

TUBERCULOSIS IN THE ELDERLY

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ABSTRACT

A study of 120 cases of tuberculosis in patients aged 65 years and above revealed that there were more males than females with the disease compared with the younger age group of 15 to 45 years old. The elderly group also had significantly more severe and more had bacteriologically positive disease. The majority of them were born outside Singapore and immigrated more than 30 years ago. Risk factors such as diabetes mellitus, past history of tuberculosis, malignancy and gastrectomy were more common in the elderly group. Standard 6-month regimens were well tolerated and adverse side effects to the drugs were negligible.

Keywords : Tuberculosis, Elderly.

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INTRODUCTION

It is well known that in Singapore, as in many other countries, tuberculosis is a disease of the elderly. Every year about a third of all tuberculosis notifications were cases aged 60 years and above. Furthermore, the rate of fall of tuberculosis incidence in the elderly seems to be much slower than that in the younger age groups. For example, from 1960 to 1989, the incidence rate of tuberculosis in those aged 65 years and above fell by an average of 4.1% annually in males and 2.8% in females, whereas over the same period, for those in the 40 - 44 year age group, the corresponding average annual fall was 6.4% in males and 6.0% in females (1).

The purpose of this paper is to study the characteristics and factors that may contribute to this high rate of tuberculosis in the elderly.

METHOD

The Department of Tuberculosis Control has been treating tuberculosis on an ambulatory basis since 1981, and in 1985 short-course regimens were used routinely as standard treatment. Consecutive patients registered for treatment by us from March 1988 were selected for this study according to the following criteria:

- Study Group - the first 120 consecutive patients aged 65 years and above.
- Younger Group - the first 120 consecutive patients aged between 15 and 45 years.

The younger group of patients was selected to serve as a comparison for the older study group.

Our policy for allocating treatment regimens is as follows:

- Standard Regimens
 - 1SHRZ/5H₃R₃ - smear negative, minimal TB in those aged < 60 years.
 - 2SHRZ/4H₃R₃ - smear positive, moderately or far advanced disease, in those aged less than 60 years.

2HRZ/4H₃R₃ - disease of any extent, in those aged 60 years and above.

In the maintenance phase, RH were given daily to be taken at home instead of three times a week if patients were unable to go to the outpatient clinics for supervised treatment.

• 9-Month Regimen

2RHE/7RH - any contra-indication to S and/or Z eg patients using alcohol regularly but without liver impairment; pregnancy.

The 6-month regimens were prolonged to 9 months during the maintenance phase for relapsed cases and those with extra-pulmonary tuberculosis.

• Long-term Regimens

2SHE/10 or 16 HE - liver disease; allergy to R.

S = Inj Streptomycin

H = Isoniazid

R = Rifampicin

Z = Pyrazinamide

E = Ethambutol

RESULTS

Among the study group, 91% were Chinese and there were 4 times more males than females (Table I). In the younger group, 74% were Chinese and the male to female ratio was 1.5 to 1, which conformed more to the national tuberculosis notification characteristics.

Table I - Ethnic Group & Sex

Ethnic Group	65+ years		15-45 years	
	M	F	M	F
Chinese	88	21	52	37
Malays	3	2	14	8
Indians	6	0	4	1
Others	0	0	0	4
Total	97	23	70	50
%	81	19	58	42

Table II shows that among the study group 86 patients (72%) were born outside Singapore and most of them had been in the country for more than 30 years. Foreign-born patients among the younger group were negligible.

Most of the cases were discovered among the patients attending the government outpatient clinics, government hospitals and private clinics (Table III). Surveys, which were mainly aimed at the older population, contributed 15% among the study group.

Sixty-five to 70% of the cases presented with symptoms, the most common of which was cough with phlegm. Surprisingly, a higher proportion of younger patients in the control group had history of haemoptysis, fever, chest pain, anorexia and loss of weight (Table IV).

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**Table II - Country of Birth & Length of Stay in Singapore by age group
65 years and above: 86 patients**

Country of Birth	Length of stay in years							Total
	1-10	11-20	21-30	31-40	41-50	50+	Unknown	
Malaysia	-	1	1	1	1	1	1	6
China	1	1	1	6	10	51	2	72
India	-	-	-	1	-	3	-	4
Others	-	-	-	-	-	4	-	4

15-45 Years: 11 Patients

Country of Birth	Length of stay in years				Total
	1-10	11-20	21-30	31-40	
Malaysia	3	1	2	-	6
India	-	-	-	1	1
Others	4	-	-	-	4

Table III - Sources of Referral

Referral Sources	65+ years		15-45 years	
	No.	%	No.	%
Govt OPDs	35	29.2	23	19.2
Govt Hospitals	30	25.0	22	18.3
Surveys	18	15.0	3	2.5
Pte Med Pract.	17	14.2	26	21.7
Old Age Homes	7	5.8	0	0
TB Contacts	5	4.2	15	12.5
Self Referrals	4	3.3	8	6.7
SATA	4	3.3	3	2.5
NS/Police	0	0	13	10.8
Students	0	0	5	4.2
School Staff	0	0	1	0.8
Foreign Workers	0	0	1	0.8
Total	120	100.0	120	100.0

Table IV - Symptoms

Symptoms	65+ years		15-45 years	
	No. (n=120)	%	No. (n=120)	%
Any Symptoms	86	71.7	78	65.0
Cough	64	53.3	64	53.3
Phlegm	52	43.3	51	42.5
Dyspnoea	30	25.0	10	8.3
Weight Loss	19	15.8	37	30.8
Anorexia	14	11.7	20	16.7
Haemoptysis	13	10.8	25	20.8
Fever	11	9.2	24	20.0
Chest Pain	5	4.2	15	12.5

Risk factors were understandably more common in the older patients in the study group, except for the history of contact with tuberculosis patients (Table V). With the high prevalence of the disease and more intensive case finding among the older people, tuberculosis is often diagnosed first in this age group, so it is not surprising that the younger patients often give a history of contact with the disease some time in the past.

Table VI shows that the majority of the cases seen were pulmonary tuberculosis, with very few cases of tuberculosis of other sites. The study group had more cases with moderately

Table V - Risk Factors

Condition	65+ years		15-45 years	
	No. (n=120)	%	No. (n=120)	%
Contact	9	7.5	34	28.3
Diabetes	30	25.0	3	2.5
Past TB	22	18.3	3	2.5
Alcohol	17	14.2	0	0
Gastrectomy	5	4.2	0	0
Malignancy	5	4.2	0	0

and far advanced disease than the younger group which had about equal number of minimal and combined moderately and far advanced disease. The difference is statistically significant ($0.001 < p < 0.01$).

Table VI - Extent of Disease

Extent of Disease	65+ years		15-45 years	
	No.	%	No.	%
Minimal	38	32	62	54
Moderate	71	60	47	41
Far Advanced	9	8	6	5

Disease of other sites

Other Sites	65+ years	15-45 years
Lymph Nodes	0	5
Lymph Nodes+ PTB	0	2
Pleura	1	0
Pleura + PTB	3	3
Prostate		1 0

Among those with pulmonary disease, the study subjects had a higher percentage of bacteriologically positive cases than the younger group (Table VII). This difference is also statistically significant ($0.001 < p < 0.01$). The routine was to take two pre-treatment sputum specimens from each patient on two consecutive days and each specimen was examined for acid fast bacilli on microscopy and cultured for tubercle bacilli.

Table VII - Bacteriological Status (Pulmonary cases only)

	65+ years		15-45 years	
	No.	%	No.	%
Positive	61	52	47	41
Negative	57	48	68	59
Total	118	100	115	100

For the study group, 50% received the 6-month short-course regimens as compared to 71% in the younger control group. There were more relapsed cases among the study group (Table VIII).

Adverse reactions during treatment were within acceptable limits in both groups and most of the reactions were mild gastrointestinal disturbances, skin rashes and giddiness (Table IX). Nine cases of the 14 in the study group were on RHZ when they complained of adverse reactions. In the control group, 17 out of 18 cases of reactions occurred while the patients were on SHRZ.

Among the 3 study cases who developed jaundice, 2 were on regimens containing both Rifampicin and Pyrazinamide (RHZE and RHZ respectively) and the other one was on SHRE

Table VIII - Regimen Allotted

Regimen	65+ years			15-45 years		
	New	Relapsed	%	New	Relapsed	%
6-month	58	2	50	85	0	71
9-month	27	8	29	12	1	11
Other	7	11	15	12	2	12
Incomplete treatment	6	1	6	8	0	6
Total	98	22	100	117	3	100

Table IX - Adverse Reaction to Drugs

Type of Reaction	65 + years		15-45 years	
	No. (n=120)	%	No. (n=120)	%
Any Reaction	14	11.5	18	15.1
Skin Rash	1	0.8	8	6.7
Giddiness	1	0.8	3	2.5
Hearing disturb	1	0.8	0	0
Fever	0	0	2	1.7
Gastro-intest. disturbance	4	3.3	2	1.7
Jaundice	3	2.5	1	0.8
Visual disturb.	1	0.8	0	0
Joint pains	2	1.7	0	0
Others	1	0.8	2	1.7

(without Pyrazinamide). All 3 were subsequently put on alternative treatment regimens and were well. One patient in the younger group developed jaundice one week after starting on SHRZ. His pretreatment liver enzyme results which became available soon after he started treatment were found to be abnormal, raising doubt that his liver impairment was directly due to the effects of the anti-tuberculous drugs.

The majority of cases completed treatment satisfactorily. Ten cases (8.4%) among the study group died before completing treatment, 2 of them directly due to the disease, and the rest due to other causes not related to tuberculosis. Those transferred out had complications such as jaundice or concurrent malignancy which required further specialised management in hospital. Defaulter rate was low in both groups - 2.5% and 3.3% respectively (Table X).

Table X - Outcome

Outcome	65 + years		15-45 years	
	No.	%	No.	%
Completed Treatment	93	77.5	106	88.3
Incomplete Treatment				
Follow-up only	1	0.8	1	0.8
Left Country	2	1.7	3	2.5
Lost sight of	3	2.5	4	3.3
Died - TB	2	1.7	0	0
Died - others	8	6.7	0	0
Transferred out	5	4.2	3	2.5
Others	6	5.0	3	2.5
Total	120	100.0	120	100.0

DISCUSSION

With the implementation of mass BCG vaccination in the newborns and improvement of the socio-economic conditions, there has been a dramatic decline in the incidence of tuberculosis to very low rates among young children and the virtual eradication of tuberculous meningitis in children. However, the pool

of infectious cases remains largely in the elderly. Many of these people were infected years ago when the disease was highly prevalent, and others were no doubt infected even before they immigrated here from countries with high prevalence of the disease.

The preponderance of cases in elderly males has also been noted in other countries like the United Kingdom⁽²⁾ and the United States⁽³⁾. Stead and Lofgren⁽³⁾ stated that one of the factors responsible for this was the fact that early in this century many women who suffered from tuberculosis died early in life. In the subsequent years when the tuberculosis case rates were determined for all tuberculin positive persons, the rates were somewhat higher for men. They suggested from this that the important factor is the positive tuberculin skin test and not sex.

Elderly persons are subject to a number of diseases and conditions such as diabetes, malignancies, gastrectomy, alcoholism and nutritional deficiencies which are known to increase the risk of endogenous reactivation of old quiescent lesion⁽⁴⁾. Because of these risk factors, tuberculosis in the elderly is often more severe and hence bacilli are more likely to be present in the sputum. The ageing process itself is accompanied by a decline in resistance as the organs undergo some degree of degenerative changes⁽⁵⁾. Exogenous reinfection is believed to play little part in areas where prevalence is high because primary childhood infection is said to produce a strong and lasting immunity to reinfection⁽⁶⁾. Proponents of the endogenous theory derive their support from epidemiological and animal studies. Epidemiological data consistently show that the elderly give a lower rate of contact history. Furthermore, about 80% of them are known to have "fibrotic" lesions (treated or untreated) in the past. Reactivation of old disease is more commonly seen in the elderly who had previously been inadequately treated or had received the old and less effective regimens⁽⁴⁾.

Except for dyspnoea, other symptoms appear to be more common in the younger age group. Dyspnoea in the older age group was mostly due to some degree of chronic obstructive airway disease. The classic symptoms of tuberculosis like fever, loss of weight, night sweats, sputum production and haemoptysis have been noted to be more common in younger people⁽⁷⁾. On the other hand, these symptoms may be ignored by the elderly who may attribute them to old age or the effects of cigarette smoking. Also, the elderly may not be able to give a proper account of their symptoms because of poor memory, confusional state, deafness or speech impairment⁽⁸⁾.

Special considerations must be observed in the treatment of tuberculosis in the elderly. Streptomycin is best avoided in the elderly because it can give rise to unpleasant side effects as a result of a decline in renal function. Ethambutol is a useful drug but it is important to exclude ophthalmic contraindications. Baseline visual acuity and test of colour perception should be done prior to commencement of treatment. In the absence of alcoholism and other liver disease, a highly recommended regimen is that of 2 months of daily Rifampicin, Isoniazid and Pyrazinamide followed by 4 months of Rifampicin and Isoniazid given either daily or three times a week. This was the most commonly used regimen in our study. The regimen was well tolerated and highly effective.

Some of the problems in the treatment of elderly persons must be borne in mind. Elderly patients may not be reliable in taking medication because of failing memory and confusional states which may occur in those with cerebral ischaemia and lack of insight into their illness⁽⁹⁾. Supervised treatment at the government outpatient polyclinics may not be possible for the elderly because of poor ambulation. They may also have difficulty in travelling to the clinic on their own because of visual

impairment, dyspnoea or giddiness. Treatment should therefore be supervised by a reliable member of the family. He should be motivated and encouraged by the staff at the commencement of treatment.

It is important to consider the effects of drug interaction when Rifampicin is used. This highly effective anti-tuberculous agent has been shown to interact with a number of commonly used drugs such as anti-coagulants, digoxin, beta-blockers, verapamil, theophylline, sulfonyleureas and glucocorticoids. Other drugs like cyclosporine, ketoconazole, chloramphenicol, phenytoin, barbiturates and steroids have also been described to interact with Rifampicin⁽¹⁰⁾. The effectiveness of any one of the above-mentioned drugs should be monitored closely when it is used in conjunction with Rifampicin and drug dosages should be adjusted accordingly.

In summary, this study has highlighted a few characteristics of tuberculosis in the elderly as compared to the younger group:

1. There were more males than females - ratio 4:1 (Younger Group 1.4 : 1)
2. The majority were born outside Singapore - 86/120 (72%) (Younger Group 11/120 (9%))
3. There were more cases of moderately and far advanced disease - 68% (Younger Group 46% - $0.001 < p < 0.01$)
4. There was a higher proportion of bacteriologically positive cases - 52% (Younger Group 41% - $0.001 < p < 0.01$)
5. Risk factors were more common.

6. Except for cough and dyspnoea, symptoms appear less frequently.

For Both Groups:

1. A majority (above 75%) completed treatment satisfactorily.
2. Treatment defaulter rate was very low - 2.5% and 3.3% respectively.
3. Side effects were negligible.

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