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NEWS & NOTES * ABSTRACTS

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TUBERCULOSIS AND DIABETES

The seriousness of the association of pulmonary tuberculosis and diabetes mellitus was first noted by that great Arab physician Avicenna nearly 1,000 years ago. With the efficient control of both tuberculosis and diabetes with modern drugs, the seriousness of the association has lost the edge and the mortality rate of diabetics with pulmonary tuberculosis has come down considerably after the advent of chemotherapy.

There is no doubt that diabetics are more prone to suffer from pulmonary tuberculosis than the non-diabetics. In the famous Philadelphia survey, carried out among industrial workers between 1945 and 1947, it was shown that pulmonary tuberculosis was twice as common in diabetics as among non-diabetics. Recent records of the incidence of pulmonary tuberculosis in diabetics and of diabetes in pulmonary tuberculosis vary considerably depending on many factors such as year of study, material examined and criteria for diagnosis of both pulmonary tuberculosis and diabetes. In the author's series reported in 1960, the prevalence of pulmonary tuberculosis in diabetics was 8.3%. In tuberculosis patients over the age of 40, the prevalence of diabetes was 11% and hence it was suggested that every tuberculosis patient of 40 and above should have a screening test for diabetes (fasting and post-prandial blood sugar) as a routine.

Most workers agree that tuberculosis takes a serious form in diabetics, the pulmonary lesions being acute dense infiltrations often breaking down into cavities. Incidence of complications such as spontaneous pneumothorax followed by hydro and pyo-pneumothorax is also high. Most workers also agree that if both diseases are promptly controlled and adequately treated, clearing of tuberculous lesions and prognosis in general is not unsatisfactory.

As mentioned above, material from the different authors is difficult to compare with each other because the criteria for diagnosis of pulmonary tuberculosis and diabetes as also categorisation of the cases in respect of extent or severity vary from author to author. In tuberculosis, the main difficulty is that most workers have based the diagnosis on radiology and not on sputum positivity. Though there is no difficulty about extent of pulmonary tuberculosis as judged radiologically, viz., minimal, moderately advanced and far advanced, there are difficulties both in criteria for diagnosis and degree of severity of diabetes. Terms such as "subclinical diabetes", "asymptomatic diabetes", "latent diabetes" "chemical diabetes" and "borderline diabetes" add to the confusion.

It is high time that the definition set out by the National Data Group of the

National Institute of Health is universally accepted. This is summarised as follows:-

(i) Diabetes mellitus should be diagnosed if fasting blood sugar is more than 140 mgm/ml on more than one occasion.

(ii) In oral glucose tolerance test, if two hours level of blood sugar is more than 200 mgm/ml, diabetes is to be diagnosed.

(iii) If two hours blood sugar level is more than 140 but less than 200 mgm/ml it is to be termed as "impaired glucose tolerance".

(iv) If two hours level is less than 140 mgm/ml the case is to be termed as "Normal".

There is confusion in describing the severity of diabetes also, as some base it on the level of blood sugar while others base it on insulin requirement. It is desirable that the basis should be blood sugar level rather than insulin requirement for obvious reasons and the following criteria are recommended:

(a) Mild diabetes: Fasting blood sugar from 80 to 120 but two hours after glucose level above 180 but less than 225 mgm %.

(b) Moderately advanced: Fasting blood sugar from 120 to 180 mgm % and two hours level from 215 to 300 mgm %.

(c) Severe diabetes: Fasting blood sugar above 180 mgm % and two hours level above 300 mgm %.

It is also worth remembering that early diagnosis of the combination is rare. At the time of diagnosis a large majority of the cases have severe diabetes and far advanced pulmonary tuberculosis. The reason is that symptoms of the complicating disease are masked by the originally existing disease and that each condition causes exacerbation of the other. The tuberculosis patient who is already feeling weakness, tiredness, loss of appetite, loss of weight etc. does not recognise the onset of diabetes which adds very little to the symptoms. The diabetic on the other hand does recognise the onset of fever and cough but attributes these to the frequent minor infections he is subject to and often blames his own irregularity of treatment. Moreover, the patients of both these diseases are notorious defaulters. Thus, the only way to make sure of this dreadful combination is to insist on routine blood sugar screening test in tuberculosis patients of 40 and over and carry out sputum and x-ray examination in a diabetic once a year or on any occasion when cough persists for a month or so or if insulin requirement suddenly goes up.

—M.D. Deshmukh

CORRELATION BETWEEN PREVALENCE RATES OF PULMONARY TUBERCULOSIS, TUBERCULOUS INFECTION AND NON-SPECIFIC SENSITIVITY

RAJ NARAIN, M.S. KRISHNAMURTHY, S. MAYURNATH and B.N. GOPALAN

Summary : Data from the initial examination of a BCG trial have been analysed to determine mathematical relationship, if any, between the prevalence of infection and disease. Also, because non-specific sensitivity offers protection against the development of tuberculosis and because there was high prevalence of nonspecific sensitivity in the area of the study, relationship between nonspecific sensitivity and tuberculosis had also been studied.

Results of the analysis showed that relationship between prevalence of tuberculous infection and disease is not amenable to any simple mathematical quantification. However, the values of the coefficients of correlation between the two were statistically highly significant suggesting that the prevalence of one varied directly with the prevalence of the other in the community, and that prevalence of infection may be used as an indicator for the prevalence of disease at different points of time. The analysis also showed the existence of an inverse relationship between prevalence of tuberculosis and prevalence of non-specific sensitivity tending to confirm the previous finding that the latter offered protection against the other.

Introduction

For assessment of the trend of tuberculosis in developing countries, little or no data are available. Notification data, wherever these exist, are grossly incomplete. Repeated prevalence surveys for morbidity are costly and difficult to organise. An easier way of assessing the problem could be by measuring infection rates in a representative sample of the population. Any change in these over a period of time could be assumed to represent a corresponding change in the prevalence of disease. Since infection in India is caused only by the open cases of the disease, *a priori* such a hypothesis should be acceptable. The ICMR has also recommended it under the New 20-point Program (ICMR, 1983). Prevalence of infection would appear to be almost the only practical measure for this purpose. A representative sample could be children, who are likely to be available for testing at different points of time more easily than most other groups.

For this *a priori* hypothesis, it could be desirable to assess the degree of correlation between prevalence of infection in some age groups and the prevalence of disease in the community. Therefore, we have analysed correlation between prevalence rates of pulmonary tuberculosis, tuberculous infection and non-specific sensitivity in the data of the initial round of the BCG trial (TB Prevention trial, 1980). Non-specific sensitivity was included in the analysis because it has been shown to

offer protection against tuberculosis (Palmer et al, 1966; M.R.C., 1972 and Raj Narain, et al 1972) and because it was highly prevalent in the area of the study (Raj Narain et al, 1975). To the best of our knowledge such a relationship in mathematical terms has not been reported before.

Material and Methods

The initial examination of the population in the BCG trial was carried out from July, 1968 to March, 1971. The design of the study and the methods adopted have been reported in detail earlier (TB Prevention trial, 1980). Briefly, the entire population 1 year or more by age was tested with 3 IU of PPD-S and 10 units of PPD-B. All persons aged 10 years or more were offered a 70 mm photofluorogram of the chest and those persons showing x-ray abnormality were offered examination of two specimens of sputum, both by smear and culture. The area consisted of 210 administrative units, namely, 209 panchayats* and a town. The data from the 210 units have been utilised to study the inter-relationship between the three parameters. The coverages for the examinations were of the order of 77% for skin testing, 82% for x-ray examination and 93% for sputum examination.

Definitions

In this report the following definitions for the three parameters have been used.

From the Tuberculosis Prevention Trial, Spurtank Road, Chetput, Madras-600 031, a project under the Indian Council of Medical Research aided by a grant from the W.H.O. Dr. Raj Narain passed away on March 3, 1984.

*A panchayat is a group of villages and hamlets and is the smallest administrative unit. The population may vary from less than 1000 to several thousand inhabitants.

1. For prevalence of pulmonary tuberculosis, the following three categories of cases have been considered. It is not easy to define a case of pulmonary tuberculosis (Raj Narain et al 1968). Possibly, one or the other definition may be acceptable to most workers.

- (i) Cases in whom the culture growth from one or more of the specimens of sputum was classified as *M. tuberculosis*,
- (ii) Cases in whom culture growths from at least two specimens of sputum were classified as *M tuberculosis*,
- (iii) Cases under (i) who, in addition, had x-ray evidence of disease.

Although category (i) is used for diagnosis of disease in most surveys, it was felt that categories (ii) and (iii) established the diagnosis of pulmonary tuberculosis with greater certainty than category (i). It may be noted that the three categories of cases are not mutually exclusive, but overlapping.

2. For prevalence of infection with *M. tuberculosis*, all persons with a size of reaction of 12 mm or more to PPD-S have been considered as infected (TB Prevention Trial, 1980).

Prevalence of infection has been studied, separately, for three overlapping age groups, namely 1-9 years, 1-14 years and all ages.

3. For non-specific sensitivity, persons with 7 mm or smaller reaction to PPD-S and showing 10 mm or bigger reaction to PPD-B, have been considered to have non-specific sensitivity (Raj Narain et al 1975). Prevalence of non specific sensitivity in the three age-groups, as for infection with *M. tuberculosis*, has been studied.

Results

Data for each of the 210 units were studied in detail (not shown); variation in the size of the units and in the prevalence rates of the three parameters between units was great.

Values of coefficients of correlation between prevalence rates of tuberculous infection and the three categories of disease are shown in Table 1. Although the numerical values of the coefficients of correlation were not large, the correlation between the prevalence rates of infection and disease, for each of the three age groups and the three categories of disease was positive and highly significant.

Correlation between prevalence rates of non-specific sensitivity and the 3 categories of cases is shown in Table II; the correlation in each case was negative and highly significant. Again, the numerical values of the co-efficients of correlation were not large.

Table III shows the values of the coefficient of correlation between prevalence of infection and the prevalence of non-specific sensitivity. All the values were very small and none was statistically significant.

A better way to consider inter-relationship between 3 variables is to consider the variables, two by two, after eliminating the effect of the third i.e., to consider partial correlation coefficients.

Partial correlation coefficients between prevalence of infection and disease and between prevalence of non-specific sensitivity and disease are presented in Tables IV and V respectively. Values of the partial coefficients were highly significant. But the values, though higher, were still small.

TABLE 1

Coefficients of correlation between prevalence rates of infection (≥ 12 mm to PPD-S) and disease

Category of case (aged ≥ 10 years)	Age-group considered for infection		
	(1-9) years	(1-14) years	All ages
1. <i>M.tub</i> on atleast one culture	0.35**	0.38**	0.41**
2. <i>M.tub</i> on atleast two cultures	0.35**	0.36**	0.32**
3. <i>M.tub</i> on atleast one culture and x-ray evidence of disease	0.39**	0.40**	0.40**

**p<0.01

TABLE 2

Coefficients of correlation between prevalence rates of non-specific sensitivity (0—7 mm to PPD-S and \geq 10 mm to PPD-B) and disease

	Age-group considered for non-specific sensitivity		
	1-9 years	1-14 years	All ages
1. <i>M.tub</i> on at least one culture	— 0.27**	—0.28**	—0.31**
2. <i>M.tub</i> on at least two cultures	— 0.27**	—0.26**	—0.30**
3. <i>M.tub</i> on at least one culture and x-ray evidence of disease	— 0.22**	—0.22**	—0.25**

P<0.01

TABLE III

Coefficients between prevalence rates of infection and non-specific sensitivity

Age-groups considered	Coefficients of correlation
1-9 years	0.11
14 years	0.10
All ages	0.09

TABLE IV

Partial correlation coefficients between prevalence rates of infection and disease (after eliminating the effect of non-specific sensitivity)

Category of case (aged 10 years)	Partial correlation coefficient
1. <i>M.tub</i> on at least one culture	0.45**
2. <i>M.tub</i> on at least two cultures	0.40**
3. <i>M.tub</i> on at least one culture and x-ray evidence of disease	0.41**

a Age group 1—14 years has been considered for the prevalence of infection

** P<0.01

TABLE V

Partial correlation coefficients between prevalence rates of non-specific sensitivity and disease (after eliminating the effect of infection)

Category of case (aged \geq 10 years)	Partial correlation coefficient
1. <i>M.tub</i> on at least one culture	—0.35**
2. <i>M.tub</i> on at least two cultures	—0.31**
3. <i>M.tub</i> on at least one culture and x-ray evidence of disease	—0.34**

a Age group 1—14 years has been considered for the prevalence of NSS

** P<0.01

Scatter diagrams and regression lines, between infection and disease and between non-specific sensitivity and disease were drawn. These did not show any definite pattern of correlation (not shown). Attempts were made to obtain closer fits (than with the linear regression model) by using transformations (log, arcsine) and by including a quadratic term. None of these, however, proved beneficial.

Discussion

The highly significant values of the coefficients of correlation between infection and the 3 categories of cases of pulmonary tuberculosis (Table 1) suggest that if prevalence of infection with *M. tuberculosis* is high, the number of cases of pulmonary tuberculosis is also likely

to be high. However, the numerical values of the coefficients of correlation were not large. This is probably not surprising as disease may develop during a greatly varying period after infection. The link between disease and infection is spread over a long period. Furthermore, the link was incomplete in the sense that the infected persons at any time were not necessarily infected by the patients of tuberculosis found at the time. Many patients responsible for spreading infection might have died or be no longer patients or migrated to other areas before the survey. Further, some persons might have been infected during their visits to places outside the study area or during short visits by patients from outside the study area to their relations in the study area. Also, in the vast majority, disease does not always develop after infection. Whatever the reason for the low numerical values of the coefficients of correlation, these do not encourage one to make an attempt to evolve an exact mathematical relationship between infection and disease or between non-specific sensitivity and disease. All the same, since the values of the coefficients of correlation are highly significant, infection rates could serve as a far simpler indicator of the prevalence of disease for at least certain purposes. For example, it should be permissible to indicate changes in the prevalence of disease by repeated tuberculin surveys rather than by the costly and time consuming repeated tuberculosis prevalence surveys for disease.

Negative and significant values for the coefficients of correlation between non-specific sensitivity and cases of tuberculosis (Table 11) support earlier reports of the association of non-specific sensitivity with lower incidence rates of pulmonary tuberculosis (Palmer et al 1966; M.R.C., 1972 and Raj Narain et al 1972).

The values of the coefficients of correlation between prevalence rates of infection with *M. tuberculosis* and non-specific sensitivity are very small and not statistically significant (Table III). Thus, the two parameters would seem to be independent of each other. Non-specific sensitivity cannot prevent infection with *M. tuberculosis*, but possibly (as suggested by the data presented in Table II), it would seem to prevent the development of disease after infection, much in the same way as BCG vaccination, thus earning for non-specific sensitivity the name 'natural vaccination'.

The values of the coefficients of correlation, though statistically significant, were numerically small. Any value of the correlation coefficient less than 0.7 may not normally be used to decide the linear relationship between two variables (Oldham, 1968). Furthermore, the

large residual or unexplained relationship would seem to point out to the great and important role of several other parameters such as the immunological factors, nutritional aspects or the low virulence of the organisms, etc., in addition to the two considered in this report on the development and prevalence of pulmonary tuberculosis in a community.

Possibly, incidence rates of infection could be more directly associated with existing disease in the community. Incidence rates are, however, more difficult to estimate. Even the definition of infection is not agreed upon (Narain et al, American Thoracic Society 1981; Comstock et al 1978; Thompson et al 1979 and Narain 1980) and the time lag between infection and disease shows great variation.

To sum up, the results presented show that the relationship between prevalence of tuberculous infection and disease, though highly significant, is not amenable to any simple mathematical quantification. All the same, it may not be unjustifiable to use prevalence rates of infection as indicators of the prevalence of disease in the community at different points of time. Further, the inverse relationship between prevalence of tuberculosis and prevalence of non-specific sensitivity supports the earlier finding that the latter offered protection against the former.

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PULMONARY TUBERCULOSIS AND DIABETES MELLITUS

P.A. DESHMUKH and T. SHAW*

Co-existence of pulmonary tuberculosis and diabetes mellitus is well known. Both the diseases require prolonged treatment and in diabetes mellitus a continued special care of the diet is necessary. Uneducated and low economic strata patients - where tuberculosis is more common - do not appreciate the necessity of sustained attention that diabetes requires. Many consider the disease as cured when sugar is not present in the urine or blood sugar is within normal limits at a certain point of time. Variations and exacerbations of diabetes are not well understood and this results in protracted treatment, unsuccessful outcome or relapse. Presented herewith is an analysis of the extent of problem of diabetes in cases of pulmonary tuberculosis attending Out-Patient Department of the Chest Clinic.

Material & Methods

All patients who attend the Chest Clinic for complaints pertaining to the chest or in whom tuberculosis is suspected undergo a clinical, radiological and bacteriological examination. Based on the assessment of examination and investigations, when a patient is found to be suffering from pulmonary tuberculosis, anti-tuberculosis treatment is started. Routinely, in all such cases post-breakfast urine is examined

for presence of sugar (Breakfast containing about 50 gms. carbohydrate). If reducing sugar is present in urine, fasting and post-glucose (2 hrs. after 75 gms. glucose) sample of blood is taken to assess the blood glucose level.

Analysis is presented for 2,434 cases of pulmonary tuberculosis of the age group 15 years and above.

Observations

Table 1 shows the age & sex distribution of total cases of pulmonary tuberculosis. It shows that 63.9 % were males and 37.1% were females. 39.6 % were in age group of 45 years and above.

Table 2 shows the age and sex distribution of total cases of diabetes mellitus. In all there were 138 cases of diabetes in 2,434 cases of pulmonary tuberculosis (5.6%). Out of 138 cases of diabetes, 100 were in males and 33 were in females. Thus the prevalence in males was 6.4% and in females 4.3%. Majority of cases of diabetes belonged to the age group of 45 years and above i.e. 82.6%.

The table also shows that the prevalence of diabetes increases as the age advances. Thus

TABLE I

Pulmonary Tuberculosis Cases by Age & Sex

Age in yrs.	Male	Female	Total
15 to 24	339	286	625
25 to 34	258	222	480
35 to 44	225	138	363
45 to 54	241	95	336
55 & above	494	136	630
Total	1,557 63.9%	877 36.1%	2,434

*Ardeshir Dalal Memorial Hospital, Jamshedpur.

TABLE 2

Diabetes Mellitus in Pulmonary Tuberculosis Cases by Age & Sex

Age in years	Male	Female	Total
15 to 24	3 in 339 (0.9%)	Nil in 286	3 in 625 (0.5%)
25 to 34	5 in 258 (2.0%)	2 in 222 (0.9%)	7 in 480 (1.5%)
35 to 44	8 in 225 (3.5%)	6 in 138 (4.3%)	14 in 363 (3.8%)
45 to 54	29 in 241 (12.0%)	11 in 95 (11.5%)	40 in 336 (11.9%)
55 & above	55 in 494 (11.0%)	19 in 136 (14.0%)	74 in 630 (11.7%)
Total	100 in 1,557 (6.4%)	38 in 877 (4.3%)	138 in 2,434 (5.6%)

} 11.8%

TABLE 3

Diabetes Mellitus Cases Known & Detected Subsequently Age Wise

Age in years	Known cases	Detected subsequently
15 to 24	2:(1.4%)	1 (0.7%)
25 to 34	2(1.4%)	5 (4.0%)
35 to 44	5/4.0%)	9 (6.0%)
45 to 54	15(11.0%)	25 (18.0%)
55 & above	36 (26.0%)	38(27.0%)
Total	60 (43.4%)	78 (56.6%)

63
80.7%

in the age group of 15 to 24 years the prevalence was 0.5% and in the age group 25 to 34 years it was 1.5%. In the age group 35 to 44 years it was 3.8% and in 45 years and above group, it was 11.8%. Analysis of sex wise prevalence did not show any significant difference.

About 60 (43.4%) patients gave history

of diabetes but 78 (56.6%) were detected subsequently in examination of urine confirmed by blood sugar examination. (Table 3) Out of 78 cases of diabetes detected subsequently, 63 belonged to the age group 45 years and above. Thus 80.7% of undetected cases could be revealed if steps are taken to rule out diabetes mellitus in those aged 45 years and above.

TABLE 4 *Diabetes**Mellitus Classification*

D.M. Classification	No. of Cases	%
<i>Mild</i> F.B.S.—120—140 mgs. % P.P.B.S. 140—200 mg. %	20	14.5
<i>Moderate</i> F.B.S.—140—180 mg. % P.P.B.S.—200—300 mg. %	61	44.2
<i>Severe</i> F.B.S.—More than 180 mg. % P.P.B.S.—More than 300 mg. %	57	41.3
Total	138	100.0%

TABLE 5

Radiological Lesions in Pulmonary Tuberculosis & Diabetes Mellitus Cases

	Min.	Mod.	F.A.	Cavitary	Non- Cavitary
	(12%)	(63.4%)	(24.6%)	(26.5%)	(73.5%)
P.T.B. With	4	100	34	96	42
D.M. Cases	(3%)	(72.4%)	(24.4%)	(69.5%)	(30.4%)

Table 4 shows the severity of diabetes mellitus cases. Majority of cases had moderate or severe type of diabetes.

Table 5 shows the radiological extent of disease and also cavitary status. The analysis shows that cavitary disease is much more frequent in diabetics than non-diabetics. Majority of diabetics show at the time of diagnosis of pulmonary tuberculosis an advanced type of disease.

Discussion and Conclusions

While managing the cases of pulmonary tuberculosis, one comes across association with diabetes at different stages :

1. A known case of diabetes develops ill health and presents with symptoms of general ill health like fever, weakness, apathy or pertaining to the chest—cough,

haemoptysis, pain chest etc. and investigations may reveal presence of tuberculosis.

2. It has been noted in a few cases that rapid deterioration of health took place and investigations revealed presence of diabetes and pulmonary tuberculosis.
3. Sometimes a patient who has been put on anti-tuberculosis treatment fails to respond adequately in a given period of time and further investigations reveal presence of diabetes.

In the analysis presented, patients who belonged to the age group 15 years and above and were suffering from pulmonary tuberculosis and taking out-door domiciliary treatment have been considered. Routinely, post-breakfast urine was examined for presence of sugar and when there was abnormality a fasting and post-glucose

blood sugar was done. The overall presence of diabetes in these cases of pulmonary tuberculosis was 5.6%. It is possible that some cases whose renal threshold could be high, would not have been thus detected. It is necessary to find out actually what the quantum of such cases is.

Out of the total cases of diabetes in this group more than 50% were revealed to be suffering from diabetes by the method mentioned above. The analysis also highlights the importance of suspecting diabetes in age group of 45 years and above.

It was noted that one group, where subsequent management becomes difficult, is insulin-dependent diabetes. Patients are reluctant to learn to take the injections themselves and even if taught they become defaulters when such treatment is life-long. It has also been seen in a few cases where due to improper sterilization, infection of the local site occurs and when this happens, the continuation of insulin is discarded and this results in deterioration of health.

The prevalence of diabetes in pulmonary

tuberculosis has been studied by a number of authors and it has been found to vary from 2 to 14%. Such wide variation is mainly due to study criteria not being uniform.

It has also been seen in a number of studies that diabetics usually have more advanced type of pulmonary tuberculosis. The salient features that have been revealed in this analysis have been :

1. The prevalence of diabetes in cases of pulmonary tuberculosis was found to be 5.6 %. It increased with age.
2. Routine post-glucose or post-breakfast urine sugar examination is a very practicable and useful method for detecting new cases.
3. In patients attending Chest Clinic for treatment of pulmonary tuberculosis belonging to the age group 45 years and above routine investigations should include exclusion of diabetes as 80% of unknown cases of diabetes could be diagnosed in this group.

IMPAIRED GLUCOSE TOLERANCE IN ACTIVE PULMONARY TUBERCULOSIS

M.M. SINGH*, S.K. BISWAS**, ASHOK SHAH***, ASHOK K. RAJPUT****
and P.P. SINGH*****

Summary : Serial oral glucose tolerance test was performed before and after anti-tuberculous chemotherapy on 52 cases of pulmonary tuberculosis. Initially, 23 patients had impaired glucose tolerance, while 2 were diabetics. Anti-tuberculous chemotherapy had a salutary effect on the impaired glucose tolerance observed initially. Correlation between the radiological extent of lesion initially and impaired glucose tolerance just failed to achieve statistical significance, but the results were highly suggestive of a positive association with the cavitory status.

Introduction

The association between Tuberculosis and diabetes mellitus has been known since antiquity. However, only one aspect viz. the increased prevalence of tuberculosis in diabetic patients has been well documented while conversely the prevalence of diabetes mellitus in tuberculous patients has received scant attention. It was even believed by Root & Dickson (1952) that, "All students have agreed that tuberculous patients do not develop diabetes with any greater frequency than non-tuberculous".

This view held sway till Nichols (1957) shattered this belief when he revealed that 5 % of his tuberculous patients had diabetes mellitus and a further one third had an abnormal screening test. Subsequent studies have further substantiated this observation.

These observations assume importance in the context of the warning issued by the National Diabetes Data Group of N.T.H. (1979), that 1 % to 5 % of patients with impaired glucose tolerance proceed to overt diabetes mellitus per year.

The present study was thus conducted to ascertain the prevalence of impaired glucose tolerance in active pulmonary tuberculosis and to determine the effect of anti-tuberculous chemotherapy on the glucose tolerance curves. An attempt was also made to correlate the extent of the disease with the degree of impairment of glucose tolerance.

Material & Methods

This study was conducted in Rajen Babu Tuberculosis Hospital on 52 adult, untreated, ambulatory, bacteriologically confirmed cases of pulmonary tuberculosis. Previously known

diabetics, pregnant women and cases with any complication were excluded.

Skiagrams of the chest were taken before initiation of therapy and after 12 weeks of therapy. Radiological extent of disease was graded as (i) minimal (ii) moderately advanced and (iii) far advanced as described by the Tuberculosis Association of India.

Oral Glucose Tolerance Test (O.G.T.T.) was performed before commencement of specific anti-tuberculous chemotherapy i.e. at 0 week. Subsequently, to assess the effect of anti-tuberculous chemotherapy O.G.T.T. was carried out every 4 weeks till 12 weeks after start of chemotherapy which consisted of Streptomycin, I.N.H. and PAS.

Standard procedure for O.G.T.T. as recommended by the report of the Committee on Statistics of the American Diabetes Association, reported by Klint et al (1969) and W.H.O. Expert Committee (1980) was followed. All drugs were stopped 24 hours before the test. A glucose load of 75 gms was given after collecting the fasting blood sample between 8 A.M. and 9 A.M. Subsequently blood was collected twice, 1 hour and 2 hours after the glucose load.

The Ortho-toluidine method as recommended by Hyvarinen and Nikkila (1962) was adopted for estimation of Blood Glucose.

The glucose tolerance curves were categorised as (a) normal glucose tolerance (b) impaired glucose tolerance and (c) diabetes mellitus (table 1) based on the criteria laid down by National Diabetes Data Group of N.I.H. (1979) and the report of W.H.O. Expert Committee (1980).

Oral glucose tolerance test was also carried

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out in a group of 20 normal, healthy volunteers, matched as far as possible for age, sex and socio-economic status.

Results and Analysis

The present series comprised 52 patients; 34 males and 18 females. Their ages ranged from 19-60 years with a mean age of 30.5 years. Maximum number of patients (30) were in third decade of life.

Amongst the 52 patients in this series, 27 (51.9%) had normal glucose tolerance at 0 week, while 23 (44.2%) had impaired glucose tolerance, and 2(3.9%) were classified as diabetics. 4 out of the 10 patients over 40 years had impaired glucose tolerance while 2 were overt diabetics, 19 out of the 42 patients below 40 years (45.2%) had impaired glucose tolerance.

Effect of 12 week's chemotherapy on the

3 types of glucose tolerance curves is shown in Table-II. Of the 23 patients who had initially impaired glucose tolerance, only 6 continued to show impairment at 12 weeks after chemotherapy. Of the two patients classified as diabetic, one continued to show diabetic curve, while the curve in the other moved to the category of impaired glucose tolerance after 12 weeks. The effect of 12 weeks of chemotherapy on the impaired glucose tolerance curves was highly significant (t = 6.99)

Further, the two hour value of blood glucose level which is the most important showed a mean fall of 33.8 mg/100ml from 0 to 12th week in the 23 patients with impaired glucose tolerance. This was highly significant (P< 0.001).

Out of the total 52 cases, 26 were in the 'moderately advanced' group and the remaining in the 'far advanced' group. Whereas only 9 cases in the 'moderately advanced' group had

Table I
Criteria for Classification of Glucose Tolerance

	Fasting	1/2, lor 1-1/2 Hours	2 Hours
I. Normal Glucose Tolerance	<100	<180	<120
II. Impaired Glucose Tolerance (I.G.T.)	<120	>180	120-180
III. Diabetes Mellitus	≥120	≥180	≥180

*These values represent concentration of glucose in mg./dl. in whole venous blood. Plasma values are 15 % higher.

TABLE II

Distribution of patients in the three different classes of glucose tolerance curves at successive periods.

Weeks	No. of patients with normal glucose tolerance	No. of patients with impaired glucose tolerance	No. of patients with diabetes mellitus
0	27(51.9%)	23(44.2%)	2(3.9%)
4	30(57.7%)	20(38.5%)	2(3.9%)
8	40(76.9%)	11(21.2%)	1(1.9%)
12	45(86.5%)	6(11.5%)	1(1.9%)

TABLE III

Oral Glucose Tolerance Test patterns observed in cases of Pulmonary Tuberculosis in various studies

Investigator's Name	Year	No. of Tuberculous patients studied	Prevalence of diabetes detected	Prevalence of glucose intolerance detected.
Nichols	1957	178	5%	22%
Ludes & Pappas	1965	1303	4%	32%
Simonin & Associates	1966	78	6.4%	35.5%
Bloom	1969	47	—	34.1% + 19.1% Borderline
Kishore et al	1973	90	4.4%	6.6% Chemical +9.9% Latent Chemical
Zack et al	1973	256	5.8% (Previously known)	41%
Singh et al	1978	100	—	27.5% + 15% (Border line)
Present Study	1983	52	3.9%	44.2%

cavities, all the 26 far advanced cases had cavitory lesions. Thus a total of 35 (67.3%) patients had cavitory lesions.

In the moderately advanced group 9(34.6 %) cases showed impaired glucose tolerance and 1(3.8%) case was proved to be diabetic, while in the far advanced group, 14 (53.8%) cases had impaired glucose tolerance and 1(3.8%) case had diabetes. The relationship between radiological extent of disease and impaired glucose tolerance just failed to attain statistical significance. ($X^2=2.77$, $0.05 < P < 0.10$).

In the cavitory group, out of 35 cases 19(54.3%) had impaired glucose tolerance and 1(2.9%) case had diabetes, while in the 17 non-cavitory cases only 4(23.5%) had impaired glucose tolerance and 1(5.9 %) case had diabetes. Statistical analysis with Yule's coefficient of association ($Q=0.61$) implied a fairly high degree of positive association between cavitory status of the disease and impaired glucose tolerance.

Discussion

The high prevalence of impaired glucose

tolerance observed in this study is in consonance with the earlier studies as given in Table III.

The high prevalence of I.G.T. in patients of pulmonary tuberculosis observed in this study probably reflects an increased association between Tuberculosis and Diabetes mellitus. This is further substantiated by the fact that antituberculous chemotherapy had a statistically significant salutary effect on the initial impaired glucose tolerance observed in patients of active pulmonary tuberculosis. Further evidence is provided by the fact that although the correlations between the extent of lesion and impaired glucose tolerance just failed to achieve statistical significance the results were highly suggestive of a positive association, especially with cavitory status of the disease.

The effect of variables such as fever, bed rest and malnutrition on glucose tolerance test cannot be completely dissociated from that of the experimental parameter i.e. tuberculous disease. In fact, these factors may have contributed to the results, but these factors alone cannot explain the high prevalence of

impaired glucose tolerance observed in cases of active pulmonary tuberculosis.

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**DIABETES MELLITUS AND PULMONARY TUBERCULOSIS
—A PROSPECTIVE STUDY**

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Summary : Properly planned prospective study, conducted at diabetic clinic of South Eastern Railway Hospital, Adra revealed presence of pulmonary tuberculosis complicating 4.1 percent of the patients registered during last five years. Concurrent study, carried out at the chest clinic of the said hospital during the corresponding period, showed diabetes mellitus in 1.5 percent of the patients suffering from pulmonary tuberculosis. Diabetes was of juvenile onset (JOD) in about one fourth of the patients and the remaining subjects belonged to maturity—onset diabetes (MOD). Male/female ratio was 4 to 1.

Introduction

In spite of phenomenal advances in the knowledge of diabetes mellitus (DM) and pulmonary tuberculosis (PTB) since the first report of association of both the diseases by the Arabian Physician, Avicenna (980) more than a thousand years ago, the problems have grown in magnitude as regards diagnosis, management, etc.

The present prospective study which is still in progress was carried out at South Eastern Railway Hospital, Adra for a period of five years from 1st January, 1978 to 31st December, 1982, the object being to highlight the association of two diseases, to find the effect of one on the other and to determine the influencing factors.

Material and Methods

All the patients attending the diabetic clinic of the hospital during the period under review were screened for presence of pulmonary tuberculosis. Every patient attending/admitted to chest clinic of the hospital was investigated for presence/absence of diabetic state.

The patients were initially hospitalised for a variable period after detection of association of both diseases in order to standardise management schedule of treatment. There was simultaneous detection of diabetes mellitus and pulmonary tuberculosis in some cases.

Protocol provided detailed for history taking, thorough clinical examination including fundoscopy, haematological examination (Hb estimation, total and differential WBC count, ESR determination) biochemical investigations (estimation of blood sugar and urea) and sputum microscopy for AFB on three consecutive days. In all cases second hour post-prandial blood

sugar after 100 gms of oral glucose load was routinely estimated (Folin Wu method) and diabetes mellitus was diagnosed according to the criteria suggested by WHO Expert Committee (1965.) An oral G.T.T. was performed if reasonable suspicion for the diagnosis existed and blood glucose level fell below the criteria suggested by the WHO. No diagnosis was ever made in an asymptomatic patient on the basis of only one blood glucose analysis. The patients were followed up periodically at regular intervals at diabetic and chest clinics of the hospital.

Observations

(a) Pulmonary Tuberculosis (PTB) among patients:

Nine (7 males, 2 females) out of 219 known diabetics (4.1 percent) were found to suffer from PTB (Table 1).

TABLE 1

Prevalence of PTB among diabetic patients

Particulars	Age in Years		Total no. of patients.
	<40	≥40	
No. of Diabetics	59	160	219
No. of PTB patients	1	8	9
Percentage	1.7	5.0	4.1

Out of 59 known diabetics under 40 years of age, one 28 years old male, Khalasi by occupation, having second hour P.P. blood sugar level of 300 mgm percent was found to

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have minimal PTB. Diabetic state had been diagnosed 3 years earlier. He was sputum positive.

There were 160 diabetics who were over 40 years in age and eight of them (6 males, 2 females) were found to have PTB. The tuberculous lesion was advanced in six (moderately advanced—2, far advanced—4) and minimal in two patients. Two cases were bacillary. One (48-year old male) with moderately advanced tuberculosis and 2nd hour P.P. blood sugar 445 mgm percent died.

Their blood sugar (2nd hour PP sample) ranged from 181 to 445 mgm percent, with a mean of 291 mgm percent.

Interval between detection of diabetic state and of PTB is shown in Table 2. It varied from seven months to 15 years, mean interval being about 6 years.

(b) Diabetes mellitus among PTB patients:

TABLE 2

Duration of Diabetes before diagnosis of PTB

Time interval between detection of	No. of cases.
Within one year	1
Within 3 years	3
Within 4 years 5 years or more	1 4

Out of 1359 patients suffering from pulmonary tuberculosis, 20 were found to be diabetic (Table 3). None of them was a known diabetic. In 14 cases both the diseases were detected simultaneously and the remaining 6 cases were detected later as a result of routine periodical monitoring of blood sugar estimation

Sixteen cases were males and 4 females giving Male! Female ratio of 4:1 in this group of patients. The youngest patient was 26 year old and the oldest was 69 years old and both were females. Eleven cases were far advanced, 7 moderately advanced and 2 were minimal. Six of them were bacillary. Their second hour P.P. blood sugar level ranged from 166 to 330 mgm percent, with a mean of 213 mgm percent.

Majority of them (14 cases) had maturity onset disease (MOD). Pulmonary tuberculosis

TABLE 3

Age distribution of Pulmonary Tuberculosis patients associated with Diabetes Mellitus

Particulars	Number of patients.		Total
	Within 40 years of age.	Beyond years of age.	
PTB patients	902	457	1359
Diabetics	6	14	20
Percentage	0.7	3.1	1.5

was far advanced in 7, moderately advanced in 6 and minimal in one (a 45 year old female). Two far advanced and 2 moderately advanced cases died. Among the juvenile diabetes (JOD) cases pulmonary lesions were minimal and moderately advanced in one each and far advanced in 4. One of them with far advanced type of pulmonary tuberculosis died.

(C) Socio-economic and nutritional status

The number of patients both in the lower and the middle income brackets of railway service was almost equal. 5.5% of the patients were under-weight and the rest were normal in weight. None of the patients were obese.

(D) Impact of hyperglycemia on prognosis

Table 4 shows deaths in relation to extent of pulmonary tuberculosis. These were directly proportional to the severity of hyperglycemia as judged by the second hour PP blood sugar levels. Maximum rate was recorded in patients suffering from advanced PTB with second hour P.P. blood sugar more than 300 mgm percent.

(E) Sputum microscopy

Nine out of the 29 diabetics (Table 5) were bacillary (31.0 percent), 3 out of 9 known diabetics and 6 out of 20 whose diabetic state was detected simultaneously with PTB or later. It is relevant to mention here that out of total 1359 cases of PTB treated at Chest Clinic of our hospital during the period under study, only 381 (27.1 per cent) were sputum positive.

Discussion

Pulmonary tuberculosis was found to complicate 4.10 percent (Table 1) of known diabetics in the present study. This compares, well "with

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TABLE 4

Impact of hyperglycemia on prognosis

Particulars of patients	Second Hour PP Blood sugar in night per 100 ml		
	166-200	201-300	300-
Minimal PTB			
No. of cases	2	2	1
Deaths (No)	—	—	—
Percentage	—	—	—
Advanced PTB			
No. of cases	9	12	3
Deaths (No)	2	3	1
Percentage	22.2	25.0	33.3

TABLE 5

Sputum microscopy for acid fast bacilli

Patients with diabetic state	Total number.	No. of sputum -five cases
Known diabetics	9	3
Freshly diagnosed diabetics	20	6
Total	29	9

the findings of Neogy and Roy (1952) who found association of PTB in 3.3 percent of their diabetic patients. Various hypotheses (reduced general body immunity, lowered resistance of respiratory epithelium from hypovitaminosis consequent upon impaired hepatic function, tissue hyperglycemia favouring multiplication of tubercle bacilli, enhanced growth of acid fast bacilli due to increased blood glycerol level from disturbed fat metabolism) have been put forward to explain higher prevalence of PTB among diabetics.

Deshmukh et al (1966) observed that the prevalence of pulmonary tuberculosis was 8.3 percent in their group of 241 diabetic patients compared to 2.4 percent of the find-

ings of Nanda and Tripathy (1968). Such variation in the prevalence of tuberculosis in cases of diabetes mellitus has been reported in the world literature also and the figures range from 0.12 percent (Joslin 1958) to 8.4 percent (Boucot et al 1952).

Maximum number of PTB cases among known diabetics was found in the age groups above 40 years (5.0 percent) compared to 1.7 percent in the younger age groups (Table 1). Preponderance among those above 40 years in age was also reported by Deshmukh et al (1966), Brij Kishore et al (1973) and Nihalani et al (1978).

Many of our patients (55 percent) were under-weight and this observation is similar to that of Tripathy and Kar (1966). Raman et al (1966) and Boucot et al (1952).

Contrary to the findings of workers like Deshmukh et al (1966), Raman et al (1976) and Patel et al (1977) who could not find any correlation between duration of diabetes and development of PTB, 4 out of 9 of our known diabetics (Table 2) had a history of diabetes mellitus of four years' duration or more before PTB was detected. Nihalani et al (1978), also made a similar observation.

Majority of our patients having advanced lesions (Table 4) had second hour PP blood sugar of 200 mgm per 100 ml or higher, which corroborates the findings of Holden and Hiltz (1962), Nihalani et al (1978) and Goyal et al (1978).

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CASE REPORTS

ACUTE SEVERE PERIPHERAL NEUROPATHY DUE TO THIA CETAZONE

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Summary : A patient of pulmonary tuberculosis developed acute peripheral neuropathy within fifteen minutes of starting chemotherapy. Subsequently, thiacetazone was found to be the offending drug.

Introduction

Peripheral neuropathy is the commonest neurological side effect caused by Isoniazid (Tuberculosis Chemotherapy Centre, 1963, Devdutta et al, 1960). The other antitubercular drugs which are known to cause such disturbance are ethionamide (British Tuberculosis Association, 1963; Legatt, 1962; Poole and Schneeweiss, 1961), rarely Streptomycin (Janssen, 1960) and ethambutol (Satoyoshi and Kowa, 1969). Peripheral neuropathy due to thiacetazone, to the best of our knowledge, has not been reported previously. This prompted us to report the case.

Case Report

A 50 year old Hindu male suffering from moderately advanced pulmonary tuberculosis, with positive sputum, was hospitalised on October 9, 1982. He was prescribed Inj. Streptomycin (0.75 Gm.), INH (300 mg.) and Thiacetazone (150 mg) daily. Within fifteen minutes of ingestion of tablets, he started complaining of itching in left palm, gradually spreading to the left half of the body below the neck, along with appearance of white macular rashes and followed by severe burning and throbbing sensations.

Nervous system examination revealed the involvement of sensory functions. Touch and sensations were diminished in whole of the left lower extremity, sparing the left lateral aspect of the leg, left half of abdomen and thorax upto the sixth dorsal vertebra. There was no saddle anaesthesia or loss of pain and touch sensations above D6. Temperature sensation was lost below the left knee joint. Joint position and vibration sensations were normal. All other central nervous system functions were within normal limits.

Laboratory investigations revealed blood urea-20 mg %, fasting and post-prandial blood sugar 80 mg% and 104 mg% respectively,

total leucocyte count 8,600/cmm, differential leucocyte count P₆₀, L₃₀, E₉, M_i. Urinalysis was normal. He was given Inj. B₁, B₆, B₁₂, together with other drugs. There was no improvement in condition after three days of institution of this therapy. Then all the drugs were discontinued and the symptoms and signs disappeared within two days. Eosinophil count was 2%.

Isoniazid (300 mg) was given on 13th Oct. which was well tolerated and on the third day, Injection Streptomycin was added, which was again well tolerated.

On October 18, 1982, following the reinstatement of thiacetazone (150 mg) in the regimen, the reaction reappeared in a more severe form within fifteen minutes of ingestion of tablets, warranting stoppage of all the drugs with subsequent improvement in condition. Thiacetazone was thus found to be the offending drug.

Placebo therapy was instituted thereafter, to rule out any psychiatric involvement. The patient tolerated well.

He was then prescribed Inj. Streptomycin, Isoniazid and Ethambutol which were well tolerated.

Discussion

The patient was considered to have peripheral neuropathy due to thiacetazone, because of the fact that symptoms of peripheral neuritis regressed rapidly on discontinuation of the drug, and after a symptom free interval, reappeared on administration of thiacetazone, simultaneously, showing tolerance to streptomycin and Isoniazid.

Peripheral neuropathy may occur in some instances, as part of an allergic reaction to drug and more obvious allergic manifestations,

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such as fever and skin rashes direct the attention to the drug. It might be possible that the neuropathy was the result of an allergic reaction to thiacetazone, because of itching, skin rashes and eosinophilia during the attack which returned to normal after stoppage of the drug. Presumably, allergic oedema of axon, allergic changes and hyper-permeability of the vasonervorum leading to nutritional changes of the nerve or eosinophilic infiltration of the nerve sheath could have been the possible factors in the development, of neuropathy (Janssen, 1960).

Although an allergic etiology is obvious, it may be difficult to determine, whether the drug induced neuropathy had an allergic basis or it was due to a direct toxic effect. One sided involvement of peripheral nervous system either due to allergic process or toxic reaction by the drug is intriguing and cannot be explained.

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ETHAMBUTOL INDUCED OPTIC NEURITIS IN TWO BROTHERS

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Summary : Two cases of ethambutol induced optic neuritis are reported. The patients were brothers. Both patients developed visual defects simultaneously while on ethambutol therapy in daily dosage of 20 mg./kg. throughout. Zinc deficiency was possibly responsible for this.

Introduction

Ethambutol is undoubtedly an effective & well tolerated drug. The only important toxic effect is retrobulbar neuritis (Citron; 1969) It is related to the dose of the drug. On daily dosage of >35 mg/kg. Kass (1965) & Leibold (1966) observed optic neuritis in 15-18% of their patients. When the dose was reduced to 25 mg./kg. throughout, optic neuritis occurred in 3 % of the patients (Pyle, Pfitze & Pearlman et al; 1966). On reducing the initial daily dosage of 25 mg./kg. after 2 months to maintenance dosage of 15 mg./kg., optic neuritis was observed in 1 % (approx.) of the patients (Lees, Allan & Smith et al; 1971, Clarke, Cuthbert & Cuthbert et al; 1972 and Barren, Tepper & Iovine; 1974). No case of optic neuritis was observed by Pyle (1969) in a series of 200 patients on 20 mg./kg. of the drug for a period of more than one year.

The simultaneous occurrence of optic neuritis in two brothers on 20 mg./kg. of ethambutol led us to investigate the patients. Serum zinc levels were estimated by atomic absorption spectrophotometry (Meret & Henkin, 1971).

Case No. 1

A 30 years old Hindu male was admitted in this hospital on 26.3.81 with the complaints of cough, fever, hemoptysis and breathlessness for 6 months. He smoked 20 bidies per day for 15 years but left smoking 2 years ago. He was non-alcoholic.

He was fairly built but poorly nourished. Examination of the respiratory system revealed bilateral coarse crepitations. Examination of cardiovascular system and abdomen revealed nothing abnormal.

His blood haemoglobin was 7 gm. %. Total and differential leukocyte count revealed nothing abnormal. Sputum smear was positive for acid fast bacilli. Skiagram of the chest revealed cavitory lesion in the left upper zone with non-homogenous shadows in the right

upper zone. The patient was put on streptomycin 0.75 gm. intramuscularly daily with isoniazid 300 mg. and ethambutol 20 mg./kg. orally. The patient improved and was discharged from the hospital with the advice to continue his treatment as an out-door patient. Streptomycin was omitted after 3 months of therapy.

In April, 1982, the patient noticed blurring of vision in both eyes but he reported to this hospital only on 26.7.82. This time his sputum smear was negative for acid fast bacilli and chest skiagram showed residual cavities in the left upper zone. All anti-tubercular drugs were stopped & the patient was referred to Ophthalmology Department, S.M.S. Hospital, Jaipur for eye check-up. His distant vision was diminished (R=6/60, Lt=6./18) but his colour vision was intact. Fundus examination revealed nothing abnormal. His fields of vision were moderately constricted. Liver function tests revealed nothing abnormal. Fasting blood sugar was 80 mg. % & serum creatinine was 0.9 mg. %. Serum Zinc was 0.6 mg./L.

The patient was managed on retro-bulbar steroid therapy and tablets containing multivitamins and minerals orally. After 20 days of this therapy, his acuity of vision improved (R=6/36, Lt=6/9) & the field of vision became normal.

Case No. 2

A 25 years old Hindu male was admitted in this hospital along with his brother (Case No.1) with the complaints of cough, fever & pain chest for 3 months. He was non-smoker & non-alcoholic; fairly built but poorly nourished. He had mild clubbing. Respiratory system examination revealed bronchial breathing in the left infraclavicular region with coarse crepitations. Examination of cardiovascular system and abdomen revealed nothing abnormal.

His blood hemoglobin was 6.5 gm. %. Total and differential leukocyte counts were normal. Sputum smear was positive for acid

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fast bacilli. Skiagram of the chest showed fibrocavitary lesion in the left upper zone. Treatment was similar to his brother (case I)

He noticed blurring of vision in his eyes in May, 1982 but reported to this hospital only on 26.7.82. His vision was too poor to assess his colour vision and fields of vision. Fundus examination revealed nothing abnormal. Liver function tests were normal. Fasting blood sugar was 74 mg.% & serum creatinine was 0.8 mg.%. Serum zinc was 0.5 mg/L.

Subsequent management was on lines similar to his brother. The acuity of vision improved. Colour vision and fields of vision could still not be assessed.

Discussion

High dosage of ethambutol (Citron; 1969), Chronic alcoholism (Sergeant & Camart; 1972), renal insufficiency, hepatic insufficiency (Hayakawa et al; 1971) & low plasma zinc levels (Delacoux et al; 1978) have been considered as risk factors for ethambutol induced optic neuritis. Our patients were non alcoholic & non diabetic. Their renal & liver function tests revealed nothing abnormal. They received ethambutol in daily dosage of 20 mg./kg. throughout. Hence these risk factors could be ruled out.

Ethambutol in large doses has been shown to cause depletion of zinc in animals (Buyske, Peets, & Sterling; 1966) but Campbell & Elmes (1975) could not observe a significant decline in serum zinc levels in tubercular patients after 2 months of ethambutol therapy in doses of 25 mg./kg. Initial serum zinc levels were not measured in our patients. But when they developed optic neuritis, their serum zinc levels were low (0.6 mg/L. & 0.5 mg./L). Low serum zinc levels (>6.7 mg./L) have been shown to increase the risk of ethambutol induced optic neuritis by Delacoux et al (1978).

The simultaneous onset of ethambutol induced optic neuritis in these two brothers was possibly due to zinc deficiency. The role of heredity could not be assessed.

Acknowledgement

We are thankful to Mr. K.N. Mathur, Senior Chemist, Geological Survey of India, for his help in estimation of serum zinc levels.

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ACUTE TUBERCULOUS PERFORATION OF SMALL INTESTINE

M.M. LAL, S. GROVER and S.N. SINGLA

Summary : A case of free tuberculous perforation of small intestine is reported. It is an uncommon manifestation of the disease and only 149 cases have been reported to date.

Introduction

Tuberculous intestine is still common in developing countries. Many of the patients report for acute complications of the disease. These include intestinal obstruction, massive haemorrhage, perforation with abscess or fistula formation and free perforation. Free perforation with features of peritonitis is an unusual manifestation of disease, Coomeraswamy and associates, after reviewing the literature in 1971, could find only 90 reported cases of acutely perforated tubercular enteritis and added one of their own. In their review, however, they failed to include 27 cases reported from India (Bhansali et al, 1968; Ohri and Aggarwal, 1964; Prakash et al, 1970). Since the report of Coomeraswamy et al, another 31 cases have been documented in English literature (Porter et al, 1972; Alankar et al, 1974; Seliger and Pinto, 1974; Prakash, 1975; Bhansali, 1978; Mohd. Bohri, 1978; Joshi, 1978; Sherman et al, 1980; Nadkarni et al, 1981). The rarity is probably due to relatively slow nature of tubercular pathological process which permits time for adequate fibrous tissue formation at the base of the ulcer (Douglas, 1953; Rikhey et al, 1963). This report concerns a patient in whom this complication occurred.

Case Report

A 32-year old male was admitted with the complaint of severe pain all over the abdomen for the last 7 days. The pain had started in the umbilical region but soon spread all over the abdomen. It was continuous and was accompanied by vomiting and abdominal distension. He also complained of absolute constipation.

There was a past history of mild abdominal pain and distension coming off and on for the last 8 years. These recurring attacks would subside with some drugs. There was history of occasional diarrhoea for the same duration.

The patient had no previous history of tuberculosis, but stated that his father who had died 4 years earlier had suffered from

pulmonary tuberculosis for 15 years and he came in contact with him during the course of his illness.

The patient was dehydrated and looked toxic. The pulse rate was 120/mt; Blood pressure, 110/70 mm of Hg and the temperature 37.8°C. The abdomen was mildly distended. It was very tender and rigid all over. There was no palpable mass. The liver dullness was obliterated. The peristaltic sounds were absent. Chest and cardiovascular system were clinically normal. Chest X-ray film did not show any abnormality. Plain skiagram of the abdomen demonstrated a few air fluid levels. There was free air under the diaphragm. Blood chemistry was within normal range. A diagnosis of generalised peritonitis due to perforated gut was entertained.

After resuscitation the laparotomy was performed through right paramedian incision. There was free purulent fluid in the abdomen which was suctioned out. Exploration revealed two annular lesions in the ileum at a distance of 10 cm and 30 cm from ileocaecal junction. The proximal lesion was stenosing and the intestine above it was dilated. The lower lesion easily admitted tips of two fingers. About 3 cm above the strictured area there was perforation in the ileum, about 5 mm in diameter, over its antimesenteric border. The rest of the gut was normal and the serous surface of intestine was free from tubercles. The mesenteric lymph nodes were enlarged without apparent caseation. A loop of intestine bearing the stricture and perforation was resected and ileoileo anastomosis was done. A mesenteric lymph node was taken for biopsy. The abdomen was closed after peritoneal lavage with 1 % Povidone-Iodine solution.

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Post-operatively the patient received intravenous metronidazole in addition to chloromycetin which had been started preoperatively. Patient had smooth recovery. The resected segment of intestine and mesenteric lymph node showed evidence of tuberculosis and the patient was put on long term antitubercular treatment.

Discussion

Intestinal tuberculosis may occur as primary manifestation or as a complication of pulmonary tuberculosis. The disease usually involves terminal ileum and caecum (Sweetman and Wise, 1959; Bhansali, 1978). This is probably related to affinity of tubercle bacillus for lymphoid tissue which is most abundant in the region, to increased physiologic stasis of intestinal contents and to freer contact of tubercle bacillus with intestinal lining at this level (Kasulke et al, 1981).

Intestinal involvement manifests in three gross pathological forms i.e. ulcerative, hypertrophic and mixed ulcero-hypertrophic form. The lesions in caecum are hypertrophic whereas ulcerative nature of the disease is commonly seen in small intestine (Bhansali, 1978). Terminal ileum is the most frequent site of tubercular perforation (Seliger and Pinto, 1974). The perforation may be associated with strictures in the small bowel (Bhansali, 1968; Joshi, 1978; Ahmad, 1983).

The fact that the patient is on antitubercular treatment does not exclude the perforation being tuberculous (Jordan and DeBakey, 1954; Seliger and Pinto, 1974). According to some, the incidence of tuberculous perforation has risen since the advent of antituberculous chemotherapy. This has been attributed to reduced local tissue inflammatory reaction to infection and diminished fibrous tissue formation (Mohd. Bahari, 1978),

Preoperative diagnosis of tuberculous perforation is seldom entertained. Most of them are admitted with diagnosis of perforated peptic ulcer or perforated acute appendicitis. The laboratory data is unrevealing. Leucocytosis is absent in 30% of cases and pneumoperitoneum in 60 per cent (Bhansali, 1978). The chest may show no evidence of tuberculosis (Coomeraswamy et al. 1971 and Sherman et al, 1980).

At operation the presence of tubercles on the serous surface of intestine, peritoneum or omentum or caseating lymph nodes may reveal the true nature of the disease. But these lesions are not always present (Ahmad, 1964). In their absence (with normal chest roentgenogram) the diagnosis must await confirmation by histopathological report of any tissue that has been removed.

The treatment depends upon general condition of the patient, extent of disease, presence or absence of stricture distal to perforation. Resection of the involved area seems to be the treatment of choice if a short segment of bowel

is involved (Prakash, 1975). But not all the cases are suitable for this type of surgery as a large number of them are in poor general condition. The other alternative of suturing of the perforation could at times prove hazardous since the integrity of the closure cannot be assured as the perforation is localised in granulating segment of bowel (Sweetman and Wise, 1959). Further, the presence of stricture distal to perforation could lead to a blow-out of suture line (Sweetman and Wise, 1959). Such cases, in addition, require bypass or stricuroplasty.

The mortality of tuberculous perforation is high. A mortality rate of 30-45% has been recorded (Sweetman and Wise, 1959; Bhansali et al. 1968). Toxaemia, delay in diagnosis, anaemia and malnutrition are the factors responsible for poor prognosis (Bhansali, 1978).

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TUBERCULOUS SCLERO-UVEITIS

S.C. REDDY* and A.Y. PRASAD**

Summary : A case of tuberculous sclero-uveitis (Scleritis, iridocyclitis and choroiditis) in a young man aged 18 years, with pulmonary and glandular tuberculosis, is reported. Healing of scleral ulcer without perforation of the globe and visual improvement from hand movements to 6/12 in the diseased eye were observed after anti-tuberculous treatment.

Introduction

Tuberculosis affects almost all the organs in the body and involvement of the eye is not an exception. But in the eye, it produces functional disturbances out of proportion to the actual size of the lesion. Ocular manifestations of tuberculosis include phlyctenular conjunctivitis, interstitial keratitis, iridocyclitis, episcleritis, scleritis, choroiditis, periphlebitis and optic neuritis. Involvement of the eye lids, lacrimal sac and lacrimal gland is rare in tuberculosis (Sorsby, 1972).

Tuberculous scleritis is not at all common and the case reports in the literature are few (Duke Elder and Leigh, 1965); it occurs typically in patients with active tuberculosis in the lung and elsewhere. Though the prevalence of pulmonary tuberculosis is high in India, no case of tuberculous scleritis seems to have been reported earlier in our country.

Case Report

A young man aged 18 years was admitted in Ophthalmic ward of Government General Hospital, Kakinada on 6th March, 1980, with complaints of diminution of vision and swelling in the upper part of the right eye since 2 months. There was no pain in the eye. Patient gave a history of having been given Streptomycin daily for two months by a private practitioner one year back, for cervical lymphadenitis (R). The lymphadenitis subsided with treatment leaving behind a sinus. History of cough with expectoration and occasional haemoptysis was present since six months. General examination revealed that the patient was of average build and nourishment. There was a healed sinus with puckered edges on the right side of the neck.

Examination of the right eye showed an ulcerated reddish mass in the sclera of 1 cm. in diameter at 12 O'clock position (Fig. 1).
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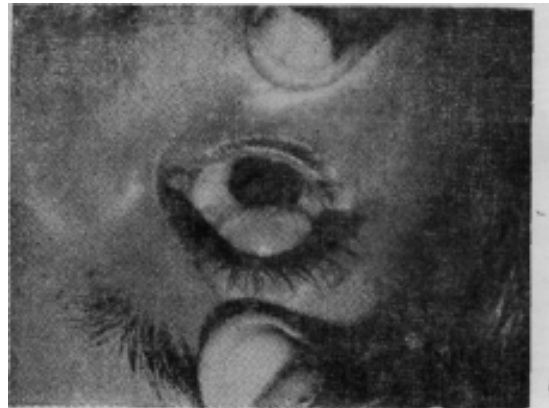


FIG. 1

Right eye on admission showing indurated lower margin of scleral mass with ulcer of 12 O'clock position.

in the primary position of the eyes. Circum-corneal congestion was present. Cornea was normal. Iris pattern was lost; pupil was small and sluggishly reacting to light. Ocular movement were normal. On dilating the pupil, posterior synechiae were seen with punctate brownish pigment on the anterior surface of the lens. Vitreous was markedly hazy; so details of the fundus could not be seen. Intraocular pressure was normal. Slit lamp examination revealed aqueous flare. Vision was markedly diminished to hand movements. A provisional diagnosis of tuberculous scleritis with iridocyclitis in right eye was made in view of the associated tuberculous sinus in the neck, and history of haemoptysis.

Vision, anterior segment and fundus in the left eye were normal.

Investigations: E.S.R. was 35 mm./1st hour. Sputum examination for A.F.B. was positive. X-ray chest showed pulmonary tuberculosis in right upper zone (Fig. 2). Mantoux test was positive (20 mm.). Blood V.D.R.I.

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was non-reactive. Blood Rose-Waaler test was negative. Smear from scleral ulcer was negative for acid fast bacilli. Conjunctival swab for culture of pyogenic organisms was sterile. The other routine investigations were within normal limits.

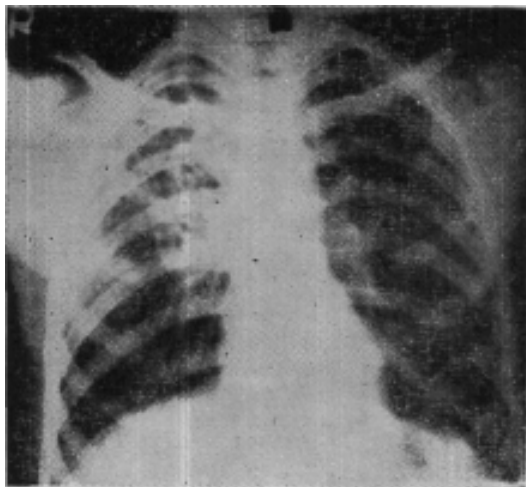


FIG. 2

X-ray chest showing pulmonary tuberculosis in right upper zone.

Treatment: locally atropine eye drops and Sofracort eye drops three times daily during day time and Soframycin eye ointment at bed time were instilled in right eye. Along with this antituberculous treatment (Streptomycin 1 gm. I.M. daily, Isoniazid 300 mg. daily and Thiacetazone 150 mg. daily) and supportive therapy were given.

The patient was discharged on 5th April '80 and advised to take the same treatment for 11 years from the District T.B. Centre, Kakinada. He was also prescribed Atroren (atropine 4-hydrocortisone) eye drops twice daily and Soframycin eye ointment at bed time in the right eye. He was followed up at regular intervals in the Ophthalmic Department and the progress was recorded.

Follow up findings in the right eye:

After 2 months: Vision improved to counting fingers at 1J metres. Scleral ulcer started healing. Vitreous was still hazy, details of fundus could hardly be made out. Disc appeared normal. Atroren eye drops were reduced to once daily in the right eye.

After 4 months: Vision 6/60. vascularisation seen over the scleral mass; ulcer almost healed. Vitreous floaters present. Fundus examination showed exudative choroiditis with

surrounding retinal oedema from 11 to 10' clock position in the equatorial region. Disc was normal. Foveal reflex was dull. Atroren eye drops were stopped but Soframycin eye ointment was continued.

After 1 months: Vision 6/24. scleral nicer healed completely. Scleral scar thin. Choroiditis clearly visible in the area corresponding to scleritis.

After 1 year: Vision 6/18. slight bulge in the scleral scar present. Choroiditis healed with pigmentation in the retina.

After 1½ years: Vision 6/12. Circular localised ectasia of sclera present at 12' clock position, with ciliary body visible underneath it (Fig. 3). Fundus showed healed patches of choroiditis with macular stippling.



Fin. 3

Right eye after 1 year of treatment showing ectatic scleral scar with ciliary body visible underneath it.

X-ray chest after 11 years showed complete healing of pulmonary lesion with fibrosis. The patient was seen three months after the completion of anti-tuberculous therapy. He was asymptomatic and the findings in the right eye were similar to those at the previous follow up.

Discussion

Tuberculosis may occur in two forms in the sclera: the proliferative type due to direct infection with *M. tuberculosis* characterised by the specific formation of tubercle and the allergic type which excites a non-descript exudative response. Infection may be exogenous, due to introduction of the organism with trauma, but this is extremely rare and tuberculous scleritis is almost invariably endogenous.

Such an infection may be haematogenous from a tuberculous focus elsewhere, or may arise from continuity either from the conjunctiva or from the inner eye, particularly from the ciliary region. If the actual lodgement in the sclera itself is not haematogenous, it may be caused by the escape of bacilli from the uveal vessels into anterior chamber and then enter into the scleral tissue at the region of the trabeculae. Clinically, one or more raised indurated nodules appear fixed to the sclera over which the injected conjunctiva at first moves freely while the eye is intensely congested and violently inflamed. The nodule turns yellow as it caseates and eventually ulcerates, the natural result being perforation of the globe (Duke Elder and Leigh, 1965).

Tuberculosis is probably the most frequent cause of scleritis. It may be classified as anterior or posterior according to the portion of the sclera affected. It is usually painless and is a chronic disease. It may heal leaving localised porcelain like scars, or the diseased sclera may finally weaken and yield to the intraocular tension to form a localised ectasia. The varying clinical picture of ocular tuberculosis is largely determined by the degree of tissue hypersensitivity to tuberculous protein and by the systemic resistance or immunity present in the host. The diagnosis of ocular tuberculosis is made when the following criteria are fulfilled: (Sorsby, 1972).

- (a) the clinical picture and the correlation of the picture with that of histologically confirmed clinical or experimental ocular tuberculosis.
- (b) the exclusion of other possible aetiological factors.
- (c) the demonstration of a systemic reservoir whence the ocular infection may have arisen.
- (d) the tuberculin reaction and
- (e) the therapeutic trial test.

Usually biopsy is not done in deep seated ocular lesions because of danger of perforation of the globe resulting in visual deterioration. Hence histological confirmation of ocular tuberculosis is done only in enucleated eye balls.

In the present case, the diagnosis of ocular tuberculosis was made on (a) the characteristic clinical picture of the eye lesion, (b) the exclusion of other possible causes, (c) the presence of active pulmonary tuberculosis and healed glandular tuberculosis, (d) positive Mantoux test and (e) very good response to antituberculous treatment i.e., complete healing of scleral ulcer without perforation of globe and visual improvement from hand movements to 6/12 in the diseased eye.

Uveitis (iritis, cyclitis and choroiditis) is almost always present in every case of deep scleritis, as seen in this case, because of extension of the disease process due to proximity of the two structures. Marginal cornea is usually secondarily involved in these patients giving the picture of sclerosing keratitis. Non-involvement of cornea throughout the course of the disease, as seen in this case, is very rare in scleritis. Gross diminution of vision in the initial stages was due to aqueous flare and marked haziness of vitreous, because of cyclitis. Vitreous haziness started clearing up after a few months of antituberculous treatment; thus choroiditis could be detected when the fundus details were visible. All the ocular lesions healed completely with anti-tuberculous therapy and local treatment, resulting in very good improvement in vision.

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BOOK REVIEW

Biology of the Mycobacteria, Vol. 2; C. Rutledge and J.L. Stanford; Pages 554; Price \$ 99; Academic Press Inc. (London) Ltd.; 1983.

The importance of Mycobacteriosis in clinical medicine is rapidly increasing for the last few years. Though very few authentic cases caused by atypical mycobacteria have been reported from India, the position may change when disease caused by *M. tuberculosis* shows a decline as has been the case in the western countries. The authors very rightly refer to the problem of atypical mycobacteria as 'a conundrum of the chicken and the egg. Did they evolve by natural selection, a system for overcoming immunological defences or are they the evolutionary pressure to which our immunity is still measuring up?'

When a book is written by twelve eminent workers on a subject about which knowledge is incomplete, there is bound to be some repetition and many conflicting views. It is perhaps an advantage that the book does not minimise conflicting views and deals with pros and cons of every controversial aspect exhaustively. Thus, the book is not meant for those who are looking for quick and clear-cut answers to the baffling problems but for those research workers who want to broaden their horizon and know the subject in its entire perspective.

The volume is in two parts, one dealing with immunological aspects and the other environmental aspects. A short chapter at the end deals with the hypotheses of correlation between mycobacterial infection on one hand and sarcoidosis and Crohn's disease on the other. The bibliography is extensive and one wonders whether there is anything published in any part of the world on any connected problem which does not find a mention in this book.

The immunology section deals with the genesis of the auto-immune phenomenon and immunotherapy of diseases like cancer. Evolution, histological significance and role of hypersensitivity and energy including selective and multiple tuberculin testing with various tuberculin including the 'New Tuberculin' have been dealt with extensively. Reference to the paradox whereby an organism though sufficiently adapted to the host tissues is yet able to induce considerable hypersensitivity as in leprosy is interesting. The authors refer to the fact that influx

of lymphocytes does not necessarily indicate an effective healing process, though it is unlikely that healing can come about without lymphocytes or granuloma. The sequence of protective events, each one developing after the failure of its predecessor, are mentioned as lymphocytic infiltration, granulomatosis, hypersensitivity, caseation, necrosis and anergy.

Mycobacteria have been classified as Saprophytes, Potential Pathogens, Facultative Pathogens and Obligate Pathogens. Their characters, habitats and factors governing pathogenicity are dealt with lucidly. The problems of animal models which are used in the study of immune mechanism have been dealt with at length. It is remarkable that despite more than 40 years of experimentation, there is yet no direct evidence that 'professional' phagocytes have a substantial capacity to kill *M. tuberculosis*.

Critical analysis of the BCG trials carried out uptodate in all parts of the world and the Uganda Leprosy trial add to the usefulness of the book. But reference to *M. africanum* and *M. asiaticum* and their characteristics is very perfunctory. It has also been shown that serological tests as available at present, including SAFA, ELISA and Radioimmuno-assay are not of much use in the diagnosis of mycobacterial diseases.

A few interesting observations are worth referring to. In both naturally and experimentally infected cattle, even minor infection in any part of the body can lead to excretion of *M. tuberculosis* in the milk even in the absence of clinical Mastitis. Monkeys in wild life even when living in close proximity to human habitations do not produce lesions following infection with *M. tuberculosis* but are highly susceptible in captivity.

On the whole, the book is very well produced. It is extensively illustrated and the illustrations are excellent. The book will be highly useful to research workers and reference libraries.

—S.P.P

NEWS & NOTES

TAI ANNUAL GENERAL MEETING

The 45th Annual General Meeting of the Tuberculosis Association of India was held on Thursday, the 19th April, 1984, in the Conference Hall of the Association, 3, Red Cross Road, New Delhi. Shri S. Ranganathan, ICS (Retd), President of the Association, presided. Dr. D.B. Bisht, Director-General of Health Services and Chairman of the Association presented the Report of the Association for the year 1983 and Shri S. Ratnam, the Honorary Treasurer, presented the audited accounts of the Association and its institutions for the year 1983.

While presenting the Report of the Association Dr. Bisht referred to the magnitude of the tuberculosis problem in the country and said that "with the inclusion of tuberculosis in the revised 2Q-Point Programme of the Government of India as enunciated by our Prime Minister, there is an upsurge in the anti-TB activities not only at the Centre but in all the States as well. Task Forces and Action Committees had been set up in order to improve the hitherto unsatisfactory or less satisfactory performance and essential activities under the National TB Control Programme are now being taken to the doorsteps of the patients through multi-purpose health workers and village health guides. Further, targets had been laid down for detection of new cases and more funds had been allocated for various anti-TB schemes under the programme. Thus, a new momentum had been given to the control measures and with stepping up of case-finding and other activities and active participation of voluntary organisations, it was expected that the performance under the programme will show substantial improvement in the near future".

Shri S. Ranganathan, President of the Association in his address, complimented the Tuberculosis Association of India and its affiliates for having contributed much towards the development of anti-tuberculosis measures in our country. He referred to the document recently prepared by the Technical Committee of the Association which enunciates in precise terms the various activities which TB Associations may undertake with a view to assist in the case-finding and case-holding activities under the National TB Control Programme and also in educating the public about the various aspects of tuberculosis and expressed the hope that these recommendations will receive the earnest consideration of all concerned so that

the tuberculosis programme may move forward as a national movement.

Shri Ranganathan gave away the awards for outstanding activities by the State Associations during 1983 and also for highest collections made by them from the 33rd TB Seal Campaign.

The General Body elected Drs. C.M. Brahma, M.D. Deshmukh, Cyan Prakash. M.L. Mehrotra S.H. Patel, M.M. Singh and S.B. Trivedi as members of the Central Committee of the Association for the year 1984-85.

The meeting terminated with a Vote of Thanks proposed by Dr. A.G. Patel, Chairman, Gujarat State TB Association.

SECRETARIES CONFERENCE

The 35th Conference of Secretaries of State TB Associations was held in New Delhi on Thursday, the 19th April, 1984 with Dr. M.S. Chadha, Vice-Chairman of the Association, in the chair. The Conference was attended by Dr. D.B. Bisht, Director-General of Health Services and Chairman of the Tuberculosis Association of India, Dr. S.P. Pamra, Honorary Technical Adviser of the Association, representatives of the State Associations of Andhra Pradesh, Assam, Meghalaya, Bengal, Bihar, Delhi, Goa, Daman & Diu, Gujarat, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Orissa, Punjab, Rajasthan, Tamil Nadu, Tripura and Uttar Pradesh, members of the Technical Committee and other special invitees.

Before commencing the Proceedings, Dr. M.S. Chadha, made a moving reference to the passing away of Dr. T. Manickam who was Honorary Secretary of the Karnataka State TB Association for over 12 years. As a mark of respect to the departed soul, the Conference stood in silence for a minute.

In his welcome address Dr. Chadha emphasized the need for the State Associations to plan their activities well in advance and also to meet frequently and review their activities from time to time as otherwise they may not achieve any worthwhile results. Dr. D.B. Bisht in his brief address complimented the Tuberculosis Association of India and its affiliates on the good work they were doing and expressed the hope that with their active cooperation both at the administrative and

technical levels, it would be possible to prepare a more realistic plan and strategy, so that our aim to control tuberculosis and our goal to provide good health by 2000 A.D. would be fulfilled.

The Conference reviewed the activities of State TB Associations during 1983 with special reference to the role of voluntary organisations in the implementation of the National Tuberculosis Programme and requested representatives of State Associations to get in touch with the Health Directorate in their respective states with a view to discuss and find out in what all ways they could supplement the governmental efforts to step up the anti-TB activities in general and to help in removing the lacunae if any in the implementation of the National Tuberculosis Programme.

The Conference also reviewed the position in regard to organisation of refresher courses for general practitioners and endorsed the view that these courses were absolutely essential because tuberculosis is now a general practitioners' disease and has been integrated with the general health services under the National Tuberculosis Programme. It was decided that every effort should be made to hold atleast 100 refresher courses during 1984.

The Conference considered the present position in regard to organisation of TB Seal Campaigns and resolved that the States should immediately review the arrangements made for the distribution and sale of seals in their respective states, identify the causes for the poor performance by the various selling agencies and take effective measures to step up the collections.

The Conference discussed the desirability of holding regional conferences on tuberculosis and Chest Diseases instead of the annual conferences being organised separately by each State and resolved that the various aspects involved in the proposal may be examined in detail and a decision taken at the time of the next National Conference to be held in Cuttack in November, 1984.

The Conference also discussed the various steps to be taken to improve the finances of TB Association and decided that this matter may be discussed further at the next meeting.

TECHNICAL COMMITTEE RECOMMENDATIONS

A meeting of the Technical Committee of the Association was held on 18th April, 1984, with Dr. A.G. Patel in the Chair. Some of the

important recommendations made by the Committee at this meeting are :

1. Facilities for training a laboratory technicians should be stepped up. Since an additional laboratory technician may have to be posted in PHCs where the workload is heavy, it is desirable that preference be given to multipurpose workers or other personnel working in rural areas for laboratory technicians' training.
2. Due importance should be given to training in tuberculosis in the undergraduate curriculum. Students must be posted for atleast 2 weeks clinical training in the tuberculosis Department of a Medical College/State Tuberculosis Center with atleast half a dozen didactic lectures. They must also be exposed to the National Tuberculosis Programme during undergraduate course of studies.
3. Since there is a paucity of information regarding prevalence and incidence of non-tuberculous chest diseases in the country, it is recommended that a survey in a representative population of adequate size be carried out to obtain authentic data in this connection.
4. Anti-smoking and anti-pollution measures be stepped up. The possibility of anti-smoking legislation should be considered. Steps should also be taken to provide facilities for prevention and management of diseases resulting from pollution.

CHANCHAL SINGH MEMORIAL AWARD-1984

The Tuberculosis Association of India will award a cash prize of Rs. 1000/- to a medical graduate below 45 years of age and working in tuberculosis, for an original article based on work done by the author himself/herself, not exceeding 30 double-spaced foolscap typed pages (approximately 6000 words) excluding charts, and diagrams on a subject relating to tuberculosis. Papers with more than one author are not eligible. Papers may be sent, in quadruplicate, to reach the Secretary-General, TB Association of India, 3, Red Cross Road, New Delhi-110001, before the 31st of July, 1984.

ESSAY COMPETITION-1984

The Tuberculosis Association of India awards every year a cash prize of Rs. 500/- to a final year medical student in India for an original essay on Tuberculosis, adjudged best by a special Committee of the Association.

The subject selected for the 1984 competition is "problems of Tuberculosis Control in India". The essay should be written in English, typed in fool-scrap size, double-spaced and should not exceed 15 pages (approximately 3000 words, excluding tables, diagrams, etc.). Four copies of the manuscript should be forwarded through the Dean or Principal of College/University to reach the Secretary-General, TB Association of India, 3, Red Cross Road, New Delhi-110001, before 31st July, 1984.

STATE CONFERENCE

The XVth Annual Conference of Madhya Pradesh State TB Association was held in the TB Hospital Campus, Idgah Hills, Bhopal on 12th and 13th May, 1984. The Conference was inaugurated by the Hon'ble Chief Minister of Madhya Pradesh. Nearly 50 persons consisting of 35 DTOs and about 15 other specialists working in TB Hospitals, etc. attended the Conference. The Minister of State for Health & Family Welfare and the Additional Chief Secretary (20-Point Programme) also attended the inaugural session as well as the meeting of the D.T.Os on 13th May. The lute Dr. N.L. Bordia Oration was delivered by Dr. G.D. Gothi and Guest Lectures were delivered by Dr. S.P. Pamra, Hony. Technical Adviser, TB Association of India, New Delhi and Dr. P. Chandrasekhar, Senior TB Specialist, National TB Institute, Bangalore. A meeting of the Secretaries of the District TB Associations was held in the evening of 12th May, 1984 to discuss the activities of the voluntary bodies vis-a-vis the National TB Programme. Eight DTOs agreed to organise a refresher course each in their districts during the year 1984. Film shows on TB were also held.

SIKKIM TB CONFERENCE

The First Sikkim State TB Conference was jointly held by the Maharashtra State Anti-TB Association, Sikkim TB Association and the Department of Public Health and Family Welfare, Government of Sikkim, on 11th May, 1984 at Raj Bhavan Auditorium, Gangtok, Sikkim. Shri Homi J.H. Taleyarkhan, Governor of Sikkim inaugurated the Conference. Drs. T.B. Master, K.C. Mohanty, V.S.J. Rao and J.C. Kothari delivered Guest lectures on "Diaanosis of Pulmonary TB", "Treatment & Chemotherapy", "Management of Complications" and "Bronchial Asthma" respectively. Dr. (Major) Dey from local Army Medical Unit highlighted on the high attitude Pulmonary Oedema. More than 40 doctors from Civil and Armed Forces attended the Conference.

REFRESHER COURSES

- (a) Maharashtra: Two courses were held in Amravati and Poona in April, 1984.

The courses were attended by 72 and 80 practitioners respectively. The Amravati course was sponsored by M/s. Pharmaceutical Company of India and the Poona course was held in collaboration with the local IMA branch and BJ. Medical College.

- (b) Delhi: Two courses were held on 19th March and 29th April respectively. The first course attended by 56 practitioners was in collaboration with the Delhi Medical Association and the second course was sponsored by M/s. Ranbaxy Laboratories Limited.
- (c) Tamil Nadu: One course was held in Salem in March, 1984 in collaboration with the local IMA branch. 106 practitioners attended the course.
- (d) Karnataka: A refresher course was held on 28th March, 1984 in Bangalore. 50 doctors attended the course. The Hon'ble Health Minister of Karnataka inaugurated the course and also released the colour film on TB in Kanada.
- (e) Haryana: A refresher course was held in Rohtak on 22nd April, 1984. About 150 practitioners attended the course. The course was inaugurated by the Hon'ble Health Minister of Haryana State. The course was sponsored by M/s. Pharmaceutical Company of India.

SYMPOSIUM

The Katni branch of the Diabetic Association of India organised a Symposium on Diabetes and Tuberculosis on the 25th March, 1984 at Katni (M.P.). Dr. S.P. Pamra, Hony. Technical Adviser, Tuberculosis Association of India, attended the symposium and delivered a lecture on "Diagnosis and management of pulmonary Tuberculosis amongst Diabetics". The organisers had also arranged a novel programme consisting of two separate sessions, one for general public and the other for medical practitioners. The session for non-medical persons was attended by about 150 persons and talks were given on 'Management and Prevention of Tuberculosis and Diabetes'. The session for medical practitioners was attended by about 100 doctors. The symposium was subsidised by M/s. Star Laboratories, Bombay.

ANTI-TB SHIBIR/CAMP

Anti-TB shibir was organised at Sasaram under the joint auspices of the Bihar TB Association, Patna District, TB Association and the District TB Association, Sasaram on 4th

March, 1984. A team of doctors and para-medical staff of the Patna TB Centre under the leadership of Dr. A.A. Mallick conducted examination of 460 chest symptomatics. 240 sputa were examined out of which 20 were found positive. 445 children were BCG vaccinated.

The Kodagu District TB Association, Madikeri organised two Mass sputum examination-camps at Parane and Murnad during the Anti-TB week. A total of 108 sputa were examined, out of which 2 were positive. 3 extrapulmonary and one x-ray positive cases were also detected. During this period anti-TB pamphlets were widely distributed, slogans on TB were published in local newspapers and a lecture on TB was also arranged for T.C.H. students, Madikeri.

ANTI-TB WEEK IN TAMIL NADU

The Anti-TB Association of Tamil Nadu celebrated the Anti-TB week from the 20th to 29th February, 1984 by organising public meetings, film shows, cultural programmes, essay competitions and medical check-up camps. These functions were organised in cooperation with the Tamil Nadu Government, Educational institutions, Lions and Rotary Clubs, and other social welfare organisations. Thiru S.N. Rajendra, Minister for Public Works Department, Government of Tamil Nadu, inaugurated the week at a special function organised at the Government Bharatiyar College for Women, Madras. The meeting's were addressed by Thiru K.A. Krishnaswamy, Minister for Dairy Development, Thiru P. Angamuthu, MLC, Dr. T.B. Venugopal, Director of Medical Services, Dr. V. Rangaswamy, Director, Institute of TB & Chest Diseases, -Dr. K. Jagannath, Superintendent, Government TB Sanatorium, Tambaram, Lion. Raghunandan, etc. The prizes for the essay competition were distribu-

ted to the winners by Dr. Tmt. Lalita Kameswaran, Director of Medical Education. The Song and Drama Troupe of Government of India also gave cultural programmes. The various District TB Associations in the State also celebrated Anti-TB Week in their respective areas by organising meetings and other programme under the patronage of the District Collector.

THIRTYFIFTH TB SEAL CAMPAIGN

The Thirtyfifth TB Seal Campaign, will commence on 2nd October, 1984, Mahatma Gandhi's Birthday and terminate on the 23rd February, 1985, the Foundation Day of the Tuberculosis Association of India. The Association has selected for the new seals five designs representing five different styles of Indian classical dances namely, Bharata Natyam and Kuchipudi (Inderani Rahman), Odissi (Sanjukta Panigrahi), Kathak (Uma Sharma) and Kathakali (Sankaran Kutty Panicker). The Association is highly obliged to these distinguished artists for giving their consent for utilising the transparencies.

OBITUARY

Dr. T. Manickam, Honorary Secretary of the Karnataka State TB Association passed away at Bangalore on 6th April, 1984. Dr. Manickam took over as the Secretary of the Karnataka State TB Association in 1972 and since then he had been deeply involved in promoting the activities of the State Association. He died in harness as he breathed his last while attending to some work in the Association's office. In his demise the Association and workers in the profession have lost a very enthusiastic and dedicated colleague. The Tuberculosis Association of India conveys its deepest condolences to the bereaved family.

The Indian Journal of Tuberculosis

ABSTRACTS

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Management of Extra-Pulmonary Tuberculosis (Excluding Miliary and Meningeal) in South and West Wales' (1976-8)

R.D.H. Monie et al: British Medical journal; 1982; 285; 415-418.

Although short-course chemotherapy has been recommended for the treatment of pulmonary tuberculosis, no such recommendation has been made for extrapulmonary tuberculosis. Nevertheless, a retrospective survey has revealed that short-term chemotherapy was more commonly prescribed than the standard 18-month treatment regimen in 180 patients with various forms of extrapulmonary tuberculosis (excluding miliary and meningeal tuberculosis). Lymph node and genitourinary tuberculosis, the most common types, were diagnosed in 66 and 54 patients respectively; 24 patients had bone and joint tuberculosis, 19 had gynecological tuberculosis, and 17 had tuberculosis in other sites. Only 47 patients (26 percent) received chemotherapy for at least 18 months. Ten patients (6 percent) received no drug treatment, and the remainder (123 patients, or 68 percent) received various short-course regimens—primarily various combinations of ethambutol, rifampicin, and isoniazid. Reasons for not prescribing drugs in five patients were because no bacilli were seen; because the disease was believed to be inactive; or because surgery alone was considered to be curative. Five others received no chemotherapy because of administrative errors. Despite the apparently inadequate treatment in many cases, only one patient died of tuberculosis, and only one relapsed. Compliance with drug therapy was generally better than that in patients with pulmonary tuberculosis, possibly because more of the present patients were women, and women may tend to comply with the treatment regimen better than do men. Chest specialists were consulted about treatment in all but 25 cases (14 percent). Similar proportions of patients in this population received 18 months' chemotherapy, regardless of whether or not their cases were supervised by chest specialists.

Reproduced from Tuberculosis Literature News (Med. Publishing Inc., USA).

Partial Synovectomy in the Treatment of Tuberculosis of the Knee

M.S. Misgar et al; International Surgery; 1982; 67; 53-55.

Partial synovectomy appears to be quite effective in the treatment of tuberculosis of the knee, particularly in children, according to Misgar and co-workers, who assessed the value of the operation in 30 children and 20 adults. Surgery was performed 6 to 10 weeks after initiation of chemotherapy and reconstitutive therapy, when tuberculosis could still be detected on histopathological examination of the diseased synovial membrane. The patients were classified by degree of knee damage as follows: group 1, synovial membrane involved, articular cartilages clear; group 2, pannus over articular cartilage, no erosion; group 3 erosion present. Partial synovectomy of the knee joint was successful, especially in patients with less severe joint damage. The results in children were superior to those in adults, possibly because significant cartilage loss occurs only in adults. In children, when the cartilage is wholly or partly covered by pannus, removal of the pannus allows better nutrition of the cartilage and reduces the number of patients who require arthrodesis. Joint clearance is effective even in adults when the disease is mainly synovial, with pannus formation over the particular cartilages but without serious damage to the bony articular surface; arthrodesis can be reserved for patients with severe damage. The authors suggest that for the best results, synovectomy should be performed early in the course of the disease, when the knee remains warm and swollen despite anti-tuberculosis therapy, or when the range of movement does not seem likely to return. The efficacy of the procedure appears to be related to the removal of the target tissue, reduction of effusion in the joint, stretching of the periarticular tissue, and reduction of joint destruction.

Reproduced from Tuberculosis Literature News (Med. Publishing Inc., USA).

The Prevalence of Tuberculous Laryngitis in Pulmonary Tuberculosis in Tanzanians

J.J. Manni Tropical and Geographical Medicine
1982; 34; 159-162.

Although tuberculous laryngitis is now rare in developed countries, a recent study of its prevalence among patients in Tanzania suggests that it may be common concomitant of pulmonary tuberculosis in less developed countries. Manni investigated the incidence and clinical manifestations of tuberculous laryngitis in 341 patients admitted to the chest unit of Tanzanian hospital with pulmonary tuberculosis; 221 had not been treated previously. All patients underwent routine examination of the ears, nose and throat, including indirect laryngoscopy, within the first week of hospitalization. Laryngeal tuberculosis was discovered in 59.27 percent of the 221 previously untreated patients. In women, the interarytenoid area was the most common site of involvement (61 percent), whereas in men it was the vocal chords (54 percent). More than one site was affected in 35 (59 percent) of these 59 patients. Laryngeal hyperemia with edema and granulomatous lesions, the most common manifestations, was present in 36 (61 percent) patients. Only nine patients (15 percent) had epithelial ulceration. Hoarseness was observed in 31 patients (53 percent) our invariably accompanied lesions in the glottic area. The authors conclude that indirect laryngoscopes is essential in routine investigations of pulmonary tuberculosis in developing countries. Tuberculous laryngitis should be the first differential diagnostic consideration in patients with pulmonary tuberculosis who present with hoarseness. It is usually associated with advanced or bilateral pulmonary tuberculosis, and the combination of the two conditions represents the most infectious form of the disease.

Reproduced from Tuberculosis Literature News (Med. Publishing Inc., USA).

Postmenopausal Tuberculosis of the Female Genital Tract

A.M. Sutherland; Obstetrics & Gynecology;
1982 59; 545-575;

A recent survey in women disclosed that the age distribution of patients with this disease has changed in recent years, with the proportion of women over 40 years of age higher now than in the past. Of 701 patients with proven gynecologic tuberculosis seen during a 30-year period in Wales, 26 (3.7 percent) were postmenopausal. The mean age of these 26 women was 54 years (range, 43 to 72 years), and none had menstruated for at least six months at the

time of diagnosis. All but five had radiological evidence or a history of previous extragenital tuberculosis. Among all 701 women with tuberculosis of the genital tract, infertility was the most common presenting symptom, and only six of the 23 married postmenopausal women had a history of pregnancy. Twenty postmenopausal patients had histologic evidence of tuberculosis of the endometrium, Vaginal bleeding was the presenting symptom in 17 postmenopausal patients, suggesting that the possibility of tuberculosis should be considered in women with postmenopausal bleeding who do not have endometrial carcinoma. Similarly, the fact that 12 postmenopausal patients had gross pelvic disease indicates that tuberculosis should be considered in examining pathology specimens in such cases. In recent years, a combination of rifampin, isoniazid, and etham-butol had been used in the treatment of tuberculosis of the genital tract. The first two drugs are given for one year, and ethambutol is given for 90 days. The authors recommend indefinite follow-up of all patients, because the long-term effects of this regimen are not known. In six patients in whom the three-drug regimen was used, no evidence of recurrence was found at a follow-up period of up to three years.

Reproduced from Tuberculosis Literature News (Med. Publishing Inc., USA).

Gynecological Tuberculosis in Victoria: A 20-year Survey

S.E. Csordas and B.M. Monheit; Australia dn New Zealand Journal of Obstetrics and Gynecology 1982;22; 86-89.

A recent review of gynecologic tuberculosis in Australia indicates that the incidence of the disease is gradually falling, although the decline is not as dramatic as that in the total number of cases of tuberculosis. Csordas and Monheit analyzed 181 cases of gynecologic tuberculosis reported in Victoria (Australia) during a 20-year period. Three-quarters of the patients were immigrants to Australia; more than half were from southern Europe. Infertility was the most common presenting symptom; in 83 patients (46 percent) it was the sole reason for presentation, and in another 19 (11 percent) it was a contributing reason. Twenty-one women (12 percent) had had children before gynecologic tuberculosis was diagnosed, but only four conceived after treatment. The diagnosis was based on bacteriologic findings in 22 percent, on histologic findings in 71 percent, and on both in 6 percent. Chest radiographs were abnormal in 84 patients (46 percent), most of whom had nodular calcification or other evidence of healed tuberculosis infection. All patients received chemotherapy, but only 89

(49 percent) received adequate treatment (usually a 12-month course of rifampin and isoniazid, plus ethambutol or streptomycin initially); however, 75 percent of those treated during the past 10 years of the survey received adequate chemotherapy. Definitive surgery was performed in 74 cases (41 percent). Disease recurred in six patients who had not received adequate chemotherapy. The authors conclude that although the incidence of gynecologic tuberculosis is low, a significant number of new cases is seen each year, and the diagnosis should be kept in mind, especially in immigrants who have abnormal chest radiographs and infer infertility.

Reproduced from Tuberculosis Literature News (Med. Publishing Inc., USA).

Miliary Tuberculosis Concurrent with Busulfan Lung

P. Altus, C.C. Andrew: Southern Medical Journal: 1982: 75; 755-757

A case of miliary tuberculosis concurrent with Busulfan lung (apparently the first such case) is reported. The patient, a 71-year-old woman, had chronic myelogenous leukemia and had been treated with busulfan for three years. On admission, her chest roentgenogram was abnormal, showing diffuse bilateral multinodular infiltrates extending to the periphery, which were believed to be consistent with metastatic carcinoma. The patients' pulmonary function was impaired, and her alkaline phosphatase and gamma-glutamyl-transpeptidase values were elevated. Although on initial examination no acid-fast bacilli were identified in the sputum and a PPD skin test was negative, a diagnosis of miliary tuberculosis was finally made on the basis of transbronchial biopsy. Areas of fibronodular alveolar exudation, prominent alveolar cells, and eosinophilic infiltrations consistent with busulfan lung as well as areas of granulomatous inflammation, were seen on histologic examination of the biopsy specimen. Treatment with isoniazid, rifampin, and ethambutol was begun, and the patient soon showed clinical improvement. In this patient, as in many other adults with miliary tuberculosis, the disease was cryptic, and authors caution that the diagnosis could easily have been overlooked. In this case, the roentgenographic abnormalities involving the entire lung-including the periphery, which is usually in busulfan lung-combined with the elevation of alkaline phosphatase and gamma glutamyl transpeptidase in a febrile, immunosuppressed patient made a search for miliary tuberculosis mandatory.

Reproduced from Tuberculosis Literature News (Med. Publishing Inc., USA).

The Geographical Distribution of Tuberculosis Notifications in a National Survey of England and Wales: (1978-79)

Medical Research Council Tuberculosis and Chest Diseases Unit: Tubercle: 1982: 88: 63-75

A survey of the geographical distribution of tuberculosis notifications in England and Wales conducted by Davies et al for the Medical Research Council Tuberculosis and Chest Diseases Unit indicated considerable variation in notification rates in different regions. Much of the variation was attributable to the differing proportions of persons of Indian ethnic origin, among whom the incidence of tuberculosis was high; however, rates among whites also varied widely. A survey of tuberculosis notifications during a six-month period made it possible to estimate annual rates (per 100,000 population) in different ethnic groups (white, Indian, Pakistani, Bangladeshi, West Indian, African, Arab, Chinese, other, unknown) in the eight administrative areas of England and the 33 boroughs of Greater London. Only newly notified patients were included; 4,172 such cases were analyzed. The estimated overall annual notification rate for all ethnic groups combined was 18.3 per 100,000; the rate for whites was 10.7, that for the combined Indian population (Indian, Pakistani, Bangladesh) was 38.2, and that for West Indians was 31.2. Of all the administrative areas, the West Midlands had the highest overall rate (23.7) and Anglia had the lowest (5.2). Among whites, the rates ranged from 4.2 in Anglia to 14.5 in the northern area. In all administrative areas, the rates for those of Indian background were high, ranging from 10.4 in Anglia to 11.32 in the East Midlands. Although the rates for the West Indian population were higher than those for whites, they were much lower than the rates for the Indian population. In Greater London, the annual notification rate was 35, twice the national average, partly because 40 percent of all nonwhite patients lived there. Within the Greater London boroughs, the rates for all ethnic groups combined varied widely, from 7 in Bromley to 11.43 in Brent. The most densely populated areas tended to have the highest rates. No correlation was found between the number of Indian patients in a borough and the notification rate in the white population in that area.

Reproduced from Tuberculosis Literature News (Med. Publishing Inc., USA).

The Use of Adenosine Deaminase Assays in the Diagnosis of Tuberculosis

J. Blake and P. Herman: South African Medical Journal: 1932; 62; 19-21

A rapid method for the determination of adenosine deaminase activity in cerebrospinal,

pleural, peritoneal, and pericardial fluids—which may be useful in the diagnosis of tuberculosis—is described. Adenosine deaminase was assayed in specimens (pleural effusions, cerebrospinal fluids, ascetic fluid, pericardial fluid, and joint aspirates) from 359 patients. Levels of adenosine-deaminase activity were significantly higher in tuberculous effusions than in effusions resulting from neoplasm, bacterial and viral infections, and simple transudates. Adenosine-deaminase activity was also elevated in the cerebrospinal fluid of patients with tuberculous meningitis as compared with patients with other neurological disorders and with normal subjects. The authors conclude that in patients one year of age or older, adenosine-deaminase levels of greater than 30 IU/l in effusions or greater than 6 IU/l in the cerebrospinal fluid indicate probable tuberculosis; in patients less than one year of age, however, the results are misleading. In addition, serial determinations of adenosine deaminase in two patients with tuberculosis suggest that adenosine-deaminase activity can also be used to monitor response to therapy.

Reproduced from Tuberculosis Literature News (Med. Publishing Inc., USA).

Abdominal Tuberculosis in Children

MRQ Davies: South African Journal of Surgery: 1982: 20:7-19

The diagnosis of abdominal tuberculosis in children is often overlooked because of the variability and nonspecificity of its presentation. Prompted by the case of an infant who died of abdominal tuberculosis that was detected only on postmortem examination, the investigators reviewed 55 cases of the disease treated during a 19-year period in the pediatric surgery ward of South African hospital. In 67 percent of the cases, the disease was diagnosed on the basis of histologic findings. In the others, the diagnosis was made when tubercle bacilli were identified in gastric washings or sputum specimens, or when classic signs and symptoms and a positive clinical response to antituberculosis agents were observed. Pain (seen in 60 percent of patients) and vomiting and abdominal distention (seen in 42 percent) were the most common indications that the abdomen was the site of disease. Diarrhea was reported in 20 percent of patients, and 30 percent had general complaints (e.g., weight loss), suggesting the presence of debilitating chronic disease. More than 90 percent of the children were malnourished, and about 30 percent had fever on admission. Erythrocyte sedimentation rates were abnormal in 25 of the 27 patients in whom they were determined. Detection of an intra-abdominal mass was

the reason for referral in 34 cases (62 percent), and intestinal obstruction (either partial or complete) was the reason in another 13 (23 percent). Mantoux tests were positive in eight (44 percent) of the 13 patients in whom they were performed. Pathologically enlarged lymph nodes were present in 10 (18 percent), and radiological evidence of pulmonary tuberculosis was seen in 23 (62 percent) of 46 patients. Twelve percent had a history of contact and 18 percent had symptoms suggestive of active respiratory disease. Evidence of extra-abdominal tuberculosis was found in 62 percent. The authors conclude that the following signs and symptom should alert physicians to the presence of abdominal tuberculosis in children: (1) acute or chronic enlargement of the lymph nodes; (2) the presence of bronchopulmonary, central nervous system, or bone and joint disease; (3) detection of an intra-abdominal mass, an intestinal obstruction, peritonitis without ascites, or a perianal or enterocutaneous fistula; and (4) a complication in the management of an unrelated condition resulting from endogenous reactivation of the infection in patients receiving cancer chemotherapy, in those recovering from major surgery, or in patients with severe burns.

Reproduced from Tuberculosis Literature News (Med. Publishing Inc., USA).

The Value of Gallium Scanning in the Diagnosis of Tuberculous Pericarditis

D.B. Lewall, et al; King Faisal Specialist Hospital Medical Journal, 1982, 2, 63-65.

The clinical diagnosis of tuberculous pericarditis can be difficult when no signs of impaired cardiac filling are present and when the heart appears normal on the radiograph. A recent case report by Lewall and associates, however, suggests that gallium scanning can be useful in detecting the site of inflammation in such patients. A 34-year-old man had been unsuccessfully treated for what was thought to be culture-negative endocarditis. His condition continued to deteriorate and he had fever for three months. The electrocardiogram showed right ventricular hypertrophy and low voltage, and a chest radiograph revealed enlargement of the right ventricle, with normal to slightly decreased pulmonary vasculature. A tuberculin skin test was nonreactive. A gallium-67 scan, performed to determine the cause of fever, showed abnormal uptake near the heart, suggesting the present of either an inflammatory process—such as tuberculosis—or a neoplasm. Two-dimensional echocardiography revealed thickening of the pericardium and restriction of ventricular motion. Irregularity and narrowing of the right ventricular outflow tract were

the most striking findings of cardiac catheterization and angiography. Inflammatory tissue over the right ventricular outflow tract accounted for the clinical and angiographic findings. Pericardiectomy revealed chronic granulomatous inflammation, and subsequent cultures were positive for *Mycobacterium gastri*. The patient was given antituberculosis drugs, and his condition improved within three days. The authors suggest that gallium-67 scanning should be used early in the examination of patients suspected of having pericardial tuberculosis.

Reproduced from Tuberculosis Literature News (Med. Publishing Inc., USA).

Peritoneal Biopsy for Diagnosis of Abdominal Tuberculosis

H.S. Shukla, et al, Postgraduate Medical Journal, 1982, 58, 226-228.

Histopathological examination of the peritoneum can be helpful in the often difficult diagnosis of abdominal tuberculosis, according to a report by Shukla and associates. The diagnostic value of open peritoneal biopsy was evaluated in 88 patients with abdominal tuberculosis. Tissue for biopsy was obtained by laparotomy in 41 patients and by making a small incision in the right iliac fossa, under local anesthesia, in the 47 others. Histopathological examination of the biopsy specimens showed caseation and epithelioid cell infiltration in 80 percent of the patients and non-specific inflammatory changes in the other 20 percent. The particular type of peritoneal histopathology was clearly associated with clinical type of abdominal tuberculosis. No complications resulted from the open peritoneal biopsy procedure. The authors attribute the accuracy of the biopsy results to the availability of sufficient peritoneal tissue for examination.

Reproduced from Tuberculosis Literature News (Med. Publishing Inc., USA).

On Isoniazid Pharmacokinetics in Combined Chemotherapy of Tuberculosis.

G.B. Sokolova, et al.

The effect of ethionamide, rifampicin, diazepam and pyridoxine on the kinetics, metabolism and blood levels of isoniazid administered rapidly by the intravenous route was studied in 96 newly registered patients with destructive tuberculosis of the lungs after a single administration of isoniazid (series I) and after its use for 5-6 months in combined therapy with ethionamide or rifampicin, diazepam and pyridoxine (series II). No effect of the above drugs on the kinetics, metabolism

and blood levels of isoniazid was observed in any of the series. The results of the clinical trials correlated with the experimental data on noninducibility of the system of N-acetyltransferases playing the main role in the metabolism of isoniazid in man.

Reproduced from Russian Literature

Study on Relation Between Isoniazid Inactivation And Genetic Marker of Blood (ABO).

K. U. Kasenov, et al.

The data concerning 248 patients with various forms of pulmonary tuberculosis were analysed. Since there are ethnic differences in distribution of ABO blood groups, use was made only of the data on Kazakh patients. No relation between the blood group and the level of isoniazid inactivation was observed. The levels of free HINA in urine collected during 24 hours after administration of the isoniazid test dose did not depend on the antigenic classification of the patients according to the ABO system. 70 per cent of the Kazakh patients with pulmonary tuberculosis were poor inactivators, 20 per cent average inactivators and only 10 per cent high inactivators of isoniazid. No relation between the onset of pulmonary tuberculosis and the ABO blood group was shown.

Reproduced from Russian Literature

Pharmacokinetics of Anti-Tuberculous Drugs in Caseous Necrotic Foci in Patients with Pulmonary Tuberculosis.

N.A. Kislitsina, et al.

The antituberculosis drugs, such as rifampicin and isoniazid used alone or in combination with pyrazinamide and ethambutol penetrated into the caseous foci of the patients with pulmonary tuberculosis after a single daily administration. Prothionamide penetrated into the caseous foci after its administration in a single dose. Rifampicin and isoniazid used alone may have a bactericidal effect on the caseous foci. When used in combination their penetration level decreases. Pyrazinamid, prothionamide and ethambutol are characterized by a low bacteriostatic activity. Pyrazinamide is the drug of choice in the treatment of patients with large caseous foci when the use of rifampicin and isoniazid is contraindicated.

Reproduced from Russian Literature.

Levamisol Effect on Immunological Reactivity of Mice Infected With Tuberculosis.

A.A. Chumak, et al.

The combined use of levamisol and isoniazid in the treatment of mice infected with

tuberculosis resulted in the increased lymphoid proliferation in the thymus, higher counts of peripheral blood lymphocytes, higher levels of the EAC-RFC in the spleen and lymph nodes and reduced skin tuberculin sensitivity. This determines a significant decrease in the affection of the internal organs with the tuberculous infection and an increase in the animal survival. Levamisol exerted no immunomodulating effect till chemotherapy was instituted.

Reproduced from Russian Literature.

Levamisol Effect on Experimental Tuberculosis.

A.E. Alexandrova, et al.

The effect of levamisol used in various doses according to different treatment schemes was studied with respect to tuberculosis on mice and guinea-pigs. It was shown that levamisol combination with isoniazid and to a less extent levamisol alone significantly decreased the severity of the tuberculosis process, the level of the organ affection being much lower and recovery of the organ structure being earlier. The doses of 2.5 and 25 mg/kg administered 3 times a week were the most effective in mice and guinea-pigs, respectively.

Reproduced from Russian Literature,

Studies on Mechanism of Tuberculosis Immunity with the use of Immunodepressants.

M.M. Averbakh, et al.

The studies on 160 CBA mice showed that the immunodepressants active with respect to T- and B-lymphocytes and inhibiting the responses of both the cell and the humoral tuberculosis immunity (imuran and cyclophosphamide) had an unfavourable effect on the process of tuberculosis infection, while chloramphenicol active mainly with respect to the B-cells inhibited the humoral tuberculosis immunity without decreasing the host resistivity to tuberculosis.

Reproduced from Russian Literature.

Pulmonary Tuberculosis and Tobacco Smoking

Yu. V. Kulachkovsky, et al.

The effect of tobacco smoking on pulmonary tuberculosis was studied in 585 tobacco smokers. The control group consisted of 410 non-smokers. It was found that tobacco smoking had no direct effect on the tuberculosis process. However, in the smokers tuberculosis was often neglected, since they paid no attention to its early signs, such as cough, expectoration

and appetite loss and considered them to be due to smoking. Excessive tobacco smoking was conducive to bronchitis as a concomitant disease and obstructive ventilation insufficiency and suppressed protective excretion of oxi-antitrypsin.

Reproduced from the Russian Literature.

Broncho-Alveolar lavage

(Amer. Rev. Resp. Dis. 1983, 126, Editorial December issue)

Introduction of fiberoptic bronchoscope has led to its wide spread use for broncho-alveolar lavage. Bronchial lavage adds only three to five minutes to the fiberoptic bronchoscopic procedure. It is safe. Minor complications e.g. transient fever, bleeding and bronchospasm occur in less than 5% cases. In one patient out of 300, there was a complicating pneumonitis. As an aid in the diagnosis of chest diseases, broncho-alveolar lavage has a limited but well established role. It helps in diagnosis of infectious diseases, intra-alveolar haemorrhages and alveolar proteonosis of the interstitial disease. The only interstitial disease which can be diagnosed with reasonable accuracy is pulmonary histiocytosis. The use of broncho-alveolar lavage in the management of the interstitial lung disease is based on (1) Current concept that interstitial fibroses is preceded and caused by alveolitis (2) Broncho-alveolar lavage cellular analysis parallels the composition of the alveolitis in some of these diseases.

The neutrophils are the major inflammatory cells in idiopathic pulmonary fibrosis. Similar data is available in respect of sarcoidosis, except that the effector cell is T-Lymphocytes. The increase of T. lymphocytes by more than 28%, if untreated, is associated with progression of disease and its decrease parallels improvement with treatment. In idiopathic pulmonary fibroses, increased lymphocyte percentage is associated with responsiveness to treatment and poor prognosis. In the absence of increased lymphocytes, elevated lavage eosinophils/or neutrophils are associated with failures to respond.

It is also suggested that increased lavage lymphocytes co-related with hypercellular biopsy is indicative of poor response to therapy.

The effect of surgical treatment on the National History of Lung Cancer.

(Amer. Rev. Resp. Dis.; 1983, 127, Editorial, January 1983)

Surgical treatment is considered highly effective for some patients with lung cancer.

Its frequent failure is attributed to unfavourable cell type or late diagnosis. However, the important factor which influences its outcome cannot be identified before or at the time of surgery resulting in the death of certain patients or early recurrence. Of the various prognostic factors, which can be identified, many are indicators of the biologic nature of the disease. A tumour which is poorly differentiated, has grown rapidly, or has produced paraneoplastic syndrome carries a poor prognosis, whether the patient is operated or not; because the characteristics which indicate resection indirectly are the results of virulent nature of the pathology. Selection bias makes it impossible to evaluate the effect of surgery. Controlled clinical trials of patients found suitable for surgery randomly allocated to operated and non-operated groups to assess the benefit of surgery have not been done. Till such time that controlled trials are carried out, the value of surgery in the treatment of lung cancer remains an open question.

Selection criteria for long term oxygen

Amer. Rev. Resp. Dis.; Editorial; 19t3, 127, 397.

Long term home oxygen therapy is now established in the management of selected patients with chronic obstructive pulmonary disease and hypoxemia. The advantages and improved survival, reduced hospitalization, improved exercise tolerance and better life. However, all patients with advanced COPD do not require or get benefit from home oxygen. The drawback of long term home oxygen is cost, inconvenience associated with social and psychological hazards. Decision has to be made about the type of patient who is likely to benefit with this therapy. Consensus is that patients who show improvement in resting mean pulmonary artery pressure in response to oxygen and greater maximum oxygen uptake during exercise had better survival at two years than those without these responses. This was due to reduction in right ventricular after load, improved overall haemodynamics and increased oxygen tissue-delivery. Studies carried out showed improved survival at 2-1/2 years in cor pulmonale patients compared to no apparent survival benefit in similar group of patients without cor pulmonale. Further follow up showed that beyond two years, there was no survival difference between two groups. Preliminary cardiac catheterization is not necessary for selection of cases. Non-invasive techniques are preferable. Nocturnal oxygen therapy trial (NOTT) have shown improvement in the clinical condition of patient with bronchodilating agents, anti-microbials, diuretics and corticosteroids. The administration of these

drugs is better, say for a period of three weeks for stabilizing.

In conclusion, for home oxygen therapy, patient should have symptomatic COPD indicating advanced disease. For assessment base-line spirometry and resting arterial blood gases estimation, should be done preferably in steady clinical state i.e. free of exacerbation of bronchitis or any other illness. For at least three weeks the patient should be stabilized with drugs and finally advised home oxygen.

Alpha Anti Trypsin Deficiency clinical and physiological features in Heterozygotes of PI Type SZ

S. Hutchinson, M.J. Tobin and P.J.L. Cook, Br. J. Dis. Chest; 1983, 72, 28.

In a multicentre survey of alpha anti-trypsin deficiency, 25 heterozygotes of type SZ were identified. Of these 14 were index cases and 11 non-index. Emphysema was largely amongst male smokers and there was no evidence amongst non-index cases. It is concluded that SZ phenotypes had little or no risk of emphysema.

Alpha Anti Trypsin Deficiency: The Clinical and Physiological Features of Pulmonary Emphysema in subjects Homozygous For PI Type Z

M.J. Tobin, P.J.L. Cook and D.C. Hutchinson; Brit J. Dis. Chest; 1983, 77, 14.

In a group of 166 subjects homozygous for the Z. phenotype comprising of 126 index cases and 40 non-index cases, biochemical and other studies revealed that hereditary deficiency of alpha anti-trypsin, which is the main inhibitor of proteolytic enzyme is associated with pulmonary emphysema of early onset.

The Relationship of Tar content to Decline in Pulmonary Function in Cigarette smokers

David Sparrow, Ted. Stefos, Raymond Besse and Scott. T. Weiss; Amer. Rev. Res. Dis. ; 1983, 127,56.

The impact of Tar content of cigarettes on pulmonary functions was determined in 1385 men comprising 383 current smokers, 555 former cigarette smokers and 417 never-smokers. Spirometry studies were done in all the patients at a period of 5 years interval. Multiple regression analysis showed that tar content did not influence base line levels of forced vital capacity (F.V.C.) or forced expiratory volume (F.E.V.). Similarly tar content did not influence followup levels of F.V.C. or F.E.V.

Primary Pulmonary Hypertension and cirrhosis—Are they related ?

Peter J. McDonnell, Patrice A. Toye and Graver M. Hutchins: Am. Rev. Resp. Dis.; 1983; 127, 437.

An unselected series of 17,901 autopsied patients of all ages showed primary pulmonary hypertension in 0.13% and 0.73% in patients with cirrhosis ($p < 0.001$). A clinical series of 2459 patients with biopsy proved hepatic cirrhosis showed a prevalence of primary pulmonary hypertension of 0.61% ($p < 0.001$) as compared with prevalence among all patients.

Air-space immunoglobulin production and levels in broncho-alveolar lavage fluid of normal subjects and patients with sarcoidosis

John A., Rank in, Gary P. Naegal, Carol E. Schradev, Richard A. Mat hay and Herbert Z. Reynolds. Amer. Rev. Resp. Dis., 1983, 127, April issue

A study to examine the relationship between immunoglobulin production and immunoglobulin levels in broncho-alveolar lavage (BAL) fluid and serum of normal subjects and patients with sarcoidosis was conducted in 11 normal volunteers and 17 patients.

In normal subjects, no important relationship existed between the number of immunoglobulin secreting cells and immunoglobulin levels in BAL or serum. By contrast in patients with sarcoidosis a highly significant co-relationship existed between the number of IgG secreting cells and IgG/Alb % in BAL ($p = 0.008$) and between the IgG secreting cells in BAL and serum IgG mg/ml ($p = 0.002$). Similar association did not exist for IgA and IgH. This indicated relationship between immunoglobulin production and immunoglobulin level in normal persons and further shows that immunoglobulin production at sites of disease activity is responsible for hypergammaglobulinemia in BAL and serum of patients with sarcoidosis.

Variation in Immunoglobulin levels and circulating immune complexes in sarcoidosis.

Jean-Marie R., Saint-Rery, Donald N. Mitchell and Peter J. Cole Amer. Rev. Resp. Dis. 1983, 127, 23.

Sixty three patients with clinically definite sarcoidosis confirmed histologically and/or positive Kveim test were studied clinically/radiographically and symptomatically regarding extent and duration. Immunoglobulin level was not raised among patients with bilateral Hilar lymphadenopathy (BAL) but IgG and IgA were raised with pulmonary sarcoidosis. Serum IgH was elevated in extra-thoracic sarcoidosis. The presence of circulating immune complex was strongly associated with recent symptomatic onset of sarcoidosis. These were more prevalent in patients with bilateral hilar lymphadenopathy and erythema nodosum. In contrast, Poly ethylene glycol precipitable immunoglobulins were associated with long-standing active disease and with neurologic involvement.

Electron Microscopy of Hypertensive Pulmonary Vascular Disease:

Donald Heath and Paul Smith, Brit. J. Dis. Chest; 1983, 77, 1.

Hypertensive Pulmonary Vascular disease secondary to chronic alveolar hypoxia is the result of vaso-constriction leading to muscularization of terminal portion of pulmonary arterial disease. Ultra structurally these two phases are characterized by muscular evagination and hyperplasia of smooth muscle cells. Pulmonary arteriopathy secondary to congenital cardiac shunts, primary pulmonary hypertension or cirrhosis liver are characterized by concentric laminar proliferation of myofibroblasts. This is followed by plexiform lesions which consist of vascular channels separated by matrix of proteoglycane containing fibrillary cells and myofibroblasts. Fibrinoid necrosis results from the passage of fibrinogen from the vascular lumen into the arterial wall. alternat