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Case report

Peculiarities of multidrug-resistant tuberculosis on the background of idiopathic pulmonary fibrosis (a clinical case report)

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A – research concept and design; B – collection and/or assembly of data; C – data analysis and interpretation; D – writing the article; E – critical revision of the article; F – final approval of the article

Objective – familiarization of practitioners with the peculiarities of pulmonary multi-drug resistant tuberculosis (MDRT) in a patient with idiopathic pulmonary fibrosis (IPF) resulted from a long exposure to environmental factors at the workplace.

Materials and methods. The article deals with a clinical case of own observation of pulmonary MDRT development in a patient with IPF. The patient was hospitalized in the Pulmonary Tuberculosis Department No 3 (Department of Resistant Tuberculosis) of the Clinical Site of Phthisiology and Pulmonology Department of Zaporizhzhia State Medical Univercity in the CI "Zaporizhzhia Regional Tuberculosis Clinical Dispensary".

Results. Patient: male, 41 years, no medical history of tuberculosis. His work was associated with a harmful environmental factor within 7 years: dust in the workplace (refueling and repair of powder-type fire extinguishers). After 3 weeks of inpatient treatment, the patient died. The presented clinical case demonstrates the complexity of a life-time IPF diagnosis, which progression provoked the development of an equally serious disease, such as multi-resistant disseminated pulmonary tuberculosis and the prescription of antimycobacterial therapy. The cause of death was a progressive pulmonary fibrosis, and as a result, a progressively worsening pulmonary heart disease.

Conclusions. Practitioners should be especially vigilant and attentive while dealing with a patient having a history of harmful environmental factors exposure that may cause IPF development. It must be borne in mind that IPF may be asymptomatic for a long time resulting in increased risk for developing tuberculosis. This case confirms the literature data that the development of pulmonary MDRT in patients with untreated IPF leads to a rapid fatal outcome in the vast majority of cases (in this case it was 3 weeks).

Key words: idiopathic pulmonary fibrosis, multi-drug resistant tuberculosis.

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Особливості перебігу мультирезистентного туберкульозу на тлі ідіопатичного легеневого фіброзу (клінічний випадок)

О. М. Разнатовська, М. О. Шальміна, А. В. Федорець, О. С. Шальмін, М. С. Потапенко

Мета роботи – ознайомлення фахівців-практиків з особливостями перебігу мультирезистентного туберкульозу (МРТБ) легень у хворого з ідіопатичним легеневим фіброзом (ІЛФ), який розвинувся на тлі тривалої експозиції факторів довкілля на робочому місці.

Матеріали та методи. Описали клінічний випадок власного спостереження розвитку МРТБ легень у пацієнта з ІЛФ. Хворий перебував на стаціонарному лікуванні у відділенні легеневого туберкульозу № 3 (відділення резистентного туберкульозу) клінічної бази кафедри фтизіатрії та пульмонології ЗДМУ в КЗ «Запорізький обласний протитуберкульозний клінічний диспансер».

Результати. Пацієнт – чоловік віком 41 рік. З анамнезу відомо, що раніше на туберкульоз не хворів. Протягом 7 років робота була пов'язана зі шкідливим фактором довкілля – запиленість на робочому місці (заправка та ремонт порошкових вогнегасників). Через 3 тижні стаціонарного лікування пацієнт помер. Наведений клінічний випадок демонструє складність прижиттєвої діагностики ІЛФ, прогресування якого спровокувало приєднання не менш тяжкого захворювання – мультирезистентного дисемінованого туберкульозу легень – і призначення антимікобактеріальної терапії. Причиною смерті стало прогресування легеневого фіброзу та, як наслідок, посилення легенево-серцевої недостатності.

Висновки. Лікарі-практики повинні бути вкрай пильними та уважними до пацієнтів із наявністю в анамнезі шкідливих факторів довкілля, які можуть стати причиною розвитку ІЛФ. Потрібно враховувати, що ІЛФ може тривалий час мати безсимптомний перебіг і бути підґрунтям для приєднання туберкульозу. Описаний випадок підтверджує відомості фахової літератури: розвиток МРТБ легень на тлі нелікованого ІЛФ призводить здебільшого до швидкого летального результату (в наведеному випадку – 3 тижні).

Ключові слова: ідіопатичний легеневий фіброз, мультирезистентний туберкульоз.

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Особенности течения мультирезистентного туберкулеза на фоне идиопатического легочного фиброза (клинический случай)

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Цель работы – ознакомление практикующих специалистов с особенностями течения мультирезистентного туберкулеза (МРТБ) легких у больного с идиопатическим легочным фиброзом (ИЛФ), который развился на фоне длительной экспозиции факторов внешней среды на рабочем месте.

Ключевые слова: идиопатический легочной фиброз, мультирезистентный туберкулез.

Запорожский медицинский журнал. – 2019. – Т. 21, № 4(115). – С. 561–564

Материалы и методы. Описан клинический случай собственного наблюдения развития МРТБ легких у пациента с ИЛФ. Больной находился на стационарном лечении в отделении легочного туберкулеза № 3 (отделение резистентного туберкулеза) клинической базы кафедры фтизиатрии и пульмонологии ЗГМУ в КУ «Запорожский областной противотуберкулезный клинический диспансер».

Результаты. Пациент – мужчина в возрасте 41 год. Из анамнеза известно, что ранее туберкулезом не болел. На протяжении 7 лет работа была связана с вредным фактором внешней среды – запыленность на рабочем месте (заправка и ремонт порошковых огнетушителей). Через 3 недели стационарного лечения пациент умер. Представленный клинический случай демонстрирует сложность прижизненной диагностики ИЛФ, прогрессирование которого спровоцировало присоединение не менее тяжелого заболевания – мультирезистентного диссеминированного туберкулеза легких – и назначение антимикобактериальной терапии. Причиной смерти стал прогрессирующий легочной фиброз и, как следствие, нарастание легочно-сердечной недостаточности.

Выводы. Практикующие врачи должны быть крайне бдительны и внимательны к пациентам с наличием в анамнезе вредных факторов внешней среды, которые могут стать причиной развития ИЛФ. Необходимо учитывать, что ИЛФ может длительное время протекать бессимптомно и является почвой для присоединения туберкулеза. Описанный случай подтверждает данные научной литературы, что развитие МРТБ легких на фоне не леченного ИЛФ приводит в преобладающем количестве случаев к быстрому летальному исходу (в представленном случае – 3 недели).

Idiopathic pulmonary fibrosis (IPF) is included in the group of interstitial lung diseases, which represent heterogeneous pathological process in the parenchyma. IPF is characterized by the development of irreversible progressive lung fibrosis with respiratory functions loss, severe pulmonary insufficiency and poor prognosis [1]. In Ukraine, IPF is presented as interstitial pneumonia [2]. One of the potential risk factors for the development of IPF is exposure to environmental factors (inhalation of metal, wood dust etc.) [3,6]. The main morphological manifestation that characterizes IPF is parenchyma distortion with honeycomb formation (fibroblastic foci, deposits of collagen and scar tissue), which radiographically manifests as a dense area of increased opacity within the lungs (ground-glass opacities), and visualized as a honeycombing pattern during dissemination [2]. But honeycombing indicates late manifestations of IPF [4].

According to the literature data, IPF is more common among middle-aged and older individuals [4–8]. V. K. Gavrisyuk (2011) [1] and S. N. Avdeeva (2015) [5] indicate that for IPF in combination with pulmonary emphysema, parameters of external respiratory function (respiratory pressure) for a long time may be within the normal range. Therefore, video-assisted thoracoscopic surgery with biopsy for early diagnosis of IPF is currently considered as one of the most important methods [1,6].

Given the unpredictable course of IFA and rapidly progressive pulmonary heart disease, J. H. Ryu et al. (2014) [7] indicate the need to address the issue of surgical treatment, including lung transplantation.

Novikova L. et al. (2015) [9] conducted a retrospective analysis of the combined course of pulmonary tuberculosis and IPF. A progressive course was noted in 12 patients with resistant tuberculosis developed due to the underlying IPF, and 9 patients (75 %) died within 2 to 24 months. At the same time, tuberculosis had an atypical course and there were difficulties in its diagnosis in all the cases. In 14 patients, IPF developed as a result of host susceptibility to tuberculosis, and 4 deaths of patients (28.5 %) were reported in several years (3, 6, 9, and 10 years).

Objective

Familiarization of practitioners with the peculiarities of pulmonary multi-drug resistant tuberculosis (MDRT) in a patient with idiopathic pulmonary fibrosis (IPF) resulted from a long exposure to environmental factors at the workplace.

Materials and methods

The article deals with a clinical case of own observation of pulmonary MDRT development in a patient with IPF. The patient was hospitalized in the Pulmonary Tuberculosis Department No 3 (Department of Resistant Tuberculosis) of the Clinical Site of Phthisiology and Pulmonology Department of Zaporizhzhia State Medical University in the CI "Zaporizhzhia Regional Tuberculosis Clinical Dispensary" (ZRTCD).

Results of own observations

Patient: male, 41 years.

He had no past history of tuberculosis. Within 7 years, there was an occupational exposure to a harmful environmental factor: dust in the workplace (refueling and repair of powder-type fire extinguishers). The regular medical examinations were annually (the previous fluorographic examination was a year ago). He was a blood donor for 17 years. He received treatment for laryngeal disease two years ago and was operated for a sinus cyst a year ago.

2 weeks before admission to the PTD No 3 of ZRTCD because of health deterioration, the patient developed symptoms such as fever and severe dyspnea. The patient consulted a therapist at the place of residence and received a course of non-specific antibiotic therapy (NSABT) for bronchitis. But the patient's condition worsened in 5 days with NSABT. After radiographic examination, changes in the form of dissemination were detected on a chest X-ray which caused the patient to be consulted by a phthisiologist.

The patient underwent additional examination during outpatient visit in the ZRTCD. Repeated X-ray confirmed dissemination syndrome, which was recommended to be differentiated between miliary pulmonary tuberculosis and pulmonary carcinomatosis.

During fibrobronchoscopy (FBS), the patient was diagnosed with fibrinous endobronchitis and an aspirate from the bronchi was sampled. Mycobacterium tuberculosis (MBT) was not detected microscopically in the bronchial aspirate. The patient was consulted by a thoracic surgeon, who recommended a video-assisted thoracoscopic lung biopsy. But the following day, rifampicin (R) resistant MTBs

were detected in the bronchial aspirate using molecular-genetic (MG) method, so newly diagnosed tuberculosis (NDTB), rifampicin-resistant pulmonary tuberculosis (RifTB) (disseminated), destruction-. MBT + M-MG + Rif + K-, extrapulmonary tuberculosis (EPTB) of intrathoracic lymphatic nodes (ITLN), category 4 (NDTB).

The patient was hospitalized to PTD No 3 of ZRTCD for treatment according to the scheme of category 4 according to the Unified Clinical Protocol of Medical Care "Tuberculosis" [10], taking into account the data of the drug sensitivity test (DST). Additionally, the patient was prescribed with pathogenetic (hepatoprotectors and cardioprotectors), symptomatic and detoxification therapy.

During the week of inpatient treatment, the patient's condition deteriorated with shortness of breath worsening. An X-ray examination revealed (*Fig. 1*): all lung fields, mainly of lung hilum zones and basal sections, contained a dense, confluent small-focal dissemination, which overlapped with enhanced interstitial component and demonstrated ground-glass pulmonary pattern; both lung hilum were infiltrated. Conclusion: lung dissemination syndrome. It was recommended to differentiate between miliary pulmonary tuberculosis and pneumocystis pneumonia.

At the same time, in a week of inpatient treatment, MBT were not microscopically detected in the analysis of sputum.

Blood count were within the normal range: hemoglobin – 156 g/l, erythrocytes – 4.88 × 10^{12}/l, color index – 0.97, leucocytes – 8.2 × 10^{9}/l, erythrocyte sedimentation rate – 18 mm/hour, banded – 8 %, segmented – 70 %, lymphocytes – 18 %, monocytes – 4 %.

A blood test for HIV infection was negative. Parameters of biochemical blood analysis were also within the normal range.

The conclusion of the respiratory function examination: I degree ventilation insufficiency.

Conclusion of the electrocardiographic examination: sinus tachycardia (heart rate – 105 per minute), shortened PQ interval syndrome, signs of right atrial hypertrophy, diffuse (dystrophic) changes in the myocardium.

Considering the anamnesis data, the patient was consulted by an otolaryngologist. ENT organs pathology was not revealed.

After ophthalmological examination, angioretinopathy and low degree myopia were revealed.

Despite the ongoing comprehensive treatment, the patient's symptoms of pulmonary heart disease progressed steadily. Respiratory function examination: 3 degree ventilation failure. Auscultation: harsh breathing, rales were absent.

Therapist report: stage 3 respiratory failure (RF), toxicometabolic cardiomyopathy, stage III heart failure (HF), cachexia.

After 3 weeks of inpatient treatment, the patient died. The postmortem diagnosis: Pulmonary RifTB (disseminated), destruction- MBT + M- MG + Rif + K-, EPTB ITLN, category 4 (NDTB). Stage 3 RF. Toxicometabolic cardiomyopathy. HF IIA. Cachexia. IPF.

Pathoanatomical diagnosis:

1. *Primary disease*. NDTB Disseminated pulmonary tuberculosis (progression phase): multiple bilateral, sometimes confluent, acinar-lobular foci of specific granulomatous inflammation, represented by epithelioid cells, macrophages with the presence of giant multi-nuclear Pirogov-Langhans cells and centrally located caseous necrosis; interstitial alveolar edema. Histology +. EPTB ITLN: extensive foci of necrosis, capturing the entire medulla and part of the cortical layer of the lymphatic node, surrounded by thick epithelioid cell granuloma. ITLN lymphoid tissue is depleted, with multiple epithelioid cell granulomas and the presence of giant Pirogov-Langhans cells.

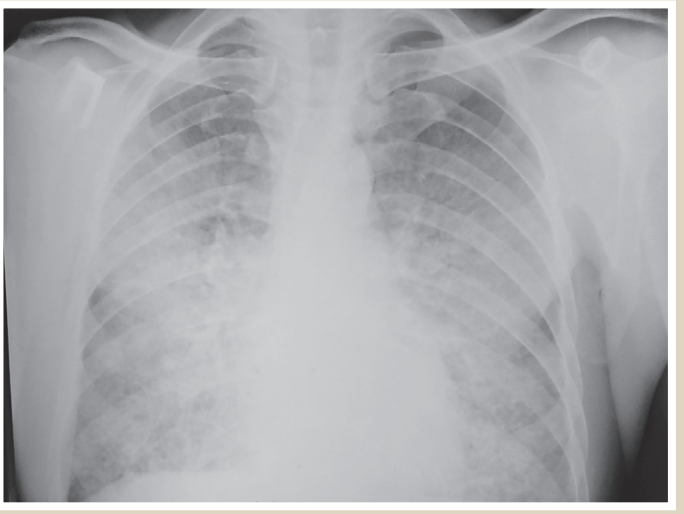

Fig. 1. Chest X-ray in a week after hospitalization.

Secondary disease: IPF: pronounced diffuse interstitial, perivascular and peribronchial pulmonary fibrosis; thickening of the interalveolar septa walls with chronic severe inflammatory cell infiltration, represented by histiolymphocytic elements.

2. *Complications*. Chronic cor pulmonale (the right ventricle wall thickness of 0.7 cm). Bilateral fibrinous pleuritis. Endogenous intoxication: focal renal tubular necrosis, centrolobular hepatic necrosis. Parenchymal dystrophy and venous hyperemia of the internal organs. Cachexia.

3. *Concomitant diseases*. Chronic erosive and ulcerative gastroduodenitis in acute stage. Chronic pancreatitis in stage of remission. Chronic calculous cholecystitis in stage of remission.

Clinical, pathological-anatomical epicrisis:

– comparing the clinical and pathological-anatomical data, it was established that the patient had a mycobacterial infection with damage of both lungs and ITLN occurred with underlying IPF;

– due to these conditions, pulmonary heart disease progressively worsened which was the direct cause of death;

– complete coincidence of clinical and pathologoanatomical diagnoses was noted.

2 weeks after the patient's death, the results of inoculation of aspirate on liquid nutrient medium were obtained and MBT resistance to isoniazid (H), R, ethambutol (E) and pyrazinamide (Z) was revealed, which indicated the presence of pulmonary MDRT in the patient.

Discussion

In the present case, such methods of examination as FBS, aspirate test, total blood count and respiratory function tests were not significant for IPF diagnosis. Respiratory

insufficiency worsening in the terminal stage (after 3 weeks from the onset of pulmonary MDRT) allowed only assessing the degree of IPF progression. The obtained results confirm the data of V. K. Gavrisyuk (2011) [1].

All literary sources indicate that the most common cause of death in patients with IPF is a progressive worsening of respiratory failure, which was observed in this case.

Novikova L. et al. (2015) [9] described an atypical course of tuberculosis, which made it difficult to diagnose in a patients with resistant tuberculosis and IPF. In the presented case, there were no difficulties in diagnosing tuberculosis, especially since the patient responsibly underwent an annual preventive fluorographic examination. Difficulties were experienced in the timely diagnosis of IPF which manifestations were observed at a late stage as a lung honeycombing on X-ray 3 weeks before death.

In the described clinical case, the secondary pulmonary MDRT with a subsequent antimycobacterial therapy for IPF patient, due to lack of early diagnosis and treatment provoked a rapid progression of the disease, so death was unavoidable.

The presented clinical case demonstrates the complexity of a life-time IPF diagnosis, which progression provoked the development of an equally serious disease, such as multi-resistant disseminated pulmonary tuberculosis and the prescription of antimycobacterial therapy. The cause of death was a progressive pulmonary fibrosis, and as a result, a progressively worsening pulmonary heart disease.

Conclusions

Practitioners should be especially vigilant and attentive while dealing with a patient having a history of harmful environmental factors exposure that may cause IPF development. It must be borne in mind that IPF may be asymptomatic for a long time resulting in increased risk for developing tuberculosis. This case confirms the literature data that the development of pulmonary MDRT in patients with untreated IFA leads to a rapid fatal outcome in the vast majority of cases (in this case it was 3 weeks).

Prospects for further research. Further study and analysis of clinical cases of tuberculosis combined with other diseases.

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