World Bulletin of Public Health (WBPH)
Available Online at: https://www.scholarexpress.net
Volume-15, October 2022
ISSN: 2749-3644

THE INFLUENCE OF DIABETES MELLITUS ON THE COURSE OF PURULENT THORACIC SURGICAL PATHOLOGIES

A.Ya. Rakhimov, Kurbanov O.M, Sh. G. Mirsoliev
Bukhara State Medical Institute

Article history:

Received: August 20th 2022
Accepted: September20th 2022
Published: October 26th 2022

Abstract:

A retrospective analysis of the clinical course of purulent thoracic surgical patients with diabetes mellitus (DM) and an assessment of the results of surgical treatment and their complications were performed. In 105 (30.1%) of 348 patients treated in the clinical base of BSMI, diabetes was diagnosed. As a result of the study, in patients with purulent thoracic surgical diseases against the background of diabetes, a complex peculiar clinical course is observed that is different from patients who do not have diabetes and leading to serious complications. Timely correction of hyperglycemia before and after surgery reduces the complications of diabetes mellitus, improves the effectiveness of surgical operations with purulent thoracic surgical diseases and leads to better treatment results. Such patients must be treated in conjunction with an endocrinologist.

Keywords: Purulent thoracic surgical diseases, diabetes mellitus, clinical course, treatment, surgical intervention

RELEVANCE

Purulent thoracic surgical diseases are among the most common pathologies in patients with concomitant diabetes mellitus and are one of the leading causes of death. From a practical point of view, it is advisable to single out in the group of patients with purulent thoracic surgical diseases Lung abscess occurring in 30-35% of patients, pleural empyema in 42-47% of patients, suppurating echinococcosis of the lungs in 32-36% of patients (1; 7; 18). The main reasons that contribute to the development of purulent thoracic surgical diseases in patients with diabetes mellitus (DM): reduced immunity and general weakening of the body; penetration of infection into lung tissue and respiratory tract (2;5;8;) hyperglycemia, which leads to a more severe course of the disease than in patients with normal blood sugar levels; pathological changes in the vessels of the lungs (pulmonary microangiopathy), which, according to medical statistics, occur in patients with diabetes twice as often as in healthy people; the presence of focal cavities in the lungs (1;6;12). All these factors, as well as poor control of blood sugar levels, create favorable conditions in the human body for the development of purulent thoracic surgical diseases. The general decrease in immunity in DM contributes to the severe course of the disease and can lead to various complications (4;13;17). For the growth of pathogenic microflora, lung tissue is the best nutrient medium (5;11;13). According to experimental studies (9), the development of massive hemorrhages in the alveolar and interalveolar tissue with necrotic changes in the alveolar epithelium, pronounced edema and loosening of the interalveolar tissue, and the appearance of perifocal inflammation were noted directly in the center of the lesion. Pulmonary microangiopathy, necrobiotic, dyscirculatory and inflammatory changes with subsequent development of lung tissue necrosis are manifested by the appearance of microabscesses. These pathological changes are morphologically characterized by an acute serous-purulent inflammatory disease. Despite many publications, a unified approach to managing patients with purulent thoracic surgical diseases against the background of diabetes mellitus, the percentage of occurrence of purulent thoracic surgical diseases against the background of diabetes mellitus, and the clinical course of this category of patients have not yet been developed. The solution of these problems will make it possible to develop questions of tactics, the need and scope of surgical intervention for purulent thoracic surgical diseases with concomitant diabetes mellitus.

PURPOSE OF THE STUDY: To improve the results of treatment of purulent thoracic surgical diseases against the background of diabetes mellitus by studying clinical data with correction of hyperglycemic parameters.

MATERIALS AND METHODS.

For the period from 2009 to 2019, in the clinical database of the State Medical Institute under our supervision there were 348 patients with various types of purulent thoracic surgical diseases, of which 105 (30.1%) patients were with concomitant diabetes mellitus, there were 72 men (68.5 %), women 33 (31.4%), as a rule, the most active, able-bodied part

World Bulletin of Public Health (WBPH)
Available Online at: https://www.scholarexpress.net
Volume-15, October 2022
ISSN: 2749-3644

of the population suffers from this pathology, the age of patients ranged from 19 to 74 years, the average age was 47.8±2.7 years. All patients were conditionally divided into 2 groups: I - control and II - main. The first group consisted of 243 patients with purulent thoracic surgical diseases without diabetes mellitus. The second group of 105 patients with purulent thoracic surgical diseases on the background of diabetes mellitus. All patients were divided by sex and age according to the classification of age groups adopted at the regional seminar of the World Health Organization. (Kyiv, 1962)

Table number 1.

As can be seen from Table 1, in the first group there were 152 (62.6%) men and 91 (37.4%) women aged 19 to 80 years (mean age was 48.4 ± 2.1 years). In group II - 64 (60.9) and 41 (39.1%) aged 19 to 75 years (mean age was 49.4±1.8 years)

Characteristics of patients by sex and age

Groups	Age										
	upto 19 years		20-44 years		45-59 years		60-75 years		75 years and more		
	Men	female	Men	female	Men	female	Men	female	Men	female	Total
I	18	14	52	30	56	35	19	9	7	3	243
II	7	3	14	8	21	14	14	10	8	6	105
Total	42 (12%)		104 (30%)		126 (36,2%)		52 (15%)		24 (6,8%)		348

The majority of patients (74.4%) were in the most able-bodied age. (from 20 to 59 years).

The diabetic history revealed that out of 105 patients diabetes mellitus was diagnosed for the first time in 58 (55.2%) patients, 47 (44.7%) patients had 4 or more years, the average duration of the disease was 11 years.

RESULTS AND DISCUSSIONS

Examination of patients revealed the following types of purulent thoracic surgical diseases against the background of diabetes mellitus: lung abscesses in 34 (32.3%) patients; suppurating echinococcosis of the lungs in 23 (21.9%) patients; pleural empyema in 24 (22.8%) patients; abscesses and phlegmon of the chest wall in 17 (16.1%) patients, purulent endobronchial fistula in 7 (6.6%) patients. Localization of lung abscesses against the background of DM was as follows: abscess of the middle lobe of the right and left lungs in 15 (14.2%) patients; lower lobe of the right and left lung in 12 (11.4%) patients and an abscess of the upper lobe of the right and left lung in 7 (6.6%) patients. Of these, 14 (13.3%) patients had a breakthrough into the right or left pleural cavity. The localization of suppurating echinococcal cysts against the background of DM was as follows: unilateral lesions were noted in 19 (18.9%) cases, of which solitary cysts - 15 (14.2%), multiple - 7 (6.6%) combined lesions of the lung and liver in 8 (7.6%) cases. Complicated forms were observed in 14 (13.3%) patients, of which a breakthrough in the bronchus with suppuration and hemoptysis in 7 (6.6%) cases, suppurated echinococcosis without a breakthrough in 10 (9.5%) cases, a breakthrough into the pleural cavity in 7 (6.6%) cases and pulmonary bleeding in 5 (4.7%) cases. Giant cysts were found in 9 (8.5%) cases. Most often, echinococcal cysts were localized in the middle lobe of the right or left lung, which amounted to 9 (26.4%) of the total number of operated patients, the lower lobe of the lungs - 8 (23.5%) and the upper lobe of the lungs was 6 (17.6%) .

Clinical manifestations of acute abscess were dependent on the stage and period of the disease. As a rule, lung destruction does not develop suddenly. This was always preceded by acute, prolonged pneumonia of various etiologies. Lung

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Volume-15, October 2022
ISSN: 2749-3644

abscess markedly worsened the condition of patients. Initially, they were worried about weakness, malaise, and the appearance of subfebrile temperature. Later, in 67% of patients, pain in the chest, aggravated by inhalation, and an unproductive cough joined. As the infectious process progressed and the volume of destruction increased, the body temperature became hectic, its rises were accompanied by heavy sweats. The unproductive cough, which was excruciating, intensified. Increased intoxication, respiratory failure. This picture was observed in 72% of the examined patients with lung abscess without diabetes mellitus. However, in patients with a similar pathology against the background of diabetes mellitus, lung abscesses proceeded with meager symptoms. Because of this, about 20% of patients were diagnosed a month or more after the onset. The clinical picture of the disease did not always correspond to morphological changes. Thus, in 56% of patients with acute lung abscesses, weakness, malaise, subfebrile temperature, and slight chills were observed.

When examining patients with acute lung abscess against the background of diabetes mellitus, pallor of the skin with a grayish tint, cyanotic lips and nail beds were noted. Due to chest pains - shallow breathing. As a result of intoxication, respiratory failure and chest pain, tachycardia is determined in patients, hypotension is possible. All patients underwent a generally accepted set of examinations: clinical blood and urine tests, biochemical blood tests, coagulogram, blood type and Rh factor, plain fluoroscopy of the chest and abdomen, ultrasound, tomography, for patients over 50 years old - ECG and consultation with a therapist. In the general analysis of blood in 78% of patients, a pronounced leukocytosis, a neutrophilic shift in the formula, and an increase in ESR were revealed. The indicators of the clinical blood test did not always correspond to morphological changes: in 62 patients (59%), leukocytosis was below 9.0 × 10 g / l, and in 54 patients (51.4%) the percentage of stab forms did not exceed 10, which in most cases was noted in patients of elderly and senile age and, perhaps, this is due to the unresponsiveness of the body during this period of life and due to the presence of diabetes mellitus. The maximum values of these parameters in other patients reached: leukocytosis — 26.4×10 g/l, metamyelocytes — 2%, stab — 32%, toxic granularity ++.

Of the biochemical parameters, creatinine, urea, ALT and AST most often increased in 27 patients (25.7%). Total bilirubin increased in 16 patients (15.2%) to 32.8 μmol/l.

To confirm the clinical diagnosis of lung abscesses, polypositional fluoroscopy and chest radiography were performed, which allows confirming the diagnosis and determining the localization of the process. In acute lung abscess, before its communication with the bronchial tree, a regular, round, homogeneously darkened cavity with perifocal infiltration was determined (Fig. 1).

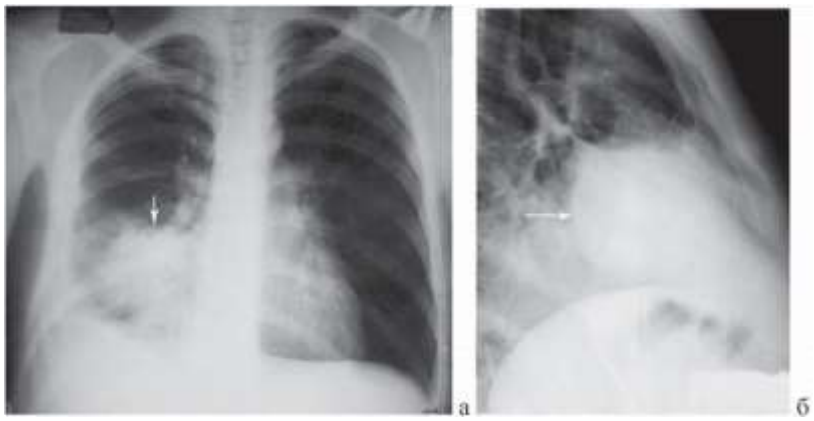

Fig. 1 Abscess of the middle lobe of the right lung.
X-ray of the chest in direct (a) and right (b) lateral projection.
After emptying the abscess into the respiratory tract - a cavity with a liquid level (Fig. 2).

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Volume-15, October 2022
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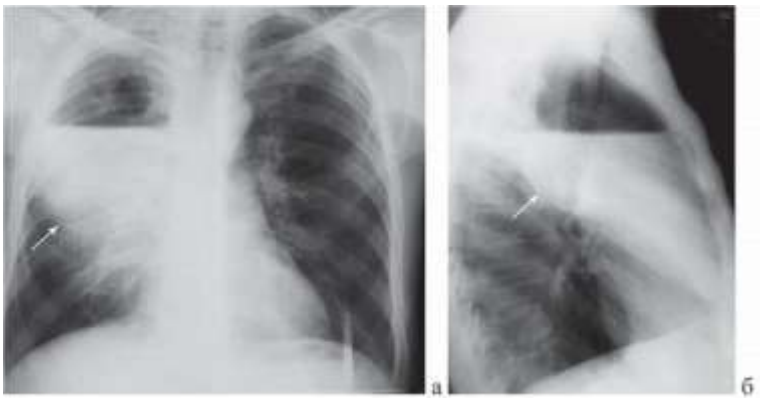

Fig.2. Abscess of the upper lobe of the right lung.
X-ray of the chest in direct (a) and right (b) lateral projection.

X-ray examination was performed several times for the purpose of dynamic observation before and after the operation.

The volume of operations consisted of thoracotomy, sanitation and drainage of abscesses in 19 (55.8%) patients. In addition, in 6 (17.6%) patients with a marginal location of lung abscesses, a puncture method of sanitation and drainage under fluoroscopy control was used. In cases of abscess rupture into the right or left pleural cavity, we performed thoracocentesis and drainage of the pleural cavity in 14 (41.1%) patients, of which 5 patients were followed by thoracotomy. Having studied the distribution of sepsis according to various etiological groups of lung abscesses, it turned out that the most often severe forms of sepsis occurred in patients with diabetes mellitus.

The volume of surgical interventions for suppurating pulmonary echinococci consisted of thoracotomy under general anesthesia followed by echinococcectomy using one of the known methods, taking into account the anatomical location, size and stage of parasitic cysts. In all cases of combined lesions of suppurating echinococcosis of the lung and liver, we performed a two-stage operation of echinococcectomy, taking into account the dominant focus. In three (13%) cases, first echinococcectomy of the liver followed by the lungs, and in 6 (26%) cases, first echinococcectomy of the lungs followed by the liver. In 7 (30.4%) cases out of the total number of those operated on, we performed lobectomy of the middle or lower lobe of the lungs. All patients with pleural empyema 24 (22.8%) on the right or left underwent thoracocentesis, sanitation, drainage of the pleural cavity, followed by washing with antiseptics. During bronchoscopy, ligature fistulas with a picture of purulent endobronchitis were found in 7 (6.6%) of the total number of patients examined. In our opinion (apparently) the ligatures are torn away from the residual cavity and accumulate at the mouth of the segmental bronchi. At the same time, during bronchoscopy, a whole lump of ligatures is found on the bifurcation of segmental bronchi. In all patients, the ligatures were removed with a bronchoscope.

Of the total number of patients, 105 (30.1%) had DM of varying severity. So of these, 49 (46.6%) patients with mild DM, 34 (32.3%) of moderate severity and 22 (20.9%) of severe patients with complications

Severity		Glycemia (mmol/l)
mild degree	(49)	8,3 – 9,9
moderate	(34)	10,1 - 16,7
Severe	(22)	16,7 – 20,5

We divided the patients into three groups according to the clinical course: mild DM, moderate severity and severe DM in comorbidity with purulent thoracic surgical diseases. With a mild degree of diabetes in patients with purulent thoracic surgical diseases, pain in the chest was observed in 61% of cases, cough with scanty sputum production in 48%, chills from 42 to 56% of cases, hyperthermia in 67% of patients, weakness and decreased performance.

With moderate severity, severe hyperthermia, chills, pain in the chest, cough with thick sputum, difficulty breathing, heavy sweat, irritability, irritability, weight loss of 20% or more were observed. Tachycardia pulse 100-120 beats per minute.

In severe DM, patients with purulent thoracic surgical diseases experienced severe intoxication, cough with fetid sputum, difficulty breathing, heavy sweat, shortness of breath, pain in the chest,

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Available Online at: https://www.scholarexpress.net
Volume-15, October 2022
ISSN: 2749-3644

hyperthermia up to 40-42 degrees, chills, fever. A sharp drop in hemodynamic parameters, a decrease in BCC, dehydration. Complete loss of performance. Weight loss by 50%, tachycardia, pulse more than 120 beats per minute, arrhythmia, heart failure. Liver damage. Psychoses, delusions and hallucinations.

In microbiological and serological examination of patients, the predominant pathogens were Streptococcus Pnevmoniae (33.4%) Klebsiella Pnevmoniae (13.4%) Streptococcus aureus (13.4%). Less common were Haemophilus influenzae (8%) Mycoplasma Pnevmoniae (7.9%) Enterobacter aerogenes (1.3%).

Along with clinical manifestations, indicators of hyperglycemia were analyzed. At the same time, persistent hyperglycemia and glucosuria were detected in these patients. Patients with a mild form of the disease did not develop glucosuria. In severe diabetes mellitus, the development of a purulent process was accompanied by an increase in temperature up to 39-40 C. In some patients, consciousness was darkened. The purulent process proceeded with high hyperglycemia, severe glucosuria, ketonuria. There were also pronounced functional disorders of the kidneys and liver, a significant increase in the number of leukocytes in the peripheral blood and an increase in ESR.

All these violations exacerbated the course of purulent thoracic surgical diseases, which was manifested by severe intoxication, exhaustion of patients, decreased immunity, slowing down the time for clearing purulent cavities and healing processes. The traditional therapy of this category of patients without DM consisted of empirical antibiotic therapy based on data on the polymicrobial etiology of pleuropulmonary infection, prescription taking into account the results of a microbiological study of the contents of abscesses. However, in the combined pathology of purulent thoracic surgical diseases with diabetes mellitus, it is necessary to correct hyperglycemia before and after surgery. Simple insulin was added to the traditional treatment of these patients in order to correct hyperglycemia, taking into account the indicators of hyperglycemia. In moderately severe diabetes, daily administration of up to 60 units of insulin per day or its substitutes was required. Patients with a severe form of the disease needed the introduction of more than 60 units of insulin per day. In patients of this group, complications of diabetes (retinopathy, diabetic nephropathy, angiopathy, etc.) were often noted.

In the study of purulent thoracic surgical patients, a high efficiency of treatment was revealed, where hyperglycemia was corrected, by using simple insulin in the complex traditional therapy for diabetes. These advantages were mainly reflected in the improvement of the general condition of patients, the reduction of ketoacidosis and intoxication, the acceleration of the cleansing of purulent cavities from infection, the timing of resorption of the infiltrate, the early appearance of reparative processes than in patients in whose complex treatment hyperglycemia was not corrected. As a result, the average stay of bed days of patients decreased.

Thus, our retrospective analysis of the treatment of patients with purulent thoracic surgical diseases associated with diabetes mellitus revealed: a large percentage of the occurrence of purulent thoracic surgical pathology against the background of the most formidable endocrine pathology of diabetes. It is known that systemic damage to the body in the pathogenesis of DM negatively affects and complicates the treatment of this category of patients, which indicates the need for further scientific and practical research aimed at solving this problem.

CONCLUSIONS:

1. Purulent thoracic surgical diseases up to 30.1% of cases occur against the background of diabetes mellitus.
2. Diabetes mellitus complicates the process of treating patients with purulent thoracic surgical diseases.
3. The development of new methods for the treatment of patients with purulent thoracic surgical diseases, taking into account concomitant endocrine pathology (DM), is an urgent problem in surgery.
4. Independent risk factors for mortality in purulent surgical diseases associated with diabetes mellitus are: persistent hyper or hypoglycemia, severe ketoacidosis, intoxication, extensive foci of necrosis, septic shock, inadequate drainage of purulent cavities and high levels of blood serum urea.
5. To maintain a good result after surgery in patients with purulent thoracic surgical diseases associated with diabetes mellitus, it is necessary to resolve a number of real-life organizational, treatment and diagnostic problems. This requires: Regular monitoring of glycemic tests and biochemical factors in these patients and timely correction. Collaboration with an endocrinologist is necessary.

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