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LADY LINLITHGOW SANATORIUM

The Tuberculosis Association of India started, at the instance of the Government of India, two model institutions viz, New Delhi TB Clinic (later upgraded as a Training & Demonstration Centre) and Lady Linlithgow Sanatorium, Kasauli, soon after its inception. The first was meant to demonstrate the feasibility of taking care of tuberculosis patients in their homes though anti-tuberculosis drugs were not available then and the Sanatorium, besides being a modern fully equipped treatment centre, was intended also to train specialists for tuberculosis work since facilities for such training were very limited at that time. The services rendered by these two institutions and the reputation they have built up both in the country and abroad, are well known. Opened in May, 1941 with one hundred beds, the Lady Linlithgow Sanatorium ultimately had 250 beds. The high standard of its services, quiet and devoted efficiency of all echelons of its past and present staff and the excellence of results achieved have made this institution the most popular one in the northern region. In spite of this, alas, the Lady Linlithgow Sanatorium has had to be closed down though India still needs more beds.

The first Sanatorium in the world was started in Germany in the sixties of the last century before Robert Koch discovered the tubercle bacillus and proved the infectious nature of the disease. Sanatoria were usually located on hills because of the then prevailing belief that salubrious hill climate helped cure tuberculosis. Sanatoria sprang up in different parts of the world and these included a few in our country. When the role of climate was proved to be of little or no consequence, specially after the introduction of collapse therapy, emphasis shifted to opening hospitals near big cities, since running of sanatoria in far-flung hilly areas was not only more costly but posed many problems regarding efficient and comprehensive services. With this development the already existing sanatoria in some countries started working more or less like convalescent homes. In India, however, sanatoria and hospitals in the plains have been functionally more or less synonymous and equally good even for surgical treatment, fulfilling the real needs in the overall management of pulmonary tuberculosis.

Closing down a Sanatorium is neither unique nor unprecedented. Many a one in the developed countries including the world-famous Trudeau Sanatorium has closed down and many more are on their way out. This is because the need for indoor treatment in those countries has considerably diminished, mainly due to fall in the prevalence and incidence of disease in general and the revolution in the management of pulmonary tuberculosis

ushered in by specific chemotherapy. Since domiciliary treatment is as effective and safe as indoor treatment and yet considerably cheaper, closure of some sanatoria and hospitals becomes inevitable as well as justified.

There is, however, a difference in the conditions obtaining in those countries with dwindling requirements of beds and in developing countries like ours where hospitalization of tuberculosis patients still has its place. There is no authentic evidence of any decline in the prevalence and incidence of tuberculosis in our country. Even with extensive facilities for domiciliary treatment, some patients do and will continue to need hospitalization for some time. It is accepted by all concerned that nearly 41,000 beds said to be available in the country to-day are not adequate even to meet the minimum needs of the country and hence provision is being made in the successive plans for increase in the number of beds. Therefore, the question why a modern and popular sanatorium with 250 beds is allowed to close down, when the number of existing beds is inadequate and new beds are being added concurrently may be a legitimate one.

A vast majority of tuberculosis patients come from weaker sections of society. They need free beds. Organisations which provide free treatment to all such patients can never be self-supporting. It is for this reason that the institutions run by voluntary organisations like the Tuberculosis Association of India cannot make both ends meet, unless subsidised by Government. On the other hand, opening new beds entails substantial capital investment. Will it not be more economical for Government to subsidise voluntary organisations to keep such institutions running and utilise all the available beds and thereby save the capital expenditure on starting new beds? The Association has been bringing this fact to the notice of the Government. We hope Government will give this matter serious consideration because the difficulties which the Kasauli Sanatorium has gone through are also being experienced by other sanatoria run by the voluntary organisations. If the Association succeeds in persuading the Government to subsidise voluntary institutions, the Kasauli Sanatorium even while closing down would have rendered another signal contribution to the control of tuberculosis.

Though lamentable, there is nothing surprising in the unfortunate fate that has overtaken this hoary Sanatorium in Kasauli. The wind of change was gently blowing over the horizon even at the time when the institution was established. The Founding Fathers of the Sanatorium envisaged that the country must have "clinics as near as possible to the centre of large cities, tuberculosis hospitals in close proximity to the cities, home visiting schemes perfected in every district, but have sanatoria in the hills *"where money permits"*. Money does not permit continuation of the Kasauli Sanatorium for, the number of paying patients started falling perceptibly after the advent of specific chemotherapy. Also the reserving bodies developed their own arrangements to attend to their patients with the result that the Association found itself in a very difficult position to maintain the institution.

Though the Sanatorium stands closed for treatment of the tuberculous, it is a great consolation that its premises, building and some equipment will be taken by the Government to serve the larger interests of the country. These

will be used by the Union Ministry of Health and Family Planning to establish a training centre and to enhance research capabilities of the Central Research Institute in Kasauli and also to step up production of triple vaccine for immunisation programme. This undoubtedly will go a very long way to promote public health in the country.

The Association is naturally sad at the closing down of one of its prestigious institutions. We take this opportunity to record our deep appreciation of the services rendered by every one of its staff. We realise that the decision to close down the Sanatorium has caused lot of mental strain to the members of the staff. It is, however, gratifying that the Government of India is trying to absorb many of the younger members of the staff in various institutions.

TUBERCULOSIS IN MENTAL HOSPITAL PATIENTS

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Introduction

The morbidity and mortality among inmates of institutions for mental diseases were found to be much higher than in the general population (Oechsli, 1949, Hendles, 1952, Katz *et al.*, 1954). This was attributed to over crowding in these institutions and poor personal hygiene and feeding habits of these patients (Katz *et al.*, 1954). Prolonged institutionalisation in an environment conducive to tuberculosis rather than the type of mental disorder seems to be the deciding factor (Ruskin, 1945). An assessment of the prevalence of tuberculosis among patients in a large mental hospital in the city of Madras was therefore undertaken. The staff were also included in the survey since prevalence among the one group is likely to influence the other.

Material and Methods

The Government Mental Hospital in Madras is 104 years old and it is spread over an area of 40 acres. It is the only institution of this nature in the state. There are 18 wards, 12 for men and 6 for women, with an in-patient strength of 100 each. The floor area of each ward is about 3,000 sq. ft. There are large open areas inside the compound of the hospital. The total number of in-patients during the survey period was 1,557, of whom 986 were men, 529 women and 42 children (34 boys and 8 girls). The hospital has outpatient service also and the daily average attendance is 150. Separate wards for the treatment of tuberculous patients, a ward for 59 men patients and another for 58 women and children patients, are available. The patients who had suggestive symptoms like cough, fever etc. were investigated radiologically and, if possible, by microscopy.

For the purpose of this survey the following investigations were done:

1. 70 mm Chest film was taken with the mobile Mass Miniature Radiographic Unit for all the inmates except those who were uncooperative, physically handicapped and children less than 5 years of age. The films were read by one of the Medical Officers (Dr. M. Abdul Rahim) and reassessed by the Director. For those who showed "doubtful" lesion as seen in the 70 mm film and children below 5 who showed positive tuberculin reaction, X-ray chest

was taken with standard size film and assessment made.

2. Bacteriological investigations were done for those who showed radiological evidence of suggestive lesion. For only a few patients sputum was available for examination microscopically and by culture. Resting gastric juice was investigated for others to the feasible extent.

3. For patients below 20 years of age Tuberculin test was done using PPD. S RT 23 with Tween 80.

Findings

The survey was started in November 1974 and completed in January 1975. 22 patients were not covered by the survey because 18 were uncooperative and 4 were physically handicapped.

70 mm chest X-ray was taken for 99% of the patients. Bacteriological investigations could be done for only 45 % of the patients who had suspicious shadows in their chest X-rays. Tuberculin test was carried out in 91% of the patients who were less than 20 years of age.

The in-patients were found to suffer from Schizophrenia, Mental Retardation, Epilepsy, Psychosis and Depression. Among the epileptics there were 13 cases of Encephalitis (4 males and 9 females) and 6 cases of GPI (all males). Drug addicts and chronic alcoholics constituted the cases of Psychosis. 69% of men and an equal proportion of women were found to suffer from Schizophrenia. The largest number of in-patients were within the age group of 21-35 years.

Radiological evidence of pulmonary tuberculosis was seen in 13% of the patients and among these 3% had inactive lesions. 12% of males and 7% of females showed evidence of active pulmonary tuberculosis. Prevalence of healed lesions was highest (14.5%) among the 36-50 years age group. However active lesions were found in equal proportion among the age groups 21-35 and 36-50 years.

Out of the 157 patients who had radiological evidence of active pulmonary lesions for only 71 (45%) bacteriological investigation could be

TABLE I

Survey coverage

No. of in-patients at the time of Survey	1557
No. examined radiologically	1535
Coverage	99%
No found radiologically positive	157
No. examined Bacteriologically	71
Coverage	45%
No eligible for Tuberculin Test (Less than 20 years age)	167
No. Tuberculin tested	152
Coverage	91%

TABLE II

Distribution of patients according to age, sex and mental status

	Age in years													
	0-5		6-12		13-20		21-35		36-50		51		Total	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F
Total subjects	2	—	28	8	80	49	417	216	298	159	184	94	1009	526
Inactive lesions	—	—	1	—	1	1	6	5	11	8	6	7	25	21
	—	—	4%	1%	2%	2%	1%	2%	4%	5%		8%	3%	4%
Active lesions	—	—	4	—	4	3	51	17	37	10	27	4	123	34
	—	—	14%		5%	6%	12%	8%	12%	6%	15%	4%	12%	7%
Primary complex	—	—	3	—	6	1	1	—	—	—	—	—	10	1
	—	—	11%	8%		2%	2%	—	—	—	—	—	.9%	.2%
Total No. of cases	—	—	8	—	11	5	58	22	58	18	33	11	158	56
	—	—	29%	14%		10%	15%	10%	16%	11%	18%	11%	16%	11%

done, the rest proving unco-operative. 10% of those examined were positive either on smear examination and/or on culture.

The prevalence of active tuberculosis was found to be highest (16.5%) in patients with

mental retardation, who constituted only 16% of the total inpatients, as against schizophrenics who, though forming 69% of the patients, showed a prevalence of only 12%, the difference being statistically significant. No case was detected among the 12 patients of mental depression.

TABLE III

Age and sex. distribution of cases detected radiological

	Age in years													
	0-5		6-12		13-20		21-35		36-50		51		Total	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F
Total subjects	2	—	28	8	80	49	417	216	298	159	184	94	1009	526
Inactive lesions	—	—	1	—	1	1	6	5	11	8	6	7	25	21
	—	—	4%	1%	2%	2%	1%	2%	4%	5%	—	8%	3%	4%
Active lesions	—	—	4	—	4	3	51	17	37	10	27	4	123	34
	—	—	14%	—	5%	6%	12%	8%	12%	6%	15%	4%	12%	7%
Primary complex	—	—	3	—	6	1	1	—	—	—	—	—	10	1
	—	—	11%	8%	—	2%	2%	—	—	—	—	—	.9%	.2%
Total No. of cases	—	—	8	—	11	5	58	22	58	18	33	11	158	56
	—	—	29%	14%	—	10%	15%	10%	16%	11%	18%	11%	16%	11%

TABLE IV

Bacteriological examination, age and sex distribution of cases

	\ Age in Years										Total	
	13-20		21-35		36-50		51				M	F
	M	F	M	F	M	F	M	F	M	F	M	F
<i>Smear</i>												
Positive	—	—	1	1	1	—	—	—	—	—	2	1
Negative	4	4	32	11	10	3	4	—	—	—	50	18
<i>Culture</i>												
Positive	1	—	1	—	—	—	2	—	—	—	4	—
Negative	3	4	31	10	10	3	2	—	—	—	46	17
Contaminated	—	—	1	2	1	—	—	—	—	—	2	2

Correlating the prevalence with the duration of stay in the hospital it is found that patients who had stayed over 5 years and upto 10 years showed a prevalence rate of 28% i.e. among those 1 in every 4 patients suffered from tuberculosis. Among those who had stayed over 10 years there is a decline in the prevalence rate possibly due to discharge from hospital or death.

50 out of 152 patients tuberculin tested showed a reaction of more than 10 mm (33%). The trend of the graph is also bimodal. Evidence of primary complex was found in 2 of the children⁴ who were tuberculin positive.

Bacteriological investigation revealed one sputum positive case among the sanitary workers. The four categories of staff viz.

TABLE V

Distribution of cases according to mental illnesses

	No. examined	Inactive lésion	Active lésion	Primary complex	Total No. of cases
Schizophrenia	1064	10	113	—	123
		1%	11%	—	12%
Mental Retardation	243	8	23	9	40
		3%	10%	4%	17%
Epilepsy	205	3	20	2	25
		2%	10%	1 %	13%
Psychosis (addiction)	23	1	1	—	2
		4%	4%	—	9%
Total	1535	22	157	11	190
		1%	10%	9%	13%

TABLE VI

Distribution of cases detected according to their duration of stay in mental hospital

	Duration of stay in Mental Hospital				Total
	Less than 1 year	1-5 yrs	5-10 yrs	More than 10 yrs	
Number studied	445	388	190	312	1535
Inactive lésions	9	7	6	24	46
	2%	2%	3%	5%	3%
Active lésions	28	19	48	62	157
	6%	5%	25%	12%	10%
Primary complex	2	7	—	2	11
	3%	2%	0%	4%	1%
Total cases	39	33	54	88	214
	9%	9%	28%	17%	14%

attendants, sanitary workers, cooks and dhobies who are closely connected with the management of the inmates showed a prevalence of 6 %, 8 %, 16% and 14% respectively and as a whole 7%

Discussion :

Tuberculosis prevalence studies among in-patients of mental institutions are usually radio-logical since bacteriological investigations are not feasible due to lack of co-operation because

TABLE VU

Distribution of tuberculin reaction in different age groups and sex

Tuberculin induration in mm													
0-5years													
Men	2	—	—	—	—	—	—	—	—	—	—	—	2
Women	1	—	—	—	—	—	—	—	—	—	—	—	1
6-12 years													
Men	19	2	—	—	—	—	—	—	—	—	1	3	25
Women	7	—	—	—	—	—	—	—	—	—	—	—	7
13-20Years													
Men	22	5	2	1	—	3	4	5	3	—	4	10	59
Women	13	8	—	1	1	1	4	3	3	1	—	5	40
Total													
Men	43	7	2	1	—	3	4	5	3	1	5	13	86
Women	21	8	—	1	1	1	4	3	3	1	—	5	48

Table VIII

Prevalence of pulmonary tuberculosis among the staff

Category	Strength	No. Inves- tigated	Coverage %	No. of cases		Prevalence	
				Inactive lesions	Active lesions	Inactive and active lesions	Active lesions
Attendants	299	275	92%	2	17	7%	6%
Sanitary workers	135	121	90%	2	10	10%	8%
Cooks	25	25	100%	1	4	20%	16%
Dhobies	7	7	100%	1	1	29%	14%
Others	206	83	40%	0	3	4%	4%
Total	672	511	76%	6	35	8%	7%

of the very nature of their illness. In the present survey 45% of the patients were subjected to bacteriological investigation also.

Reports on the prevalence of active pulmonary tuberculosis among these patients varies from 0.41% to 13.5% (Ruskin, 1945, Oechsli,

1949, Early, 1950, Hendles, 1952) a rate which was much higher than that among the general population (Oechsli, 1949). The crude prevalence rate of 10% noted in our survey is 5 times that in the general population in India.

Another significant finding is that prevalence increases with duration of stay in the institution (Oechsli, 1949). In the present survey we found 1 in every 4 patients whose stay in the institution ranged between 5 to 10 years, suffered from pulmonary tuberculosis.

The high prevalence among these patients is attributed to over crowding, poor socio-economic status and bad personal hygiene. Pamra *et al.*, (1969) found in their study in New Delhi the standardised rate of prevalence of active disease in Poor House mental patients to be 12.2%, that in Central Jail 4.5% and the crude prevalence rate in mental hospital 1.2%. The wide variation in the three institutions was due to differences in environment and socio-economic status of the patients, the Poor House being very congested with the consequential higher prevalence.

Though individual mental illness does not cause any specific lack of resistance to tuberculosis, considering the relative absence of personal hygiene together with the general character of their socio-environmental state which are variable factors as far as the different mental illnesses are concerned, the prevalence may be more in schizophrenics and mentally retarded. The mentally retarded showed the highest (16.5%) prevalence in the present survey.

The staff of the Institution especially those who are closely associated with the management of these patients—the attendants, sanitary workers, cooks and dhobies together showed a prevalence of 7% and separately 6%, 8%, 16% and 14% respectively, the dhobies and cooks showing the highest prevalence. The prevalence among the staff is also much higher than in the general population. This seems to be the result of much intermingling of infection between the staff and the patients.

Katz *et al.*, (1954) reported a decline in the prevalence of tuberculosis during a period of 12 years as assessed from 3 surveys at 4 years interval. This decline was made possible by isola-

tion of infectious cases and improvements to the general sanitation. The modern management of the mentally ill and improvements to their socio-environmental conditions together with prompt detection of pulmonary tuberculosis by periodical radiographic examination and institution of effective and adequate chemotherapy will contribute much to the decline of tuberculosis among the mentally ill.

Summary

A survey of prevalence of active pulmonary tuberculosis among inmates and staff of a large Mental Hospital in Madras is reported. A prevalence of 10% among the inmates and 7% among the staff is noticed. This is higher than the 2% prevalence among the general population. The prevalence among the inmates is also found to rise with their duration of stay. Mentally retarded patients showed the highest prevalence (16.5%).

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A STUDY OF SOME OPERATIONAL ASPECTS OF TREATMENT CARDS IN A DISTRICT TUBERCULOSIS PROGRAMME

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Introduction

The District Tuberculosis Programme (DTP) provides diagnosis and treatment facilities free to tuberculosis patients from health institutions situated nearer their homes. Treatment for tuberculosis involves close co-operation between patients as well as staff of health institutions offering them treatment. For a disease like tuberculosis, this needs an efficient treatment organisation on the part of the health institution and adequate understanding on the part of the patient with regard to the long treatment.

The main problems with treatment under DTP are that some patients discontinue treatment earlier than the prescribed period, others fail to collect drugs on the stipulated dates or do not consume them regularly and the health institution staff are not prompt in taking defaulter action to bring the defaulting patients back to treatment. A careful study of the treatment organisation under DTP might reveal some factors which may help in improving the quality of treatment. Though the treatment organisation is provided specifically for the benefit of tuberculosis patients, yet it is obvious that treatment default is a major problem of DTP.

Irregular collection of drugs by patients could be more easily identified from DTP treatment cards maintained at the centres offering treatment. Information on defaulter actions taken by the centre staff is also available only on treatment cards because they are "action-oriented" records. The "case-index" maintained at the District Tuberculosis Centre (DTC) indicates only the total quantity of drugs consumed by a patient and not the regularity or promptness with which collections were made. The pattern of drug collection or the steps taken by treatment centres to retrieve defaulting patients, therefore, could only be studied from treatment cards that are filed separately at District Tuberculosis Centres (DTC) after transfer of the required information on to case index cards.

2. Objectives

Treatment cards filed at DTC Bangalore, pertaining to one calendar year were studied for the following operational treatment aspects.

- (i) The time taken from diagnosis to initiation of treatment and steps taken to bring the initial defaulters to treatment.

- (ii) The regularity with which tuberculosis patients collected drugs and the pattern of defaults in drug collection.
- (iii) The pattern of actions taken by health institutions to retrieve the defaulters.

3. Methods

(a) The Bangalore DTP was chosen on account of convenience of access. The cohort of patients diagnosed during 1964 was selected because all their treatment cards could be expected to have been returned to the DTC from the peripheral health institutions (PHIs) when the analysis was taken up.

(b) *Grouping of patients* : The cohort of patients was distributed into three groups, according to three kinds of centres offering treatment namely (i) those treated at the DTC, Bangalore, where better trained staff motivated the patients and took defaulter actions under a good organisational set up, (ii) the Urban PHIs (UPHI) of the city of Bangalore where the organisational set up was meant to provide only general health care but motivation of tuberculosis patients and defaulter actions were still taken by the specialised staff of DTC, and (iii) Rural PHIs (RPHI) where motivation of tuberculosis patients as well as defaulter actions were taken by non-specialised rural general health workers along with their regular duties. It was expected that the treatment pattern among patients under each kind of centre would be different. *The distribution was made according to kind of centre where last drug collection was made irrespective of the place of diagnosis.*

(c) *Regularity of drug collection* : To study the regularity with which patients collected drugs, only the "initial period of treatment" of each patient was considered in order to remove any variations due to stopping and restarting of treatment, either on own accord or on the advice of medical officers. Since under DTP each patient has necessarily to make the first or initial drug collection because drugs are dispensed as soon as the diagnosis is established or the patient returns to know the result of the examination, the regularity of drug collection was studied from the second monthly collection on wards. Also, regularity was studied in terms of whether collection was made on the expected due date and, if not, the interval between the due

date and the actual date of collection. Analysis was limited to 12 collections or 15 months from initiations of treatment.

(d) *Defaulter actions* : Each default in drug collection was eligible for a "first action" and if the defaulter was not retrieved, for a "second action". Both kinds of actions were to be taken on "due dates". Therefore, all defaults in drug collection were studied in terms of whether or not the eligible action(s) was taken and, if so, the promptness with which it was taken.

4. Material

The cohort comprised 3,089 patients of pulmonary tuberculosis. Treatment cards of 147 (5%) patients were not available and another 463 (15%) treatment cards had insufficient treatment information recorded on them. Therefore, the analysis is based on 2,479(80%) treatment cards.

Of the 2,479 patients, 1,582 (63.8 %) could be credited to DTC, 386 (15.6%) to UPHIs and 511 (20.6%) to RPHIs (Table 1).

5. Findings

(a) *Initiation of treatment* : Of the 2,479 patients under treatment, 2,330 (94%) were put on treatment within the permissible 10 days after diagnosis. The remaining 149 (6%) were initial defaulters, but put on treatment after 10 days. It is to be noted that in respect of as many as 74 (14.5%) of RPHI patients treatment started 10 days after diagnosis though, under the programme, treatment should have started for all patients on the day of diagnosis in the microscopy centre (Table 1).

For the 149 patients who did not return within 10 days of the first visit to learn the result of examination and start the treatment, the centres were expected to take initial defaulter actions. Table 2 shows that initial defaulter actions were taken for 58 (39.0%), DTC for 73.7%, UPHIs for 59.5% and RPHIs as low as 10.8%.

It was observed that only 69% of the actions taken were taken on time (Table 2). The DTC staff were more prompt in taking actions i.e., for 71.5% of their own patients and 77.3% of UPHI patients they had taken prompt actions. Whereas RPHIs were poor in this respect and only 37.5% of the actions were taken on time.

(b) *Regularity of drug collection* : In figure I, the proportion of patients making second drug collection onwards, as per the expectation i.e., within 33 days from the date of previous collection are shown for each drug collection separately in respect of the three kinds of centres. For the DTC, the lowest proportion of 67 % was for the ninth collection and the highest of 75 % for the fifth collection. For UPHIs and RPHIs the lowest proportion was 57% for the 7th and 8th collection and highest of 71 % for the twelfth collection (with comparatively small numbers) respectively. Although the pattern may not appear to be different for the three kinds of centres yet the difference attained statistical significance suggesting that at the DTC more patients collected their drugs on the due dates.

Analysis with regard to age, sex and sputum status of patients showed that the sputum positive collected their drugs on time significantly more often than the sputum negative patients.

A similar kind of analysis done for patients

TABLE 1

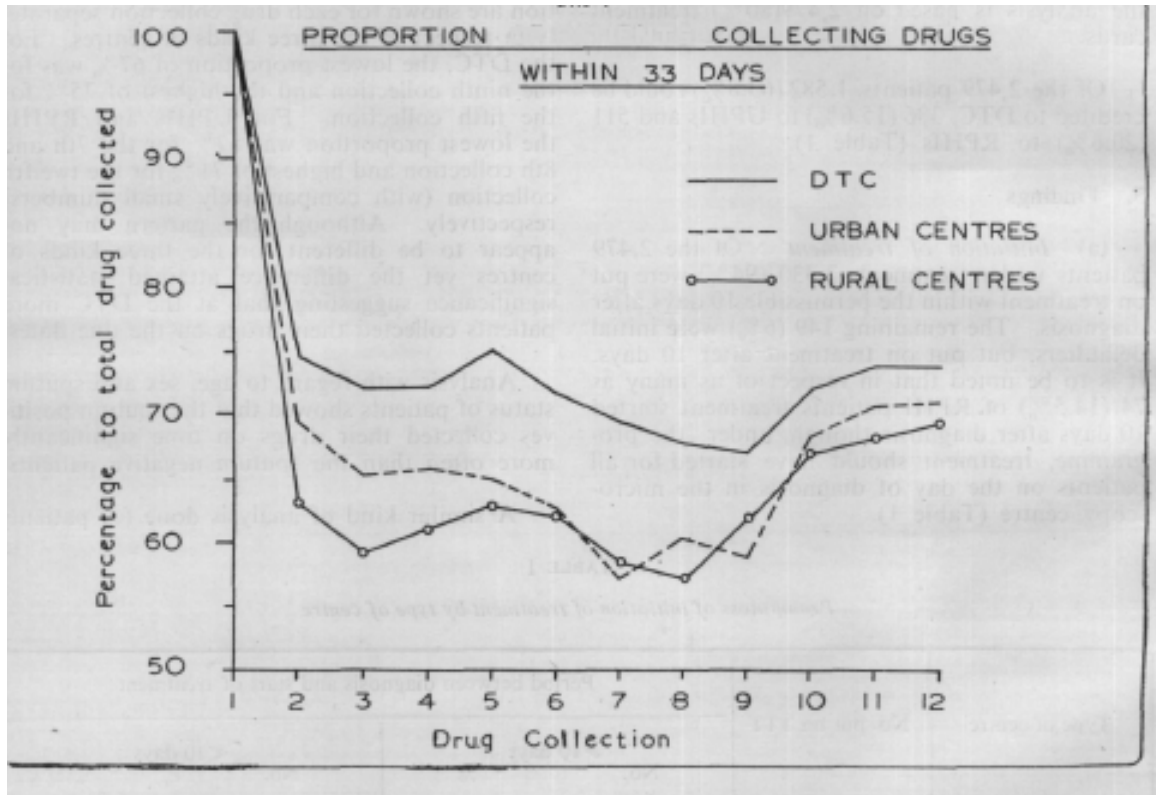
Promptness of initiation of treatment by type of centre

Type of centre	No. put on TTT	Period between diagnosis and start of treatment			
		> 10 days		< 10 days	
		No.	%	No.	%
DTC	1582	1544	97.6	38	2.4
UPHI	386	349	90.4	37	9.6
RPHI	511	437	85.5	74	14.5
Total	2479	2330	94.0	149	6.0

TABLE 2

Promptness of initial defaulter actions by type of centre

Type of centre	No. of initial defaulters	Defaulter action taken		Action taken on due date (of actions taken) No. %	
		No.	%	No.	%
DTC	38	28	73.7	20	71.5
UPHI	37	22	59.5	17	77.3
RPHI	74	8	10.8	3	37.5
Total	149	58	39.0	40	69.0



who had successfully completed 12 collections in the permissible 15 months showed that the highest proportion of 83.3% was for the 2nd collection and the lowest of 72.4% for the 9th collection, for patients attending the DTC. Among patients attending UPHIs and RPHIs also, a similar comparative improvement was observed as was expected from the group that had completed their treatment as prescribed (Table not presented).

In respect of patients who did not collect their drugs on time, the number of days of delay was studied in respect of each collection upto 60 days of delay since after that limit the DTP regards them as "lost". More patients attending RPHIs collected their drugs with 15 days or more of delay compared with those attending DTC or UPHIs. Further, the extent of delay in making the collection tended to become less after the

9th collection. This may suggest that repeated reminders have some effect.

(c) *Pattern of treatment default.* The pattern of default in drug collection was studied separately for patients who remained on treatment upto 15 months from the start of treatment and the rest who were classified as "lost" during this period. There were 763 (30.8%) and 1,716 (69.2%) patients respectively in the two groups.

In Table 3, the 763 patients belonging to the first group are distributed by the kind of treatment centres and the number of defaults made by them. Only 138 out of 763 (18.1 %) did not make any default : ranging from 12% at UPHIs to 20.1 % at the DTC. An almost equal proportion

of patients made one, two or three defaults each, while 265 (34.7%) made four or more defaults during 15 months. The differences seen in the three kinds of centres were not statistically significant.

The pattern observed in 1716 patients; belonging to the second group is presented in Table 4.

At the first default itself, 893 (52.0%) patients were "lost" to treatment followed by 348 (20.3 %) at the second default, 206 (12.0%) at the third default and 269 (15.7%) at the fourth or subsequent defaults. Centrewise and at the first default, 44.5% were lost at the RPHIs, 53.7% at UPHIs and 54.2% at the DTC. Thus the differences between centres were statistically significant.

TABLE 3

Patients remaining on treatment for 15 months distributed by centre and No. of defaults

Centre	Patients making various number of defaults										Total	
	0		1		2 No.		3		4+ No.		No.	%
	No-	%	No.	%	No.	%	No-	%	No.	%		
DTC	105	20.1	101	19.3	86	16.5	63	12.1	167	32.0	522	100.0
UPHI	11	12.0	13	14.1	18	19.6	16	17.4	34	37.0	92	100.0
RPHI	22	14.8	19	12.8	24	16.1	20	13.4	64	43.0	149	100.3
Total	138	18.1	133	17.4	128	16.8	99	13.0	265	34.7	763	100.0

TABLE 4

Patients "lost" to treatment distributed by centre and number of defaults

Centre	Patients making various number of defaults								Total	
	1		2		3		4+		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
DTC	574	54.2	234	22.1	118	11.1	134	12.6	1066	100.0
UPHI	158	53.3	40	13.6	41	13.9	55	18.7	294	100.0
RPHI	161	44.5	74	20.4	47	13.0	80	22.1	362	100.0
Total	893	52.0	348	20.3	206	12.0	269	15.7	1716	100.0

Of all the 2,479 patients only 138 (5.6%) did not make any default during the 15 months of treatment. This proportion did not vary much with the kind of centre.

However, the first treatment default occurring at any collection (upto 12 collections) resulted in a loss of about one third or more patients: 38.9% of patients attending the DTC, 42.1% attending UPHI and 32.9% attending RPHIs (Table not presented). First default is very crucial from the point of view of completion of treatment.

Collection at which first default occurred. It became of interest to study when the crucial first default occurred among the two groups of patients, namely those who remained on treatment for 15 months and the rest who got "lost" earlier.

Table 5 shows that among the "lost" patients, the first default occurred at the second collection among 55.6% of DTC, 61.2% of UPHI and 62.7% of RPHIs patients. In other words, those who got "lost" did so most frequently the first time they were given the choice to come back for drug collection after the obligatory first collection. Further, in 75% to 82% of this group the first default had occurred by the third collection. Among those who remained on treatment for 15 months, the first default occurred at the second collection to the extent of 22.1% at

the DTC, 25.9% at UPHI and 27.6% at RPHIs and upto 6 collections for 75%.

(d) *Defaulter actions* : For convenience, defaulter action by the three kinds of centres were studied from the first to the fourth defaults.

Table 6 shows that action taking was poor at the RPHIs uniformly (66.7% to 72.5% defaults remained without actions) while for the other two centres for about a fifth of the defaulters the DTC staff had not taken action. However, the proportion of defaulters at DTC without defaulter actions was less and less as the patients made more and more defaults.

In order to study whether defaulter actions (first as well as the second action) were taken when they become due, those patients who had become "lost" to treatment were selected because for them both the actions were due. Table 7 shows that for DTC patients, even the first defaulter action was not taken for 12.5%, another 36.1% received only the first action while only 51.3% got both the actions before declaring them as lost. A similar picture was seen for UPHIs but for RPHIs the position was disappointing, 41.4% did not receive any action, 36.2% had only one action and 22.4% had two actions.

TABLE 5

Collection at which first default among patients remaining on treatment for 15 months and patients "lost" by type of centre

Collection number	On treatment for 15 months			Patient "lost"		
	DTC	UPHI	RPHI	DTC	UPHI	RPHI
2	22.1	25.9	27.6	55.6	61.2	62.7
3	17.5	19.8	20.5	19.1	16.7	19.1
4	13.2	16.0	15.7	8.3	6.1	7.7
5	9.1	4.9	9.4	4.7	6.8	3.6
6	7.7	8.6	7.9	4.4	3.7	2.2
7+	30.5	24.7	18.9	7.9	5.4	4.7
No. of patients	417	81	127	1060	294	362

TABLE 6

Proportion of defaulters for whom no retrieval action was taken according to number of default and type of centre

Default number	DTC		UPHI		RPHI	
	No. defaulted	Proportion without action	No. defaulted	Proportion without action	No. defaulted	Proportion without action
First	1477	23.0	375	16.8	489	67.1
Second	802	18.5	204	19.1	309	68.0
Third	482	14.7	146	19.9	211	72.5
Fourth	301	12.6	89	9.0	144	66.7

TABLE 7

The number of defaulter actions taken for patient "lost" default by type of centre

Type of centre	No. of patients	Actions taken to retrieve defaulters					
		No action		One action		Two actions	
		No.	%	No.	%	No.	%
DTC	1060	133	12.5	383	36.1	544	51.3
UPHI	294	35	11.9	70	23.8	189	64.3
RPHI	362	150	41.4	131	36.2	81	22.4

TABLE 8

Promptness of defaulter actions taken by type of centre

(For first default only)

Centre	Number defaulted and action taken	Day of taking defaulter action			
		on due date	1 day later	2—5 days later	6+ days later
DTC	1131	67.8	10.7	9.8	11.6
UPHI	312	60.6	19.9	7.7	11.9
RPHI	161	19.3	5.6	6.8	68.3

Promptness of defaulter actions

It was of interest to study how promptly (as per the manual) the defaulter actions were taken by the three kinds of centres.

In Table 8 the day on which first defaulter action was taken for the first default is presented. Similar analysis could be done for the second action and for other defaults as well. At the DTC 67.8% of the actions were taken on the due date, 10% a day later, 9.8% within a week and 11.6% after a week. The pattern for UPHIs was almost similar. But, at RPHIs, only 19.3% of the actions were taken on due date, 5.6% a day later, 6.8% within a week and 68.3% after a week.

6. Discussion

The present analysis of data from the treatment cards has provided interesting information which could not be obtained from analysis of the case index card.

The RPHIs could immediately initiate treatment for all patients diagnosed by them. Yet, only about 85% of RPHI patients were put on treatment within 10 days of diagnosis. One explanation for this could be the initiation of treatment of patients diagnosed at other centres on referral. But, the extent of referral in the programme is not large enough to fully explain this gap of 15% and there may be some other reasons why RPHIs are not initiating some of their patients on treatment soon after diagnosis.

Majority of tuberculosis patients (57% to 75%) collected their drugs within 33 days from the date of previous collection, a substantial proportion collected drugs after 48 days, particularly in RPHIs. This proportion of late collectors decreased at later collections from all types of centres. Banerji *et al*¹ observed from a study of urban patients that sputum positives were more regular in collecting drugs (i.e., missed fewer collections). The present study showed that sputum positives were also more prompt in collecting drugs as compared to sputum negatives. Similarly, patients who made 12 or more collections in 15 months were more prompt in making any monthly collection, probably because they had the urge on realization to complete the treatment.

A substantial proportion of patients, particularly in rural areas, collected their drugs even after 48 days from the previous collection i.e., delay by over 15 days whereas they were expected to collect them within 33 days. This may be due partly to accumulation of drugs with them

because every monthly collection included drugs for 3 extra days. Gothi *et al*² has also observed that on any day, on the average, about 70% of patients with drugs consumed the drug. Such occasional gaps in consumption of drugs could also result in accumulation of drugs. But, such occasional gaps in consumption did not seriously affect the efficacy of treatment [Gothi *et al*²]. In another study, Banerji³ had also reported that some patients who were irregular in collecting the drugs prolonged their period of treatment to make up the required number of collection and could benefit from this type of treatment. Baily *et al*^{*} found that a good proportion of patients who made only a few monthly collections of drug in one year achieved bacteriological quiescence.

The extent of delay tended to become less after 9th collection. It would be interesting to find out the reason for such behaviors of patients.

The pattern of default did not vary among patients taking treatment at the three types of centres but differed between patients on treatment for 15 months and patients "lost" from treatment. Among the former group, the proportions making 1, 2 or 3 defaults was in the range of 12.8% to 19.6%. Four or more defaults were made by 32.0% to 43.0% of such patients, indicating that this group of patients could also be very often classified on defaulters because of making late collections, though they were comparatively more prompt as mentioned earlier. One possible reason is the additional 3 days drugs being issued every month and classifying the patient as "defaulter" if he does not return within 3 days for which he has the drugs.

About half of the "patients lost" from treatment had made only one default during 2nd or 3rd collection. This is so even at the DTC where specially trained staff have been provided for motivating the patients to take treatment for at least one year. It is surprising that defaults, some of which are really due to discontinuation of treatment, occur so soon after the motivation and occur less often later on. It would be worth while to find out the reasons for such early defaults. Probably motivation of patients alone is not adequate or the service provided at these centres did not infuse sufficient confidence in the patients. Better methods of motivation and probably improvements in providing the services have to be thought of.

The RPHIs had not taken defaulter actions for about two thirds of the defaulting patients. Also, more than two thirds of the actions were carried out after 7 days. These centres were

inferior to DTC and UPHIs in both these aspects. Yet 29% of patients had completed 12 or more collections in 15 months as compared to 33% at DTC and 24% at UPHIs. This questions the utility of defaulter actions and also whether these actions, on a uniform basis, are justified for urban and rural patients. If defaulter actions, as being taken now, have no effect on the drug collection pattern, improved methods have to be devised so that larger proportion of patients would complete the required treatment.

These findings point out the need for more careful investigations on various aspects of organization of treatment. Uniform procedures are perhaps not necessary or even desirable for all patients. But, such changes call for considerable ingenuity in spear-heading research and in adapting the findings of research studies.

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A STUDY OF DEFAULTERS IN ANTITUBERCULOSIS THERAPY

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Introduction

Drug default is a serious problem in anti-tubercular therapy now-a-days. It is estimated that patients, to the extent of 70 to 90 percent, fail to take the drugs regularly (Anderson and Banerjee, 1963). Such defaults may cause social and economic hardships resulting from prolongation of treatment and physical ailments and also lead to development of drug resistant bacilli. It also seriously undermines the progress of control programmes in the community. The present paper deals with a study of various social and other factors associated with drug defaulters attending a well established T.B. clinic in Agra city.

Material and Methods

This study was carried out at the T.B. Demonstration and Training Centre, Agra from July '73 to December '73. The unit of study was a defaulter who was defined as a patient of tuberculosis who had a discontinuity of more than one month in his treatment schedule within one year. For comparison, an equal number of control cases who had taken the treatment regularly for at least one year were studied by pairing. The samples were drawn randomly

from the daily attendance of the clinic where patients come to collect their monthly quota of drugs. The treatment pattern was unsupervised continuous domiciliary treatment. Studies elsewhere (Gothi *et al*, 1971) show that self drug collection and consumption is of high order (70 to 80 percent). In the event of failure to collect the drugs on the due date a reminder letter was sent to the patient, and repeated again after a week followed by a visit of health worker, if possible. The patient was declared uncooperative and defaulter, if he/she failed to turn up in spite of these efforts.

Results

Defaulters and non-defaulters numbering 150 each were studied. These cases were predominantly of rural background (76 and 71 percent respectively) mostly from Agra or surrounding districts as well as from neighbouring states. There were 82 (54.7 percent) males and 68 (45.3 percent) females in study cases and 87 (58.0 percent) and 63 (42.0 percent) in controls respectively. There were 126 (84.0 percent) Hindu and 24 (16.0 percent) Mohammedans in study cases and 130 (86.7 percent) and 20 (13.3 percent) in controls respectively.

TABLE 1

Cases and controls by age

Age (in years)	Study Number	group Percentage	Control Number	group Percentage
Upto 10 years	4	2.6	2	1.3
11 to 20	21	14.0	24	16.0
21 to 30	56	37.3	76	50.7
31 to 40	42	28.0	33	22.0
41 to 50	18	12.0	9	6.0
51 to 60	8	5.3	5	3.3
61 to 70	1	0.7	1	0.7
Total	150	100.0	150	100.0

Age distribution was almost similar in both the groups except for 31 to 40 years age group (table 1) where defaulters were more in study group while controls were more in 21-30 years age group. But the differences were not significant statistically ($P > 0.05$).

It is evident from table 2 that default was more amongst scheduled castes as compared to other Hindu castes. The difference between scheduled caste and non scheduled caste patients was very highly significant ($X^2 = 27.3$, $df=1$, $P < 0.001$).

Illiterates formed the majority (73.3 per cent) among defaulters, while comparatively there were more literates among the non-defaulters. The difference was highly significant ($X^2 = 38.50$, $df=1$, $P < 0.001$).

More defaulters belonged to joint family system (46.0 percent) as compared to non-defaulters (28.0 percent) as shown in table 4. The difference was highly significant ($X^2 = 12.76$, $df=1$, $P < 0.001$).

Defaulter rate was comparatively high in the

TABLE 2

Cases and controls by caste

Caste	Study group Number	Percent	Control group Number	Percent
Brahmin	13	8.7	18	12.0
Baniya	3	2.0	8	5.3
Kayastha	1	0.7	5	3.3
Rajput	1	4.7	30	20.0
Khatri	1	0.7	6	4.0
Backward	39	26.0	40	26.7
Scheduled caste	62	41.3	24	16.0
Mohammedans	24	16.0	19	12.0
Total	150	100.6	150	100.6

TABLE 3

Cases and controls by literacy status

Literacy status	Study group Number	Percent	Control group Number	Percent
Illiterate	110	73.3	57	38.0
Primary	31	20.7	50	33.3
Middle	4	2.7	20	13.3
High School	4	2.7	12	8.0
Intermediate and above	1	0.7	11	7.3
Total	150	100.0	150	100.0

TABLE 4
Cases and controls by nature of family

Nature of family	Study group		Control Number	group Percent
	Number	Percent		
Joint	69	46.0	42	28.0
Nuclear	81	54.0	106	70.7
Others	—	—	2	1.3
Total	150	100.0	150	100.0

TABLE 5
Cases and controls by family income

Family income Rupees per month	Study Number	group Percent	Control Number	group Percent
100-199	60	40.0	59	39.3
200-399	13	8.7	31	20.7
400-599	1	0.7	13	8.7
600 and above	1	0.7	4	2.7
Total	150	100.0	150	100.0

TABLE 6
Cases by reasons of default

Reasons of defaults	(Multiple response)	
	Number	Percent
No reason	8	5.3
Felt better	14	9.3
Carelessness	27	18.0
Ignorance	7	4.7
Wrongly advised by family members	9	6.0
Changed treatment to others	6	4.0
Lack of rail/road communication	26	17.3
Family affairs	74	49.3
Due to other illness	26	17.3
Lost faith in treatment	6	4.0
Financial difficulty	46	30.7
Base	150	100.0

low socio-economic status patients (table 5). The difference of defaulters between income group upto rupees 99 per month and above rupees 100 per month was highly significant in study and control groups ($X^2 = 14.28$, $df=1$, $P < 0.001$).

Amongst various reasons stated by patients for discontinuing the treatment, commonest was family affairs (table 6) which included occurrence of vital events in the family like marriages, births and deaths mostly. Sometimes more than one such event was responsible for default. Next common reason was financial difficulty which was more in the case of poor patients coming from far off places. Some patients suffered from other illnesses which prevented them from attending the clinic at scheduled time. Lack of communication was common during rainy season.

Discussion

Default in antituberculosis therapy is always likely to cause adverse effects on the recovery and health of the patient but this depends on the type of drug regimen, duration of default and immunological status of defaulter. By reviewing contemporary literature it is felt that no proper definition is given to the word 'defaulter' in the antitubercular regimen. Mehrotra *et al* (1971) have reported no effect in the condition of patient or the treatment schedule if the default is even upto four weeks duration but more than this effected the efficacy of treatment. In the present study this criteria was kept at one month in one year of treatment in view of the past studies as well as convenience to carry out the study.

Certain individual characteristics of the defaulters such as age, sex and religion did not show any significant association with drug default (Table 1), as all these factors had almost similar distribution in both groups. But some workers have reported more default among males and in both sexes over 45 years of age (Tuberculosis Chemotherapy Centre, Madras 1960, Gothi *et al*, 1971). Reasons for such difference have not been ascertained fully but it may be a matter of chance only.

Socio-economic factors like caste, literacy, status, family income and family system showed highly significant association with drug default (tables 2, 3, 4 and 5). Many workers have reported similar observations specially the role of illiteracy and poor socio-economic status, being important factors in drug defaulting in any therapy (Porter, 1969, T.B.D.T.C. 1971, Schwartz *et al* 1962). Default was found to be

more common in joint family system (table 4) which is quite prevalent in rural, backward as well as those of orthodox views. In joint family system, individual care is lacking due to many members sharing common economy hence there is more of drug default.

Various reasons stated by patients as causes of default mostly reflected the influence of background. For example more defaults were due to family events (table 6). Among these, commonest were births, deaths and marriages. People with predominant rural background and belonging to lower strata of society coupled with illiteracy and ignorance, are probably much more bound by their traditional customs and cultures and therefore the drug intake becomes of secondary importance for them in such circumstances. More so, when the relief is fairly quick after initial antitubercular therapy. The importance of domestic problems as cause of defaults has been reported by others also (Ghosh *et al*. 1972, T.B.D.T.C. 1971). Next common cause was financial difficulty which was mostly in case of outstation patients who needed money for the journey, since the drugs are supplied free by the T.B. Centre. Lack of rail/road communication and long distances were other causes of failure for drug collection, which was more common during rainy season. Similar observations have been reported by others too, (Tuberculosis Chemotherapy Centre Madras 1970, T.B.D.T.C. 1971). Carelessness and ignorance accounted for much less default (18.0 percent) than in some other studies such as Ghosh *et al* 1972 (47 percent). Probably it is due to a lot of effort being made to educate the patients either by personal interviews or by audiovisual aids such as films, photographs etc.

It is clear that irregularity in drug intake is mainly due to multitude of certain social factors such as poverty, illiteracy, backwardness where deeply entrenched cultures and customs always govern the attitude of the people towards drug intake. To tackle this problem it is suggested firstly to improve the general standard of living, eliminate poverty, illiteracy and backwardness. Secondly, the patients should be fully educated after taking them into confidence and explaining the details of drug intake, gravity of disease etc. Lastly, facilities should be provided for patients to continue domiciliary treatment under the supervision of the nearest medical centre after initial checkup at district T.B. Clinics to avoid journey and expenses.

Summary

A study of 150 defaulters and equal number of randomly picked up non-defaulters was carried

out. It has revealed a very strong association of poor socio-economic status, illiteracy and joint family system with irregularity in drug intake in tuberculosis. Commonest reasons mentioned for default were domestic problems followed by financial difficulties and carelessness etc. A need for sustained education of the patients in drug intake is emphasized.

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MANAGEMENT OF TUBERCULAR EMPYEMA THORACIS — A REVIEW OF 53 CASES

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Tuberculosis of lung may lead to pleural effusion or empyema. The latter is often seen in cases with post primary tuberculosis when a large caseous matter from superficial lung cavity, paratracheal glands or paravertebral abscess secondary to Pott's spine, erodes directly into the pleural cavity. Heavy contamination thus leads to tubercular empyema in the same way as tubercular pleural effusion (Parry & Seller, 1969). Underlying lung cavity when it ruptures into pleural space, may lead to pyopneumothorax. Infection in such cases may be mixed. Tubercular nature is confirmed on aspiration of pus and isolation of acid fast bacilli.

Cases who attend our hospital are often poor with neglected and improperly treated disease outside the hospital and excreting tubercular bacilli resistant to primary line drugs. Neglected tubercular empyema and pyopneumothorax are still seen as important complications of this chronic disease. It is aimed, therefore, to present in this communication the clinical features of tubercular empyema and problems met with in its management.

Material and Methods

53 cases of tubercular empyema who were seen in Medical, Surgical and Tuberculosis wards of S.N. Medical College and Hospital, Agra, during the years 1970-1975 were studied.

A detailed clinical study was made coupled with necessary laboratory and radiological investigations. The tubercular nature of empyema was ascertained by detection of acid fast bacilli from sputum and aspirated pus, pleural biopsy and radiological examination of chest. All patients received primary anti-tubercular chemotherapy which was later modified if necessary. Patients with mixed infections were also given other antibiotics depending upon the sensitivity. Various surgical procedures employed and their indications are listed below:

1. Intermittent chest aspiration and instillation of streptomycin in pleural space, used as an initial procedure in early uncomplicated cases and in children.
2. Closed or open intercostal drainage used in pyopneumothorax and in cases where repeated pleural aspiration had failed. It was done

from the beginning in those cases who were dyspnoeic and had large bronchopleural fistula. It was done in most dependence part by a large bore tube connected to water seal, pus being drained slowly to relieve the intrapleural positive pressure and to convert it into negative pressure. The closed drainage was continued till the quantity of pus became negligible and the underlying lung either expanded partially or completely depending on the size of fistula, and the check X-ray was taken after clamping the tube. If positive pressure did not build up, the case was considered ready for open drainage.

3. Decortication used where there was sufficient pleural thickening with entrapment of underlying lung and fair general condition of patient.
4. Standard Thoracoplasty and modified Thoracoplasty as advised by Allison (1943) were used where there was extensive bilateral pulmonary tuberculosis with bronchopleural fistula and poor general condition and lung function. In modified Thoracoplasty parietal pleura was stripped and pressed over the visceral pleura along with removal of 2nd to 9th ribs to maintain the approximation of parietal pleura with visceral pleura.
5. Pleuropneumectomy used where there was large bronchopleural fistula with extensive underlying lung disease, other lung being normal or with minimal disease. It was contraindicated in extensive bilateral disease and poor pulmonary function (MBC less than 40 L/min.).

Observations

(A) Age, Sex and Economic Status

Of 53 cases of tubercular empyema studied. 41 (77.35%) were male and 12 (22.64%) female. Age varied from 3 to 52 years. Highest incidence was found in age group 21-40 years (Fig. 1) which declined rapidly on either side of this range. 42 cases (79.24%) belonged to poor socio-economic class and it was seen more in farmers than other professions.

(B) Clinico-Pathological Features

Total empyema was seen in 31 cases (58.49%),

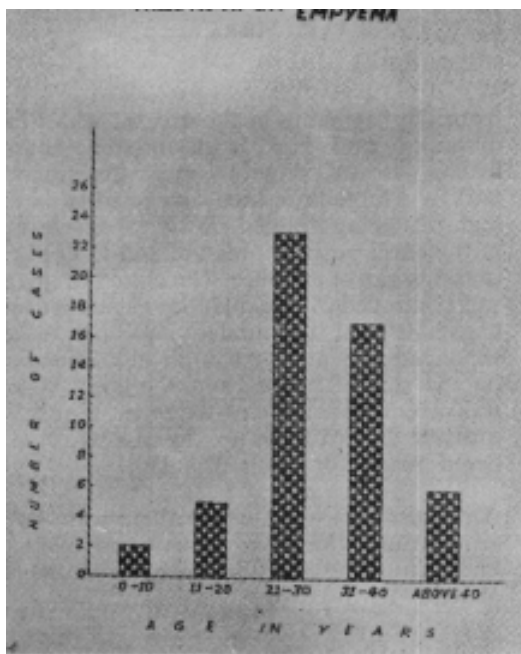


Fig.

Age distribution amongst 53 cases of tubercular empyema.

sub-total in 17 cases (32.07%), whereas localized empyema was seen in 5 cases (9.43 %). Right sided lesions were more common than left (3:2). 33 cases (62.26 %) presented in subacute or chronic phase and had received some kind of therapy outside the hospital. Duration of illness prior to admission varied from a few days to 8 months, most attending within 4 months of onset of illness.

Each case complained of pleuritic chest pain, fever, weight loss and fatigue at some stage of illness. Incidence of common symptoms and signs and relevant laboratory findings as recorded in 53 cases are shown in Table 1.

One female child of three years having tuberculosis with pyopneumothorax on right side developed empyema necessitatis which had burst forming a discharging sinus. Other cases of empyema necessitatis occurred in 29-40 years age group and presented as such in out-door department. In 3 cases sinus formation occurred later in hospital.

Laboratory Findings

Haemoglobin ranged between 6 g to 12 g with a mean value of 8.5 g%. TLC ranged between 10500-16000/cmm. whereas in one case a level of 32600/cmm. was recorded. This patient had mixed infection and sputum examination revealed heavy growth of pneumococci. ESR

TABLE I

Showing clinical and laboratory features of tubercular empyema, (53 cases)

Clinical feature	No. of cases
A. SYMPTOMS	
1. Chest pain	53(100%)
2. Fever	53(100%)
3. Weight loss and fatigue	53(100%)
4. Dyspnoea	49(92.45%)
5. Haemoptysis	37(69.81%)
B. SIGNS	
1. Anaemia	53(100%)
2. Chest fullness and deformity	31 (58.49%)
3. Clubbing	18(33.96%)
4. Empyema necessitatis	7(13.20%)
5. Sinus	4(7.54%)
C. LABORATORY FINDINGS	
1. Sputum for A.F.B. (Microscopic and/or culture on Lovver.stein-Jenson or Dorset's egg medium, examination)	19(35.84%)
2. Pleural aspirate for A.F.B. (Microscopic and/or culture examination)	38(71.69%)
3. Pleural biopsy for tubercular granuloma.	6(11.32%)

was always raised between 55-85 mm. in previously untreated cases. Presence of A.F.B. was recorded in pleural aspirate of 38 cases, 19 of these also had positive sputum for A.F.B. Pleural biopsy was done in 10 cases where no A.F.B. were seen in sputum or pleural aspirate. Out of these 10 cases 6 showed tubercular granuloma whereas rest of 4 cases showed non-specific or no change (Fig. 2).

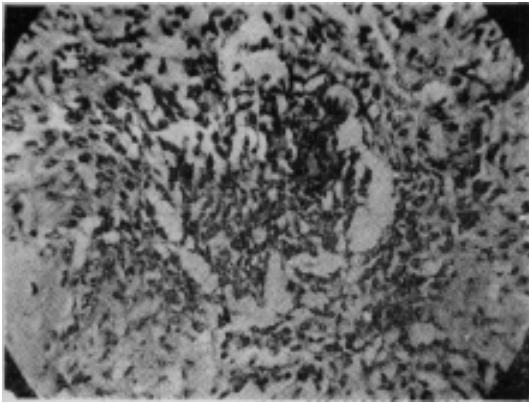


Fig. 2.

Photomicrograph showing histology of pleura obtained on pleural biopsy. Typical tubercular granuloma is present in the section (H & E x 83).

Examination of pleural aspirate revealed mixed infections with one or more organisms in 35 cases (66%). These cases had bronchopleural fistula (as confirmed by instillation of methylene

blue in pleural space and noting its presence in sputum) or had chest aspiration prior to admission. Organisms isolated from pleural pus are listed in Table 2.

Other features of pleural aspirate are given in Table 3.

Radiological Examination

Table 4 shows radiological features of 53 cases under study. Presence of bronchopleural fistula was confirmed by Methylene Blue Test.

Treatment

All cases received anti-tubercular chemotherapy choice depending upon the response to primary drugs, resources of patient, previous treatment received and results of sensitivity pattern. It was aimed to start with primary line of drugs unless it was thought to be resistant infection. Patients with mixed infections were given appropriate antibiotics in addition to anti-tubercular treatment. The surgical treatment received by the patients is listed in Table 5.

Results and Complications

7 succumbed during post-operative period due to secondary infection, respiratory failure or cardiogenic shock. 9 died of non-operative causes of which 7 had massive haemoptysis and 2 developed severe tubercular infection which was difficult to control. Of the 7 cases who died of massive haemoptysis 3 died during immediate

TABLE 2

Pyogenic organisms isolated from pleural aspirate

Organisms	No. of cases	Percentage	Sensitivity pattern
Streptococcus faecalis	11	31.5	Penicillin
Escherichia Coli	9	25.7	Ampicillin, Chloromycetin, Kancin.
Klebsiella	6	17.1	Streptomycin, Kancin.
Pseudomonas Pyocyneas	5	14.3	Genticin
Pneumococci	4	11.41	Penicillin, Sulpha
Staphylococcus auries	3	8.55	Penicillin, Erythrocine.
Proteus vulgaris	3	8.55	Chloramphenicol, Ampicillin.

TABLE 3

Laboratory findings of pleura] aspirate in tubercular empyema

S. No.	Examination	Range
1.	Colour	Opalescent
2.	Cell count	10,000—30,000
3.	Proteins	3g—8g/100mls.
4.	Sugar	10—50 mgs/ 100 ml.
5.	Chloride	590—680 mgs/100 ml.

TABLE 4

Showing radiological features of 53 case of tubercular empyema

S.No.	Radiological Features	No. of cases
1.	Active pulmonary tuberculosis, unilateral or bilateral, with or without cavity	44 (83.01%)
2.	Thickened pleura	18 (33.96%)
3.	Pyoneumothorax due to broncho-pleural fistula with partial collapse of lung	16 (30.20%)
4.	Pyoneumothorax due to broncho-pleural fistula with complete collapse of lung	13 (24.52%)
5.	Pyoneumothorax following chest aspiration	8 (15.10%)
6.	Empyema necessitatis with or without sinus	11 (20.75%)
7.	Encysted empyema	5 (9.43%)
8.	Closed tubercular empyema (Total)	3 (5.66%)
9.	Pett's Spine	2 (3.77%)

post-operative period whereas 4 died later in follow up. Of the 37 cases who showed improvement, 2 developed chronic respiratory failure. These had advanced pulmonary tuberculosis and had thoracoplasty and pleuropuhnonectomy in one case each. 35 cases (66%) have shown continued improvement and 23 (43.5%) are now completely off the treatment (Table 5).

Discussion

Tubercular empyema thoracis was more commonly seen in younger age group (20-40

years), in contrast to the findings in the West, where it is commonly seen in extreme ends of ages (Sellers and Cruickshank, 1950; Le Roux, 1965). This age difference is probably due to higher incidence of pulmonary tuberculosis in young adults, unemployment and low socio-economic status. Higher incidence in male is in agreement with other reports. The more common right sided empyema is for greater chance of infection on the right side due to direct route of right bronchus as compared to left. The higher frequency of empyema in farmers was found mainly due to lack of diagnosis and negligence

TABLE 5

Surgical treatment and immediate results in tubercular empyema

S. No	Treatment	No. of cases	Non-operative deaths		Post-operative deaths
			Immediate	Late	
1.	Repeated chest aspiration and intrapleural! instillation of streptomycin with or without other antibiotic and steroids.	7 (2 had small broncho-pleural fistula)	1 (Tubercular meningitis)		„
2.	Drainage (closed or open) including Elossar flap drainage	27 (15 had Broncho-pleural fistula)	1 (Acute miliary tuberculosis)	1 (Massive haemoptysis)	3 (Secondary infection in empyema space)
3.	Decortication	7 (5 had localized and 2 generalized empyema)		1 (Massive haemoptysis)	2 (Haemorrhage due to laceration of lung)
4.	Thoracoplasty	10 (All had large broncho-pleural fistula and poor lung function & presence of small parenchymatous lesion on other side)	3 (Massive haemoptysis)	2 (Massive haemoptysis)	1 (Cardiac arrest)
5.	Pleuropneumectomy	2 (Both had large bronchopleural fistula & evidence of extensive pulmonary disease in effected lung, other lung healthy)			1 (Died of uraemia)

and in these people total empyema was much more common than subtotal, mainly due to associated pyopneumothorax and patient not receiving proper treatment during acute stage of the disease. Several of these were referred as acute emergency. Subtotal or localized empyema was more commonly seen in better class people who had received treatment during acute phase with empyema became localized.

The common presentation of our cases with sepsis, emaciation, anaemia and weight loss, was due to inadequate treatment given to these on the line of only pulmonary tuberculosis. Total empyema developed subsequently with unresolved pyrexia, empyema necessitatis and discharging sinus, evidently suggesting negligence on the part of the patient or medical practitioner who failed to treat the case on proper lines. The clinical presentation in our cases is, therefore, not comparable either with Sellers and Cruick-

shanks (1950) or Le Roux (1965) as their cases presented in early stage of disease.

Bronchopleural fistula was present in 29 (54.7%) of our cases, and all had mixed infection. In 6 other cases, mixed infection was due to chest aspiration. This is in agreement with Pecora and Raybroke (1958) who found incidence of bronchopleural fistula in 60% of their cases of empyema, but mixed infection was seen in only 25%.

All our cases of empyema were subjected to chest aspiration for diagnostic as well as therapeutic purposes. 6 (11.5%) of these were cured by repeated aspirations and instillation of streptomycin alone or in combination with other antibiotics. Two of these had small bronchopleural fistula. One case developed tubercular meningitis and expired while receiving treatment. It is thus evident that early cases of tubercular empyema specially in younger age can satisfactorily be

treated by a simple procedure of repeated thoracocentesis even if complicated by a small bronchopleural fistula.

Of the remaining 46 cases, 26 were treated with inter-costal drainage either from the beginning or after a few days' trial of intermittent thoracocentesis. 15 of these had bronchopleural fistula with partial or complete collapse of underlying lung. Another case, who could not tolerate intercostal tube had skin flap from the chest wall stitched to the parietal pleura to provide a track lined by the skin. He made a satisfactory recovery. This procedure described by Elossar was used in some of their cases by Sellors and Cruickshank (1950).

In 26 cases the treatment was limited to closed or open intercostal drainage. We were able to obliterate the empyema cavity and eliminate the infection in 22 (41.5% of total cases). One case died of acute miliary tuberculosis while three others succumbed due to severe secondary infection in the empyema cavity. Sellors and Cruickshank (1950) in their analysis of 58 cases of tubercular empyema reported that most of these cases responded to repeated aspirations, and insullation of antibiotics and closed or open drainage. These and other western reports, (Siddons and Konstoms, 1951 and Johnson, 1973) are in contrast to our findings where these procedures were successful in only 52.84% of our cases.

Seven cases (15%) required decortication, 5 of whom had only localized empyema and two had total empyema. 2 of these cases died of severe bleeding post-operatively due to laceration of the lung. The remaining 5 (9.43 %) which included four partial and one total empyema were successfully decorticated. The lung in these cases was healthy and expanded following decortication.

Primary decortication of chronic tubercular empyema without significant underlying lung disease has been done in the past by several workers (Burford *et al*, 1945; Gurd, 1947; Hummelstein *et al*, 1948; Lam, 1948; Weinberg 6 Davis, 1949, Sellers and Cruickshank, 1950; Pecora, 1958; Le Roux, 1965), in 4 to 20 per cent of their cases of chronic tubercular empyema with satisfactory results.

Ten cases were subjected to thoracoplasty, all were having fistula, poor lung function and evidence of tubercular lesion on the other side of the chest. In these cases primary decortication was not possible because of extensive pulmonary disease and poor general condition of patients. Standard thoracoplasty was done in 8 cases to

obliterate the empyema space. Modified thoracoplasty was done in another 2 cases.

Six out of 10 cases died, one due to cardiac arrest immediately after operation and 5 due to massive haemoptysis. 2 cases though are respiratory cripples due to chronic cor pulmonale secondary to advance pulmonary tuberculosis. Various types of thoracoplasties have been performed by Sellors and Cruickshank (1950), Lindskog (1956) and Pecora (1958) in 10-40% of their cases with satisfactory results. The relatively high mortality in our group is obviously due to severe underlying bilateral pulmonary disease.

Pleuropneumectomy was performed in 2 of our cases. Both had large bronchopleural fistula and extensive bronchiectatic changes in the lung and mixed infection in the pleural cavity. Other lung was healthy. One survived while other died of uraemia during post-operative period. Lindskog (1943) used pleuropneumectomy in these cases with similar results.

Summary

53 cases of tubercular empyema were studied. Majority of cases were young adult male from rural area. The disease was common on the right side and total empyema occurred in 58.49% of cases. Clinically sepsis, emaciation, toxemia and occasional occurrence of empyema necessitatis was observed. Bronchopleural fistula confirmed by Methylene Blue test was noted in 54.71% cases. All these and another 11.32% had mixed infection. Tubercular nature was confirmed either by radiological examination of chest, detection of A.F.B. in sputum and pleural aspirate or pleural biopsy.

11.5% were cured simply by repeated thoracocentesis and instillation of antibiotics along with systemic anti-tubercular treatment, while 41.5% were cured by inter-costal drainage. More aggressive treatment was required in rest of the cases who were complicated by chronic thickened empyema wall with partial or complete collapse of lung, and bilateral pulmonary disease. 9.43% improved by decortication alone. Standard and modified thoracoplasty resulted in improvement in 7.55% cases, while pleuropneumectomy was done in two cases with extensive unilateral disease helping in survival of one case. Overall mortality was 30.18%, 43.5% are now well and off treatment while another 22.70% are well, but still on chemotherapy. 5 cases although cured of empyema, are respiratory cripples due to associated advanced parenchyma! lung disease and cor pulmonale.

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CASE REPORTS

PULMONARY ALVEOLAR MICROLITHIASIS*

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Introduction

Pulmonary Alveolar Microlithiasis is a rare disease with a typical X-ray picture and is characterised by intra alveolar calcific concretions occurring diffusely throughout both the lungs. In contrast to the radiological and pathological changes, there are relatively few symptoms and signs particularly in the early stages of the disease. Except that it has a tendency to occur in siblings, its aetiology and pathogenesis are not known upto now. Less than 90 cases have been reported in the world literature. Only four cases have been reported from India. We are presenting three more cases of this rare disease with some special features. One case, which we have followed for more than 12 years, has developed superadded pulmonary tuberculosis with positive sputum. The other two cases are real sister and brother, and the latter is probably the youngest patient diagnosed during life and in him the lesions are at the earliest stage of this disease.

Case Reports

R.D., a 26 years old male hailing from U.P. but working as an Operator in the Calico Printing Mills, Amritsar for the last 5-6 years, was hospitalised in V.J. Hospital, Amritsar on 2nd June, 1962 with a history of sudden rise of temperature upto 105° F. While undergoing investigations for pyrexia in the V.J. Hospital his skiagram of the chest was taken and he was thought to be suffering from miliary tuberculosis. He was treated with anti-tuberculosis drugs and corticoids for a few days and was transferred to the T.B. Sanatorium, Amritsar on 12th June, 1962 for further treatment. At the time of admission in the sanatorium he was asymptomatic. Physical examination at this time revealed that he was a young man of normal built with a pulse rate 82/minute, Respiration rate 18/minute temperature 98 F° and B.P. 130/70. There were no signs of dyspnoea, cyanosis and oedema. Nothing abnormal could be detected in the examination of abdomen, cardio—vascular and nervous system. In the chest there were fine crepitations at the end of inspiratory phase over both bases.

The treatment with anti-tuberculosis drugs was continued as it was thought inadvisable to stop this treatment, which had already been

*A part of this material was presented at the World Congress on Asthama, Bronchitis and conditions allied held in Nov. 1974 at New Delhi.

started in the V.J. Hospital, Amritsar. However we had strong reservations in our mind about the diagnosis of miliary tuberculosis as skiagram of the chest which resembled miliary tuberculosis but was not typical in appearance of this disease. The skiagram (Fig. 1) showed most remarkably

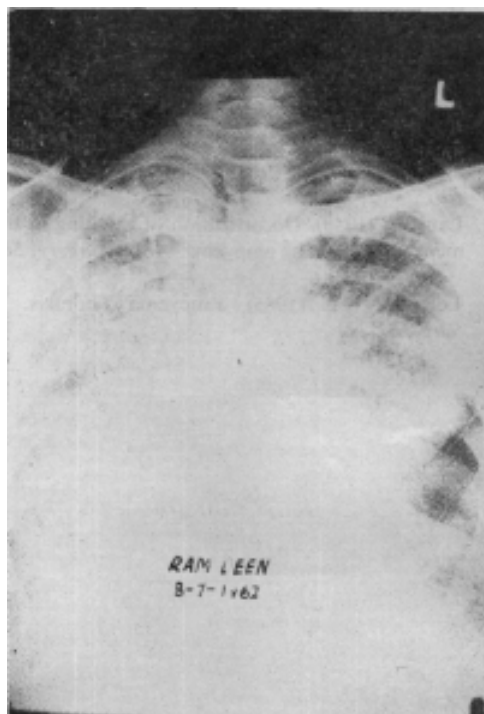


Fig. I Case I

A Chest Radiogram of June, 1962, showing bilateral sand like shadows.

fine, diffuse, granular and sand like nodulations all over both lungs, the greater density being towards the bases where these obscured the cardiac and diaphragmatic outlines, while in miliary tuberculosis apart from the greater size of the nodules which are also not of calcine density, there is more collection of these nodules near the apices. Bases may be relatively free.

When his next radiogram was taken at an interval of 3 months, it showed absolutely no clearing. Normally in miliary tuberculosis with chemotherapy and corticoids within this period marked radiological improvement takes place. This further raised doubts about the diagnosis of miliary tuberculosis. The following possibilities were entertained:

To rule out Pneumoconiosis detailed investigations were made. He was thoroughly interrogated as to the job he has to do in the Calico Printing Factory. It was found that he did not do the printing himself but was merely a machine operator who does starching of the cloth. He was not to handle the starch or dye himself. Mass miniature radiography of his co-workers was done to find if any of them have similar shadows. But none was found to have such abnormality.

To rule out any hereditary tendency of this obscure disease, his family members were X-rayed, but no family member showed any abnormal radiological feature.

Sarcoidosis, collagen disease, diffuse pulmonary fibrosis and pulmonary alveolar microlithiasis were then considered as possible aetiological entities and the following investigations were carried out.

His haemoglobin was 14gms, Blood sedimentation rate was 2 mm 1st hour (Westergrens). Urine analysis was normal. Total leucocyte count was 5400 per cu. m.m. with 60% neutrophils, 32% lymphocytes, 5% monocytes and 3% eosinophils. Bleeding and coagulation time were normal. Blood urea 30 mg%, serum bilirubin 0.2mg%, thymol turbidity 2 unit, thymol flocculation negative, cephalin cholesterol flocculation negative after 24 and 48 hours, Serum protein 7.8 gms. with albumin 4.5 gms. and globulin 3.3 gms. Serum Sodium 330 mgm%, Serum potassium 16 mg%, Serum Calcium 9.2mg%, Alkaline phosphatase 3.5 B.T. Blood for L.E. cells was negative. Tuberculin test with O.T/1: 10,000 was positive, sputum was repeatedly negative for A.F. B. by smear. Sputum culture for tubercle bacilli was repeatedly negative. X-rays of long bones were normal. All these tests yielded no clue to the aetiology and lung biopsy was advised to establish the diagnosis. In spite of strong persuasion, patient refused thoracotomy as he was asymptomatic. The patient was kept under observation and it took us about 11 years to finally convince him to undergo thoracotomy for lung biopsy. This was in April, 1973 when he was called for check up. At this time he was complaining of breathlessness on exertion and cough with expectoration for the last 3-4 months. There was no cyanosis, no oedema, and no signs of congestive cardiac failure; clubbing of moderate degree was present, B.P. was 120/80, pulse rate 94/minute, regular, fair in volume, respiration rate 24/minute, examination of chest revealed some restriction of movements. There were fine to medium crepitations on both sides of chest especially over the bases. All other systems were normal.

Other investigations done at this time were haemoglobin 15.5gms%, Leucocytes count 9200/cu mm with 65% neutrophils, 30% lymphocytes & 5% monocytes. ESR 4 mm 1st hour (Westergren). Urine analysis normal. Blood urea 25 mg%. Serum calcium 11.0 mg%, Serum phosphorus 2.9 mg%, Serum Alkaline Phosphatase 4.7 Bodansky units, Serum Sodium 320 mg%, Serum potassium 16.4 mg%, Serum Protein 8.2gm% with albumin 4.6 gm% and globulin 3.6 mg%. Sputum negative for A.F.B. ECG did not reveal any evidence of right ventricular strain or hyper-trophy.

Lung function tests. Vital capacity 2050 ml (Predicted* 4060 ml) F.E.V₁ 1350ml, % FEV₁/FVC 66%, MBC 47.6 L/min (Predicted 106 L/min) Partial pressure of arterial oxygen, breathing room air (Pa O₂) = 84 mm Hg. Partial pressure of arterial oxygen after patient breathing 100% oxygen for 30 minutes (Pa O₂, 100% oxygen for 30 min) = 260 mm Hg. Pa CO₂ after patient breathing 100% oxygen for 30 minutes = 37 mm Hg. Alveolar = arterial Gradient for oxygen (A-aDO₂) Calculated by the formula: A-a DO = PA O₂ — PaO₂.

$$= \text{Alveolar oxygen tension} - \text{arterial oxygen tension} \\ = 642 - 260 = 382 \text{ mm of Hg.}$$

The vital capacity was reduced almost to half of normal. The reduction of vital capacity was mainly due to space occupying concretions in the alveoli and partly due to interstitial fibrosis and secondary emphysema. FEV₁/FVC was 66%. This showed that the lesions were mainly of restrictive type. There was good degree of desaturation of oxygen in the arterial blood.

X-ray chest at this time revealed again minute discrete, sand like shadows in both lungs with coalescence of these shadows specially in basal parts and near the hilum. There were appearance of bullous shadows on both sides. On the right side the emphysematous bullae involved the whole of the upper and a part of the middle zones. Open lung biopsy was done on 21st April, 1973 and this finally established the diagnosis of Pulmonary Alveolar Microlithiasis. Microscopically it was seen that large number of alveoli contained a microlith. These concretions were composed of irregular concentric rings of laminations. Many of the alveoli containing microlith had normal wall. At places there was a moderate degree of fibrosis in the intersti-

*Predicted values according to Baldwin, EGCE, Cournon. A and Richards, D.W., Jr., Physiologic Classification, Clinical Methods of Analysis, Standard values in Normal Subjects Medicine 27. 243, 1948.

tial tissue with minimal cellular infiltration

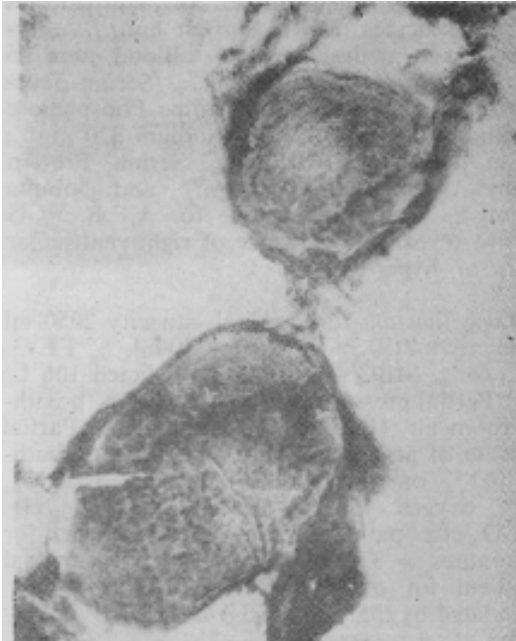


Fig. II Case I
Microscopic section of lung biopsy revealing intra-alveolar Microliths.

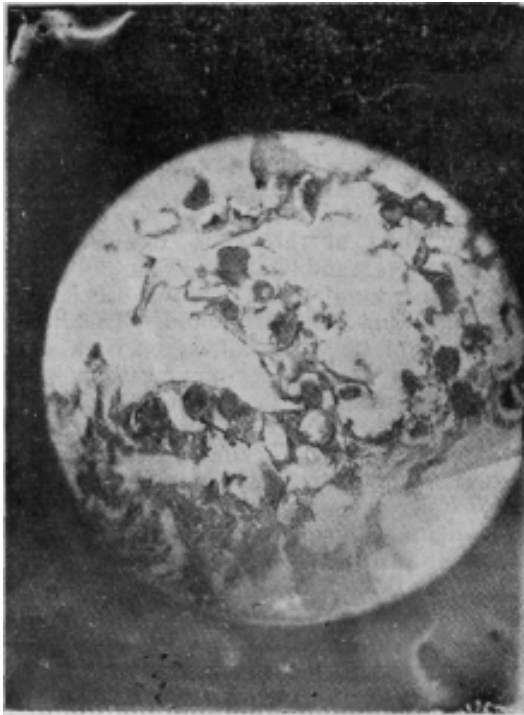


Fig. III Case I
Microphotograph showing magnified view of Microliths,

Thereafter he has been repeatedly examined. The disease is gradually progressing further. More and more emphysematous bullae have appeared on both sides. He was again hospitalised on 7th August 1974 when his sputum was found positive for A.F.B. He was put on anti tuberculosis chemotherapy to which he responded well and his sputum has become negative in Oct., 1974. His latest X-ray chest taken on 18.10.74 is shown in Fig. IV.

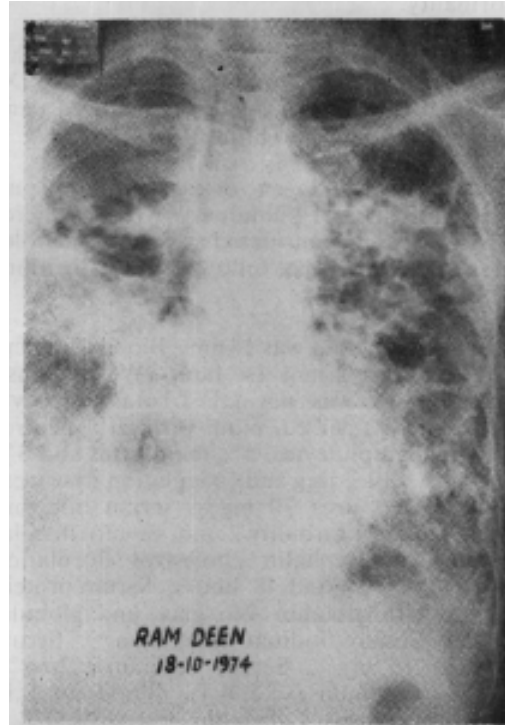


Fig. IV Case I

Latest chest radiogram of October, 1974. In August, 1974 his sputum for A.F.B. was positive which became negative with chemotherapy in October, 1974

Case II

U.K., a 13 years old female child from Batala, District Gurdaspur, was admitted in Tuberculosis and Chest Diseases Hospital, Amritsar on 29th May., 1971 with a 4 years history of gradually increasing breathlessness on exertion and weakness. There was no other complaint. Her father was a case of pulmonary tuberculosis. Clinical examination of the patient was non-contributory. She was diagnosed as a case of miliary tuberculosis and was put on anti-tuberculosis chemotherapy and corticoids. After treating her for a few months it was found that there was no improvement in her symptoms and in her radiological picture. It was realised at that time that her X-ray picture (Fig. V) was very

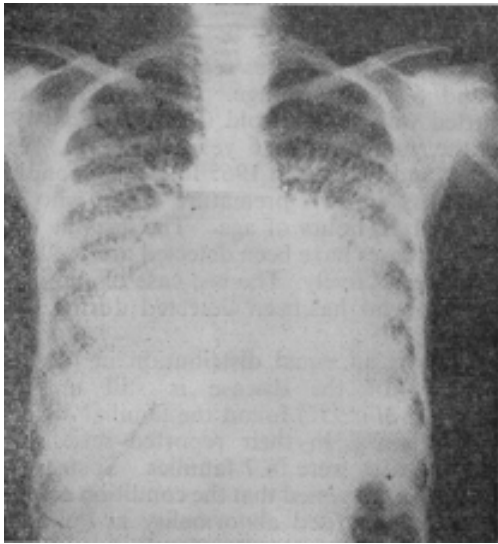


Fig. V Case II

A skiagram of chest showing bilateral, diffuse, sand like nodulation mainly in the lower 2/3rd of lung fields, obscuring the cardiac and diaphragmatic outlines and sparing of the apices.

much suggestive of Pulmonary Alveolar Microlithiasis which showed diffuse, granular and almost reticular pattern of nodulation in both lung fields. The nodulations which were of calcific density were very extensive in lower 2/3rd of both the lung fields. The upper 1/3rd of fields showed very little of this infiltration. Open lung biopsy was performed in August 1972 and histopathological examination showed typical picture of Pulmonary Alveolar Microlithiasis. There was no evidence of interstitial fibrosis or thickening of alveolar walls and no infiltration with inflammatory cells.

Her father was a case of pulmonary tuberculosis. Her younger brother aged 4 years was found to have miliary mottlings in the X-ray chest. His case will be presented separately. Examination of all other family members did not reveal any abnormality. Other investigations done were, Haemoglobin 10 gms%, total leucocyte count 6800 cu. mm with 75% Polymorphs & 25 % lymphocytes. Urine examination normal. Tuberculin test was negative. Sputum was repeatedly negative for A.F.B. Serum calcium 9 mg%, Phosphorus 2.4 mg%, Alkaline Phosphatase 10.7 Bodansky units, Serum Sodium 325 mg% and Serum Potassium 16.8 mg%. No L.E. cells were seen in the blood. E.C.G. was normal. Lung function tests were as follows: Vital capacity 2150 ml (Predicted value 2700 ml) FEV₁ = 1775 ml (82% of V.C.), % FEV₁/FVC was 82. Maximum breathing capacity 55

liters/mm (Predicted value 70 L/Min). On room air partial pressure of arterial oxygen (PaO₂) was 94 mm. of Hg. After breathing 100% oxygen for 30 minutes (PaO₂) was 403 mm of Hg. & Pa CO₂ was 34 mm. of Hg. Alveolar arterial gradient for oxygen A-a DO₂) was 242 mm. of Hg. As expected her VC is reduced but FEV[^] FEV/FVC ratio were more than 80% indicating restrictive type of disease. There was very slight desaturation of oxygen in the arterial blood. This desaturation was due to pulmonary cause and there was no evidence of right to left shunt.

Case III

R.K., 14 years old male child, brother of case No. II, was diagnosed as a case of miliary tuberculosis during the examination of family members of case No. 2 and was admitted in T.B. & Chest Diseases Hospital, Amritsar on 4th June, 1971. On asking the history it was told that he used to get loose motions and occasional fever since birth which used to be cured with treatment. There were no symptoms related to respiratory system. On examination he was rather a thin and weak child somewhat anaemic with no other abnormal finding.

On investigation Haemoglobin was 10.5 gm%, white blood cell count normal, urine & stools were normal; sedimentation rate of blood was 16 mm 1st hour (Westergren), Serum calcium 10.2 mg %, Serum phosphorus 4.5 mg %, Alkaline Phosphatase 5.2 Bodansky units, Serum sodium 320 mg% Serum potassium 14 mg%, No L.E. cells were seen in the blood. Mantoux test was negative, sputum was negative for A.F.B. E.C.G. was normal.

Skiagram of May, 1971 showed miliary mottlings and resembled miliary tuberculosis (Fig. VI). The density of these nodules was rather soft and was not of calcific density. He was also treated for miliary tuberculosis for sometimes but after correlating the whole picture including that of his sister, it was strongly suspected that he was also a case of pulmonary alveolar microlithiasis. Skiagram taken on 1st July, 1971 showed increase in nodulation in both middle & lower zones. The apices and bases were relatively free. Now the nodules were of calcific density. The disease is rapidly progressing and the last skiagram of January, 1974 (Fig.) VII was quite characteristic of this disease. There were no symptoms related to respiratory system, inspite of extensive lesions in the X-ray picture. This fact, the characteristic radiological picture and the family history strongly support the diagnosis of Pulmonary Alveolar Microlithiasis.

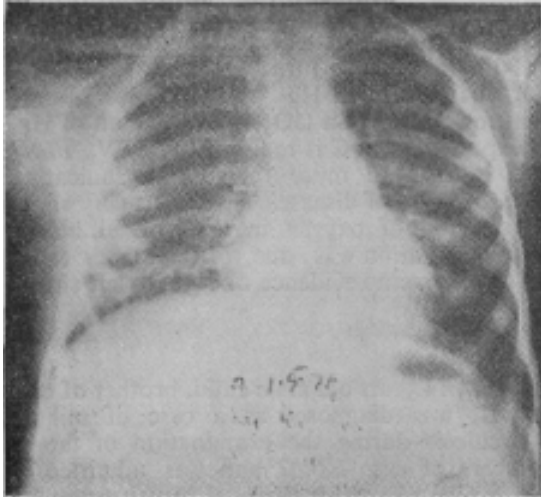


Fig. VI Case III

A chest radiogram May, 1971 showing military nodulation near the hilum and middle zones on both sides.

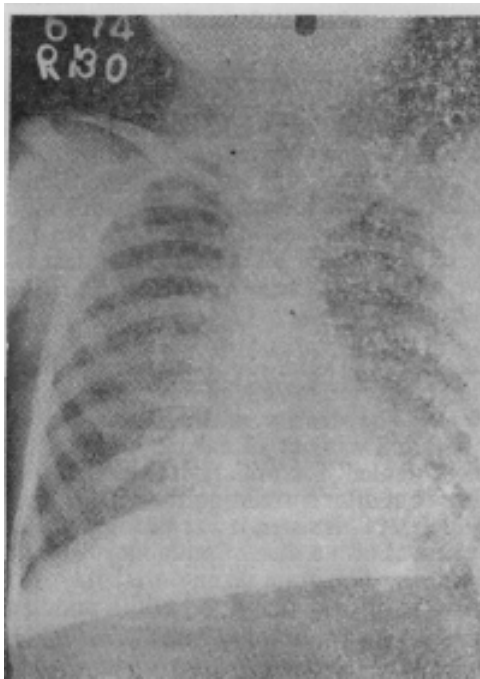


Fig. VII Case III

A Chest Radiogram June, 1974, showing bilateral calcific nodulation with sparing of apices.

Discussion

After the first description of this disease by Friedrich in 1856, it was Puhr who in 1933

named this disease as 'Microlithiasis Alveolar Pulmonum.'

Majority of the cases reported were between 30 and 50 years of age. The oldest patient reported was 72 years old (Benard *et al.*, 1950) and the youngest was 6 years old (Sato, 1955). Caffery and Altman in 1965 found the condition at autopsy in two premature twins who died at 11 and 12 hours of age. The ages at which our three cases have been detected are 26, 13 and 4 years respectively. The last case of ours is the youngest who has been detected during life.

There is an equal distribution in the sexes. Aetiology of the disease is still unknown. Sosman *et al* (1957) found the familial incidence of the disease. In their reported series of 44 cases, 19 cases were in 7 families. Sosman *et al* (1957) have suggested that the condition could be due to an inherited abnormality in Pulmonary Metabolism at the alveolar interface, possibly of the nature of an enzyme defect. Caffery and Altman (1965) who found this condition in two premature twins also suggested that the disease could be due to an inborn error of metabolism at the alveolar level. Kent *et al* (1955) suggested that the lesions may result from a hyperimmune reaction to one or a number of irritants. A peculiarly composed intra-alveolar exudate is formed for instance in Rheumatic Pneumonitis. The exudate in this condition is not easily absorbed and due to its composition they undergo organisation and calcification. Chinachote and Tangchai (1951) mentioned characteristic radiological shadows in the lungs in nine persons addicted to heavy inhalation of snuff prepared from mixture of tobacco and earthy materials. Manz (1954) suggested that the cause is infected with fungi which get calcified but no fungus has been grown so far. It seems that general calcium metabolism plays no part in production of this disease. Majority of the cases reported were asymptomatic at the time of diagnosis & were discovered in a routine radiological examination. Maximum duration for which cases have been under observation is 25 years. Our first case is under observation for more than 12 years. First symptoms to appear are slight cough with mucoid expectoration and exertional dyspnoea. Later still cyanosis, polycythaemia and corpulmonale may develop. Death occurs from cardiac failure or respiratory failure. Emphysematous bullae may rupture leading to spontaneous pneumothorax. Calcified bodies may be coughed out occasionally by some patients. In one of our cases (case No. 2) there were symptoms of breathlessness and cough for the last 4 years at the time of her first presentation.

In the first case now for the last 1½ years

symptoms of exertional dyspnoea and respiratory insufficiency have appeared. The VC is reduced to almost half of the predicted value. FEV/FVC ratio is 66%. There is desaturation of oxygen in the arterial blood. The latest radiogram shows large number of emphysematous bullae on both sides. He is heading toward cor pulmonale. A very interesting feature which has appeared now is that he has developed superadded pulmonary tuberculosis with positive sputum. No such case has been reported in the world literature.

Our 3rd case had come under our observation at very early stage of this disease when the lesions were mostly exudative in nature and when calcification had not taken place. At this stage it was very difficult to differentiate these miliary shadows from miliary tuberculosis. We have observed that within a few months the exudative nodules started getting calcified. The latest skiagram showed very characteristic picture of this disease. All workers now believe that this disease can be diagnosed with certainty when such a characteristic X-ray picture is seen in contrast to such a paucity of symptoms. It is better if the diagnosis is confirmed by histopathology. As far as is known no case has been described so far who was diagnosed at such a young age during life and no case had been seen at such an early stage of disease when the lesions were still exudative in nature.

Summary

Three cases of Pulmonary Alveolar Microlithiasis have been reported from Punjab (Northern India), two of these proved by open lung biopsy. A familial incidence was noted as two of them are real brother & sister. One case developed superadded Pulmonary Tuberculosis.

2. All the three cases were diagnosed during life. The youngest patient diagnosed during life at the age of 4 years have been reported. In him the lesions were at the earliest stage of this disease. As far as is known no case has been detected at such an early stage of this disease.

3. The clinical features, possible aetiology, pathogenesis, X-ray findings, lung function studies and course of the disease along with review of the literature has been discussed.

ACKNOWLEDGEMENT

We are thankful to Dr. R.S. Sethi, Dr. A.K. Ohri and Dr. B.R. Prabhakar and Dr. B.K.

Aikat for their kind help in confirming the diagnosis of the two cases.

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LYMPHOGRAPHY IN TUBERCULOSIS

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Lymphography is getting popular in the field of radiology lately. It helps in differentiation of primary and secondary neoplasm, assessing the extent of disease and in the planning and assessment of treatment. After the work of Kinmonth *et al.* (1952) very few studies on the value of lymphography in tubercular abdomen have been published. A case who attended the department with clinical picture of carcinoma cervix uteri, and enlarged inguinal lymph nodes and in whom lymphography was performed, is presented.

Case Report :

Smt. Saraswati Devi, 40, H.F. came to this Institute with complaints of watery discharge and irregular bleeding per vagina, loss of weight, loss of appetite, and pain in abdomen of 6 months duration. There was no history of pyrexia. There was no family history of tuberculosis. On examination, abdomen was slightly distended but no lump was palpable. The inguinal glands of almond size were palpable on both sides. The glands were firm, mobile and nontender. Vaginal examination showed an ulcerated area on the lip of the cervix. Vagina and fornices were free. Parametria were not involved.

Pathological Examination

Blood :- Hb% 8.6 gms%, TLC — 10,500/c.mm. Polymorphs 60%, Lymphocytes. 30%, Eosinophils 3%, Monocytes 7%, E.S.R. 36 mm/ 1st hr.

Urine Examination : normal

Biopsy :- Histopathological examination of gland and cervix revealed tubercular adenitis and tuberculosis respectively.

Radiological Examination Plain

X-ray Chest :- Normal.

Lymphographic Examination

The technique consists of exposure of the lymph-vessel under full aseptic precautions under local anaesthesia. Prior to procedure the injection of Evan's Blue 11% 1. c.c. mixed with 2% Xylocaine was accomplished in between the 1st and 2nd toe web. Fifteen minutes later, 2½ inches above the site of injection a skin

incision of one inch was made when 2-3 blue coloured streaks were seen. One of these was dissected and punctured by needle no.27 carrying a polythene tube connected with syringe having "Lipiodal-ultra-fluid". The dye was injected at the speed of lcc/10-15 minutes. The total requirement of dye was 15 CC. on one side. The skiagrams were taken immediately and after 24 hours. In this, the lymph nodes were visible up to the para-aortic region. The visualised lymph nodes were markedly enlarged with preservation of margin. A few lymph nodes of common iliac and external iliac group showed central filling defects which were suggestive of lymphoma. This central filling defect was mostly seen with the matted lymph nodes (Fig. 1). Some of the common iliac lymph nodes showed radio-opaque shadow due to retention of more contrast medium.



Fig. I

Discussion

Patient presented with the clinical picture of carcinoma cervix and on clinical examination it was suspected to be a case of lymphoma. Both were ruled out on histopathological as well as on lymphographic findings. The normal lymph nodes exhibit plump, elongated, ovoid or bean shaped, 2-3.5 cm. in size having coarsely granular internal architecture and a smooth margin. The abnormality may be seen either in the change in size, shape or alteration in the internal architecture or changes in the margin. The metastatic lymph nodes are partially enlarged with peripheral filling defect, giving moth-eaten appearances (Averette *et al.*, 1962), while in lymphoma there is marked enlargement of the lymph nodes with central filling defect and preserved margin giving foamy and lacy appearances (Fig. 2)

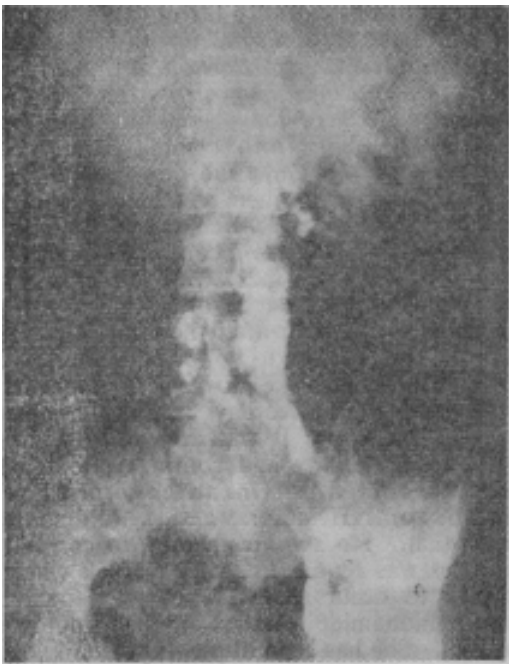


Fig. 2

(Jackson *et al.*, 1961, Jing and McGraw 1966, Cook *et al.*, 1966, Banks AJ. 1969 and Gupta and Haldar 1971).

In this case the involved lymph nodes showed enlargement with normal architecture, preserved

margin and central filling defect in the matted lymph nodes. On the basis of lymphographic finding the possibility of metastases and lymphoma were ruled out.

According to Wallace *et al.*, (1964) and Betoulier *et al.*, (1968) tuberculosis may simulate the pattern seen in Hodgkin's lymphoma except the matted gland. Our findings conform to those of Wallace *et al.*, (1964) and Betoulier *et al.*, (1968).

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GRAND MAL EPILEPSY WITH ISONIAZID

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Introduction

Isoniazid has few toxic effects and in conventional doses of 200-300 mg. daily it may be considered entirely free from them except in patients with impaired renal function, vitamin B deficiency, epilepsy or psychosis (Heaf and Rusby, 1968). If high serum levels are maintained due to size of the dose, slow speed of inactivation or impaired renal function, peripheral neuritis may occur. Other side effects may be mild excitement, euphoria, and impaired concentration; constipation, hesitancy of micturition, pellagra, postural hypotension, dizziness, eosinophilia and rarely allergy (Krantz and Carr, 1969).

Epilepsy is a paroxysmal and transitory disturbance of the functions of the brain which develops suddenly, ceases spontaneously and exhibits a conspicuous tendency to recurrence (Brain and Walton, 1969). It may be classified as idiopathic (without any apparent cause) and symptomatic (with an apparent cause).

Isoniazid is capable of precipitating convulsions in patients with history of seizures or even without any history of such disorder (Goodman and Oilman, 1969). No mention of grand mal epilepsy with I.N.H. could be found in literature. We are reporting a case in which the patient developed grand mal epileptic fits during isoniazid therapy.

Case Report

Meenu, a 14 year old girl, was seen in O.P.D. on 12.4.74 with cough with white scanty expectoration, mild grade fever off and on, weakness and loss of weight for 2 months. There was no previous history of fits or epilepsy in patient or in family. No history of contact with a tuberculous patient could be elicited. On examination she was of average build and nutrition and anaemic. No enlarged lymph nodes were palpable. Pulse was 78/minute and B.P. 112/80 mm. Hg. Chest examination revealed fine to medium crepitations in both infraclavicular and supra-scapular regions. Other systems including nervous system were found normal.

Investigations revealed erythrocytic sedimentation rate 48 mm. first hour (Wintrobe), Haemoglobin 11.6 gm.% and total and differential leucocyte count within normal limits.

Sputum was negative for A.F.B. P.P.D. test (Mantoux) was strongly positive. X-ray chest revealed multiple, small, ill defined opacities of variable sizes in both upper zones.

She was put on injection Streptomycin 0.75 gm. plus Isoniazid 300 mg. once a day. After one month she reported considerable clinical improvement. She came back in the second week of the second month with history of fits for one week. She was admitted for observation and same therapy was continued. There were one to two fits in twenty four hours occurring at any part of the day or night. There was no aura nor any provocative factor could be traced. The fits came all of a sudden with her becoming rigid with clenching of teeth and fists. Some times she became cyanosed. After 30 to 40 seconds there were convulsions involving whole body with white froth coming from mouth. After about a minute the convulsions ceased spontaneously with her breathing deeply and noisily. She used to lose consciousness with the onset of the attack and it continued for 15 to 20 minutes after the attack. She felt drowsy and complained of headache after the attack and slept for 1 to 2 hour after the attack of seizure. She was not allowed to fall or injure herself as a constant watch was kept over her. Four attacks were watched in three days in consultation with a neuro-physician. It was decided to withdraw INH from therapy and continue streptomycin alone for a few days. One attack occurred on the next day of INH withdrawal, but it did not recur after that. No specific therapy to control the seizures was required. After a week when fits ceased to occur she was put on Ethambutol plus Ethionamide withdrawing the Streptomycin as well. She has been improving steadily on the above drugs and after three months of therapy she has not had a single attack. She is perfectly well mentally and physically. She was diagnosed as a case of grand mal epilepsy due to INH on clinical grounds. Wasserman reaction, X-ray skull and cerebro-spinal fluid were found normal. Investigations like pneumoencephalography and electro-encephalography (E.E.G.) could not be done.

Discussion

That Isoniazid is capable of precipitating attacks in patients with epilepsy is a recognised fact hence it is contra-indicated in such patients. Goodman and Oilman (1969) mention that it may

lead to convulsions in patients even without any prior history of seizures, but isoniazid has not been associated with, as far as known, leading to attacks of grand mal epilepsy, as seen in the present case. As mentioned by Goodman and Oilman (1969) possible causes of seizures due to INH may be pyridoxine deficiency, large doses of INH may sensitise the nervous system to auditory and visual stimuli which may provoke convulsions in epileptics or large doses may lead to severe metabolic acidosis, hyperglycemia and seizures. The cause of attacks in the present case could not be determined. The diagnosis of grand mal epilepsy in this case was made on clinical grounds by carefully watching the attacks. Investigations were not helpful. As mentioned by Davidson (1965) careful description or watching an attack is the most useful evidence of epilepsy and examination of patient or investigations are of secondary importance.

Summary

A young girl suffering from pulmonary tuberculosis and developing grand mal type of epileptic fits with Isoniazid in conventional doses

of 300 mg. once a day is described. The fits ceased with the withdrawal of INH. There was no previous personal or family history of seizures.

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NEWS & NOTES

ANNUAL MEETING

The Thirtyseventh Annual General Meeting of the Tuberculosis Association of India was held on 22nd April, 1976 at the Conference Hall of the Association. Shri S. Ranganathan, M.P., President of the Association, presided.

AWARDS

The Khushi Ram Shield in recognition of outstanding work in 1975 was awarded to the Bengal TB Association. Merit Certificate for good performance in 1975 was awarded to the Kerala TB Association.

The Seal Sale Trophy for the highest collections made in 25th Campaign was awarded to the Tamil Nadu TB Association. Tamil Nadu won this Trophy for the ninth time. The Runner-up Cup was awarded to the Kerala TB Association. Kerala won this Cup for the fourth year in succession. Merit Certificates were awarded to the TB Associations of Andhra Pradesh, Madhya Pradesh and Tripura for improving their Seal Sale collections in the 25th Campaign. The Cup for smaller State was awarded to the TB Association of Goa, Daman and Diu. Goa won this Cup for the fourth time.

SECRETARIES CONFERENCE

The 27th Conference of Secretaries of State TB Associations was held on the 22nd April, 1976 in the Conference Hall of the Association. Dr. M.S. Chadha, Vice-Chairman of the Association, presided.

TECHNICAL COMMITTEE

The Technical Committee of the Association met on 21.4.1976 and considered, among other matters, the Report of the Expert Committee appointed by the ICMR to review the National TB Control Programme and discussed the Programme for the 31st National Conference of TB & Chest Diseases to be held in Lucknow.

NATIONAL CONFERENCE

The 31st National Conference on TB & Chest Diseases will be held in Lucknow (Uttar Pradesh) from the 13th to 17th November, 1976. Dr. Tahir Mirza, TB Adviser to the Government of Jamrou & Kashmir, has been nominated as President of the Conference. The TB Association of Uttar Pradesh is playing host to the Conference. The subjects for discussion at the Conference include:

Surgery; a Symposium on Air Pollution/Smoking Hazard; National TB Control Programme; Childhood Tuberculosis; Problem of Drug Default — its reasons and management; Chemotherapy (including Management of resistant cases); Extra-pulmonary tuberculosis and assorted papers.

TWENTY-SEVENTH TB SEAL

The Tweniy-seventh TB Seal Sale Campaign will, as usual, commence on 2nd October, 1976, Mahatma Gandhi's birthday and terminate on 26th January, 1977. Four designs depicting Indian wild life have been chosen for the Seal.

HEALTH VISITORS COURSE

The 1976-77 TB Health Visitors' Course commenced on 1st July, 1976. Nine candidates have joined the course. The 9 months course will include five months' training in the New Delhi TB Centre, two weeks in the Lady Reading Health School, New Delhi, two weeks for examination and three months internship which will last from 1st January to 31st March, 1977 (including two weeks in a rural Centre).

CHANCHAL SINGH MEMORIAL AWARD —1976

The Tuberculosis Association of India will award a cash prize of Rs. 500/- to a TB worker preferably below 45 years of age, for an original article not exceeding 30 double spaced foolscap typed pages (approximately 6,000 words excluding charts and diagrams) on a subject relating to tuberculosis. Papers may be sent, in quadruplicate, to reach the Tuberculosis Association of India office latest by 31st August, 1976.

ESSAY COMPETITION

The Tuberculosis Association of India will award a cash prize of Rs. 300/- to a final year medical student in India for an original essay on Tuberculosis adjudged best by a special committee of this Association. The subject selected for the 1976 competition is 'Domiciliary Treatment of Pulmonary Tuberculosis and Causes of its Failure'. The essay should be written in English, typed in foolscap size, double-spaced and should not exceed 15 pages (approximately 3,000 words excluding tables, diagrams, etc.). Four copies of the manuscript should reach the Secretary-General, Tuberculosis Association of India, 3, Red Cross Road, New Delhi-110 001, not later than 31st August, 1976 and should be

forwarded through the Dean or Principal of the College/University.

SHIBIRS

The 77th Anti-TB Shibir of the Maharashtra State Anti-Tuberculosis Association was held at Chirner, Taluka Uran, District Kolaba, on Sunday the 9th May, 1976. It was organised by a group of social workers led by Dr. V.G. Talwalkar. A team of specialists and technicians from Bombay, led by Dr. M.D. Deshmukh, examined 181 persons, screened 176 persons and vaccinated 494 children with BCG at Chirner and Veshvi. Number of X-ray positives and sputum positives found were 25 and 13 respectively. As part of the Shibir 32 eye operations, and 25 general operations were also carried out and all cases were discharged as satisfactory.

A mass TB detection camp was held at Badanarshalli village, Madhugiri Taluk, Tumkur District, (Karnataka), led by Dr. M. Siddalingiah, District Tuberculosis Officer, Tumkur and Dr. M. Shamanna, Assistant Surgeon, Tumkur. In all 459 cases were examined. Sputum examination was done on 135 cases and BCG vaccination given to 121 cases.

Twenty-four anti-TB Shibirs have been conducted in Chickmagalur, Karnataka. Of these 13 were one-day Shibirs and 11 were two-day Shibirs. A total of 1,528 sputum examinations were done and 21,593 were BCG vaccinated.

EASTERN REGIONAL CONFERENCE-KOREA

The Xth Eastern Regional TB Conference of the International Union Against Tuberculosis will be held in Seoul, Korea, from 11th to 15th October, 1976. The Scientific Committee of the Eastern Regional Conference has compiled the following list of subjects for presentation: (1) Case finding & diagnosis (2) Bacteriology (3) Chemotherapy & treatment (4) TB Control-administration, supervision and training (5) Epidemiology & surveys (6) BCG (7) Extra pulmonary TB (8) TB in children (9) Chest Diseases other than TB (10) Role of voluntary organisations.

TB SEAL SALE SILVER JUBILEE MEMORIAL BUILDING

The TB Association of Kerala raised a sum of over Rupees eight lakhs by issuing special prize coupons to mark the Silver Jubilee of the Seal Sale Campaign. The money was utilised to construct a new building to house the State TB Training and Demonstration Centre in Trivand-

rum. The building was formally opened by Shri C. Achutha Menon, Chief Minister of Kerala, at a ceremonial function presided over by Shri N.K. Balakrishnan, Minister for Public Health, on the 23rd June, 1976 and addressed by Shri K. Pankajakshan, Minister for Public Works. The building has been named the "Silver Jubilee Memorial Building". Shri B.M. Cariappa, Secretary-General, Tuberculosis Association of India, delivered the felicitation Address on the occasion.

G.B. PAI HONOURED



Sri G.B. Pai, who is a Trustee of the Tuberculosis Association of India and its Honorary Legal Adviser, has been awarded in the International Philatelic Exhibition held recently in Philadelphia, U.S.A., a large Silver Medal for his Cochin Stamp collections and a Vermeil Medal for his book on Cochin Stamps. It may be recalled that Sri Pai has been assisting the Association in selecting designs for the TB Seals during the past few years.

The Association congratulates Sri Pai.

UNESCO MEET

The Round Table on Cultural and Intellectual Cooperation and the New World Economic Order was held in Paris under the auspices of the UNESCO from 22nd to 25th June, 1976. Dr. M.L. Mehrotra, Director, TB Demonstration and Training Centre, Agra and a member of the Technical Committee of the Tuberculosis Association of India, participated in this.

REFRESHER COURSE

A Refresher Course in Tuberculosis will be organised in the New Delhi Tuberculosis Centre

under joint auspices of the Tuberculosis Association of India and IMA College of General Practitioners in the first week of November, 1976. The Course will be of one week duration. It is very exhaustive and educative course, beneficial to all those interested in Tuberculosis Control work. The Tuberculosis Centre will, as usual, pay Rs. 100/- per outstation participant to cover partly their out of pocket expenses in connection with this course. No T.A. or D.A. will be paid to the participants. For further particulars Dr. S.P. Pamra, Director, New Delhi TB Centre, Jawaharlal Nehru Marg, New Delhi-1 may be contacted.

CLINIC AND IMMUNIZATION CENTRE, BARKATPURA

The Tuberculosis Clinic for Children and Immunization Centre was inaugurated by Dr. S.N. Mathur, Director of Medical and Health Services, Andhra Pradesh and Vice-Chairman of TB Association of Andhra Pradesh on 11 th July at the Association premises. Jointly sponsored by the Tuberculosis Association of Andhra Pradesh and City Branch the Clinic is meant for immunization in B.C.G., Polio and Triple Antigen vaccines. The Clinic will also act as a sub-centre for the distribution of anti-tuberculosis drugs to TB Patients in the nearby localities.

TRAVELLING FELLOWSHIPS

To encourage interest among young promising research workers in Diabetes, the Diabetic Association of India has offered 20 Travelling Fellowships of Rs. 500/- each. For details, contact Diabetic Association of India, Maneckji Wadia Building, 1st Floor, M.G. Road, Bombay 400 023.

I.M.A. AWARDS

The Indian Medical Association has instituted a number of cash awards (Rs. 1,000/- and Rs. 500/-) which are open to all members of I.M.A. For details write to the I.M.A., Indraprastha Marg, New Delhi.

I.A.M.C. AWARDS

The Indian Academy of Medical Sciences will award medals, prizes and certificates of merit to bio-medical scientists in January 1977. For details write to Indian Academy of Medical Sciences, C-11/16, Ansari Marg, New Delhi.

B.C. ROY NATIONAL AWARD—1976

Dr. B.C. Roy National Award Fund has

decided to give an award in recognition of the best talents in encouraging the development of specialities in different branches of Medicine. Nominations are invited for this purpose and the value of the Award is Rs. 5000/- and a Medal. For particulars contact Secretary, Dr. B.C. Roy National Award Fund, Office of the Medical Council of India, Temple Lane, Kotla Road, New Delhi.

MEDICAL FACILITIES FOR WORKERS

The Employees' State Insurance Corporation has embarked upon a crash programme of hospital construction to provide hospitalisation facilities to workers. The Corporation has put into use 56 full-fledged hospitals with 9,460 beds, 25 annexes and dispensaries. The total amount sanctioned for construction for various projects is about Rs. 581.1 million. Ten hospitals with 257 beds, three annexes and 20 dispensaries are in different stages of construction. The Corporation is planning for the construction of, in addition to this, eight hospitals, three annexes and seven dispensaries. The scheme which provides protection to employees against five-fold contingencies like sickness, maternity, disbursement and death due to employment injury, funeral benefit and medical care, covers about 5.09 million employees in factories and establishments. The total beneficiaries for medical care including insured persons comes to about 21 million. Besides, the standard of medical care has been improved considerably and has also been expanded to include pathological examination, radiological investigations, specialists' care etc. (P.I.B.)

OVERSEAS SUPPLY OF DRUGS AND PHARMACEUTICALS

India's export trade in drugs, Pharmaceuticals and fine chemicals has been showing an increasing trend during the past few years—Rs. 431.4 million in 1974-75 as compared to Rs. 373.3 million in 1973-74, Rs. 134.8 million in 1972-73 and Rs. 103 million in 1971-72. But, the exports during 1975-76 showed a declining trend mainly due to the recession in the international markets as well as domestic constraints like power supply. In the first eleven months of 1975-76 (April 1975 — February 1976), the exports totalled Rs. 332.6 million as compared to Rs. 402.7 million in the corresponding period of the previous year.

The major importer of medical and pharmaceutical products (excluding fine chemicals) from India has been the Soviet Union. It imported worth Rs. 41.50 million out of the total exports in the line valued at Rs. 227 million during 1974-75. The other important buyers are Sri Lanka,

Federal Republic of Germany, Hong Kong, Japan, Nepal, Nigeria, Switzerland, Thailand, U.K. and U.S.A.

The drugs and pharmaceuticals exported from India cover a large number of items. The important pharmaceutical preparations currently being exported comprise antibiotic preparations, surgical dressing, salicylates, patent and proprietary medicines and vitamin preparations.

An encouraging factor is that export of finished formulations constitute about 80 to 90 percent of the total exports of drugs and pharmaceuticals. Side by side, exports of crude drugs

are also increasing over the years. In 1974-75 crude exports accounted to Rs. 139 million as against Rs. 77 million in the previous year.

There are over 2,500 units engaged in the production of basic drugs as well as ready-to-use formulations. A wide range of products are being manufactured by the industry including antibiotics, sulphur drugs, anti-T.B. drugs, anaesthetics, vitamins, hormones, gastro-intestinal drugs, insulin, antileprosy drugs, intermediates, tonics, blood purifiers and emulsions, antidysentery and titanus, several synthetic drugs like anti-filiasial drugs, stimulants, enzymes and muscle relaxants are also manufactured (P.I.B.)

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ABSTRACTS

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Abst. No. 3

Controlled trial of intermittent regimens of Rifampicin plus isoniazid for pulmonary tuberculosis in Singapore.

Singapore Tuberculosis Service/British Medical Research Council. The Lancet; 1975, ii, 1105.

A total of 481 newly diagnosed smear positive patients were allocated at random to 4 regimens of intermittent Rifampicin plus INH. All patients were given initially streptomycin with INH and Rifampicin daily for 2 weeks. This was followed in half the patients by twice weekly INH (15 mg./kg.) and Rifampicin 900 or 600 mg. The other half were given both INH and Rifampicin once weekly, dosage being the same as in twice weekly regimen. In addition, all patients were given daily either 25 mg Rifampicin or a matched placebo to see if the daily Rifampicin supplement would reduce the incidence of adverse reaction to the drug. At 12 months, all patients on twice weekly regimens had a favourable bacteriological status. In the case of once weekly regimens, favourable response was 97 % in those getting 900 mg of Rifampicin and 93 % in those getting 600 mg. of Rifampicin. The therapeutic response was significantly better in the twice weekly regimen ($P < 0.005$). The dose size of Rifampicin did not have a statistically significant effect.

Adverse reactions to intermittent Rifampicin occurred in 25% of the patients getting 900 mg of Rifampicin in the once weekly regimen. In the other three regimens, the incidence of toxicity was low. The effect of dose size on the incidence of "Flu" syndrome and of antibodies was statistically significant. The interval between doses affected the incidence of "Flu" syndrome but not of anti-bodies. The daily 25 mg supplement of Rifampicin had no effect therapeutically or on the incidence of adverse reactions or of anti-bodies.

S.P.P.

Probenecid and Rifampicin Serum Levels

R.J. Fallen et al. The Lancet; 1975, ii, 792.

It had been reported that peak serum levels

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of Rifampicin were raised by 86% if probenecid was given orally 30 minutes before the dose of Rifampicin and mean Rifampicin serum levels at 4, 6 and 9 hours were increased by about 100 %. Since this would be a major gain, if substantiated, the authors investigated this problem further. Patients were given Rifampicin 300 mg. alone or with other anti-tuberculous drugs and probenecid 30 minutes before the dose of Rifampicin. Rifampicin serum level in these patients was not more than half of what was achieved by patients getting 600 mg. of Rifampicin without probenecid. It has thus been concluded that administration of probenecid does not lead to raising of the Rifampicin serum level and, therefore, is of no use in reducing the dose of Rifampicin.

S.P.P.

Early results of treatment of chronic pulmonary tuberculosis with Rifampicin and Ethambutol, administered intermittently twice or once a week preceded by continuous 3-month administration.

A. Kost & Z. Moskwa. Gruzlica.; 1975, 43, 719.

The early results of intermittent treatment with Rifampicin and Ethambutol either once or twice weekly for 12, 18, 24 months in 73 chronic tuberculosis patients with positive sputum are reported. Intermittent treatment was preceded by daily administration of drugs for 3 months. In once weekly regimen bacteriological quiescence was obtained in 31 patients (97%). In twice weekly regimen 37 patients (93%) attained bacteriological quiescence. Patients who remained sputum positive after 4 months treatment usually did not convert thereafter. Treatment had to be discontinued in 16 patients (24%) due to intolerance, mainly to Rifampicin.

S.P.P.

The value of Ethionamide (ETH) combined with INH in intermittent treatment of pulmonary tuberculosis

Z. Krawczyk et al. Gruzlica; 1975, 43, 921.

Eighty patients, excreting tubercle bacilli

sensitive to INH, SM, ETH, after initial period of continuous treatment with these three drugs, were divided at random into two groups of 40 persons each. Group I was given INH-SM, Group II was given INH-ETH. Supervised administration of the drugs, twice weekly, was used in each group for 12 months beginning from bacteriological quiescence.

In Group II, nine patients (22.5 per cent) required discontinuation of ETH because of its side effects; ETH had to be replaced by another drug. Long-term observation, 40 months on the average, showed that intermittent treatment with INH-SM preceded by an initial period of 3-drug continuous regimen, resulted in permanent sputum conversion, while INH-ETH administered after the same initial period of continuous treatment, did not prevent bacteriological relapses.

S.P.P.

Disturbances of water and electrolytes in patients with pulmonary tuberculosis.

J. Graczyk, Gruzlica; 1975, 43, 911.

In 59 persons (8 healthy individuals and 51 tuberculous patients) investigations of body water were carried out. The total volume of water in the body was determined by the anti-pyrine method, extracellular water by the rhodanate method; the difference between these values corresponded to intracellular water. In tuberculous patients an increase of extracellular fluid correlating with the degree of severity of tuberculous process was found. The amount of extracellular fluid in patients with limited tuberculosis of the lung constituted 25.01 per cent of body weight and it was similar to that in healthy individuals (23.41 per cent). Compared with these two groups the increase of volume of extracellular water in patients with advanced pulmonary tuberculosis was highly significant statistically : 30.57 per cent in patients with respiratory insufficiency and 42.76 per cent in patients with fever and in grave general condition. The total volume of body water was much the same in tuberculous patients and in healthy individuals. Therefore, the increase in extracellular fluid in patients with far advanced pulmonary tuberculosis resulted in a considerable decrease of their intracellular fluid. In 27 per cent of the total number of patients a fall in serum Na was found, the most considerable being in patients with far advanced pulmonary tuberculosis. The increase of volume of extracellular fluid correlated with the decrease of Na and albumin concentrations in blood serum.

S.P.P.

Epidemiology of Hydatid Disease at Kurnool

C.R.R.M. Reddy, ICMR Bulletin; 1975, Vol. 5, No. 11.

From 1933 to 1957, 527 cases of hydatid disease have been reported from the entire country and of these 239 were from Kurnool, Guntur, Madras and Vellore. 70% of these 239 were from Kurnool alone. 83% were Casoni positive. In 33 cases who were suspected of hydatid and operated, presence of hydatid was confirmed in 25 at the time of operation. Casoni test was carried out in 760 persons above the age of 5 engaged in keeping sheep and out of them 22 % gave a positive reaction. One hundred and fifty stray dogs were autopsied and adult worms were present in 50. 7.7% of pigs, 16.96% of goats, 21.7% of sheep and 60.94% of cattle slaughtered in the local slaughter house had evidence of hydatid cysts. Fertile cysts were found in 64.6% of cysts recovered from sheep, 66.7% from buffaloes, 54.5% from goats, 41.7% from cows, 31.5% from oxen and 28.5% from pigs. The cysts were more often seen in the lungs of the animals and the lung cysts were more frequently fertile than cysts in other organs.

S.P.P.

Abdominal Tuberculosis with special reference to Pathological aspects

V.C. Vasantha, CM. Habibullah & Arun Kumar, Journal of the Indian Medical Association; 1975, 65, 302.

A surgical biopsy was carried out in 70 patients with symptoms referable to the abdomen from 1964 to 1973 in Osmania Medical College, Hyderabad. The females were nearly 3 times as many as males and majority of the patients were between 20 and 40 years. The commonest site of involvement was the ileocaecal region. Colon alone was involved in 2 cases only. Seventeen cases had ileal involvement, Jejunum alone was involved in 5 cases. All cases had ulcero-hypertrophic lesions. The ulcers were varying in number, size, shape and distribution. All of them were superficial and less than 3 cm. in diameter. None of the cases had internal fistula, fissures or transmural cracks. Mesenteric lymph glands were involved in one-third of the cases in addition to intestinal involvement. Caseation was seen in 67.5% of intestinal and 27.5% of lymph node lesions.

S.P.P.

Tuberculous stricture of Duodenum

S.G. Deshpande & (Mrs.) M.J. Mehta
Journal of the Indian Medical Association;
1975, 65, 306.

Case of a 19 year old male patient who attended the hospital with symptoms of intestinal obstruction is described. He was under treatment for pulmonary tuberculosis for 6 months before the symptoms of intestinal obstruction. Barium meal examination showed strictures in the third part of duodenum with marked dilatation proximal to the stricture. Duodenojejunostomy was done. The duodenum distal to the obstruction was normal. The mesenteric lymph nodes were moderately enlarged and there were some tubercles over the terminal ileum. No other stricture was found in any other part of the G.I. Tract. Histopathological examination confirmed tuberculous aetiology.

S.P.P.

Evidence for infection by two distinct strains of Mycobacterium Tuberculosis in Pulmonary Tuberculosis

James W. Raleigh et al. Amer. Rev. Resp. Dis.; 1975, 112, 497.

The sputum cultures of 26 patients in whom bacteriological relapse occurred during or after an initial course of treatment with antimicrobial drugs were compared by phage typing with cultures isolated previously from the same patients. Nine (34%) were different in phage type. Possibility of error in phage typing or labelling and identification of cultures was completely ruled out. The difference in phage type of the two strains could be ascribed to (i) relapse being due to exogenous re-infection with a differ-

ent strain (ii) the presence of two distinct phage types present from the outset and therefore relapse being due to one strain and the initial disease due to the other (iii) change in phage type of the original single strain as a result of treatment or immunologic response of the host. Whereas the first possibility is extremely remote it is not possible at this stage to determine which of the other two possibilities could be responsible for this phenomenon which has important epidemiological implications.

S.P.P.

Incidence and clinical significance of visible non-viable bacilli in patients with pulmonary tuberculosis.

W. Krychniak et al Gruzlica; 1975, 43, 785.

Detection of bacilli seen on direct smear but not growing on culture creates difficulties in assessment of cure in pulmonary tuberculosis. Occasionally the appearance of these bacilli is interpreted as exacerbation or relapse. In 3,434 patients with pulmonary tuberculosis treated by the authors at the Tuberculosis Institute in Warsaw from 1971 to 1973 such bacilli were isolated from 100 patients (2.9%). Isolation was more frequent (11.2%) in patients treated with Rifampicin as compared to 1.43% in patients not receiving Rifampicin. The stage of treatment at which they were isolated varied considerably but in 73 % the period was first 6 months of treatment. They appeared mainly in patients with fibro-cavernous lesions of long standing. The authors conclude that this is a transient phenomenon and usually precedes sputum conversion. It is not an evidence of relapse or deterioration and does not require any change in chemotherapy.

S.P.P.