

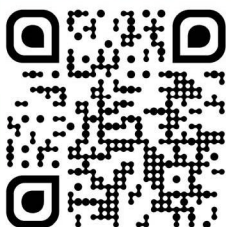
# БИОМЕДИЦИНА ВА АМАЛИЁТ ЖУРНАЛИ

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## RADIOLOGICAL SEMIOTICS OF CHRONIC OBSTRUCTIVE PULMONARY DISEASE IN TYPE II DIABETES MELLITUS

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### ABSTRACT

**Introduction:** Chronic obstructive pulmonary disease (COPD) combined with type 2 diabetes mellitus (T2DM) is a complex clinical condition characterized by mutual aggravation of pathological processes, leading to a worse prognosis and lower quality of life. Identifying specific radiological signs helps improve early diagnosis.

**Methods:** A total of 75 patients were examined and divided into three groups: I — COPD + T2DM (40 patients), II — COPD without diabetes (20), III — diabetes only (15). Methods included conventional radiography, multislice computed tomography (MSCT), and spirometry.

**Results:** Patients with COPD and T2DM showed more severe symptoms (dyspnea — 75%, bronchial wall thickening — 80%). MSCT revealed reduced lung parenchyma transparency, especially in the upper lobes. Distinct microvasculopathy signs were observed: vascular dilation, "coral-like" deformation, and peribronchial changes. Emphysema and bronchiectasis were more frequent in the comorbid group.

**Discussion:** COPD with type 2 diabetes leads to intensified lung morphology changes, including small airway and vascular damage. MSCT demonstrated high sensitivity (95%) and specificity (93.8%) for detecting structural abnormalities and is recommended for early-stage diagnostics in this patient group.

**Keywords:** COPD, type 2 diabetes mellitus, radiological diagnosis, MSCT, microvasculopathy.

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## РЕНТГЕНОЛОГИЧЕСКАЯ СЕМИОТИКА ХРОНИЧЕСКОЙ ОБСТРУКТИВНОЙ БОЛЕЗНИ ЛЕГКИХ ПРИ САХАРНОМ ДИАБЕТЕ II ТИПА

### АННОТАЦИЯ

**Введение:** Хроническая обструктивная болезнь легких (ХОБЛ) в сочетании с сахарным диабетом II типа представляет собой сложное клиническое состояние, при котором взаимное отягощение патологических процессов приводит к ухудшению прогноза и снижению качества жизни. Выявление специфических рентгенологических признаков позволяет улучшить диагностику на ранних стадиях заболевания.

**Методы:** Обследованы 75 пациентов, разделённых на три группы: I — ХОБЛ + СД II типа (40 пациентов), II — ХОБЛ без диабета (20 пациентов), III — только диабет (15 пациентов). Проведены рентгенография, мультиспиральная компьютерная томография (МСКТ), а также оценка функциональных показателей (спирометрия).

**Результаты:** У пациентов с ХОБЛ и СД II типа выявлены более выраженные клинические проявления (одышка — 75%, утолщение стенок бронхов — 80%). МСКТ показала снижение прозрачности лёгочной ткани, преимущественно в верхних долях. Характерны признаки микроваскулопатии — расширение сосудов, «кораллоподобная» деформация, перибронхиальные изменения. У пациентов с сочетанием ХОБЛ и СД II типа чаще выявлялись эмфизематоз и бронхоэктазы.

**Обсуждение:** Сочетание ХОБЛ и диабета приводит к усилению морфологических изменений в лёгких, включая поражение мелких бронхов и сосудистые нарушения. МСКТ обладает высокой диагностической чувствительностью (95%) и специфичностью (93,8%) в выявлении структурных изменений и рекомендуется для использования на ранних стадиях заболевания у данной категории пациентов.

**Ключевые слова:** ХОБЛ, сахарный диабет 2 типа, рентгенологическая диагностика, МСКТ, микроваскулопатия.

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## II TIPDAGI QANDLI DIABETDA O'PKANING SURUNKALI OBSTRUKTIV KASALLIGI RENTGENOLOGIK SEMIOTIKASI

### ANNOTATSIYA

**Kirish:** Surunkali obstruktiv o'pka kasalligi (SO'OK) va 2-tip qandli diabet birga kechganida patologik o'zgarishlar kuchayib, bemor holati og'irlashadi va hayot sifati pasayadi. Rentgenologik belgilarni erta bosqichda aniqlash samarali tashxis qo'yishga yordam beradi.

**Usullar:** 2020–2023 yillarda 75 nafar bemor tekshirildi: I-guruh — SO'OK + 2-tip diabet (40 bemor), II-guruh — SO'OK (20), III-guruh — faqat diabet (15). Rentgen, MSKT va spirometrik tadqiqotlar o'tkazildi.

**Natijalar:** SO'OK va diabetli bemorlarda klinik simptomlar og'irroq (nafas qisishi — 75%, bronxlar qalinlashuvi — 80%). MSKT nafas yo'llari va o'pka parenximasidagi o'zgarishlarni aniqladi. Ko'p hollarda mikroangiopatiya belgilariga — tomir kengayishi, “marjon”simon deformatsiya va peribronxial o'zgarishlarga duch kelindi. Emfizema va bronxoektaziya ham aynan shu guruhda ko'p uchradi.

**Muhokama:** SO'OK va diabet birgaligi o'pka to'qimalarining strukturaviy va funksional o'zgarishlariga olib keladi. MSKT yuqori sezuvchanlik (95%) va spetsifiklik (93,8%) ko'rsatkichlariga ega bo'lib, erta tashxis qo'yishda tavsiya etiladi.

**Kalit so'zlar:** SO'OK, 2-tip qandli diabet, rentgenologik tashxis, MSKT, mikroangiopatiya.

**Introduction** . Early diagnosis of COPD, assessment of morphological changes in the lungs against the background of type 2 diabetes mellitus, development of effective treatment methods, prediction and prevention of the development of irreversible stages of chronic disease remain urgent scientific problems. Extensive epidemiological studies show that.

COPD is often misdiagnosed, especially in its mild stages [6]. This encourages the development of more sensitive methods for early detection. Radiological methods play an important role in the diagnosis and monitoring of COPD. Although the primary diagnosis is based on clinical presentation and spirometric data, imaging methods, including radiography and computed tomography, help to detect structural changes in lung tissue and exclude other diseases [ 1;3; 5]. In the last decade, computed tomography has been widely introduced into pulmonology practice due to a number of important advantages over radiography. MSCT is a powerful diagnostic tool for COPD due to its high resolution, quantitative analysis capabilities, and ability to detect early signs of the disease [ 6; 4] . Early detection of OSOC in patients with type 2 diabetes is of particular importance, because the co-occurrence of these diseases aggravates the clinical condition, worsens the prognosis and reduces the quality of life. Timely diagnosis makes it possible to prevent the development of complications and optimize treatment [2;5].

**Objective** : To identify the specific features of the radiological semiotics of type 2 diabetes mellitus and chronic obstructive pulmonary disease.

**Materials and methods of the study.** Data from 75 patients examined in the X-ray radiology department of the SamDTU multidisciplinary clinic in 2020-2023 were analyzed. A comprehensive X-ray diagnosis of CKD with type 2 diabetes was performed. The examined patients were divided into 3 groups. The main (I) group included patients with type 2 diabetes mellitus and concomitant CKD (40 people). To compare the results, patients with CKD without diabetes mellitus (group II) and diabetes mellitus (group III) (15 people) were examined.

**Table 1**

**Distribution of patients by gender and age, n=75**

Age	Group I (n =40 )		Group II (n= 20)		Group III (n= 15)	
	Male .	Women .	Male .	Women .	Male .	Women .
18-44	1 (2.5%)	2 (5%)	3 (15%)	1 (5%)	1 (6.7%)	1 (6.7%)
45-59	7 (17.5%)	7 (17.5%)	3 (15%)	6 (30%)	4 (26.7%)	1 (6.7%)
60-74	11 (27.5 %)	8 (20%)	2 (10%)	3 (15%)	4 (26.7%)	2 (13.3%)
75 -89	3 (7.5%)	1 (2.5%)	1 (5%)	1 (5%)	1 (6.7%)	1 (6.7%)
Jami :	22 (55%)	18 (45%)	9 (45%)	11 (55%)	10 (66,7%)	5 (33,3%)

Determined of patients sexual according to distribution 44 men and 31 women over 50 years old exceeded of patients advantage (Table 1) . did Comparison I and III in groups men advantage did. II in the group women advantage did From the inspection past the patient's the most the youngest is 25 years old , the most age the eldest and at 70 years old was Elderly patients indicator advantage did.

X-ray morphological methods used were conventional radiography and MSCT. Computed tomography was performed on a General Electric (GE) Revolution EVO 128 tomograph, with a height of 2.5 mm and a reconstruction of 0.125. The thickness of the reconstruction slices was 1 mm. Technical equipment of MSCT: X-ray tube voltage 120 kV, current 146 mAs.

**Results of the study.** The clinical features of the patients studied were diverse. In patients with type 2 diabetes mellitus and COPD, metabolic disorders of the myocardium (30%) and right ventricular enlargement (32.5%) were more common. When analyzing risk factors, smoking was found to be more common in patients with COPD. Out of 60 patients with COPD (groups I and II), 28 patients were smokers for more than 5 years. In all examined patients with COPD (groups I and II), the main complaints of varying severity were identified: shortness of breath, cough with phlegm (Table 2). For information, all patients with COPD (100%), without exception, complained of cough. In the main group, shortness of breath was more pronounced than in group II (75% and 45%,

respectively). Mobilization of accessory muscles during breathing was noted in 14 (35%) patients in group I and 2 (10%) patients in group II.

Chest pain was significantly less common in patients with type 2 diabetes and COPD (12.5%). Undoubtedly, the reduced pain sensation is due to diabetic neuropathy.

The frequency of recurrence of the inflammatory process more than three times during the year was determined in 16 patients (40%) with CKD in group I, and only 3 (15%) in group II. This comparison shows that: a relatively frequent recurrence of CKD occurs in group I (with CKD, diabetes mellitus), and one of the indicators of exacerbation of the disease was the detection of purulent sputum. In most patients (45 people), exacerbation of the chronic inflammatory process was observed during the accumulation of viral diseases, which were subsequently complicated by bacterial infections.

**Table 2**

**Under review clinical signs in groups**

Clinical signs	Patients group					
	I (n=40)		II (n=20)		III (n=15)	
	abs .	%	abs .	%	abs .	%
Breath contraction	30	75	9	45	4	26.7
Grass	40	100	20	100	1	6.7
Sputum production	25	62.5	16	80	1	6.7
Involvement of auxiliary muscles involved in breathing	14	35	2	10	-	-
Chest pain	5	12.5	5	25	-	-
ЎJUICE zhadallashgan kursatkich yiliga March 3	16	40	3	15	-	-

OSOK phenotypes appearance to be frequency assessment his/her to oneself characteristic characteristics identified : OSOK emphysematous , more comfortable phenotype II in the group in patients relatively more observed . First in the group mainly mixed typical patients , then and bronchitis phenotype advantage did .

Blood glucose level only with a sore throat for patients relatively ( sugar) consumption from loading before  $5.04 \pm 0.01$  mmol / l) diabetes mellitus ( sugar consumption from loading before  $9.4 \pm 0.2$  mmol / l and then  $11.0 \pm 0.3$  mmol / l) together with coming USOC first in the group high was . and without loading then  $5.7 \pm 0.02$  mmol / l numbers shown . III in the group in patients hungry to the stomach blood glucose level average  $8.2 \pm 0.6$  mmol / l and without loading then it is  $11.9 \pm 0.9$  sugar consumption from loading before and later of blood glucose levels difference I  $1.6$  mmol / l in group II in the group -  $0.66$  mmol / l and III in the group it is  $3.7$  mmol / l did .

Upka with the help of activity spirometry evaluated . Spirometry method volume , time , air current speed and in the spirogram volume-time agri line between dependency like main parameters to study possibility gives Functional diagnostics of OSOK organization doer mandatory of spirometry main criteria are : COPD ( lung reinforced vital capacity ) ; 1KNCH ( in 1 second) reinforced breath to release size ) , Tiffany index .

In patients with COPD and type 2 diabetes, spirometry revealed more pronounced changes in bronchial permeability than in patients with COPD with a normal sugar profile. Only suffering from diabetes spirometry indicators in patients normal at the borders was .

Clinical examination and to spirometry data According to , 60 patients with OSOC suitable in a way following three small to the group divided : mild , moderate and heavy . Our our control very heavy under to the extent owner was patients no was (Table 3).

**Table 3**

**USOC weight level description**

USOC weight level	Group I (n=40)		Group II (n=20)	
	Abs .	%.	Abs .	%.
Light degree	8	20	5	25

Medium degree	27	67.5	13	65
Heavy degree	5	12.5	2	10
Patients total	40	100	20	100

Lung morpho-functional state of parenchyma assessment for all checked patients without contrast from radiography was conducted . Weight to the level looking at In the USOC radiological changes Generalization of chest X-ray data in patients across the study groups did not reveal significant differences in the study of changes in the lung parenchyma in groups I and II compared to patients with diabetes mellitus (Table 4) .

Specific radiological criteria for pulmonary obstruction, such as increased lung tissue transparency, were observed in 40% of cases in group I and 45% in group II. Emphysematous conditions were detected in only 6.7% of patients with diabetes mellitus. Lung image enhancement in the form of pneumosclerosis and Tursimon deformation were detected in 75% of cases in USOC, in 80% in group I and in 40% of patients with diabetes mellitus.

**Table 4**

**Frequency of detection of radiographic signs of disease in OSOC in research groups**

Radiological changes	Patients group					
	I (n=40)		II (n=20)		III (n=15)	
	Abs .	%	Abs .	%	Abs .	%
Emphysema	16	40	9	45	1	6.2
Pneumosclerosis	32	80	15	75	6	40
Bronchi wall thickening	32	80	15	75	4	26.7
con tomir contours , bronchi va ildiz zonalari noanicligi	22	55	12	60	1	6.7
Kilic shacklidage trachea	14	35	9	45	-	-
Peribronchial and perivascular " cuffs".	29	72.2	16	80	7	46.4
Diaphragmatic domes flattening and sinuses veil	22	55	9	45	1	6.7
Bulaclararo pleuronimation Kalinlashuvi	17	42.5	9	45	3	19.6
Kerli- chiziklari	26	65	11	55	1	6.7
Calcinatlar	7	17.5	1	5	3	19.6

Bronchi of the walls thickening with HIGH pain in patients both pathognomonic is calculated ( I 80% in group II 75% in the group ). II group with COPD in patients blood veins contours , bronchi and lung roots , bronchi and veins around peribronchial and blurring of perivascular " cuffs ". is observed as well inter-source pleura compression II group with COPD ( corresponding respectively 60%, 80%, 45%) in patients clearly expression will be From the inspection of the past known one in part trachea sagittal size please from the diameter ( directly from the projection ) above that it was determined ( in I - 35%, in II - 45%).

See you later. as we are , maximum breath to take during of classical radiography described to the signs based on the existence of OSOK only about guess management can X- ray sensitivity was 65%, specificity was 71.4%. However , the clinical doctor everyday in practice , of the disease characteristic clinical manifestations to the existence regardless. This therefore , widely comprehensive x-ray examination with the help of to achieve possible was reliable diagnostic parameters installation necessity is born This is OSOK in differentiation MSCT expanded functions assessment for reason It happened .

Collected MSCT data his/her grade four logical stage includes : 1 ) visual analysis ; 2 ) quantitative analysis ; 3) comparative analysis ; 4) data comparison

First of all , from the visual analysis then , all checked parenchyma density in groups was evaluated , i.e. of OSOK to the weight and his/her combination with diabetes mellitus looking at lung of the fields enthusiasm to account received Densitometric analysis right and left your lungs three on the belt held : high belt ( of the trachea 5 cm above the bifurcation ), middle belt ( of the

bifurcation of the trachea projection ) and lower belt ( 5 cm below the bifurcation of the trachea ). Lungs parenchyma breath to take and to release in stages is evaluated . Suffering from OA 1- and 2- in groups your lungs densitometric parameters III group compared with the data , that is, only lung pathology suffering from type 2 diabetes patients . Quantitative evaluation of MSCT data in all patients of groups I and II with mild COPD (13 patients) showed an average increase in densitometric parameters (summarized by 35.4HU) compared to patients of group III: a decrease in transparency was observed in all three studied areas of the lung, this phenomenon prevailed in the apical area of the lung (Table 9) and was more pronounced in patients with COPD accompanied by type 2 diabetes mellitus. In addition, even with this degree of COPD, MSCT can detect symptoms of expiratory obstruction (in 54% of cases).

The comparison of densitometric criteria of MSCT with the average level of severity of OSOC disease, which was the largest sample (40 people) compared with the control group (group III), revealed a statistically significant difference ( $p < 0.05$ ) in all three study zones. A slight decrease in the transparency of the lung parenchyma was noted (approximately 24.1HU). Parenchymal density indicators varied depending on the study zone. The greatest decrease in the transparency of the lung parenchyma (approximately 41.0HU,  $-767.1 \pm 37.2$ HU) was noted in the upper zone of the right and left lungs in patients in group II. In patients in the main group, a minimal decrease in the transparency of the parenchyma (approximately 6.5HU,  $-801.6 \pm 10.4$ HU) was noted in the upper lung belt (Table 9).

It is seen that in patients with moderate levels of OSOC, as in mild levels of the disease, against the background of an increase in densitometric indicators throughout the lungs, the development of pathological changes in the upper lung vault predominated. Moreover, if in group II the presence of air in the upper part significantly decreased compared to the middle and lower levels, then in the main (I) group the presence of air in the upper level increased compared to other levels.

Comparative evaluation of MSCT with numerical indicators of group 3 in all patients of groups 1 and 2 with severe COPD (7 patients) revealed an increase in the presence of air in the lung tissue: in the upper field, the lung was equal to 8.2HU, in the middle field - 11.2HU, in the lower field - 10.5HU, which is statistically significant ( $p < 0.05$ ).

The two-way difference in lung density was not significant in densitometric criteria and was not statistically significant ( $p > 0.05$ ). Comparison of mean values showed that patients with COPD (group II) had a more pronounced decrease in densitometric values than patients with COPD with type 2 diabetes (group I). At the same time, patients in group I, which was at a lower level, had the highest parenchymal density ( $-793.0 \pm 41.2$ ) (Table 5).

At a certain stage, the intensification of diffuse interstitial changes was noted due to the long duration of the disease. As the severity of OSOC increased, the sclerotic process expanded along the entire axis , but the average densitometric density was partially covered by emphysematosis.

**Table 5**

**Densitometric criteria in the studied groups according to the examination belt**

Research take visited group	Weight level	right lung				left lung				M±m both up
		Up field	Middle field	Low field	M±m	Up field	Middle field	Low field	M±m	
I	Engil (n=8)	-757.4 ±18.0	-783.5 ±19.2	-770.5 ±12.0	-770.5 ±14.1	-759.4 ±16.0	-764.9 ±26.4	-755.6 ±15.6	-760.0 ±17.0	-765.2 ±15.0
	Ўрта (n=27)	-801.7 ±11.0	-795.0 ±12.5	-781.0 ±13.3	-792.6 ±11.0	-801.4 ±9.7	-778.6 ±13.1	-765.7 ±13.6	-781.9 ±10.9	-787.2 ±10.7
	Og'ir (n=5)	-797.4 ±35.1	-822.4 ±19.5	-818.6 ±30.0	-812.8 ±26.0	-825.8 ±32.7	-824.2 ±31.0	-767.4 ±52.4	-805.8 ±35.5	-809.3 ±30.4

II	Engil (n=4)	-755.0 ±50.4	-799.0 ±31.0	-777.5 ±40.3	-777.2 ±39.5	-743.5 ±49.1	-790.8 ±34.0	-776.8 ±43.0	-770.3 ±39.7	-773.8 ±39.5
	Yrta (n=12)	-744.8 ±49.0	-782.7 ±19.1	-774.9 ±23.3	-767.4 ±25.3	-789.3 ±25.3	-781.1 ±24.2	-774.0 ±29.2	-781.5 ±25.1	-774.5 ±24.6
	Severe (n=4)	-832.0 ±32.0	-832.3 ±32.4	-826.8 ±52.1	-830.3 ±36.0	-809.8 ±20.5	-810.1 ±38.3	-811.5 ±52.1	-810.4 ±34.3	-820.4 ±34.1
III	(n=15)	-808.4 ±10.0	-817.4 ±10.4	-803.7 ±9.0	-809.8 ±8.9	-807.7 ±13.7	-804.7 ±13.9	-787.5 ±12.1	-800.0 ±11.9	-804,9 ±10,3

From now on outside , outside parenchyma , blood veins and bronchi visual assessment of architecture , as well as densitometric parameters analysis to do , HIGH and suffering from diabetes X-ray morphological in patients changes in detail from evaluation then we collected the information to the following we were Received information two to the category divided into : These To the USOC characteristic was criteria and in the lungs inflammation from the situation next remainder changes (Table 6) and to microvasculopathy characteristic was criteria (Table 7).

**Table 6**

**To the USOC and in the lungs from inflammation next remainder to changes characteristic MSKT- semiotics**

Signs	Patients group					
	Group I (n=40)		Group II (n=20)		Group III (n=15)	
	Abs .	%	abs .	%	abs .	%
Presence of emphysema	30	75	17	85	-	-
Bronchi thickening and deformation	40	100	19	95	2	13.3
" Ring " sign ( bronchiectasis existence )	32	80	14	70	-	-
Bronchioles damage (" swelling" tree trunk")	29	72.5	13	65	-	-
Expirator barrier symptoms .	37	92.5	17	85	-	-
Pneumosclerosis	34	85	15	75	1	6.7
Pleural contract and pleural leaves thickening	25	62.5	11	55	3	20
Petrified	24	60	8	40	2	13.3

First to the category incoming changes in pneumosclerosis, bronchi remodeling characters ( expanded and deformed bronchi ) bronchiectasis , emphysematosis, pleural layers compression and pleurancing engagements, engagements , above dream born to be Enter .

Microvasculopathy to himself special appearances ( second category ) expanded into itself , dichotomy divided and corals in the form of deformed to the lungs veins and average large soybeans ( roots please pieces ) is included .

Pictures analysis to do the results compared to OSOK characteristic criteria for X -ray morphological CT and in the lungs inflammation from the situation later remainder changes 1- groups for both , 2- groups for both pathognomonic is , 3- group for characteristic absence was determined . 3- in the group separately of pleural layers in observations thickening and also petrification in the lungs determined . to OSOK characteristic signs of MSKT and in the lungs inflammation from the situation later remainder changes mainly of 2 types with diabetes mellitus suffering from a recurring OA in patients advantage did , that is . I in the group . So and the bronchi change ( thickening and deformation ) signs main 100% in the group and II in 95% of cases in the group revealed , bronchiectasis in 80% and 70% (" ring symbol ") . record III in the group bronchial remodeling only two in the patient detected . I in group pneumosclerosis in 34 cases (85%), II in the group - in 15 cases (75%) and diabetic in the patient only in 1 case observed . (85%). From this come It turns out that this characters are of 2 types against the background of diabetes also , without diabetes both To the USOC It is unique .

That's it emphasize should be emphysematosis various appearances I in the group in patients (75%) II group compared to patients (85%). a little less observed . In the inspiratory modification, MSKT is

additional in a way your lungs apical in the fields basal in segments hypoventilation limited in space swelling determined . In all cases interalveolar of obstacles a little thickening invisible was Subpleural only small bullous swelling diagnosed with . of patients main in percent expiratory MSKT expiratory modification obstacles symptoms ( I in group -92.5%, II in the group - 85%) and " swollen buds was " tree " symptom ( I in group -72.5%, II in the group - 65% ) small bronchi at the level pathological of abnormalities the existence proves .

Second to the category included microvasculopathy signs analysis that showed that dichotomous in a way dilated parenchymal vessels all compared three in the group detected ( I in group - 95%, II in group - 70%, III in group I - 93.3%) (Table 7). At the same time , and II to groups who has been diagnosed with esophageal cancer in patients described appearances bronchial remodeling and some emphysema signs in the background was and known to the extent inflammation from the situation later remainder of changes result was Only suffering from diabetes III from the group patients emphysematosis and " ring " in those examined sign " symptom no was thickened bronchi one in observation (13.3%) to the eye abandoned

Of the veins coral in the form of appearance 1- in 38 (95%) patients in the group and only 2- In 8 (40%) patients with OSA in the group distinguished . At the same time , 3- in the group This criterion was met in 14 (93.3%) people with diabetes. distinguished and this 2 to the group compared to 53.3% more .

Table 7

**Of the hills microvasculopathy MSKT - semiotics**

Signs	Patients group					
	Group I (n=40)		Group II (n=20)		Group III (n=15)	
	Abs	%	Abs	%	Abs	%
Con- tomirlaring muzzle in appearance deformations	38	95	8	40	14	93.3
Con- tomirlaring middle teachers allies	28	70	12	60	13	86.7
Dichotomous tomirlar kengaishi	38	95	14	70	14	93.3

**Discussion** . Above from what has been said come it turns out that MSKT. by detected suffering from diabetes in patients dichotomous expanded and coral in the form of deformed veins , middle with a stove shadows of diabetic angiopathy the opposite as study need These changes are combined with OSOK arrived in the sick is determined , however sugary for COPD without diabetes characteristic no , this In the USOC microhemodynamic under the circumstances diabetes aggravating role to show In addition , lung CT scan has been shown to detect signs of COPD in patients with milder disease. The presence of respiratory distress and the presence of a "tree with swollen buds" sign indicate a pathological condition at the level of the smallest bronchi. CT scan spirometry function to study as a result taken suitable records compared with diagnosis . MSCT 's sensitivity 95%, to itself specificity was 93.8% .

**Conclusions:** Patients with COPD, type 2 diabetes mellitus, and asthma are characterized by more pronounced shortness of breath and bronchial obstruction, more frequent exacerbations of the disease, and a more pronounced emphysematous bronchitis phenotype than patients with COPD without diabetes mellitus.

In patients with COPD, who are accompanied by type 2 diabetes mellitus in the early stages of the disease, the capabilities of X-rays in studying the state of lung macrostructure are significantly limited, and the assessment is subjective.

The detection of signs of damage to the small bronchi, the manifestation of specific microvasculopathy in some forms of COPD, with a small amount of emphysema, as well as a tendency to increase blood glucose levels, indicate a mutual exacerbation of COPD and diabetes mellitus.

In patients with COPD and type 2 diabetes mellitus, MSCT in the early stages revealed pneumosclerotic changes, which are expressed in a moderate increase in densitometric parameters of lung tissue, the onset and prevalence of the pathological process.

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# БИОМЕДИЦИНА ВА АМАЛИЁТ ЖУРНАЛИ

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