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Description of Diffuse Interstitial Lung Diseases and Assessment of Their Activity

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A B S T R A C T

Conventional roentgenograms constitute the groundwork for the evaluation of diffuse interstitial lung disease (DILD). ILO classification with its symbols (additionally extended to granulomatoses) does not comprise pathoanatomic assumptions and does not enter lesion genesis for it could lead to diagnostic misconception. »High resolution« computer tomography (HRCT) provides the evaluation of lesion morphology and disease activity. After having treated our 129 patients with diffuse interstitial lung disease we have come to the conclusion that, beside pneumoconiosis, the application of extended standard ILO symbols are suitable to other interstitial pathology for the homogeneity of morphologic characteristics. As for diagnoses making, in distinction to other methods, it can be said that analyzing roentgenograms of the extended ILO provides high level of lesion evaluation standardization for diffuse interstitial disease as well as substantial congruity with CT finding. It is clear that such analysis cannot be applied in our daily work, however we have both concluded and proved that on conventional roentgenograms the condition of interstitial lesion can roughly be assessed. This is of high importance considering minimal dose of radiation exposure by standard tests in comparison with other radiological techniques. Nevertheless, CT scanning should be performed if there should be the need for the assessment of the morphology and the activity of lesion, to the benefit of our patients.

Key words: *diffuse interstitial lung disease (DILD), International Labor Office (ILO), high resolution computer tomography (HRCT)*

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Introduction

The subject of this research is the objectification and standardization of the evaluation of lesion level and the degree of interstitial lesion, their morphology and activity of disease and their dynamics in diffuse interstitial lung disease (DILD).

The name itself (DILD) covers a variety of damage in functional and supporting structures of pulmonary units for gas exchange, perialveolar tissue and alveolar walls[1–4].

Considering an increase in DILD, these diseases have become a major health and social problem because the number of patients in clinical practice is considerably higher than the number of patients with pneumoconiosis[5–7].

According to radiographic criteria this specific group of diseases is distinctive for its diffuse lesions on chest radiographs[8–16]. Similar picture is in imaging techniques[10,16–28].

Material and Methods

We have treated 129 patients at the Department for Clinical Thoracic Radiology, University Hospital for Lung Diseases »Jordanovac«, Zagreb.

In all of the patients we have verified the diffuse interstitial lung disease (DILD). We have used chest radiograph and CT scans, bronchoalveolar lavage (BAL), pathoanatomic or cytological pattern of transbronchial lung biopsy, pulmonary function tests, and possible biochemical indicators.

There were 129 patients: 65 men and 64 women. The average age was 49.5, all of the patients in the 28–80 brackets.

Conventional radiographs represent the basis for the evaluation of DILD. We have used posteroanterior and lateral chest roentgenograph (F-fi 180 cm) using high-voltage techniques (125 kV and 12.5 mAs). We used X-ray equipment »Thoramat« (Siemens), in middle inspiration. We have also analyzed chest radiographs by using standard ILOU/C 1980 criteria (International classification of radiographs of the pneumoconiosis)[29,30].

ILO criteria has been extended[11,12] for granulomatoses: reticulonodular patterns (*xyz*); »ground glass« *(gg)* – affected air -ways and fine interstitial changes, nodular patterns (*pqr*); linear opacities *(stu)*; overlapping opacities *(overl)*, not entering lesion genesis and patoanatomic assumptions because of potential diagnostic misconceptions[11].

Profusion of lesions was read on 12 -point-scale and distribution in 6 zones.

We treated patients by using CT scans (»Shimadzu Intellekt« equipment) and 1 mm collimation with short exposition (100–500 ms) with HRCT. This technique enables us to evaluate lesion morphology (reticulonodular, nodular, linear and »ground glass«) and disease activity.

We have connected these radiological techniques with the other above-mentioned diagnostic treatments as well as tried to find both specific and relevant correlations. Our aim was to find answers to the following questions:

– The possibility of the application of the ILO symbols not only to pneumoconiosis but to other interstitial diseases, the possibility of the application of additional symbols as well as the quality of certain subdivisions to be better described by the ILO symbols;
– Comparison of diagnostic accuracy of chest radiography and HRCT for the lesions of the interstitial lung diseases as well as correlation between radiological methods and other methods used for diagnostic treatments;
– The possibility of the congruity of BAL results and the ILO symbols in connection with the standardization of the evaluation of the lesion level in the interstitial lung disease, which is based

on the standardization by the ILO classification.

Results

Table 1 shows the DILD classification according to the histological type and the observation of the 129 patients examined in clinical practice.

It can be seen that the predominant group is granulomatos diseases (n=76; 59%), with sarcoidosis predominant in the group (n=51; 67%), then idiopathic pulmonary fibrosis IPF (n=37; 28.7%) and extrinsic allergic alveolitis EAA (n=14; 10.8%). Other diseases are: miliary tuberculosis, histiocytosis x, interstitial pneumonias, asbestosis, silicosis, lymphangitis carcinomatosa.

Table 2 shows the prevalence of the predominant types of opacities in the whole sample as well as in the two major groups of disorders (granulomatoses and other diseases).

It can be seen that the predominant type of opacities is *xyz* (n=28; 95%), which is of considerable relevance. The types of opacities recorded less often are *pqr* (25%), overlapping type (23.68%), *stu* (21.05%).

We can conclude that the prevalent type of opacities is reticulonodular *xyz* patterns characteristic of granulomatoses.

In the group of other diseases the predominant type of considerable relevance are *stu* opacities (83.02%).

The overall result is: the most frequent type *is/are stu* opacities (46.51%), another frequent are *pqr* and overlapping (17.82%) and *xyz* (17.05%). The least frequent type is »ground-glass« opacities (0.80%), and only in granulomatoses.

TABLE 1
DILD CLASSIFICATION ACCORDING TO THE HISTOLOGICAL TYPE AND THE OBSERVATION OF THE 129 PATIENTS EXAMINED IN CLINICAL PRACTICE

Disease classification	Number of patients
Infective: Tuberculosis miliaris	5
Allergic: Extrinsic alveolitis allergica	14
Granulomatosis: Granulomatosis	1
Sarcoidosis	51
Toxoplasmosis granulomatosa	1
Histiocytosis x	4
Pneumatoconiosis: Asbestosis	2
Silicosis	2
Idiopathic pulmonary fibrosis	37
Interstitial pneumonia	2
Malignant: Lymphangitis carcinomatosa	2
Others: Proteinosis alveolaris pulmonum	1
Bronchiolitis obliterans	1
Sclerosis tuberosa	1
Hemosiderosis idiopathica	1
Sclerosis progressiva systemica	1
Arthritis rheumatoides medicamentosa	1
Decompensatio cordis	1

TABLE 2
PREVALENCE (%) OF PREDOMINANT TYPES OF INTERSTITIAL LESIONS IN TOTAL SAMPLE (N=129), AND IN GRANULOMATOSES (N=76) AND NON-GRANULOMATOSES (N=53) GROUPS

Predominant types of interstitial lesions		*pqr*	*stu*	*xyz*	*gg*	*overl*
Total	N	23	60	22	1	23
	%	17.82	46.51	17.05	0.80	17.82
Granulomatoses (N=76)	N	19	16	22	1	18
	%	25.00	21.05	28.95	1.32	23.68
Non-granulomatoses (N=53)	N	4	44	0	0	5
	%	7.55	83.02	0	0	9.43
Poisson's probabilities	p	0.0252	0.00001	0.00001	0.66	0.05

xyz = reticulonodular patterns; *gg* = »ground glass«; *pqr* = nodular patterns; *stu* = linear opacities; *overl* = overlapping opacities

We can conclude that the major group of diseases is the one of chronic character.

Figure 1 shows the prevalence of profusion of interstitial lesions in the whole sample as well as in major groups of diseases.

The overall result is that the most frequent type of lesions is the type with medium level of profusion (47.17%). The result in our sample shows moderate intensity of the diseases.

The predominant types of interstitial lesions in relation with the activity of the diseases (BAL, Dsb, histopathologic findings, CT scans) are given in Tables 3–6.

Table 3 shows predominant types of interstitial lesions in relation with BAL activity.

BAL shows that severe activity of the diseases is characterized by *pqr* opacities in both groups of diseases as well as *stu* opacities for inactivity.

Table 4 shows predominant types of interstitial lesions in relation with diffusing capacity for carbon monoxide (Dsb).

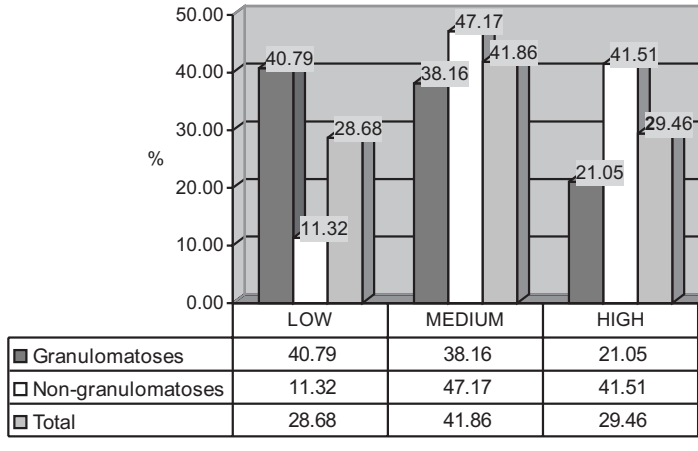

Fig. 1. Prevalence (%) of lung profusion with interstitial lesions in granulomatoses (N=76) and in non-granulomatoses (N = 53) groups.

TABLE 3
ACTIVITY (BAL) OF PREDOMINANT TYPES OF INTERSTITIAL LESIONS IN TOTAL SAMPLE (N=124) AND IN GRANULOMATOSES (N=75) AND NON-GRANULOMATOSES (N =49) GROUPS

BAL activity	*pqr*	*pqr (%)*	*stu*	*stu (%)*	*xyz*	*xyz (%)*	*gg*	*gg (%)*	*overl*	*overl(%)*	Total
Severe	13	56.52	6	10.53	9	40.91	1	100.00	10	47.62	39
Modest	5	21.74	18	31.58	5	22.73	0	0.00	2	9.52	30
Inactive	5	21.74	33	57.89	8	36.36	0	0.00	9	42.86	55
Total	23	100.00	57	100.00	22	100.00	1	100.00	21	100.00	124

χ^2 =156.69; df=8; p=0.0001

xyz = reticulonodular patterns; *gg* = »ground glass«; *pqr* = nodular patterns; *stu* = linear opacities; *overl* = overlapping opacities

TABLE 4
ALVEOLOCAPILLARY MEMBRANE BLOCK (DCO) IN PREDOMINANT TYPES OF INTERSTITIAL LESIONS IN TOTAL SAMPLE (N=129) AND IN GRANULOMATOSES (N=76) AND NON-GRANULOMATOSES (N=53) GROUPS

DCO	*pqr*	*pqr (%)*	*stu*	*stu%*	*xyz*	*xyz (%)*	*gg*	*gg (%)*	*overl*	*overl (%)*	Total
Total											
2+	1	4.35	20	33.33	1	4.55	1	100.00	2	5.88	25
+	9	39.13	29	48.33	4	18.18	0	0.00	12	58.82	54
–	13	56.52	11	18.33	17	77.27	0	0.00	9	35.30	50
Total	23	100.00	60	100.00	22	100.00	1	100.00	23	100.00	129
χ^2=397.04; df=8; p=0.0001											
Granulomatoses											
2+	1	5.26	5	31.25	1	4.55	1	100.00	1	5.88	9
+	8	42.11	8	50.00	4	18.18	0	0.00	10	58.82	30
–	10	52.63	3	18.75	17	77.27	0	0.00	7	35.30	37
Total	19	100.00	16	100.00	22	100.00	1	100.00	18	100.00	76
χ^2=395.02; df=8; p=0.0001											
Non-granulomatoses											
2+	0	0.00	15	34.09	0	0.00	0	0.00	1	20.00	16
+	1	25.00	21	47.73	0	0.00	0	0.00	2	40.00	24
–	3	75.00	8	18.18	0	0.00	0	0.00	2	40.00	13
Total	4	100.00	44	100.00	0	0.00	0	0.00	5	100.00	53
χ^2=74.54; df=4; p=0.001											

Granulomatoses vs. non-granulomatoses	*pqr*	*stu*	*xyz*	*gg*	*overl*	Total
χ^2	13.09	0.206	/	/	11.51	1.218
p	0.03*	0.90			0.03*	0.54
df=4						

xyz = reticulonodular patterns; *gg* = »ground glass«; *pqr* = nodular patterns; *stu* = linear opacities; *overl* = overlapping opacities

The overall result is: the most important alveocapillary block (Dsb) is characterized by *stu* opacities (33.33%). The least important block (Dsb) is characterized by *xyz* opacities (77.27%).

The alveocapillary block (Dsb) is characterized by *stu* opacities, which means there is reticular pattern.

Table 5 shows the histopathologic findings of different predominant types of opacities.

The overall result is as follows: the histopathologic finding of inflammation is the most frequent with »ground glass« attenuation (100%). It is less frequent with *pqr* (72%) and *xyz* (63.64%). The histopathologic finding of fibrosis as a definitive finding is most frequent with *stu* opacities (66.10%). There is a highly significant discrepancy in *pqr* opacities, which are manifested as inflammation in granulomatoses and as fibrosis in the group of other diseases. »Ground glass« attenuation is manifested as histopathologic inflammation and *stu* opacities as histopathologic fibrosis.

Table 6 shows the CT activity in different predominant types of opacities. The

TABLE 5
PATHOANATOMICAL FINDINGS IN PREDOMINANT TYPES OF INTERSTITIAL LESIONS IN TOTAL SAMPLE (N=127) AND IN GRANULOMATOSES (N=75) AND NON-GRANULOMATOSES (N=52) GROUPS

PA	*pqr*	*pqr (%)*	*stu*	stu%	*xyz*	*xyz%*	*gg*	gg%	*overl*	*overl (%)*	Total
Total											
Normal findings	4	16.00	8	13.56	7	31.82	0	0.00	7	35.00	26
Fibrosis	3	12.00	39	66.10	1	4.55	0	0.00	4	20.00	47
Inflamation	18	72.00	12	20.34	14	63.64	1	100.00	9	45.00	54
Total	25	100.00	59	100.00	22	100.00	1	100.00	20	100.00	127
χ^2=237.01; df=8; p=0.0001											
Granulomatoses											
Normal findings	3	14.29	3	18.75	7	31.82	0	0.00	4	26.67	17
Fibrosis	0	0.00	9	56.25	1	4.55	0	0.00	3	20.00	13
Inflamation	18	85.71	4	25.00	14	63.64	1	100.00	8	53.33	45
Total	21	100.00	16	100.00	22	100.00	1	100.00	15	100.00	75
χ^2=224.592; df=8; p=0.0001											
Non-granulomatoses											
Normal findings	1	25.00	5	11.63	0	0.00	0	0.00	3	60.00	9
Fibrosis	3	75.00	30	69.77	0	0.00	0	0.00	1	20.00	34
Inflamation	0	0.00	8	18.60	0	0.00	0	0.00	1	20.00	9
Total	4	100.00	43	100.00	0	0.00	0	0.00	5	100.00	52
χ^2=90.91; df=4; p=0.0001											

Granulomatoses vs. non-granulomatoses	*pqr*	*stu*	*xyz*	*gg*	*overl*	Total
χ^2	164.103	4.507	/	/	27.43	53.007
p	0.0001	0.14			0.07	0.14
df=4						

xyz = reticulonodular patterns; *gg* = »ground glass«; *pqr* = nodular patterns; *stu* = linear opacities; *overl* = overlapping opacities

CT activity in granulomatoses is found with »ground glass« attenuation, *xyz* and *pqr* opacities (100%). The CT inactivity is found with *stu* opacities (66.67%).

The CT activity in the group of other diseases is found with overlapping opacities (33.33%). and the CT inactivity with *pqr* opacities (100%)?! and *stu* (76.47%). The most surprising finding as far as *pqr* opacities are concerned is the presence of the CT activity in granulomatoses and the CT inactivity in the group of other diseases. However, it is certain that the CT activity is manifested as »ground glass« attenuation and *xyz* opacities while the CT inactivity is manifested as *stu* opacities.

The CT inactivity is prevalent both in total as well as in the group of other diseases, while the CT inactivity is prevalent in granulomatoses.

Table 7 shows the relationship between the CT activity and the moderate profusion of the interstitial lesions seen in chest radiographs (Figures 2 and 3).

Discussion

Diffuse interstitial lung disease (DILD) is a distinct group of diseases that are characterized by diffusely distributed densities on chest radiographs. These disorders may be primary pulmonary diseases, or may be cases in which the lung »mirrors systemic disease«[11]. This paper gives the classification of DILD according to the histological type and the observation

TABLE 6
IMPACT ON CT FINDINGS IN PREDOMINANT TYPES OF INTERSTITIAL LESIONS IN TOTAL SAMPLE (N=38) AND IN GRANULOMATOSES (N=16) AND NON-GRANULOMATOSES (N=22) GROUPS

CT	*pqr*	*pr (%)*	*stu*	stu (%)	*xyz*	*xyz (%)*	*gg*	*gg (%)*	*overl*	*overl (%)*	Total
Total											
Active	4	66.67	6	26.09	0	0.00	1	100.00	4	57.14	15
Inactive	2	33.33	17	73.91	1	100.00	0	0.00	3	42.86	23
Total	6	100.00	23	100.00	1	100.00	1	100.00	7	100.00	38
χ^2=235.832; df=3; p=0.0001											
Granulomatoses											
Active	4	100.00	2	33.33	0	100.00	1	100.00	3	75.00	10
Inactive	0	0.00	4	66.67	1	0.00	0	0.00	1	25.00	6
Total	4	100.00	6	100.00	1	100.00	1	100.00	4	100.00	16
χ^2=327.263; df=3; p=0.0001											
Non-granulomatoses											
Active	0	0.00	4	23.53	0	0.00	0	0.00	1	33.33	5
Inactive	2	100.00	13	76.47	0	0.00	0	0.00	2	66.67	17
Total	2	100.00	17	100.00	0	0.00	0	0.00	3	100.00	22
χ^2=37.81; df=2; p=0.10											

Granulomatoses vs. granulomatoses	*pqr*	*stu*	*xyz*	*gg*	*overl*	Total
χ^2	2.34	0.004	/	/	33.14	16.84
p	0.13	0.952			0.0001**	0.0001*
df=4						

xyz = reticulonodular patterns; *gg* = »ground glass«; *pqr* = nodular patterns; *stu* = linear opacities; *overl* = overlapping opacities

TABLE 7
CORRELATION BETWEEN THE LUNG PROFUSION AND IMPACT ON CT FINDINGS IN TOTAL SAMPLE (N=38) AND IN GRANULOMATOSES (N=16) AND NON-GRANULOMATOSES (N=22) GROUPS

Impact on CT/profusion	Low	Medium	High	Total
Total sample				
Active	2 (28.57%)	6 (42.86%)	7 (41.18%)	15
Inactive	5 (71.43%)	8 (57.14%)	10 (58.82%)	23
Total	7 (100.00%)	14 (100.00%)	17 (100.00%)	38
χ^2=4.88; df=2; p=0.10				
Granulomatoses				
Active	2 (50.00%)	5 (83.33%)	3 (50.00%)	10
Inactive	2 (50.00%)	1 (16.67%)	3 (50.00%)	6
Total	4 (100.00%)	6 (100.00%)	6 (100.00%)	16
χ^2=30.51; df=2; p=0.08				
Non-granulomatoses				
Active	0 (0.00%)	1 (40.00%)	4 (36.36%)	5
Inactive	3 (100.00%)	7 (60.00%)	7 (63.64%)	17
Total	3 (100.00%)	8 (100.00%)	11 (100.00%)	22
χ^2=51.31; df=2; p=0.14				

xyz = reticulonodular patterns; *gg* = »ground glass«; *pqr* = nodular patterns; *stu* = linear opacities; *overl* = overlapping opacities

of the patients examined in clinical practice. We have found that granulomatoses are more frequent (59%) than the group of other diseases (41%). However, according to Rubin (1956)[8] and Mc Loud et al. (1983, 1984)[11,12] the granulomatoses are less frequent (32%) than the group of other diseases (68%).

Following findings correspond to the findings by McLoud et al. (1983) [11]:

Sarcoidosis is most frequent in the group of granulomatoses (67%). McLoud's et al. (75%). Another frequent diseases are idiopathic pulmonary fibrosis (IPF) and extrinsic allergic alveolitis (EAA). Reticulonodular opacities *xyz* are prevalent in the group of granulomatoses (28.95%).

The overall result (both granulomatoses and other diseases): the most frequent opacities are of *stu* type (46.51%). while the least frequent is »ground glass« attenuation (0.80%).

Following findings do not correspond to the findings by McLoud et al.: »ground glass« attenuation is found only in granulomatoses, while according to McLoud et al. (1983)[11], it is also found in chronic eozinophilic pneumonia.

Our findings do not correspond to the findings by Jaakkola et al. (1991)[21], which say that there is a small percentage (8%) of »ground glass« attenuation present in extrinsic allergic alveolitis.

The most frequent type of interstitial opacities is *stu* (94.5%) with idiopathic pulmonary fibrosis (IPF) implying prevalence of the end stage of the disease.

As far as the profusion of interstitial opacities is concerned, the most frequent is medium level of profusion, which corresponds to the findings made by other authors[7,11,12,20,21]. The score shows the moderate intensity of the diseases.

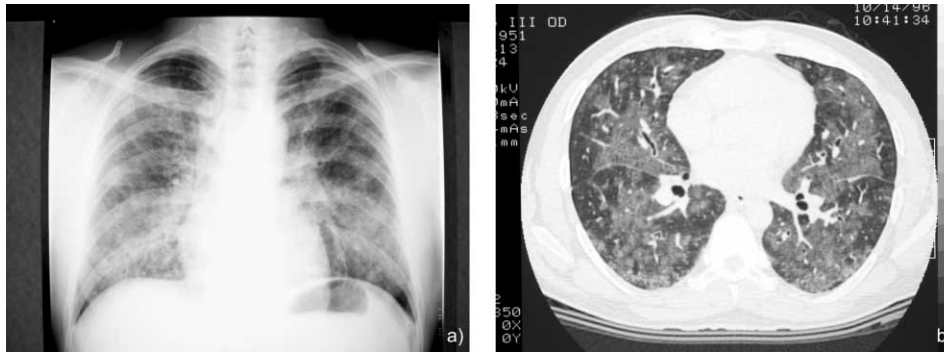

Fig. 2. Sub–acute extrinsic allergic alveolitis. a) ILO standard radiograph, u/t 2/2, ground-glass opacity; b) CT-scan »mosaic perfusion« diffuses ground-glass opacity, hyper-transradiant pulmonary lobules due to coexisting bronchiolitis

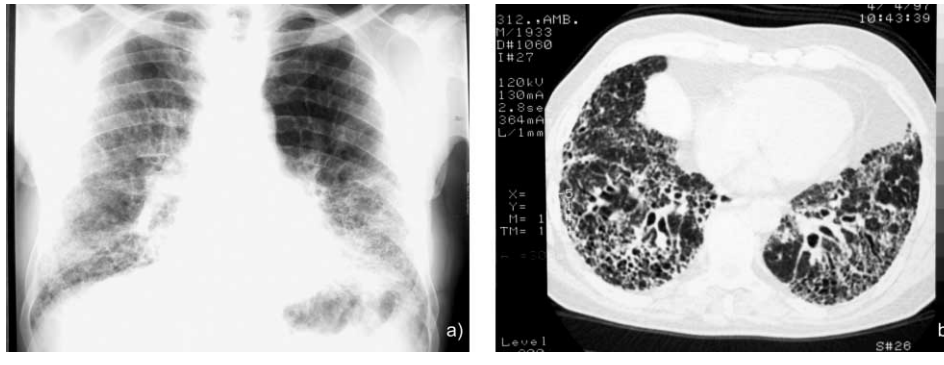

Fig. 3. Idiopathic pulmonary fibrosis – end stage of the disease. a) ILO standard radiograph t/t 3/3; b) CT-scan peribronchovascular interstitial thickening, irregular intralobular interstitial thickening, honeycombing traction bronchiectasis

Another significant element is the profusion of overlapping opacities that is present in both granulomatoses and the group of other diseases, whereas specific *xyz* opacities are found only in granulomatoses and *pqr* opacities are specific for the group of other diseases, which again corresponds to McLoud et al. (1983)[11].

Bronchoalveolar lavage (BAL) shows that severe activity of the diseases is characterized by *pqr* opacities in both groups of diseases as well as *stu* opacities for inactivity. As far as BAL results are concerned. Nugent and collaborators (1989)[20] do not find correlation between prevalent types of interstitial opacities and the level of the activity of the disease.

The same correlation is found in the degree of alveocapillary block (Dsb) with the prevalent types of interstitial opacities. The most important alveocapillary block (Dsb) is characterized by *stu* opacities in both groups of diseases (31.25%–34.09%). The alveocapillary block is not found with *xyz* opacities (77.27%) and *pqr*

opacities (75.00%). Nugent and other authors do not find any correlation between the alveocapillary block and *stu* opacities!

What is highly significant is the difference in histopathologic findings between inflammation and fibrosis for *pqr* opacities. In granulomatoses the *pqr* opacities indicate inflammation (85.71%) whereas in the group of other diseases the same indicates fibrosis (75.00%).

The histopathologic findings of »ground glass« opacities indicate inflammation (100%), whereas the same findings of *stu* opacities indicate fibrosis (56.25–69.77%).

In our patients with granulomatoses the histopathologic findings indicate inflammation, whereas in the group of other diseases the same indicates fibrosis.

Having examined the literature on the topic of diffuse infiltrative lung disease we have not found the kind of work we are presenting here.

The CT findings of activity and inactivity of the disease correlates with histopathologic patterns in *pqr* opacities. The most interesting finding as far as *pqr* opacities are concerned is the presence of the CT activity in granulomatoses and the CT inactivity in the group of other diseases.

In granulomatoses the CT activity (100%) of the disease is found in both »ground glass« and *xyz* opacities.

The CT inactivity is present in *stu* opacities in both granulomatoses (66.67%) and the group of other diseases (66.67%).

According to the analyses of the prevalent types of lesions in the diffuse interstitial lung disease we have come to the conclusion that the most frequent type of opacities are *stu* opacities, which corresponds to the findings by McLoud et al. (1983) [11]. We can also say that *stu* opacities are characteristic for the inactivity of the disease in the correlation to the other methods used. For some of these methods Nugent et al. (1989)[20] do not find any correlation. »Ground glass« opacities are characteristic for the diffuse interstitial disease and *xyz* for granulomatoses.

We should say that, according to our findings, there is a correlation between CT findings of the activity of the disease and moderate profusion of the interstitial lesions seen in chest radiographs.

Conclusion

In our opinion, the application of the standard ILO symbols is possible not only to pneumoconiosis but to other interstitial pathology because of their homogeneity in morphologic characteristics. These morphologic characteristics are used as graphic terminology of the ILO classification, which enables the objectification of radiological findings.

McLoud et al. (1983)[11] have extended the ILO criteria for reticulonodular *xyz* and »ground glass« patterns only for granulomatoses, the group that is predominant (59%) in our work.

The ILO symbols have proved to be more suitable for the description of the subdivision of fibrosis, but only for *stu* opacities.

There are two different types of congruity in the methods used for diagnostic treatments and interstitial lesions analyzed by the ILO:

– As far as activity and inactivity of the diseases in both groups are concerned, there is identical congruity between the BAL findings and ILO symbols as well as between the degree of alveocapillary block and the ILO symbols.
– There is another congruity between histopathologic and CT findings and one part of the ILO symbols, which does not correspond to the previous findings in relation to the diagnostic treatments and the activity of the diseases.

The nature of the problem lies partly in the suitability and standardization of BAL samples[33,34] and the biopsy specimen for histopathologic analyses[31–37], but also in the discrepancy of the two radiographic methods used for diffuse interstitial lung disease[18].

Finally, we have come to the conclusion that by analyzing conventional roentgenograms and using the extended ILO criteria we obtain high level of the standardization of the lesion condition evaluation in diffuse interstitial lung disease. Contrary to other methods, there is considerable congruity with CT findings.

It is clear that such analysis cannot be applied in our daily work, however I have both concluded and confirmed that on conventional roentgenograms the condition of interstitial lesion can roughly be assessed, which is of great importance considering minimal dose of radiation exposure by standard tests in comparison with other radiological techniques. Nevertheless, CT scanning should be performed if there is need for further information for the assessment of the morphology and activity of lesions, to the benefit of our patients.

REFERENCES

1. CRYSTAL, R. G., P. B. BITTERMAN, S. I. RENNARD, A. J. HANCE, B. A. KEOGH, N. Engl. J. Med., 310 (1984) 154. — 2. SPERBER, M., Diffuse lung disorders: A comprehensive clinical-radiological overview. (Springer-Verlag, London Limited, 1999). — 3. TURNER-WARWICK, M., Infiltrative and interstitial lung disease. In: MURRAY, J. F., J. A. NADEL (Eds.): Textbook of respiratory medicine. (W. B. Saunders, Philadelphia, 1988). — 4. HERBERT, Y., M. D. REYNOLDS, Seminars in Respiratory Medicine, 6 (1984) 1. — 5. NOVAK, D.: Lung injuries secondary to inhalation of toxic gases, fumes and aerosols. In: SPERBER, M. (Eds.): Radiological diagnosis of chest disease. (Springer-Verlag, New York, 1990). — 6. KIM, E. A., K. S. LEE, T. JOHKOH, T. S. KIM, G. Y. SUH, O. J. KWON, J H. HAN, Radiographics, 22 (2002) 151. — 7. EPSTEIN, D. M., W. T. MILLER, E. A. BRESNITZ, M. S. LEVINE, W. B. GEFTER, AJR, 142 (1984) 53. — 8. RUBIN, E. H.: The lung as a mirror of systemic disease. (Charles C Thomas, Springfield, IL, 1956). — 9. CARRINGTON, C. B., E. A. GAENSLER, Clinical-pathologic approach to diffuse infiltrative lung disease. In: THURLBECK, W. M., M. R. A. BELL (Eds.): IAP Monograph No. 1. (Williams and Wilkins Co, Baltimore, 1978). — 10. CRYSTAL, R. G., J. D. FULMER, W. C. ROBERTS, M. I. MOSS, B. R. LINE, H. I. REYNOLDS, Ann. Intern. Med., 85 (1976) 769. — 11. McLOUD, T. C., C. B. CARRINGTON, E. A. GAENSLER, A New Scheme for Description, 149 (1983) 353. — 12. McLOUD, T. C., E. A. GAENSLER, C. B. CARRINGTON, Clin. Chest Med., 5 (1984) 329. — 13. HANSELL, D. M., Clinical Radiology, 44 (1991) 227. — 14. IVANOVI HERCEG, Z., Liječnički vjesnik, 100 (1978) 421. — 15. MAŽURANIĆ, I., Z. IVANOVI HERCEG, Radiol. Oncol., 30 (1996) 89. — 16. PARK, J. S., K. K. BROWN, R. M. TUDER, V. A. HALE, T. E. KING, JR., D. A. LYNCH, J. Comput. Assist. Tomogr., 26 (2002) 13. — 17. ROACH, H. D., G. J. DAVIES, R. ATTANOOS, M. CRANE, H. ADAMS, S. PHILLIPS, Radiographics, 22 (2002) 167. — 18. REMY-JARDIN, M., J. REMY, C. DEFFONTAINES, Radiology, 181 (1991) 157. — 19. SCHAEFER-PROKOP, C., M. PROKOP, D. FLEISCHMANN, C. HEROLD, Eur. Radiol., 11 (2001) 373. — 20. NUGENT, K. M., M. W. PETERSON, H. JOLLES, M. M. MONICK, G. W. HUNNINGHAKE, Clin. Chest Med., 96 (1989) 1224. — 21. JAAKKOLA, J., K. PARTANEN, E. O. TERHO, L. NIEMITUKIA, SOIMAKALLIO, Acta Radiologica, 32 (1991) 461. — 22. HANSELL, D. M., Eur. Radiol., 11 (2001) 1666. — 23. CREVELEY, J. R., N. J. SCREATON, M. P HIORNS, J. D. FLINT, N. L. MULLER, Clin. Radiol., 57 (2002) 292. — 24. BESSIS, L., P. CALLARD, C. GOTHEIL, Radiographics, 12 (1992) 45. — 25. MULLER, N. L., C. A. STAPLES, R. R. MILLER, Radiology, 165 (1987) 731. — 26. JOHKOH, T., K. ICHIKADO, M. AKIRA, O. HONDA, N. TOMIYAMA, N. MIHARA, T. KOZUKA, M. KOYAMA, S. HAMADA, H. NAKAMURA, J. Thorac Imaging, 15 (2000) 162. — 27. SPERBER, M., M. KAISER: Magnetic resonance imaging of the thorax. (Warren-Green, St. Louis, 1987). — 28. MULLER, N. I., Eur. Respir. J., 35 Suppl. (2002) 3. — 29. INTERNATIONAL LABOUR OFFICE Silicosis records. Studies and reports. Series F. No. 13, (Labour Office, Geneva, 1930). — 30. INTERNATIONAL LABOUR OFFICE Guidelines for the use of the ILO international classification of radiographs of pneumoconiosis. International Labour Office Occupational Safety and Health 2 (rev 80). (International Labour Office, Geneva, 1980). — 31. MAŽURANIĆ, I.: Vrijednost transbronhalne biopsije pluća u bolesnika s difuznim bolestima plućnog intersticija, M. Sc. Thesis, (School of Medicine, University of Zagreb, Zagreb, 1991). — 32. WALL, C. P., E. A.

GAENSLER, C. B. CARRINGTON, A. HAYES, Am. Rev. Respir. Dis., 123 (1981) 280. — 33. DANEL, C., D. ISRAEL-BIELT, U. COSTABEL, B. WALLAERT, H. KLECH, Eur. Respir. Rev., 2 (1991) 83. — 34. TURNER-WARWICK, M., P. L. HASLAM, Am. Rev. Respir. Dis., 135 (1987) 26. — 35. MAYER-SIDOW, J., M. G. RUST, A. KAPPOS, H. KRONENBERGER, K. NERGER, G. SHULTZE- WERNINGHAUS, Ann. NY Acad. Sci., 456 (1986) 515. — 36. PEROŠ-GOLUBIČIĆ, T., Acta Med. Iug., 42 (1987) 165. — 37. WEBB, W. R., M. G. STEIN, W. E. FINKBEINER, Radiology, 166 (1988) 81.

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OPIS DIFUZNE INTERSTICIJSKE BOLESTI PLUĆA I OCJENA NJENE AKTIVNOSTI

S A Ž E T A K

Konvencionalni rengenogrami su temelj procjene difuzne intersticijske bolesti pluća (DILD). ILO klasifikacija sa svojim simbolima (naknadno proširenim na granulomatoze) ne obuhvaća patoanatomske pretpostavke i ne uključuje genezu lezija te može dovesti do dijagnostičkih zabuna. Kompjutorska tomografija »visoke rezolucije« (HRCT) omogućuje procjenu morfologije i aktivnosti lezija. Nakon liječenja 129 bolesnika s DILD, došli smo do zaključka da, unatoč pneumokoniozi, primjena proširenih standardnih ILO simbola je prikladna za drugu intersticijsku patologiju zbog homogenosti morfoloških obilježja. Što se dijagnostike tiče, za razliku od drugih metoda može se reći da analizirani rengenogrami proširenog ILO omogućavaju visok stupanj standardizacije procjene lezija kod DILD kao i značajnu sukladnost s nalazima CT-a. Jasno je da se takve analize ne mogu primjenjivati u svakodnevnoj praksi, no mi smo i zaključili i dokazali da na konvencionalnim rengenogramima stanje intersticijskih lezija može grubo biti procijenjeno. To je od velike važnosti imajući na umu niske doze ekspozicije radijaciji standardnih testova u usporedbi s drugim radiološkim tehnikama. Ukoliko je procjena morfologije i aktivnosti lezija na dobrobit bolesnika, CT pregled treba svakako napraviti.