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Features in hospitalized patients with symptom-detected or radiologically-detected pulmonary tuberculosis

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ABSTRACT: To compare features of tuberculosis detected either clinically or radiologically, we studied 498 patients hospitalized for tuberculosis. Tuberculosis was less frequently radiologically-detected in patients over 65 yrs old ($p<0.01$) and in directorial staff and inactive subjects ($p<0.0001$). Pleural effusion and radiological cavities were more frequent in the symptom-detected group, but half of the radiologically-detected patients had clinical symptoms which could have led to the diagnosis of tuberculosis, especially in alcoholics and office workers. Finally, 26% of the radiologically-detected patients had positive direct tuberculosis smears and should be considered contagious.

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The efficiency and cost-effectiveness ratio of roentgenographic screening for tuberculosis have recently been brought into question [1]. For example, in 1987 the discovery of a single case of active tuberculosis by mass roentgenographic screening was about FF 300,000 in France, while the average cost of treatment of one out-patient with tuberculosis was about FF 8,400 [2], thus leading to the progressive abandonment of chest-roentgenographic mass screening for tuberculosis. Nevertheless, besides the persistent need for roentgenographic screening in some population subgroups [2], the consequences for an individual of the late discovery of tuberculosis due to delayed detection of the disease remain unclear.

We studied clinical, radiological and bacteriological features of hospitalized patients with pleuro-pulmonary tuberculosis with the aims of: comparing the clinical, radiological and bacteriological features of patients according to whether they were admitted as a result of clinical or radiological case-finding; describing the characteristics of the radiologically diagnosed patients who did not report any symptoms before being detected.

Methods

Study population

A total of 498 hospitalized patients with pleuro-pulmonary tuberculosis were studied from January, 1981, to December, 1985. The diagnosis of tuberculosis was based on bacteriological data (examination for acid-fast bacilli of various specimens such as sputum, bronchial and/or gastric aspirations, either on direct smear or culture) and/or both typical clinical and radiological features improving after antituberculous treatment, and positive tuberculin skin testing [3].

Detection of tuberculosis

The mode of discovery of tuberculosis allowed the identification of two groups of patients: 325 subjects were hospitalized after a case-finding based only on clinical grounds and were defined as clinically-detected (group CD); 173 subjects were hospitalized based on a radiological case-finding and were defined as radiologically-detected (group RD); in the group RD, 89 patients also had clinical symptoms (subgroup RD+) and 84 patients had no symptoms (subgroup RD-).

Data collection

Sex, age, ethnic origin, and socio-professional status: - namely: directorial (executive) staff, managerial staff (office workers), manual workers, and inactive subjects (without occupation or over 65 yrs old) - were recorded in all patients; 28.3% of them had a prior history of tuberculosis; alcoholism was considered probable if the patient reportedly drank more than 50 g of alcohol per day. Clinical symptoms (asthenia, weight loss, anorexia, fever >38°C, nocturnal sweating, cough, sputum production, haemoptysis, chest pain and dyspnoea), radiological patterns and bacteriological studies (presence or absence of acid-fast bacilli on direct smears and/or cultures) were recorded in each patient.

Statistical analysis

The clinically-detected (CD) and the radiologically-detected patients (RD) were compared first, then the two subgroups of radiologically-detected patients (RD+ and RD-) were further compared. Quantitative data were compared using the non-paired t-test, while qualitative data were compared using the Chi squared test with Yates' correction or Fisher's exact test if necessary. A difference was considered significant if $p<0.05$.

Results

Socio-economical characteristics

Table 1 shows data from the study group and from the French INSEE (Institut National de la Statistique et des Etudes Economiques) census (1982) of the general population in the same geographic area as the study group. No difference in sex or ethnic origin was found between CD and RD groups. Elderly people (>65 yrs) were less often frequently radiologically-detected for tuberculosis than younger people, as shown on figure 1 ($p<0.01$). Table 2 shows the socio-professional status in CD and RD groups.

Table 1. – Demographic characteristics (expressed in %) of the study population and of the general population of the same geographic area as the study group (data obtained from the French 1982 census)

General	Study population	General population
Sex		
Males	71.1	48.5
Females	28.9	51.5
Age yrs		
<40	48.2	60.9
41–65	39.0	27.7
>65	12.8	11.4
Origin		
Europeans	60.4	91.6
North-Africans	20.5	4.8
Blacks	10.2	2.5
Miscellaneous	8.9	1.1
Socio-professional status		
Directorial staff	10.0	3.6
Managerial staff	20.1	18.8
Workers	35.7	38.8
Inactives	34.2	38.8
Alcoholism	19.1	6.9

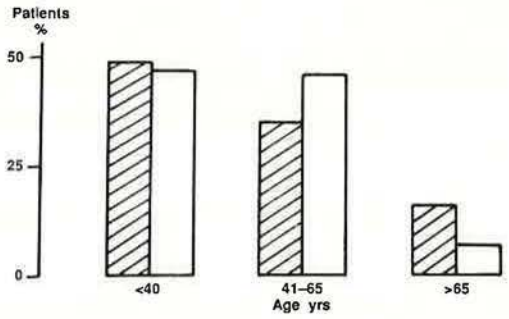

Fig. 1. – Age distribution of clinically- and radiologically-detected patients. ▨: clinical detection; □: radiological detection.

Table 2. – Influence of socio-professional status on the type of detection

	% of clinically-detected	% of radiologically-detected	p value
Directorial staff	78	22	<0.0001
Managerial staff	53	47	NS
Workers	58	42	NS
Inactives	76	24	<0.0001

NS: not significant.

Clinical and radiological signs

Prior history of tuberculosis was more frequent in the CD group (32%) than in the RD group (22%, $p=0.03$). Table 3 shows general and functional symptoms in the CD and RD groups. These symptoms were significantly less frequent in the case of radiological detection ($p\leq0.0001$). Location and extension of radiological abnormalities did not differ between the CD and RD

Table 3. – Percentages of clinical symptoms in the clinically- and radiologically-detected patients

Symptom	Detection	
	Clinical	Radiological
Asthenia	75	27
Weight loss	68	23
Anorexia	43	7
Fever	60	12
Nocturnal sweating	26	11
Cough	77	31
Sputum production	53	20
Haemoptysis	23	3
Pain	28	8
Dyspnoea	32	12

groups. Cavitation (46%) and pleurisy (17%) in the CD group were more frequent than in the RD group (32% and 8%; p=0.003 and p=0.01, respectively).

Bacteriological data

Mycobacterium tuberculosis was more often seen on direct smears and cultured in the CD group (46% and 80% respectively) than in the RD group (26% and 70%; p<0.001 and p<0.01 respectively).

Features of RD group patients

No significant difference was found between the subgroup RD+ and RD- with regard to sex, age, ethnic origin or past history of tuberculosis. Figure 2 shows that in the RD+ subgroup, clinical symptoms were more frequent in managerial staff (office workers), while workers (labourers) constituted the most important group in the RD- subclass (p<0.01). Alcoholism was more frequent in the RD+ patients (33%) than in the RD- patients (13%, p<0.01). Radiological and bacteriological features of RD+ and RD- patients are shown in table 4.

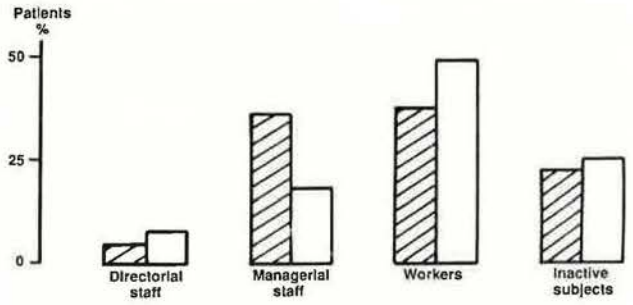

Fig. 2. – Comparison of symptomatic and asymptomatic patients in the radiologically-detected group, according to socio-professional status. ▨: symptomatic patients; □: asymptomatic patients.

Table 4. – Percentages of radiological and bacteriological features in radiologically-detected patients without (RD-) and with (RD+) clinical symptoms

		RD-	RD+	p value
Radiology				
	Advanced (bilateral) lesions	25	40	<0.05
	Cavity	20	43	<0.01
	Pleurisy	6	10	<0.05
Bacteriology				
	Positive smear	20	34	<0.05
	Positive culture	66	73	NS

NS: not significant.

Discussion

The main findings of our study are:

(1) although tuberculosis is more severe when detected clinically than radiologically, more than a quarter of radiologically-detected patients had a positive direct smear for *Mycobacterium tuerculosis*;

(2) some socio-economic groups underestimate their symptoms, especially alcoholics and managerial staff;

(3) the most important fact is that 20% of totally asymptomatic radiologically-detected patients had a positive direct smear for *Mycobacterium tuberculosis* and should be considered contagious.

In our study, the majority of the patients were less than 65 yrs old. A recent work established that in the USA, the rate of tuberculosis, while falling among younger people, had been increasing among people over 65 yrs for at least the last twenty years [4]. This discrepancy could be related in our population to the frequent necessity of hospital care in certain socially and economically depressed groups like immigrants, and possibly to the frequent reluctance of elderly people to be hospitalized. Moreover, although elderly people are considered a risk group for tuberculosis for many reasons, namely morbid associations predisposing them to the reactivation of previous infection [5], frequent exposure earlier in life [6], and risk of new infections in nursing homes [7], the diagnosis of pulmonary tuberculosis is frequently underestimated in these patients [5]. A prior history of tuberculosis seems to alert patients to the potential reactivation of the disease. Thirtytwo percent of the clinically-detected patients, as compared to 22% of the radiologically-detected, had a past history of tuberculosis. This may be due to the better compliance of the former tuberculous patients to seek medical help because of fear of potential reappearance of an old disease [8].

Although tuberculosis is, as expected, more severe when detected clinically than radiologically, it should nevertheless be noted that some of the radiologically detected patients had clinical symptoms which were either neglected or ignored. This could partly arise from the underrating of the actual risk of pulmonary tuberculosis by the general population and/or by the medical staff [9]. Likewise, cavities and pleurisy were more frequent in the clinically-detected patients than in the radiologically-detected group. Nevertheless, our study shows that patients with tuberculous cavities can be asymptomatic (table 4) and are therefore an important source of transmission of infection, especially in socio-economically depressed foci [10]. This is reinforced by the observation that a quarter (26%) of the radiologically-detected patients had positive direct tuberculous smears and should be considered contagious [11].

Concerning the group of radiologically-detected patients, 51% of them (group RD+) had clinical symptoms which should have led to the diagnosis of tuberculosis. This, however, leaves an important proportion (group RD-, 49%) who did not report any symptom. This relatively high proportion could be due to a recruitment bias, since LE GALES *et al.* [2] found only 23% of totally asymptomatic cases amongst the radiologically-detected patients in an undifferentiated population. Another reason, a selection bias [12], cannot be excluded because the rate of hospital admission is probably different in the case of clinical or radiological findings. Therefore, it is possible

that the proportion of symptomatic radiologically screened patients is underestimated in our study.

Two groups of patients probably underestimate their symptoms. Alcoholics are more symptomatic (33%) in the radiologically-detected group than in the clinically-detected group (13%). This is probably due to the fact that while alcoholics have a high prevalence of tuberculosis [10, 13], they tend to neglect their symptoms and this often leads to a delayed diagnosis of the disease [14].

Surprisingly, managerial staff (office workers) neglect their symptoms, although they are not considered as a "high risk" group for tuberculosis. Surveys are necessary before any conclusions can be drawn on this particular point. Bacteriological data of the radiologically-detected patients are similar to those previously published [15, 16], but again it is emphasized that 20% of the asymptomatic radiologically-detected patients had a positive direct tuberculosis smear and hence may be considered as possible transmitters of infection.

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Caractéristiques des patients hospitalisés pour tuberculose pulmonaire détectée sur symptômes ou par l'examen radiologique. B. Herer, C. Kuaban, F. Papillon, P. Durieux, J. Chrétien, G. Huchon.

RÉSUMÉ: Nous avons étudié 498 patients hospitalisés pour tuberculose, afin de comparer les caractéristiques des cas détectés soit par la clinique soit par l'examen radiologique. La détection radiologique fut moins fréquente chez les sujets de plus de 65 ans ($p<0.01$) ainsi que chez les cadres de direction ou les sujets inactifs ($p<0.0001$). Les épanchements pleuraux et les cavités s'avèrent plus fréquents en cas de détection sur symptômes, mais la moitié des cas détectés aux rayons X avaient des signes cliniques qui auraient pu conduire au diagnostic de tuberculose, surtout chez les alcooliques et les employés. Finalement, les frottis d'examens directs sont positifs chez 26% des tuberculeux détectés par l'examen radiologique qui doivent donc être considérés comme contagieux.

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