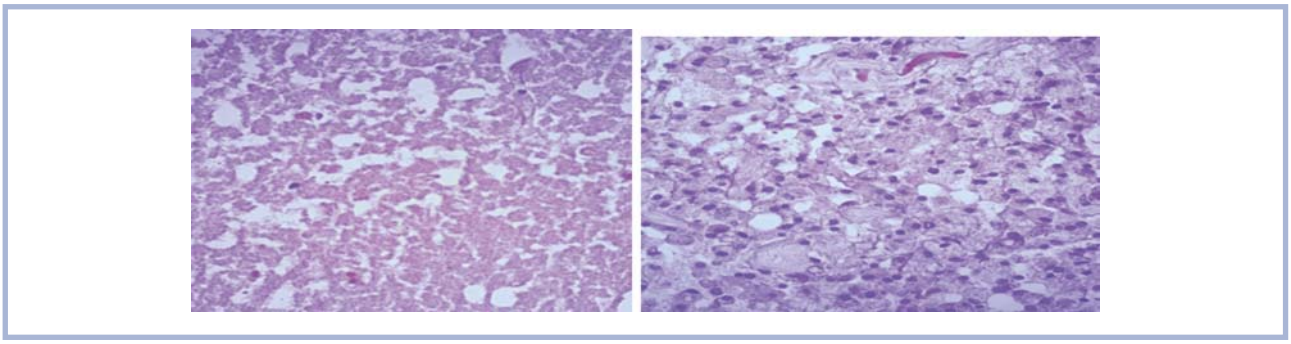

Fig. 7. **Brain matter destruction focus (slide). Homogeneous anuclear cell-free masses. Right, an area of ischemic cerebral infarction, «granular sphere» cells (macrophages with light fine-grained cytoplasm, performing the function of phagocytosis).**

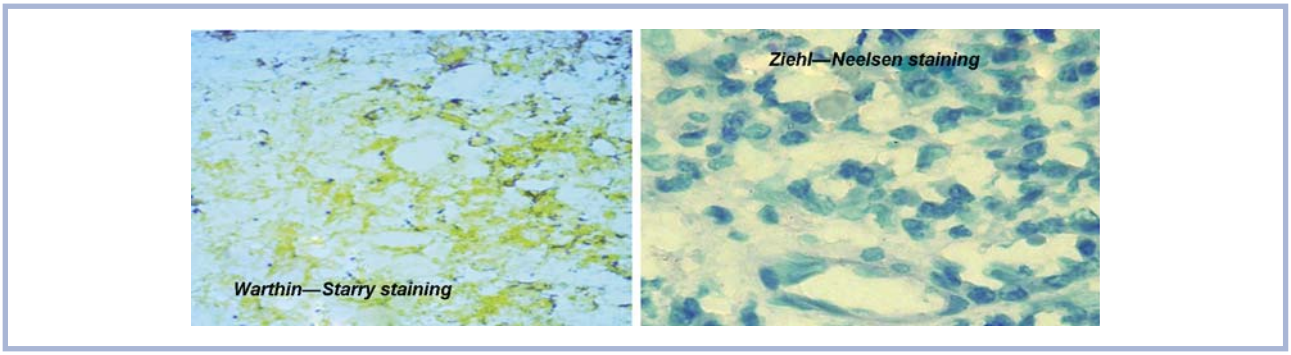

Fig. 8. **Numerous spirochetes (small black structures) were found in the brain destruction focus. Right, TB causative agent was not found (staining for acid-fast bacteria).**

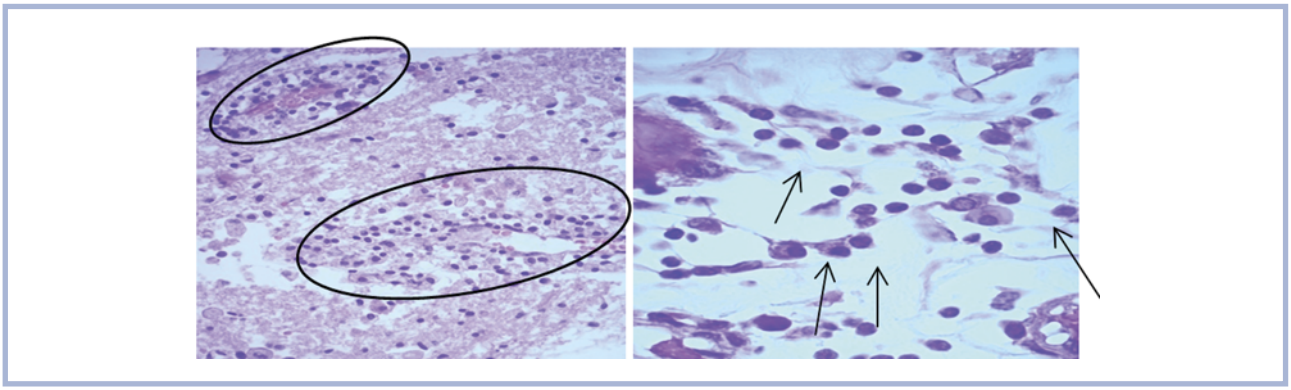

Fig. 9. **Perivascular lymphocytoplasmacytic infiltration. A fragment with plasma cells indicated by arrows is shown on the right.**

signs of aspiration pneumonia. Chronic pulmonary heart: moderate dilatation of the right heart cavities; myocardial hypertrophy of the right ventricle, 0.5 cm. Pulmonary edema. Acute hemorrhagic erosions of the gastric mucosa. Cachexia. Bedsore in the sacrococcygeal area. Anemia.

Comorbidities: Residual tuberculous changes — right pleural thickening; adhesion in the right pleural cavity; scrubbed air encapsulated residual pleural space on the right. Macrofocal cardiosclerosis of the anterior wall of the left ventricle. Complicated coronary atherosclerosis involving 70% of the intimal surface, with a 2 cm calcified plaque 1 cm from the orifice of the anterior interventricular branch of the left coronary artery, with complete lumen obliteration. Atherosclerosis of the cerebral arteries affecting 75% of the intimal surface as well as stenosis up to 50%. Epigastric adhesions.

Surgery. Right upper lobectomy (histological findings: pulmonary tuberculomas), October 2016. Tracheostomy (06.01.17). Median laparotomy (old intervention).

Cause of death statement. The patient died of neurosyphilis with extensive ischemic cerebral infarction and final development of cerebral edema.

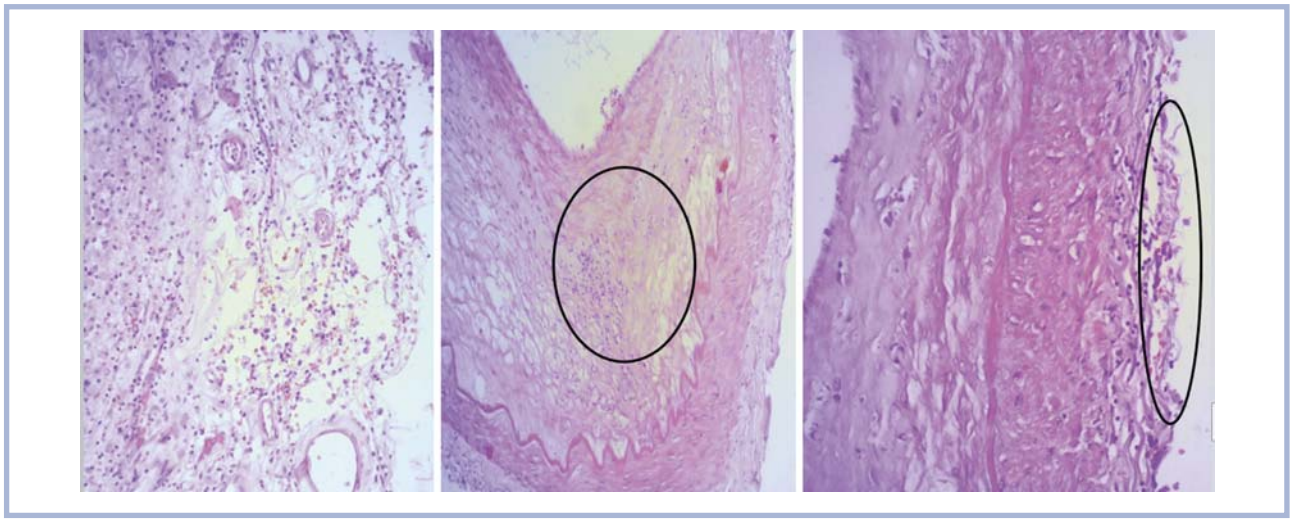

Fig. 10. **Meningovascular lesion. Productive meningitis — lymphocytoplasmacytic infiltration of the pia mater.**
Right, proliferative vasculitis of the skull base vessels — focal lymphocytic infiltration (encircled).

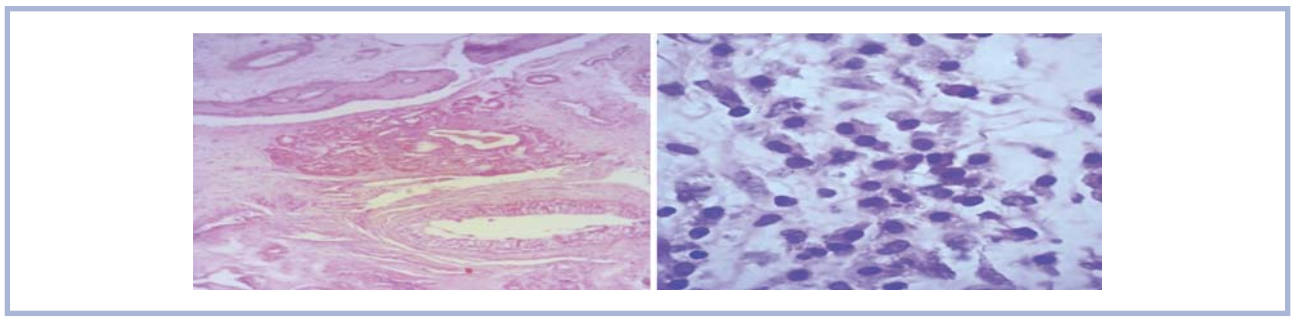

Fig. 11. **Skull sinuses. Mucous membrane of the skull sinus with diffuse cellular infiltration. Right, plasma cells infiltrate in the skull sinus mucosa (fragment).**

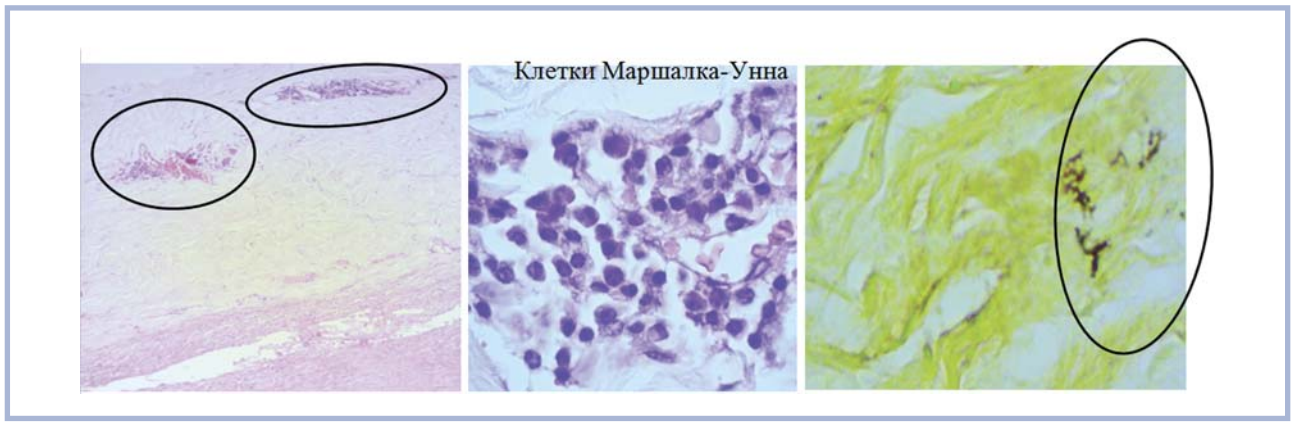

Fig. 12. **Microscopic examination of aortic tissue — syphilitic mesaortitis.**
Plasma cell infiltration around the *vasa vasorum* in the aortic arch wall (encircled). Right, spirochetes were found in the plasmacytic infiltrate (small black structures are encircled).

Discussion

Management of a patient with a combined pathology of two serious infections is a challenge in many aspects. One infection «obscures» another because its symptoms are more obvious and first attract the doctor's attention. In the presented case, TB was this obscuring infection, while the cause of death was syphilis.

Above, we already mentioned publications on various combinations of socially significant infections in the same patients. Usually, these people have a number of common behavioral traits that make them vulnerable:

these are the so-called risk groups. Upon their examination, of great importance are the results of screening and attention to all details of these results, even if they seem at first glance to be of secondary importance or belong to the competence of another specialist.

As early as October, the patient presented with dizziness and imbalance, i.e. neurological symptoms that developed until the stroke on 27.12.16. Liquorologic examination was required. However, the patient was punctured (repeatedly) only at the end of January, in a critical care department. The previous antisyphilitic treatment included intramuscular administration of drugs, which was inadequate for neurosyphilis. It should be noted that the diagnosis of latent syphilis established in July was an indication for spinal puncture, but it was not performed due to the severity of patient's condition. The puncture was performed only several months later, in a neurocritical care department, i.e. with the patient being in a much more severe condition. However, the puncture purpose was not to detect neurosyphilis but to confirm the diagnosis of bacterial meningitis, therefore only cytosis and protein were determined in CSF. Serological tests of CSF were performed only upon the fourth puncture, and even then diagnostically important non-treponemal tests (RPR/MPR/VDRL) were not performed. It is necessary to give credit to the infectious disease specialist who first suggested neurosyphilis in the patient. In fact, this suggestion should have been made much earlier and come from a dermatovenereologist or a neurologist.

Clinical and laboratory findings suggested not only specific lesions of the nervous system but also **internal organs** (degenerative changes in the aortic root and aortic valve; hepatomegaly; diffuse changes in the liver and pancreas; increased liver enzymes and urea). These findings required consultation with a dermatovenerologist, a cardiologist, and a therapist. These changes were ignored by consulting dermatovenerologists, but were identified during autopsy that confirmed their specific nature.

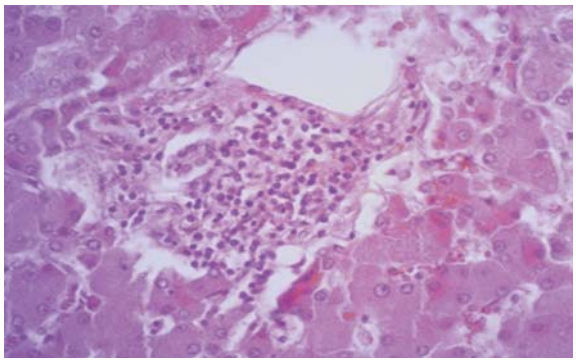

Fig. 13. **Histological examination of the liver. Infiltration in the portal tract of the liver.**

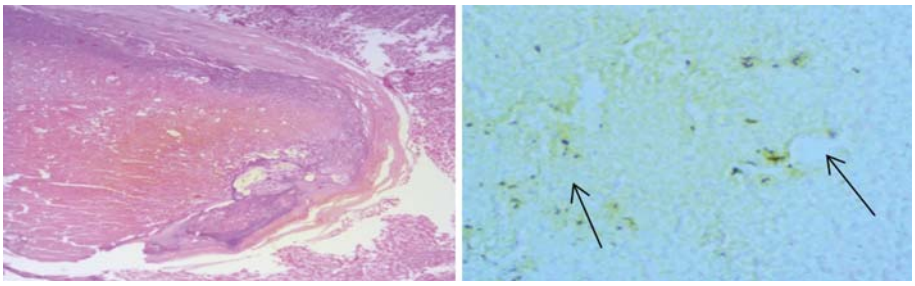

Fig. 14. **Histological examination of the liver. Gumma of the liver. Encapsulated necrotic focus in the liver. Right, spirochetes in the necrotic focus (indicated by arrows).**

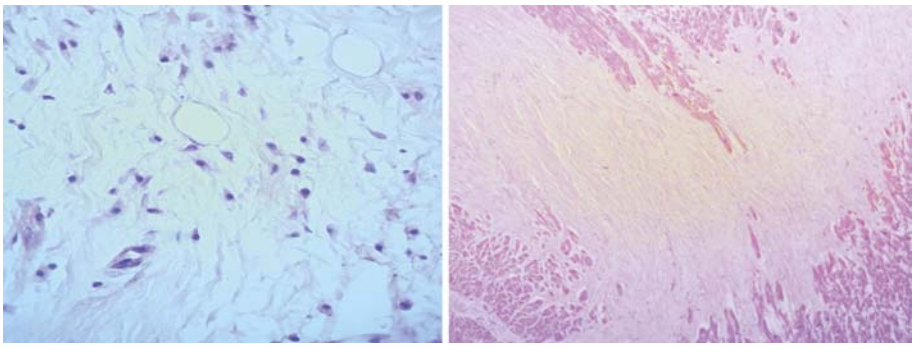

Fig. 15. **Histological examination of the myocardium. Productive perivasculitis of the coronary arteries. Right, macrofocal cardiosclerosis.**

After hospitalization due to an acute cerebrovascular accident, consultation with a dermatovenereologist suggested false-positive results for syphilis, apparently due to a MPR-negative response. Meanwhile, the patient received specific latent syphilis treatment six months earlier, which might affect the reaction results. However, severe clinical neurological symptoms remained in the background, and cerebrospinal fluid was still not studied. After obtaining the CSF data, almost a month later, the diagnosis of a meningovascular form of neurosyphilis was made, and treatment with ceftriaxone was again prescribed, despite the fact that the drug had been repeatedly used in this patient and demonstrated its inefficacy. Penicillin would be preferable.

The patient's condition at discharge can only be assessed as severe: tube feeding, loss of contact, aphasia, and tetraparesis. By the way, the presence of a deep bedsore was first indicated at discharge. Similar patients should be treated in a hospital, but not be followed-up outpatiently.

The main reason for failure in the treatment of this patient is the lack of **operational coordination among doctors of various specialties** who should have been involved in diagnostics and treatment. Establishment of the diagnosis of latent syphilis, not specified as early or late, alone requires examination for neurosyphilis. This was done only six months later, which caused an **unacceptable delay in treatment onset**.

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The authors declare no conflicts of interest.

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