

# The Indian Journal of Tuberculosis

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## THE DELHI CONFERENCE

The Tuberculosis Association of India organised the IX TB Conference of the Eastern Region of the International Union against Tuberculosis from 4th to 8th November, 1974 along with its XXIX National Conference. The conference was attended by over 100 delegates from Eastern Region countries, nearly 400 delegates from India and a few distinguished representatives of WHO and the International Union Against Tuberculosis and observers from western countries. It was inaugurated by Shri Fakhruddin Ali Ahmed, President of India, before a large and distinguished gathering in the Mavalankar Hall, Constitution Club, New Delhi. The inaugural session was addressed by Dr. Karan Singh, Union Minister for Health and Family Planning. It was, however, unfortunate that indisposition prevented Dr. M.S. Chadha from presiding over the Conference.

During the five day conference, over sixty papers on practically all aspects of tuberculosis were presented. The topics included community and clinical aspects of pulmonary tuberculosis, non-pulmonary tuberculosis and non-tuberculous chest diseases. The conference was highly successful in ways more than one. Not only the scientific fare provided was of a high order but the participants' interest was also a noteworthy feature of the conference. The attendance in all sessions was remarkably high.

In the first session, the national control programmes of practically all countries in the region were discussed. The WHO representative opened the discussion by giving a brief resume of the epidemiological situation and the control programmes of various countries in the Eastern Region. The discussions brought out the fact that though the objective of the programmes is more or less the same in all countries, there is diversity in the approach to the problem. Whereas the programmes everywhere are based on case-finding, case-holding, health education and immunization, the means to achieve the ends differ in regard to epidemiological situations and the needs and resources of the countries concerned. Where better-off countries today are, others are likely to be in the not very distant future and the experience and achievements of the former are of great interest to all.

The session on 'Role of voluntary organisations' highlighted various activities of these organisations e.g. to act as watch-dog, to disseminate knowledge, to give economic assistance, to bring about community participation in the national programme, etc. It was heartening to see that the national associations in all countries represented at the conference were doing notable work in this important sphere,

Four excellent papers were presented on the subject of training of medical and para-medical personnel in tuberculosis. The speakers emphasised that training must be need-based. As the objectives of the national programmes go on changing, this change must be reflected in the content and quantum of the training programmes.

In the session on BCG, the programmes obtaining currently in India, Sri Lanka, Indonesia, Nepal and Korea were presented. The achievements of BCG, its strategy, organisational problems and above all its role in the overall control of tuberculosis were clearly brought out.

It was brought out in the session on case-finding that in a service programme, diagnosis based on repeated examination of sputum by direct microscopy is not inferior and the contribution of sputum culture is not much. Culture and sensitivity tests are important for epidemiological studies and assessment of programmes rather than for diagnosis and management of individual patients. Studies on the results of modified techniques for staining of sputum smears were also very interesting. They showed that our workers are trying to simplify the staining technique without impairing efficiency.

Although some papers on non-tuberculous diseases of the chest are often presented at our national conferences, this conference devoted two sessions to this subject. Excellent papers were presented on fungus diseases to show that fungus diseases are mixed up with tuberculosis in two ways. Firstly, it is a problem in differential diagnosis of cases with sputum negative for AFB, and secondly fungus infections often supervene when the tuberculous lesion is arrested.

The programme also included a session on non-pulmonary tuberculosis. The session on "Tuberculosis of bones and joints" included latest concept of pathogenesis and trends in management of spinal tuberculosis and was very interesting and educative.

The Tuberculosis Association of India-Wanders Annual Oration was also included in the conference programme. The subject of the Oration was "Taming of Tuberculosis" and Dr. Krishnaswami who delivered the Oration covered admirably a very wide field within a short time.

An off-the-programme was a short session which discussed the IXth report of the WHO Expert Committee on tuberculosis. Dr. K.N. Rao who initiated the discussion linked the recommendations of the IXth Committee to those of the VIIIth and high-lighted the more salient features of the IXth report. A number of speakers drew attention to some features of the IXth report with which they were not in agreement. The Chairman of the session, Dr. Donald R. Thomson, pointed out that the Expert Committee's report only provided broad guide-lines and was not meant to be adopted *in toto* by every country. The recommendations can and may be modified to suit the requirements of individual countries. The Technical Committee of the Tuberculosis Association of India after considering the VIIIth report had brought out its own Blue-Print on Tuberculosis control to suit conditions in India. This Committee as also the national associations of other countries of the region should adopt the same procedure in relation to the IXth report.

Two sessions were allotted to the important subject of chemotherapy. In one session assorted papers on this subject including management of patients excreting drug resistant bacilli were presented. The other in which a number of speakers dealt with the current status of chemotherapy in general including organisational problems, assessment etc. in depth in various countries of the region provided a grand and befitting finale to the conference.

The conference ended with an emotion-packed vote of thanks by Dr. W. Cotter Harvey of Australia, a Founder Member of the Eastern Region and the senior-most worker of the region. He recalled the day, eighteen years ago, when the Eastern Region came into existence in New Delhi and felt happy that its ninth conference was held here. He paid glowing tributes to those senior members of the National Associations of this region who had done so much in expanding their activities during these years. He was full of praise for the excellent arrangements made for the conference by the host country and paid a rich tribute to all those who had worked hard for the success of the conference. "The Conference, in my opinion", he stated "was an outstanding success. I was impressed by the enthusiasm shown by members and by the quality of the work being carried out in India".

## AWARD OF TAI GOLD MEDAL

The Tuberculosis Association of India decided that the 1974 Gold Medal be awarded to Dr. M.D. Deshmukh, a pioneer in the anti-tuberculosis field.

After graduating from the Grant Medical College, Bombay and after doing his housemanship in Medicine for a year in the Sir J.J. Group of Hospitals, Dr. M.D. Deshmukh proceeded to U.K. and passed his T.D.D. (Wales) in 1939. He got his M.R.C.P. (London) on his 25th birthday. The



**Dr. M.D. Deshmukh**

Diabetes. He is now Emeritus Professor.

He has been working as Hon. Secretary of the Maharashtra State Anti-TB Association since 1962. His most remarkable work is the pioneer service rendered by way of Anti-Tuberculosis 'Shibirs' for rural areas of which he has completed 56 so far, not counting the numerous smaller anti-TB & BCG drives. He has organised 13 State TB Conferences and for the last three conferences he has conducted a demonstration Anti-TB Shibir in a rural area along with the conference. He has presented papers in many International Conferences on Tuberculosis. He has been on all important committees of the Tuberculosis Association of India and was Chairman of the Standing Technical Committee in 1964-65 and presided over the 20th All-India TB Conference at Ahmedabad in 1965. He is the co-editor of the Indian Journal of Tuberculosis and co-author of the Text Book of Tuberculosis published by the Tuberculosis Association of India. He has also edited a book "Pulmonary Tuberculosis and Some Common Chest Diseases" especially written for the undergraduate and postgraduate students. In the Text Book of Medicine published by the Association of Physicians of India, he has contributed the section on 'Clinical Signs, Diagnosis & Differential Diagnosis of Pulmonary Tuberculosis'.

With the extensive experience of Shibirs, he has now launched an intensive Anti-Tuberculosis drive in the State of Maharashtra where case-finding and BCG Vaccination will be done taluk by taluk and village by village.

In recognition of his services to the Anti-TB movement, the Tuberculosis Association of India decided to award its Gold Medal to him.

## **Summaries of Papers Presented at the Ninth Eastern Region Tuberculosis Conference and Twentyninth National Conference on Tuberculosis and Chest Diseases**

### **Tuberculosis Control Programmes in Countries of the Eastern Region**

#### **CONTROL PROGRAMME & EPIDEMIOLOGY OF TUBERCULOSIS IN SOUTH-EAST ASIA REGION**

T. OLAKOWSKI

During the last 20 years, 37 projects were operated in the countries of the South-East Asia region with assistance from WHO and UNICEF at a cost of more than 6 million US dollars from WHO and over 10 million dollars from UNICEF. These projects revolutionized the classical bed-rest, sanatorium approach of the developed countries and helped to evolve a new and modern concept of national tuberculosis programmes for developing countries.

The prevalence of bacillary pulmonary tuberculosis ranges from 241 per 100,000 in Sri Lanka to 610 and 656 per 100,000 in the Maldives and Indonesia. Lowest incidence is again in Sri Lanka (70 per 100,000 per year) and the highest in the Maldives and Indonesia (200 & 179 per 100,000 per year). Prevalence among males is about 2 to 6 times higher than among females. Prevalence is lowest in the age group 5 to 14 years and highest among males aged 55 years and more. Incidence of infection is about 1 % among school-age children. 80 % of the newly detected cases are persons who have been infected a long time in the past.

The estimated number of bacillary cases in all countries in the region is 3,100,000. If treatment is not provided, about 1,200,000 patients will go out of the pool of bacillary tuberculosis during the year; 700,000 (22.1%) becoming bacteriologically negative (self-cured) and about 500,000 (16%) will die. During the same period, the pool of infectious cases will be enlarged by about 900,000 new cases.

Operational studies conducted in South India revealed that if patients collect drugs for 6 or more months, 69.9 % become bacteriologically negative after one year, 20.6 % remain sputum positive and 3.5% die. If such a treatment were offered to the tuberculosis patients in all countries of the region, the pool of infectious cases is likely to be reduced by about 1,100,000 and about 300,000 lives will be saved.

Tuberculosis control programmes in the region succeed in registering 3 % to 23 % only of the bacillary cases & the coverage of BCG vaccination is not more than 50 %. In some countries (e.g. India), vaccination is the responsibility of specialized BCG teams whereas in some others (e.g. Sri Lanka and Burma), BCG vaccination is integrated with the work of basic health institutions. In Indonesia, BCG vaccination has recently been merged with small pox vaccination. The governments in the regions spend 1 to 7 % of their health budget on tuberculosis control.

Persons with x-ray shadows considered as active tuberculous but with negative sputum have a marginal impact on the tuberculosis situation and limited epidemiological significance. The best approach would be to consider them as a high-risk group and to ensure follow-up bacteriological examinations. If resources are limited, the optimal strategy for tuberculosis control in countries of this region would be BCG vaccination and treatment of bacillary cases,

#### **NATIONAL TUBERCULOSIS CONTROL PROGRAMME OF INDIA**

N.L. BORDIA

Dr. N.L. Bordia gave a brief resume of the magnitude of the problem of tuberculosis and its epidemiology in India; available facilities both in specialized and general health institutions for combatting this problem and the modus operandi of the national tuberculosis control programme.

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Citing the situation in Indore district as an example, he compared the achievements of various activities e.g. case-finding, case-holding, BCG vaccination with the targets expected to be achieved and the overall problem in the district. He showed that the output at present was not satisfactory and highlighted the main reasons for the shortfall.

### **TUBERCULOSIS CONTROL PROGRAMMES**

D.R. NAGPAUL

Success of national tuberculosis programmes depends upon planning, implementation and performance. The programmes may be specialized or integrated. The choice is controlled by well recognised factors and yet the two are not mutually exclusive.

India's national tuberculosis control programme is of integrated type. It is faced with a number of difficulties mainly administrative, organisational and operational and hardly technical. Many of the difficulties were expected and are common with similar programmes in other countries. Medical as well as para-medical personnel deployed in tuberculosis programme are not yet inclined to discharge such responsibilities satisfactorily, primarily because of their different basic training and attitudes. This does not render the programme unsuitable or mean that it has failed. The embryonic general health services with which tuberculosis control programmes have to be integrated pose another difficulty. While case-finding activities are about 50 % of the expected (though not of total cases present) BCG was 75 %. 15% of the freshly diagnosed cases are initial defaulters. 35 % complete the treatment regularly and satisfactorily while in the remaining 50% the treatment is unsatisfactory even though their quarterly collection of drugs is satisfactory as long as they take the treatment.

While a considerable leeway is needed to reach the 'expectations', it would not be correct to say that the programme has not succeeded.

### **TUBERCULOSIS CONTROL PROGRAMME & EPIDEMIOLOGY OF TUBERCULOSIS IN AUSTRALIA**

WILLIAM A. OLIVER

The historical and geographical aspects of the Australian anti-tuberculosis campaign leading to the Tuberculosis Act of 1948 and its development there after, the role of compulsory mass x-ray examination of the population, BCG vaccination and their future were extensively dealt with. 85 % of the population in Australia live in towns and cities. 20 % of the population were born overseas mainly in the UK and Europe and 0.8% are aboriginal. Anti-tuberculosis services are mainly the responsibility of states with central assistance. Diagnosis and treatment is free for every one and in addition patients get a monetary allowance from the state to allow them to complete the treatment satisfactorily. The campaign costs the government over 10 million dollars annually which is 1 % of the total health budget for the country. Organisation varies from state to state; integrated with general health services in some states and specialized institutions in some others. The death rate from tuberculosis is now about 2 per 100,000. The fresh notifications are falling rapidly and consistently since 1954 and nearly 5,000 hospital beds have been released for other purposes. Mass mobile x-rays form the basis of case-finding. Urban areas with good medical and hospital facilities tend to produce more cases by symptomatics attending the health facilities voluntarily, whereas in rural areas with inadequate health facilities and long distances, many new patients are found through mass x-ray. The yield of fresh cases from mass x-ray is falling and now 5500 films have to be taken for one active case.

Most patients are still admitted to hospital for initiation of chemotherapy and kept there till sputum becomes negative. Ethambutol and Rifampicin are being used increasingly with INH as standard initial treatment. Sputum negative cases are also included in active cases. Extra pulmonary disease has declined as rapidly as pulmonary disease and continues to be 11% of the total tuberculous disease. Persons born outside Australia make up 20% of the population, 35.9 % of the pulmonary notification, 43.1% of new extra pulmonary notifications and 67.5% of geneto-urinary cases. The Australian Tuberculosis and Chest Association is purely voluntary and helps the campaign by conducting mass x-ray surveys, providing sheltered workshops for training and rehabilitation of disabled patients and procuring sheltered employment. The activities of the Association are heavily subsidized by the government.

Migrants and aborigines still constitute a problem. Despite a drop in the notification rate in Victoria from 1966 to 1971, the rate in non-British born migrants actually rose from 24.3% to 26.9% per 100,000. The notification rate in aborigines was 93 % as compared to the European rate of 10.3 % per 100,000. This problem is accentuated by the drift of the latter from reserves to towns and cities.

## **RESPONSIBILITY IN INTERNATIONAL HEALTH DEVELOPMENT**

C.W.L. JEANES

In international health development, the aim should be to interchange knowledge and expertise between the developed and the developing countries on a two-way basis. Transferring the problems of the high budget programme (e.g. 300 dollars per head per year) to the low budget country (1 dollar per head per year), thereby causing regional disparity, should be avoided. Emphasis must be laid on rational programmes within the scope, capabilities and budget of the receiving country, keeping in mind the needs of both the urban and the rural population. Sanitation, health education, nutrition, prevention of communicable diseases and family planning should have absolute priority over the sophisticated procedures like heart surgery, renal transplantation, etc. A rational use of the health auxiliaries of all grades should be made and the doctor should be the leader of the health team comprising auxiliaries. Finally, developed countries must not arrange programmes which attract personnel to emigrate from developing, to developed countries.

## **TUBERCULOSIS CONTROL PROGRAMME IN SRI LANKA**

H.W. PERERA

The demographic data were presented in detail. The per capita income is Rs 666/- per year. 5.3 % of the total budget (Rs 22/- per capita) is earmarked for health. 2.5 % of the health budget is for tuberculosis control. The Superintendent of anti-TB campaign is responsible to the Ministry of Health for control of tuberculosis in the country. National training and assessment team, the central reference laboratory, the central tuberculosis registry and the statistical units are housed in National Tuberculosis Institute, Colombo. There are 18 chest clinics, 20 branch chest clinics and 2000 TB beds in 3 chest hospitals and 15 TB wards situated in all parts of the country. Community-oriented tuberculosis control programme aiming at integrating the anti-TB activities with the general health services was started in 1968 and is expected to cover the whole country by the end of 1974.

In each general health division in the country, a managerial team has been assigned under a divisional tuberculosis control officer. The team organises, maintains and supervises BCG vaccination, case-finding, treatment and health education activities in addition to training of general health personnel for the integrated programme. Case-finding is by examination of sputum of symptomatics at the various out-patient departments of general health facilities and chest clinics, supplemented by x-ray examination if the latter facility is available. At the health centres without laboratory facilities, sputum from symptomatics is collected, slides are prepared and posted for microscopy to an assigned laboratory.

All newly diagnosed cases are offered intensive triple-drug therapy for a period of 3 months in a chest hospital to begin with. Subsequent treatment and the entire treatment of those few who are not in a position to enter a hospital is carried out from the nearest medical care institution. Supervised twice weekly treatment with streptomycin and INH for a period of 18 months is preferred to oral chemotherapy. Second-line drugs are made available to drug failures and relapse cases. Defaulters are followed up by Range Public Health Inspectors and the medical officers of health. New borns are vaccinated before discharge from the hospital. Babies not born in the hospitals are vaccinated at home through Well Baby Clinics, or at Paediatric clinics. Those who escape are vaccinated on entry in the school. Children are revaccinated at the age of 10 if they have only one previous BCG scar. Contacts of newly diagnosed patients are examined at chest clinics, chest hospitals or medical care institutions if facilities are present in the latter. Health education is also the responsibility of the general medical care institutions. Assistance of Rs 70/- to Rs 80/- p.m. is provided to the needy tuberculosis patients.

In 1973, 30% of the total bacillary cases were found by the general medical care institutions. Over 80% of the patients reported regularly for one year of supervised intermittent chemotherapy.

## CURRENT PROBLEM OF TUBERCULOSIS IN BANGLADESH

M.S. ISLAM

National Sample Survey conducted in 1964-66 in a population of 30,090 selected by multi-stage stratified random sample from cities, towns and villages showed that the sputum positive cases were 0.7 %, x-ray cases 5 % of the population above 10 years. Infection rate was 58 %.

The structure of health services since liberation is based on the new concept of integrated health programme through the Thana health complex, to enable delivery of health services to the rural population. All health activities are being carried out by 12,000 basic health workers named as family welfare workers. Anti-TB work including BCG vaccination, case-finding through sputum microscopy and domiciliary treatment is also the responsibility of these health workers. The specialized TB institutions' main activity in addition to routine case-finding and treatment is supervisory, advisory, co-ordination and training of family welfare workers. The public participation in the programme is achieved through the Voluntary National Tuberculosis Association.

## TUBERCULOSIS IN TASMANIA

L.A.F. YOUNG

For the last 25 years a programme of case-finding based principally on compulsory mass x-rays, hospital treatment of all new cases, supervision of patients and follow up of contacts organised from chest clinics has resulted in reduction of the tuberculosis incidence in Tasmania with a population of 400,000 to very low levels by world standards. BCG vaccination has not been used on a mass scale unlike most other states of Australia. In the early stages of the campaign i.e. in 1950's, approximately 40 % of the total new pulmonary cases were detected by mass x-rays. In 1973, this percentage had come down to 20 % and this method of case-finding has now become expensive and cumbersome. Changes in the priorities of control measures are now being contemplated. Unlike the rest of Australia, migrants are not a problem in Tasmania as they constitute only 10 % of the population. Achievements of Tasmania in the control of tuberculosis used to be better than most of the other Australian states but they now seem to be lagging behind and this is being attributed to the absence of BCG vaccination. Programme of mass BCG vaccination of high school students in Tasmania is now being instituted.

## Industrial Chest Diseases

### PREVALENCE OF TUBERCULOSIS AMONGST TEXTILE WORKERS

S.S. GOYAL, V.K. PERUMAL, G.P. Mathur, S.K. AHLUWALIA and S.P. PAMRA

A prevalence survey was carried out in a big cotton textile mill with over 6000 employees. The coverage was 92.3%. The overall prevalence rate of active pulmonary disease was 18.1 per 1000 including bacillary disease 5.4 per 1000. Out of the 32 bacillary cases, 15 were positive by direct smear and 17 negative by direct smear but positive by culture. 25% of the cases were minimal and 75 % moderately advanced (only one out of 107 active cases was far advanced). Workers in spinning department where cotton dust and humidity are maximum had a significantly higher prevalence rate (23.1 per 1000) and workers in the office and engineering sections had the lowest prevalence (13.1 per 1000). Over all rate of 18.1 per 1000 of this survey is not significantly different from the standardised rate for general population in Delhi and an earlier survey carried out in the same mill in 1952 when it was 2.2%. The rate was found significantly higher in older age groups.

The symptomatics (cough of more than 6 weeks' duration with or without other symptoms such as haemoptysis, fever etc.) were 14 % of the total workers but 50 % of the total active cases were found amongst the symptomatics. Out of the total of 107 active cases, 30 were already known.

H.K. SINGH and R. VISWANATHAN

Comprehensive health survey of 8,822 coal workers in Dhanbad area revealed that besides pneumoconiosis and tuberculosis, tropical pulmonary eosinophilia (TPE) constituted one of the major causes of respiratory morbidity. 826 workers (9.3%) had total eosinophil count of 2,000 or more; 47.6 % had a count of 600 to 2,000 and the rest had less than 600 eosinophil per cmm of blood. 300 cases fulfilled the Donohugh's criteria for diagnosis viz eosinophils of 2000 or more, respiratory symptoms including diurnal dry cough, diffused miliary mottlings along with increased hilar markings in a chest x-ray, remission of symptoms after two weeks of Diethyl Carbamazine therapy and residence in tropical climate while the remaining 526 cases (63.7 %) were asymptomatic but otherwise similar to the first group. It is possible that the latter may be in the early stage of development of disease. & Prevalence of TPE among coal face workers was higher. Duration of colliery work and therapeutic response to Diethyl Carbamazine helped in differentiating these cases from those who had pneumoconiosis alone or in association with TPE. Hook worm infestation among coal workers appears to be an association rather than a causative factor for TPE.

### **SILICOSIS IN GLASS INDUSTRY**

A.G. PATEL

One hundred and twenty five workers in crushing and mixing departments of glass industry were examined. Thirty three of these were silicosis. Silicosis is related to period of exposure. The percentage rises with age. Workers in the crushing department were more prone to develop silicosis and the severity of disease was also comparatively more in this department than in the mixing department. Very few workers had symptoms. There were 3 cases of active tuberculosis, 2 among the silicotics and one in the non-silicotics. Particle count was 32.3 mppcf in crushing department. Of these 32.3, 75 % were below 2.4 microns. The value in mixing department was 16 mppcf. 64 mgs/m<sup>3</sup> amount of dust was present in crushing department and 58 % of this was pure silica.

### **INDUSTRIAL CHEST DISEASES**

T. YOSHIOKA

Silicosis control law was promulgated in Japan in the year 1912. Pneumoconiosis is diagnosed on radiological findings, cardio-pulmonary function tests and the quality and density of mineral dust occurring at the site of operation in addition to complete clinical evaluation. Cases are usually found in industries concerned with metals, cast-metal, mining, cement, glass manufacture, ceramic industry tunnelling work, stone cutting and extraction of gravel. The rate of pneumoconiosis has remained more or less steady from 1967 to 1973 being about 5 to 7 % in category I and 3 % in categories II, III and IV. Results of pneumoconiosis survey in 210,758 workers were presented.

## **Role of Voluntary Organisations in Control of Tuberculosis**

### **ROLE OF VOLUNTARY ORGANISATIONS IN TUBERCULOSIS CONTROL PROGRAMME**

B.M. CARIAPPA

Tuberculosis is said to be India's Public Health Enemy number one, though it has now ceased to be serious public health problem in many other countries. The principal components in the campaign against tuberculosis are Government, medical profession and general public. The Tuberculosis Associations should be reckoned as the sum total of these principal components. While Government find the resources, the profession provides the technique and the Tuberculosis Associations ensure the involvement of the community in the campaign.

The Tuberculosis Associations have to carry out a variety of functions. They have to influence Government and ensure proper planning of comprehensive control programme and find adequate

funds for tuberculosis work. They have to ensure the unstinted cooperation of the general practitioners. The Associations have to educate the people regarding every detail about tuberculosis. They should undertake such activities as can promote the general campaign against the disease. They can assess the needs of the community in regard to specific anti-tuberculosis measures and help Government to establish and implement them. They should serve as watchmen of official programmes, as the eyes and ears of service units and as mentors of the community. They have a duty to educate the public about the advisability of taking regular treatment in homes through their local TB Centres and make the concept of Home Treatment really popular, effective and successful. They should also help in supervising regular intake of drugs by patients for which Services voluntary agencies are eminently suited. They have a special duty to influence Authority in favour of utilising the existing institutions instead of building new ones.

The activities of the Tuberculosis Association of India are generally guided by the broad objectives just mentioned. It has, in cooperation with various other agencies, been carrying out fair amount of educative work. It publishes the Indian Journal of Tuberculosis and organises annual conferences of tuberculosis specialists. It works in close collaboration with Government in various ways. It has an Association in every State affiliated to it and most of the State Associations have District Associations, all of which carry out their own activities based on the broad objectives of the Centre.

### **COMMUNITY PARTICIPATION IN NATIONAL CONTROL PROGRAMME**

H. KUSNADI

Community participation is essential for the success of any national control programme. In the implementation of the programme the objectives must be clearly defined and those aspects of the programme which require community participation should be clearly indicated. The main constituents of a control programme are BCG vaccination, case-finding and case-holding. The community's role in the BCG vaccination is to help in gathering the children in the vulnerable age group at previously fixed vaccination centres, to give due publicity to the utility of BCG in the prevention of disease and to overcome any constraints or objections which mothers may have in relation to the BCG vaccination or giving it simultaneously with small pox vaccination.

In case-finding, community should be made conscious about the main symptoms of the disease and to encourage and persuade those who have cough of more than 2 weeks' duration to get themselves examined. Contacts of known cases should also be persuaded to get themselves examined. People must be made aware that sputum examination by direct microscopy is a very good criterion for finding unknown cases. The role of the community in case-holding is to help the official treatment supervisors in checking drug default by the patients, to foster regularity amongst them and to make them attend the treatment centre periodically for assessment and drug collection. The voluntary organisation should try to maintain the enthusiasm of voluntary workers by organising meetings once in 2 months besides arranging special health education seminars for them to enable them to meet the official supervisors and discuss common problems with them.

### **ROLE OF VOLUNTARY ORGANISATIONS**

B.B. ELLEPOLA

In Sri Lanka the diagnostic and treatment services are the responsibility of the Government and a network of government centres, hospitals, fringe hospitals and dispensaries manned by trained staff, adequate in number and location have been provided. The object of the voluntary organisation is mainly to supplement the government effort in BCG vaccination, case detection, treatment and home visits to arrange assistance to needy families. The workers of the voluntary organisation should be sincere, compassionate, patient and scrupulously honest in order to create and maintain confidence of the community in the activities of the organisation. In the implementation of the programme, excellence of buildings, vast sums of money and exuberant propaganda matter less than the honesty of purpose and achievements. "If you want to uplift, get underneath" is a saying which applies aptly to preventive work in tuberculosis. If the community cannot be induced to participate in the national programme, prevention cannot succeed. Preventive measures must take into consideration the habits, mental attitude and resources etc. of the community.

## **ROLE OF VOLUNTARY TUBERCULOSIS ASSOCIATIONS IN TB CONTROL**

M.B. DASS

To provide tuberculosis services is the recognised responsibility of the government. The role of voluntary organisations in the control of disease is to make the programme effective through community participation, health education, motivation and to supplement the government services. In Malaysia the voluntary organisation came into existence in 1946 whereas the government programme was launched systematically in 1961. From 1946 to 1961, voluntary organisation raised funds, built sanatoria, donated X-ray machines, supplied free drugs and looked after the needy patients in several other ways. With the launching of the national programme and changed strategy of tuberculosis control, the voluntary organisation has also modified its activities. Now-a-days it concentrates mainly on assisting in case-finding and BCG vaccination, promoting health education, forming health committees in rural areas and training the volunteers to educate the rural population, to hold refresher courses for teachers, to arrange group talks on the essentials of the tuberculosis control programme and to prepare propaganda material such as posters, slides, brochures and to help needy patients with financial assistance. Realizing the importance of school teachers in promoting education, they are mobilized to form health teams and special refresher courses for such teachers are arranged. Financial assistance to the family usually helps to cut down the problem of drug default. Patients who are on injections as out-patients are also reimbursed the bus fare for visits to the injection centres.

## **ROLE OF VOLUNTARY ORGANISATION IN CONTROL OF TUBERCULOSIS**

INDER SAIN JAIN

The evolution of voluntary organisations in the city of Delhi, their importance in tuberculosis control, their main activities now and in the past were briefly described. Care & After-Care Committees were started in Delhi in 1948 under the guidance of Dr. B.K. Sikand to look after the social aspects of the patients' problems. Such committees can only succeed if their workers are treated as part and parcel of the TB clinics and are not made to feel as if they were mere money-collectors or subordinates to carry out the wishes of the clinic staff. The success of the voluntary organisations working in collaboration with the New Delhi TB Centre is mainly due to the excellent relationship of the Centre staff with the voluntary workers. Fund raising is an important activity of these organisations as without that their activities would be considerably hampered. The methods of fund collection will vary with the composition of the community. Funds are raised by the Care Committees in Delhi through donations, subscriptions, charity shows etc. and spent on fulfilling the needs of the patients such as financial assistance if the bread winner is a patient, education expenses of the patient's children, warm clothes during winter, house rent, bus fare for periodic visits to the Centre etc. These Committees also provided free drugs to the needy patients before 1962 when the government had not taken up that responsibility. They also help the Centre staff in organising case-finding campaigns, BCG vaccination, prevention of drug default etc.

## **ROLE OF VOLUNTARY AGENCY IN TUBERCULOSIS CONTROL**

CHAN-SAE LEE

The main role of a voluntary agency in tuberculosis control is to familiarize the community with tuberculosis services provided by the government and to bring about their proper utilization. The voluntary agency also acts as a reviewer of the government programme and being the representative of the people sees that the government programme is properly conducted to give maximum benefit. They also work for the betterment of people's health. The role of voluntary agency will vary with the circumstances of the community and its needs from time to time.

The Korean National Tuberculosis Association was started in 1953. The first activity was to sell Christmas Seals. Mass X-ray surveys were carried out in 1956 and in 1963. Central tuberculosis laboratory was established. It helped the government to carry out national prevalence surveys in 1965 and 1970. During this period there has been a 20% decrease in the tuberculosis prevalence in the country (from 5.1 % to 4.2 %). 45 % of the annual funds of the Association are utilized in financing the national programme and also providing the much-needed technical assistance for this programme. Thus the Korean National Association is not merely a initiator and educator but a strong partner with the government in tuberculosis control work.

## ROLE OF SOCIAL WORKERS IN TB CONTROL

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MRS. DEVKI B. SINGH

Social workers are a liaison between the patient and the doctor. A selfless, socially inclined individual who may be a relative, a friend or a neighbour of a patient will help in making the patient take the treatment regularly, observe preventive measures and carry out the instructions of the clinics for the patient and the family. Publicity of the national programme at social, religious or communal and recreational gatherings is another useful activity of the social workers. Social workers should not only be well wishers but also philosophers and guides for the patients.

*(Summaries of papers from Drs. D. R. Thomson and A. Selvaratnam not received. Dr. K. V. Krishnaswami's text of Oration on "Taming of TB" published in full has been included as a supplement to this issue of the Journal.)*

### Training of Medical & Para-Medical Personnel in Tuberculosis

#### TRAINING OF MEDICAL & PARA-MEDICAL PERSONNEL IN TUBERCULOSIS

J.S. SODHY

The training should be programme-oriented and in keeping with the structure of health services in the country. If there is no organised programme, training is purely of academic interest and, therefore, not of much value. In an integrated programme the training must be adequate to produce generalists to man multi-purpose health centres in the delivery of all health programmes such as tuberculosis, malaria, leprosy, family planning etc. Emphasis must be on community health aspects rather than mere clinical aspects. Felt-need of the community should get precedence. Training should be limited to only the specific needs of the programme to enable achievement of operational objectives. The teaching should be integrated in the curricula of all types of personnel such as doctors, nurses, health visitors. The training should be of sufficient depth to make the personnel fully aware of the tuberculosis problem, the rationale of control measures and the tasks expected of the personnel. Finally the training should be an ever-continuing process in tune with the requirements of the programme from time to time.

#### EDUCATION & TRAINING OF MEDICAL AND PARA-MEDICAL TUBERCULOSIS WORKERS

D.R. NAGPAUL, P. CHANDERSEKHAR and G.D. GOTHI

The requirement of training of programme personnel under India's Tuberculosis Programme are different from those of the specialized staff required to work in tuberculosis institutions. The mutual roles of medical and para-medical staff in the programme are complementary and the latter category are not meant solely to assist medical officers in the discharge of their routine duties. The training programmes of the NTI are aimed at providing knowledge, skill and attitude necessary for carrying out community-wide anti-TB activities by personnel of general health services. A team of 5 properly trained para-medical workers (viz. laboratory technician, x-ray technician, treatment organiser, statistical assistant and BCG team leader) under the leadership of one medical officer (the district tuberculosis officer) is trained for each district where the programme is to be implemented. Upto May, 1974, 407 teams comprising 2655 persons have been trained. Of the trained personnel, only about 50% are working in the programme, the remaining having gone out of the programme due to promotion, retirement, death etc. New incumbents to replace those lost to the programme and refresher training for those still working in the programme are also necessary.

#### TRAINING OF NURSING PERSONNEL IN TUBERCULOSIS

(MRS.) M. PAUL

The national tuberculosis programme envisages integration of tuberculosis with the general health services especially at the periphery. As such, it is necessary that the curricula for training of nurses, health visitors etc. should be suitably revised to enable this personnel to discharge their duties efficiently vis-a-vis tuberculosis in respect of diagnosis by sputum examination, treatment organisa-

tion, health education and BCG vaccination. Education and training should be programme-oriented, both theoretical and practical and should include field training. Re-orientation courses are also necessary.

\* \* \*

Dr. R. Viswanathan dealt with the training of physicians working in tuberculosis institutions basing his observations on the results of a questionnaire to post-graduate diploma students. He was of the opinion that in-service training would meet our requirements more appropriately. What was equally important was training of the teachers which can be brought about by introducing M.D. Course in Tuberculosis and Chest Diseases. Reorientation of the Administrators, some of whom seem to think that tuberculosis has already been controlled, is equally essential.

## **BCG Vaccination Programme in the Countries of the Eastern Region**

### **BCG VACCINATION PROGRAMME IN INDIA**

B.N.M. BARUA

The first BCG vaccination in India was performed by Dr. A.C. Ukil in 1928. Large scale BCG vaccination was started in the country in 1948 and about the same time the BCG vaccine production laboratory was established in Madras. Mass BCG vaccination campaign was started in 1951 and terminated in 1962 by which time 178 million persons had been tuberculin tested and 63 million out of these had been vaccinated. To ensure thorough coverage and proper record-keeping, house-to-house vaccination was introduced in 1962. Subsequently as house-to-house vaccination did not materially improve the performance, precedence was given to school vaccination. To step up the coverage still further, direct BCG vaccination without prior tuberculin test of the new borns was introduced in 1964. Now-a-days vaccination is by choice limited to persons below 20 years in age and without prior tuberculin test.

At present there are 302 BCG vaccination teams working in the country. About 170 million vaccinations have been given so far, out of which about 90 % are in the younger age group of 0 to 14 years, and direct vaccinations average about 30 to 40 million per year. New born vaccinations are limited only to urban areas especially in maternity hospitals and other such institutions. There is a BCG assessment team for periodical, operational, technical and organisational assessment of BCG work and for recommending corrective measures. The entire quantity of BCG vaccine for the programme is now being manufactured in freeze-dried form. A large scale trial mainly to assess the protective effect of BCG vaccination is in progress.

In a country like India where 45 % of the population is infected the annual infection rate is 2 to 5 % and about 1.5% of the population has active tuberculosis (about a quarter of which is infectious), BCG vaccination has to be continued as a routine measure by the general health services for a long time to come.

### **BCG VACCINATION IN SRI LANKA**

J.R. WILSON

BCG vaccination was started in Sri Lanka in 1949 as a mass campaign with a propaganda unit as a part of the BCG team. BCG was given to all those who had tuberculin reaction of less than 10 mm irrespective of the age of the person. Liquid vaccine was used. From 1949 to 1958, a total of 3,919,757 persons were tuberculin tested and 1,587,070 of these were vaccinated. At this stage the strategy was changed and preference was given to school children. In 3 years (1959 to 1962) 1,800,959 children attending 5045 schools in 7 out of the 9 provinces of the country were tested and all tuberculin negative children were vaccinated. From 1968 direct vaccination is being done. BCG vaccination of the new borns was started in 1963 and has proved very successful since 80 % of the new births in Sri Lanka take place in government hospitals. The actual cost per vaccination works out at Re. 1/-.

At present the plan of BCG vaccination is as follows :

1. Maximum coverage of all newborns.
2. BCG vaccination in pre-school and Well-Baby Clinics who could not be vaccinated soon after birth.
3. Vaccination at entry into school if not vaccinated earlier.
4. A second vaccination to all children in 5th standard in the school i.e. at the age of 10 years.

**BCG VACCINATION IN INDONESIA**

H. KUSNADI

BCG vaccination was started in Indonesia in 1956 with liquid vaccine obtained from Alabama. In 1966 liquid vaccine was replaced by freeze-dried vaccine from Tokyo. In 1969, direct BCG vaccination to children upto the age of 14 years was introduced. In 1972, vaccination strategy was changed again and simultaneous BCG and small-pox vaccination by small-pox vaccinators was introduced. It is expected that 75 % of the target would be reached by the end of 1974. A BCG laboratory has been started with assistance from the WHO and UNICEF and the country is expected to be self-sufficient regarding BCG by the end of 1975. The bifurcated needle is also being tried. The post-vaccination allergy by this method is relatively a little less than with the intra-dermal technique but the operation is definitely simpler.

**BCG VACCINATION PROGRAMME IN NEPAL**

J.S. MALLA

To collect preliminary information, a tuberculin survey was conducted in Patan and it was found that 44 % of the children in 10 to 14 years age group were infected. Direct BCG vaccination to children up to the age of 14 was there after introduced. In village panchayats around Kathmandu, vaccination by house to house visit was started in June, 1966. Vaccination of the new-borns simultaneously with small-pox vaccination was started in 1967. BCG vaccination is now integrated with family planning and maternity and child health projects. A small operational study proved that vaccinators recruited for small-pox vaccination could be utilized for safe and effective simultaneous BCG and small-pox vaccination. A large number of national and international agencies are helping in the programme and it is expected that the entire vulnerable population of the country will be covered by 1979-80.

**BCG VACCINATION IN NEW-BORNS**

P.A. DESHMUKH, K.W. BARLINGAY, C.R.N. Menon &amp; B.R. TOTEY

A study was undertaken in 3 maternity homes and 2 female wards of government hospitals in Nagpur. From August to October, 1972, 1881 new borns were vaccinated. Parents were asked to bring the infants for testing with 5 TU tuberculin, 3 months after the vaccination. Very few children were brought for the test. Subsequent testing and reading were carried out at the residence of the vaccinated infants. Nearly 85 % of the children showed a reaction of 6 mm or above when tested after vaccination. The mean reaction was 9.9 mm. Mean size of the vaccination scar was 3.4 to 4.4 mm. Relation between tuberculin reaction and the size of the scar was variable. Different batches of the vaccine were used and there was no difference in the reaction from different batches. The dose of the vaccine used was 0.05 ml.

**BCG VACCINATION PROGRAMME IN KOREA**

CHONG DAL PARK

BCG vaccination on a national scale was started in Korea in 1962. Simultaneous direct vaccination with small-pox was started in 1967. At present direct BCG vaccination is given to pre-school children. Vaccination of new-borns is encouraged but is not satisfactory. Those children not vaccinated earlier are vaccinated on entering school. Approximately 3 million vaccinations are given annually. National sample survey showed 16.4% of the population had BCG scars in 1965 and 30.3% in 1970. Assessment carried out in 1973 showed post-vaccination allergy to be 10 to 15 mm and the size of the scar 5 to 7 mm, 10 to 12 weeks after the vaccination. It is expected that in 1975 freeze-dried vaccine will replace liquid vaccine currently in use.

**ASSESSMENT OF BCG VACCINATION PROGRAMME IN MALAYSIA — THE COVERAGE**

CHEONG PAK SOON

The BCG vaccination programme in Malaysia was launched in 1961 as an integrated programme from its inception with emphasis on the younger age group of 0-20 years. After a slow start activities

rapidly increased as the training programme provided the required personnel and the development programme of the country produced an expanding basic health service.

By 1965 the BCG programme was fully operational on a country-wide scale and estimates of the coverage of the 0-20 year age group from the cumulative total vaccinated made, pointed to a possible achievement of the objective of 75 % coverage of the eligible child population in this age group. Assessment by random sampling methods in 1970, and from 1972 onwards verified the correctness of the estimates of the coverage achieved.

The benefits from achieving the recommended coverage include a significant decline in the number of cases of tuberculous meningitis and in the number of childhood tuberculosis annually registered.

## **Fungus Diseases, of the Chest**

### **PREVALENCE OF PULMONARY MYCOSES AMONG 1063 PATIENTS OF CHRONIC BRONCHO-PULMONARY DISORDER**

S.K. SHOME

Prevalence of pulmonary mycoses in human bronchopulmonary disorder was investigated during 1968-1973. Systematic screening of the sputum and/or bronchial washing and bronchoscopy material of 1063 patients with bronchopulmonary disorder for the presence of human pathogenic fungi was conducted. On direct microscopic examination 40.7% of the samples were positive for fungal elements whereas 15.9% (170) and 13.4% (143) only were found positive for pathogenic fungi by culture on nutrient media and mouse passage technique respectively. Mycoses recorded were candidiasis (83 cases), cryptococcosis (50 cases), nocardiosis (31 cases) and aspergillosis (5 cases). Human pathogenic fungi isolated during the study were mainly represented by *Candida albicans*, *Cryptococcus neoformans*, *Nocardia asteroides*, *N. Brasiliensis* and *Aspergillus fumigatus*.

From among the 170 cases diagnosed as pulmonary mycoses 141 (82.9 %) were associated with pulmonary tuberculosis whereas only 29 (17.1 %) were mycoses clinically diagnosed otherwise. Quite often conditions like pulmonary nocardiosis, candidiasis and cryptococcosis not only go undiagnosed but untreated as well due to lack of proper laboratory services even in major hospitals. This can lead to complications in treatment since the presence of mycoses may enhance virulence of *M. Tuberculosis*.

### **ROLE OF "ASSOCIATES" IN THE PRODUCTION OF ACTINOMYCOSIS OF LUNG IN EXPERIMENTAL RABBITS**

S.C. CHAKRAVARTY, J.M. HODARKAR & V.N. DAMODARAN

Previous attempts to produce experimental actinomycosis with single injection of *A. israelii* in animals failed. Recently a new method has been tried with *A. israelii* along with "associates" and compared with animals which were injected with *A. israelii* only.

In this investigation *A. israelii* along with *H. influenza* (associates) were injected intra-tracheally in rabbits and compared with lesions in rabbits injected with *A. israelii* alone intra-tracheally. It was found that combination of associates with *A. israelii* enhances the virulence of *A. israelii* and produces more lesions in the lungs of rabbits. If the injection is repeated twice in the same animal, the lesions are further enhanced.

### **SIGNIFICANCE OF ISOLATION OF FUNGI FROM SPUTUM IN BRONCHOPULMONARY DISEASES**

V.K. JHA, M. JOSHI & P.C. SEN

Sputum from 134 patients and 25 healthy controls was investigated for fungal flora and 53 were positive. The fungus most frequently isolated from the sputum specimens was *Candida* in 22.5 % of

patients. The fungus ranking second in frequency, *Aspergillus fumigatus*, was comparatively more in patients with Asthma when compared to other diseases. One species each of *Cryptococcus neoformans* and *Penicillium* was isolated. The incidence is comparatively high in males than females as regards fungal growth. The patients who received treatment for more than 6 months showed an increase in the fungal growth. Only five patients were having diabetes mellitus associated with other pulmonary diseases out of which four gave positive fungal growth. In the control group, candida grew from 2 specimens and *Aspergillus fumigatus* and *aspergillus flavus* from one specimen each.

#### **INCIDENCE OF PULMONARY ASPERGILLOSIS IN PATIENTS WITH PULMONARY TUBERCULOSIS & ATYPICAL MYCOBACTERIOSIS**

K.L. SOBTI

Study was designed to find out the incidence of pulmonary aspergillosis in normal people and patients suffering from pulmonary tuberculosis and atypical mycobacteriosis, It was carried out in National Jewish Hospital, Denver, Colorado, U.S.A.

Anti-aspergillus antibody was determined by a quantitative sensitive primary binding test and qualitative agardiffusion. In addition, intradermal skin tests were performed. Three specimens of sputum were cultured from each patient on Sabouraud broth. Other investigations included blood and sputum eosinophilia and radiological procedures.

Eight (40 %) out of 20 cases of pulmonary tuberculosis showed pulmonary aspergillosis. There were 2 cases of aspergilloma, one of invasive aspergillosis and one of allergic bronchopulmonary aspergillosis and 4 were contributory. Out of 15 cases of atypical mycobacteriosis, aspergilloma was seen in 2 cases and 5 were contributory. Out of the 20 controls, primary binding was positive in 3 and one had intradermal test positive in addition to aspergillus antibody.

The evidence indicates that precipitins are associated with present or recent fungal growth in the body tissues or within damaged bronchi whether with obvious aspergilloma formation or occult fungal colonization of diseased bronchial spaces, whether there is associated allergic aspergillosis or not.

#### **A STUDY OF OPPORTUNISTIC ASPERGILLUS INFECTION IN CHRONIC PULMONARY TUBERCULOSIS OF KERALA**

P. RAVINDRAN, P. SUNDARAM, E. ARAVINDAKSHAN, P. PRASANNAKUMAR, K.G. GEORGE & P.K.R. WARRIER

Two hundred cases of chronic pulmonary tuberculosis were studied for evidence of aspergillus infection by sputum culture, culture of bronchial washing whenever indicated, skin sensitivity test and x-rays. 13% of the cases had aspergillus infection and 2.5% had radiological evidence of aspergilloma. The risk of infection increases with the chronicity of tuberculous lesions. The mode of presentation is with haemoptysis and/or dyspnoea.

Opportunistic aspergillus infection in chronic pulmonary tuberculosis is not rare. Therefore, when patient who was once tuberculous develops haemoptysis or wheezing at a later date, a diligent search should be made for a possible secondary infection by opportunistic aspergillus before starting specific chemotherapy for relapse of the tuberculous lesion.

#### **Assorted Papers**

##### **COMBINED TUBERCULIN SURVEY IN THE NORTH COAST AREA OF NEW SOUTH WALES**

K.W.H. HARRIS

Nearly 18,000 children between the ages of 12 and 18 years were tested with three antigens viz. human tuberculin, CSL avian tuberculin undiluted, CSL avian tuberculin diluted and Weybridge avian tuberculin. The reactor rate to human tuberculin was much lower (13.7%) and there was a marked difference in response to the two CSL products and the Weybridge product (50 % and 28 %

respectively). The reactor rates bear no relationship to the amount of atypical infection notified from that area. In view of the low rate of reactors to the human tuberculin, there does not seem to be good reason for carrying out BCG vaccination at school leaving age.

### **CHEMOPROPHYLAXIS FOR TUBERCULOSIS**

**T. YOSHIOKA**

Chemoprophylaxis was tried in recent tuberculin-converters and those with inactive tuberculous lesions. The recent converters were divided into 6 groups of about 120 each. One group was given PAS alone daily for 3 months, the second group was given IHMS (isoniazid sodium methan-sulfonate) twice a week for 6 months and the third group was given INH daily for 3 months. The other 3 groups served as controls. A period of observation from 76 to 92 months showed fresh disease to be about 5 % in PAS group, 2.7 % in IHMS and 3.3 % in INH group. There was not much difference between the treated groups and the controls. In the case of inactive cases, 36 were given INHG (isoniazid glucuronic acid natrium) daily for 6 months and 52 were given IHMS daily for 6 months. Only one case of reactivation was discovered in INHG group. No inactivation was seen in the IHMS group.

### **SUNDAY SHIBIRS TO SUPPLEMENT THE TUBERCULOSIS CONTROL PROGRAMME IN MAHARASHTRA STATE**

**M.D. DESHMUKH, K.G. KULKARNI, S.S. VIRDI And H.V. BAHULKAR**

The Maharashtra State Anti-Tuberculosis Association has held 54 shibirs from January 1969 to 25th February, 1974. The ideal way of taking a shibir for, say population of 2000 to 3000 is by taking a pre-shibir house to house survey. Help and cooperation from voluntary bodies and official TB services is essential. Systematic shibir cover at District level and at the peripheral centre is strongly recommended to boost up our Tuberculosis Programme. Urban shibirs are not so productive. Out of 230 symptomatics on average at each shibir from an estimated 40,000 population, 122 were screened and 34 x-ray positive cases seen (8 sputum positive). Average number of BCG vaccinations was 1890.

### **PULMONARY EOSINOPHILIA**

**K. NEELAKANTACHAR**

One hundred and ninety one persons amongst the new out-patients attending Gulbarga district TB centre in 1970-71 were diagnosed as suffering from pulmonary eosinophilia. Total eosinophil count of 2000 or more per cmm of blood was absolute criterion for diagnosis. Maximum number of cases were in the age group 11 to 20 years. 80 % showed abnormal x-ray findings. X-ray mottling was seen more often in cases having high eosinophil count. Patients treated with diethylcarbamazine alone or with anti-histamines and diethylcarbamazine with cortisone gave almost equal results (improvement in over 90 % cases), whereas the fourth group treated with antihistamines alone gave an improvement rate of 33% only.

### **A COMPARISON OF PARENTERAL AND ORAL METHODS FOR THE ESTIMATION OF INH INACTIVATION RATE**

**V.K. PERUMAL, P.S. BHATNAGAR, G.P. MATHUR & S.P. PAMRA**

The usual method recommended for estimation of inactivation rate of INH is by parenteral administration of INH. Since oral administration of INH would be relatively simpler, a study was carried out to determine if this method is equally efficient. Inactivation rate was determined both by parenteral and oral methods in 100 previously untreated and bacteriologically confirmed cases of pulmonary tuberculosis attending the New Delhi TB Centre. There was an interval of at least 4 days between the two tests and the order in which the tests were carried out was decided randomly. Diabetic patients were excluded from the study. The ratio of acetyl INH to free INH in the urine (inactivation index) was calculated for each patient. Patients with an index of more than 2.0 were marked as rapid inactivators and those below 2.0 as slow inactivators. Sixty seven of the 100 patients were classified as slow by both methods and 30 as rapid by both methods. The remaining 3 patients were classified as rapid by one method and slow by the other. There was a very high and positive correlation (0.8) between the values obtained by both methods. There were no differences in respect of age and sex.

## HEPATIC INVOLVEMENT IN PULMONARY TUBERCULOSIS

C.C. MUKHOPADHYA

Eighty cases of pulmonary tuberculosis were studied to find out the nature and extent of hepatic derangements that may occur in such cases. The cases consist of minimal, moderately advanced, far advanced and miliary tuberculosis of lungs. Cases of pleural effusion have also been included. Needle biopsy of liver was performed in these cases and the tissues were studied histopathologically to find out the structural changes. Hepatic function tests viz., estimations of serum proteins, serum bilirubin, serum alkaline phosphatase, SGOT, SGPT, Thymol turbidity tests, Zinc turbidity tests, Electrophoresis of serum protein were also performed. Histopathological examination of the liver tissue showed tuberculous changes in 12 cases but non-specific reactive hepatitis was present in a large number of cases. Other changes like fatty change, cloudy swelling and plant cell appearances were also present. Changes in serum proteins and abnormal hepatic functions were observed in a large number of cases. The changes ranged from slight to gross.

## POSTMORTEM APPEARANCES OF NORMAL AND PNEUMOKONIOTIC LUNGS IN THE ASSESSMENT OF PATHOGENESIS

L.B. BANERJI

Dr. Banerji brought out the pathological features of pneumokoniosis with the help of a few slides showing unstained microscopic sections of the whole lung of normal persons as well as those suffering from early and late pneumokoniosis and asbestosis.

### Case-Finding By Sputum Microscopy

#### A STUDY ON THE METHOD OF TRANSPORTATION OF SPUTUM SPECIMENS

S. TAKAHASHI

Transportation of sputum specimens without decreasing the viability of the bacilli is a problem. Stuart medium (containing Thioglycollic Acid) was used to transport smear positive specimens of sputum containing about  $10^3$ /ml of bacilli. The yield of tubercle bacilli was almost constant from the specimens kept in the Stuart medium for as long as 6 weeks and even upto 8 weeks. The growth of colonies was the same the medium-kept specimen and fresh specimen. In contrast, the number and speed of appearance of colonies of tubercle bacilli decreased with increasing time of storage in ordinary containers. Furthermore, the contamination became heavier and more frequent with control specimens after longer storage time, while no contamination was observed in medium-kept specimens. More than 1/3rd of bacilli in the medium were alive after 12 weeks under the test conditions i.e. 28 to 30°C whereas in the specimens kept under ordinary conditions the viable bacilli decreased in number even after one week and their isolation failed completely after 5 weeks due to overgrowth of saprophytes.

#### DIAGNOSTIC PHOTOFLUOROGRAPHY AND SPUTUM MICROSCOPY IN TUBERCULOSIS CASE-FINDING

D.R. NAGPAUL *et al*

Results of two case-finding studies were presented. Firstly 2,229 symptomatic out-patients were offered sputum microscopy and photofluorography followed by sputum microscopy for the eligibles on the 3rd day simultaneously and independently of the results of either. Losses and gains were measured in terms of sputum positive cases found and the number put on treatment. While the two methods differ widely in their operational simplicity and cost, there was nothing much to choose in terms of outcome.

In the second study, each eligible person after photofluorography was offered 8 sputum examinations consecutively instead of the usual one in routine practice. The gain in the number of sputum positive cases with each successive examination was measured. Among the symptomatics attending

health institutions, two smear examinations detect about 85 % of all smear positives and 2 smear examinations are roughly equal to one culture. The available evidence further suggests that in experienced hands all positive smears including those which are scantily positive are truly positive. Photofluorography and culture can, therefore, be dispensed with in routine programme conditions.

### **CASE—FINDING BY SPUTUM EXAMINATION**

SUNG CHIN KIM

A method to reduce the work-load of laboratories required to examine a large number of sputum specimens every day was described. Fluorescence microscopy usually recommended under such conditions is very expensive to instal and the replacement of bulbs is also difficult in developing countries. The blue-light attachment which can be fitted into an ordinary microscope without much cost was described. When using this set up, the background is almost black and tubercle bacilli, stained with Auramine O appear as bright yellow against the background. The results of fluorescence and blue-light microscopy were compared in 723 sputum specimens. Out of those with positive culture, 85% were found positive by blue-light microscopy and 89% by fluorescence microscopy. Among culture negatives there were 1.9% positive by fluorescence microscopy and 1.1% by blue-light microscopy. Among the 98 culture positive specimens, 28 were negative by fluorescence microscopy and 31 by blue-light microscopy. These results show that blue-light microscopy is nearly as efficient as fluorescence microscopy but is more economical and simpler to operate.

### **SPUTUM MICROSCOPY — SOME VARIATIONS IN TECHNIQUE**

N. NAGANATHAN, D.R. NAGPAUL, S.S. NAIR & G.D. GOTH

The Ziehl Neelsen Technique of sputum microscopy is the standard procedure in routine practice. Attempt has been made to investigate whether the procedure could be simplified without loss of efficiency. In one study three sets of smears of 1,120 specimens were prepared. One smear in each set was stained by conventional Ziehl Neelsen method, the second was stained by the conventional method but decolorization with alcohol was omitted and the third smear was stained with Carbol Fuchsin in the conventional method but after washing with water the smear was treated with Gabbets Methylene Blue for 30 seconds thus combining decolorization by Acid and counter staining. It was found that omission of decolorization with alcohol does not influence the results. Further, combining the procedure of decolorization and counter staining does not materially affect the diagnosis even though the staining with this method is usually not satisfactory.

In the second study two brands of Basic Fuchsin were used, one of which was considered to be inferior. 1,120 sputum smears were stained with both reagents. It was found that the results were more or less similar with both.

### **CASE-FINDING BY SPUTUM MICROSCOPY IN PENINSULAR MALAYSIA**

CHEONG PAK SOON

Case-finding in Peninsular Malaysia was initially based on the use of mass miniature X-rays deployed as mobile and static units throughout the country. In 1969 as its use was found to be both uneconomical and the yield poor, mobile mass miniature X-ray was abandoned as a case-finding tool and case-finding by sputum microscopy of symptomatics presenting with cough of more than two weeks' duration was organized on a country-wide basis.

The objective denned was to identify two-thirds of the infectious cases prevalent in the country. The results of the case-finding programme over the past years revealed that only half the objective was achieved. Analysis of the case-finding activities at the basic health services established a "norm" for the proportion of symptomatics who qualified for sputum examination and the yield of smear positive cases. Performance in the states varied and poor performance was associated with failure to identify and submit for examination all symptomatics who qualified for sputum examination and/or inefficient or inadequate bacteriological examination.

It is estimated that the case-finding potential at the basic health services is such that a substantial proportion of the infectious cases prevalent in the community can be detected.

## ‘Chemotherapy’

### CHEMOTHERAPY UNDER DISTRICT TUBERCULOSIS PROGRAMME AND PROBLEM OF DRUG RESISTANT BACILLI

G.V.J. BAILY & G.D. GOTHI

The paper dealt with bacteriological status at the end of one year's treatment and 4 years after that of 452 previously untreated sputum positive patients treated from a District Tuberculosis Centre. Three hundred and ninety of these were initially drug sensitive and 62 initially drug resistant. Of the initially drug sensitive patients, 37 (9.4 %) died by the end of first year (treatment year) and 90 (23 %) by the end of 5th year (i.e. 4 years follow up). Among the 62 initially drug resistant patients, 4 (6.4 %) died by the end of first year and 23 (37.1 %) by the end of the 5th year. 71.7 % of the initially drug sensitive patients were negative on culture and of 50 drug resistant patients, 16 (32%) were negative by culture at the end of one year. 17 % of the initially drug sensitive patients had become drug resistant at the end of one year. The total number of drug resistant patients at one year was 86 as against 62 at the start of the study.

At the end of 5th year, 86.7% of the available patients in the initially drug sensitive group were negative for culture while 9 % were excreting drug resistant bacilli. Of the 26 initially drug resistant patients available for follow up at the end of 5th year, 12 continued to excrete drug resistant bacilli. The total number of drug resistant patients at the end of 5th year was 33 only. Thus, whereas the number of patients with resistant bacilli at the end of one year had increased, their number had actually gone down at the end of 5th year because of the higher death rate amongst them. The problem of drug resistance, therefore, appears to be primarily a humanitarian problem. Whether it is an epidemiological problem depends on the length of survival of these patients, the nature and degree of drug resistance, the infectivity of resistant bacilli and the immunological status of the population.

### CHEMOTHERAPY INCLUDING THE PROBLEM OF DRUG RESISTANT BACILLI

M. AQUINAS

Forty patients in Hong Kong, previously treated unsuccessfully with standard drugs and some second-line drugs (Pyrazinamide, Ethionamide, Cycloserine) were treated with Rifampicin and Ethambutol daily for 24 months. Capreomycin was given in addition for the first 6 months. At the end of 5 years, 70 % of these 40 patients were sputum negative, 5 % were still positive, 15 % had died and the remaining 10 % could not be traced. Of the 6 patients who died, 3 died with active tuberculosis, 2 died of sequelae of the disease and one died of carcinoma of the liver. The regimen was very well tolerated and there were no serious side effects.

In another study, Rifampicin and Ethambutol were tried in failures of the standard drug regimens only. Rifampicin and Ethambutol however were given daily to one group, twice weekly to another group, once weekly to the third group and in the 4th group daily for first two months followed by once weekly thereafter. At the end of 12 months, the sputum conversion rates were more or less the same in all regimens. Resistance to Rifampicin was present in 1 % before start of treatment and at 3 months, 31 % of the 32 patients who were still sputum positive were excreting Rifampicin-resistant bacilli. At the end of 6 months, 73% of the 26 positive strains were resistant. Resistance to Ethambutol developed relatively late. As for toxicity, the incidence was low (11 %) in the daily regimens; 30% in twice weekly regimen but very high (64%) in the once weekly regimen. The most frequent side-effect was the "Flu" syndrome and 90 patients on intermittent Rifampicin developed it while no patient on the daily regimen got this syndrome. The "Flu" syndrome coincided with the peak serum level of Rifampicin and there was a fall in anti-body scores during this period. Some of these patients had their Rifampicin changed to the daily regimen and the anti-bodies disappeared within 6 weeks. In a few patients the anti-bodies were still present in their sera 4 months later and in these the symptoms persisted even when intermittent regimen was changed to the daily regimen. In 116 patients in once a week regimen, a supplementary dose of 75 mg of Rifampicin was given on the remaining 6 days of the week to half the patients and a placebo to the other half. It was found that the patients who were given supplementary dose of Rifampicin, the "Flu" syndrome was less common and when it did occur it was less severe. Rifampicin anti-bodies were also less common.

The association between the "Flu" syndrome, the intermittent Rifampicin and the presence of anti-bodies suggests the immunological basis for the syndrome, specially as the incidence was less when the intermittent rhythm was preceded by a daily phase or when a small daily dose was given to patients receiving the once weekly regimen.

### **CHEMOTHERAPY IN DRUG RESISTANT CASES**

P.A.L. HORSFALL

Reserve regimens are indicated in patients who fail on primary treatment with emergence of resistant strains.

In areas where SM, INH and PAS<sub>2</sub> are the drugs used in primary treatment, the combination of Ethionamide, Cycloserine and Pyrazinamide followed by Ethionamide and Pyrazinamide are commonly used. Latter regimen gives satisfactory results, some 85% of patients achieving sputum conversion, but is attended by a high level of adverse reactions and is relatively expensive. Expense is increased by the necessity to hospitalise patients.

In East Africa where SM, INH and TB1 (with SM for 2 months only) are used the combination of SM, PAS and Pyrazinamide gives satisfactory results in treatment of failure cases.

As an alternative to Ethionamide, Pyrazinamide and Cycloserine a combination of Rifampicin plus Ethambutol, either daily or intermittent, produced sputum conversion in 80 to 90 % in drug resistant pulmonary tuberculosis in Hong Kong. Intermittent Rifampicin however, produced adverse reactions, particularly the "Flu" syndrome associated with the development of Rifampicin dependent anti-bodies. The incidence was lower in twice weekly. Despite limitations a twice weekly Rifampicin Ethambutol regimen is practical for out-patient treatment, hospitalization not being necessary. Rifampicin is, however, a very expensive drug and on this account cannot as yet be recommended for routine use.

### **SEMI-SUPERVISED CLINICAL TRIAL OF SHORT COURSE (6 MONTHS) REGIMEN OF CHEMOTHERAPY FOR TREATMENT OF PULMONARY TUBERCULOSIS**

M.L. MEHROTRA *et al*

One hundred and thirty seven previously untreated sputum positive patients were randomly allocated to a control group (streptomycin, INH and Thiacetazone daily for 4 weeks in hospital followed by 48 weeks domiciliary treatment with INH and Thiacetazone) and a study group (Streptomycin, INH, Pyrazinamide and Ethambutol for 4 weeks in hospital followed by Pyrazinamide, Ethambutol and INH, domiciliary treatment for 20 weeks followed by Streptomycin, INH, Pyrazinamide and Ethambutol again for 2 weeks followed by placebo for the remaining 26 weeks).

Out of 32 regular patients in the control group, 3 patients died within 6 months of treatment with no further death during the next 6 months. There was one death in the study group between the 7th and the 12th month. The defaulter rate was higher in the control group.

Sputum conversion by culture was obtained in 80 % in the control group and 100 % in the study group. The radiological improvement was also more or less of the same order. Four of the 21 study group patients relapsed between the 7th and the 12th month.

### **SOME OBSERVATION OF BIOCHEMICAL ASPECT OF PYRAZINAMIDE TOXICITY**

B.K. KHANNA *et al*

Sixty nine proved cases of pulmonary tuberculosis were studied for 6 months in the hospital to determine, the correlation between the clinical toxicity of oral administration of Pyrazinamide and serum Pyrazinamide, S.G.O.T., S.G.P.T., serum alkaline phosphatase and serum uric acid levels. Peak serum Pyrazinamide concentration was obtained 2 hours after the administration of the drugs.

It dropped gradually during the next 4 hours after which the fall in the serum level was very sharp. The drug seemed to accumulate in the body so that the highest serum Pyrazinamide levels were noted in the third month in patients on daily regimen group (62/ug/cc) and in the fourth month (90/ug/cc) in those on bi-weekly regimen. The rise in the level of serum Pyrazinamide also coincided with the rise in the levels of the serum enzymes.

Gradual rise in the serum uric acid level was noted in all the patients. Jaundice was seen only in 1 case. The frequency of joint pains could not be correlated with serum uric acid level therapeutic administration of Pyrazinamide in the doses employed appeared to be safe and virtually non-toxic.

## **Extra-Pulmonary Tuberculosis-I (Bones and Joints)**

### **OSTEO-ARTICULAR TUBERCULOSIS**

B.SANKARAN

Two thousand two hundred and seventy eight cases of osteo-articular tuberculosis were treated in the Central Institute of Orthopaedics, New Delhi from 1960 to 1970 giving an average of about 225 cases per year. Out of these 2,278 cases, 1301 (nearly 45%) were cases of the disease of spine. The other important categories were hip joint 394, knee joint 372, sacroiliac joint 38, ankle joint 28, elbow joint 26, wrist joint 15, shoulder joint 8 and miscellaneous 96 cases.

For many years lymphatic theory and vascular spread theory were commonly accepted particularly at sites where there was a likelihood of trauma also. This also probably explains the involvement of the rætaaphyses. Role of pre-vertebral venous plexus in the spread and localization of disease was dealt with. Results of angiography on 20 full-term or near full-term still-born foetuses were presented to show the existence of a vertebral venous plexus. The flow in this plexus differs with varying pressures in the vein and reversal of flow can very easily occur with increase of abdominal pressure as for example, during the fit of coughing. This reversal and the intimate connection with the Azygos system can explain the very frequent spread of tuberculous disease from hilar lymphnode to the vertebra and the hip joint and also account for the relative infrequency of involvement of the joints elsewhere.

### **TREATMENT OF TUBERCULOSIS OF THE SPINE**

M. AQUINAS

The presentation was based on results of controlled clinical trials in Korea, Rhodesia and Hong Kong in collaboration with British Medical Research Council with a view to assess the value of different forms of treatment for tuberculosis of the spine. Patients with previous chemotherapy for 12 months or more, paraplegia and serious tuberculous or non-tuberculous complications were excluded. The results showed that INH and PAS is as effective in ambulant children as in hospitalized. There was no extra benefit in giving streptomycin daily for first 3 months in addition to INH and PAS. Similarly there was no additional benefit if a plaster jacket was given to out-patients for a period of 9 months. In another trial, results of 'debridment' (operation consisting of removal, as far as possible, of all pus, caseous material, sloughs and sequestra but not deliberate removal of unaffected or viable bone, except to provide adequate access to the disease) were compared to outpatient treatment with chemotherapy. The conclusions from the study were that debridment was not superior to the ambulant treatment in respect of overall response, resolution of abscess and sinus and deformity. Initial streptomycin supplement was of no significant benefit.

In the third trial debridment was compared with radical 1 excision and it was found that the radical operation in experienced hands gave better results in respect of healing by bony fusion. There was lesser bone loss and deformity and the mediastinal abscesses cleared more rapidly.

## Extra-Pulmonary Tuberculosis-II (Other Organs)

### TUBERCULOUS CERVICAL LYMPHADENITIS

S.P. PAMRA

A co-operative study from 8 centres in India was carried out under the auspices of the Indian Council of Medical Research to correlate the clinical with the bacteriological and histological findings in case of cervical lymphadenitis and also to type the bacilli recovered from the glands. Three hundred and three cases were included in the study out of which 214 were tuberculous. Tuberculous lymphadenitis appears to be more common in females and in the age group 11 to 30 years. Histopathological examination is the most dependable diagnostic criterion. Nearly 50 % of the glands were bacteriologically negative. The proportion of bacteriologically positive glands was about the same in caseated and non-caseated glands. Chances of demonstrating tubercle bacilli in the resected gland decreased if the bacteriological examination was not carried out soon after resection. All bacilli recovered from the glands were human in type. Dependence on clinical features, tuberculin test etc. is liable to lead to considerable under-diagnosis and over-diagnosis.

### HAEMATOGENOUS TUBERCULOSIS IN INFANTS AND CHILDREN

H.B. DINGLEY

Out of 2431 tuberculous children admitted in TB Hospital, Mehrauli from 1957 to 1973, 296 or 12.1% had evidence of haematogenous dissemination viz. miliary tuberculosis, tuberculous meningitis with or without miliary tuberculosis and pleurisy with effusion. One hundred and thirty four children had meningitis, 87 miliary tuberculosis and 75 had pleurisy with effusion. 58.9 % of the meningitis cases were infants as compared to pleurisy with effusion where 71.3 % were in the school age. In miliary tuberculosis and pleurisy with effusion males predominated over females, whereas meningitis cases were almost equal in males and females. 76% of the pleurisy with effusion cases were tuberculin positive but the positivity rate in miliary tuberculosis and meningitis was 50.5 % and 42 % respectively. There was no difference in the three manifestations of haematogenous dissemination in respect of history of household contact, previous BCG vaccination and frequency of constitutional symptoms.

### OBSERVATIONS IN 100 CASES OF GENITAL TUBERCULOSIS

MRS. S.N. TRIPATHY

One hundred consecutive cases of genital tuberculosis diagnosed in the departments of Obstetrics and Gynaecology and Chest Diseases of Tuberculosis in V.S.S. Medical College, Burla were reviewed. The commonest presenting features in these cases were menstrual disorders (46 %) of which secondary amenorrhoea was in 24 %, menorrhagia 18 % and irregular cycle in 4 %. The next common complaint was sterility in 28 % of which primary sterility was 20 % and secondary sterility 6%. 22 % of the cases had lower abdominal pain. Endometrium seems to be the most common site. (74 %) Next in order are tubes 22 % and cervix 4 %. There was no case of vulval or vaginal involvement. 94 % of the women were below 40 years and 52 % of the cases were between 21 and 30 years in age. More than 3/4th of the cases were paras and the remaining nulliparas.

### PLEURAL EFFUSION (A REVIEW OF 265 CASES)

M.S. PARMAR

Two hundred and sixty five cases of pleural effusion seen in the Department of Tuberculosis and Chest Diseases in Medical College Hospital, Rohtak from 1965 to 1973 were reviewed. 74.3 % of the effusions, serous as well as purulent, were tuberculous. The next common group was empyema due to pyogenic organisms (45 cases out of 265). Empyema due to amoebiasis was seen in 4 cases and due to malignancy in 8 cases. Tubercle bacilli could be recovered from pleural effusion in 19 out of 202 cases.

In 53 patients the sputum was positive for tubercle bacilli. There were more cases in men than in women, more on the right side than on the left and majority of the cases were in the age group 11 to 40 years.

Serous effusions are more amenable to repeated aspirations and chemotherapy. With chemotherapy the results of surgical treatment in tuberculous empyema are as good as in non-tuberculous empyema.

## **Chemotherapy, Including Problem of Drug Resistant Bacilli**

### **SHORT-COURSE CHEMOTHERAPY IN THE TREATMENT OF PULMONARY TUBERCULOSIS**

M. AQUINAS

The results of a controlled short-course chemotherapy trial in Chinese patients in Hong Kong were reported. A total of 620 patients were allocated to 3 drug regimens containing streptomycin, INH and Pyrazinamide. In one regimen all the three drugs were given daily, in the other thrice weekly and in the third twice weekly. Half the patients in each regimen were randomly treated for 6 months and the other half for 9 months. Amongst patients with initially sensitive bacilli 6 months results were slightly inferior in twice weekly regimen, not only in terms of sputum conversion but also sputum reversion. Of the patients allocated to 9 months chemotherapy, again twice weekly regimen was inferior. The results were unfavourable in 6% of the patients in thrice weekly regimen as compared with 1 % in thrice weekly and none in daily regimens.

In patients with pre-treatment resistant strains, all the regimens gave poor results amongst those treated for 6 months both in respect of failure of sputum conversion as well as sputum reversion. However, amongst those allocated to 9 months chemotherapy, the results were fairly satisfactory in the daily and thrice weekly regimens but somewhat inferior in twice weekly regimens. Thus it appears that 6 months treatment is not enough. Nine months treatment with daily and thrice weekly regimens gives fairly satisfactory results.

### **CAUSES OF FAILURE OF DOMICILIARY CHEMOTHERAPY IN PULMONARY TUBERCULOSIS**

S.P. PAMRA

Modern chemotherapy makes it possible to achieve, at least theoretically, almost 100 % success in treatment of pulmonary tuberculosis under ideal conditions. In actual practice, however, there is almost always a shortfall, which may be due to some adverse factors either present at the start of treatment or those appearing during the course of treatment. Far advanced disease and poor general condition at start of treatment and irregular and inadequate treatment are the main causes responsible for failure of treatment. While emergent drug resistance is closely associated with failure, the contribution of initial drug resistance to failure, contrary to what is usually believed, is much less. Behaviour pattern of the patient influences his co-operation in treatment and resultant regularity in taking of drugs when symptoms have disappeared after a few months treatment. Patient's irregularity and stopping treatment prematurely against advice are many a- time due to organisational problems. Unless it is made possible for the patient to collect drugs nearer home or place of work without interfering with the patient's normal routine and all other socio-economic difficulties of the patient are removed, treatment failure cannot be avoided.

### **EFFICACY OF DRUG REGIMENS IN DOMICILIARY TREATMENT**

K.V. KRISHNASWAMI

The favourable results from various drug regimens in routine treatment programme are usually less by 20 to 30 % than the results that can be obtained in clinical trials. Probable reasons for this shortfall are that the regimen may not be suitable for domiciliary administration, the presence, of

initial drug resistance and inadequate drug intake by the patient. "Efficiency" gap between what can be achieved under research conditions and routine treatment service can be reduced considerably by purposeful motivation of the patient, making the service flexible to suit the convenience of the patient e.g. by changing the timings of the clinic, schedule of treatment etc. and a better doctor-patient relationship.

### CHEMOTHERAPY IN PULMONARY TUBERCULOSIS

M. PARDO DE TAVERA

Some of the problems of chemotherapy in Philippines were high-lighted. Children showing strong tuberculin reaction and all reactors below 3 years of age should be treated with INH for a minimum of one year. Chemoprophylaxis however should not be the general rule. Discovering and treating the source of infection will be more rewarding than chemoprophylaxis. Relapses are almost always due to irregular and inadequate treatment. Many patients become irregular because collecting the drugs interfere with their normal vocation or they cannot afford the transportation charges for frequent visits to the clinic for drug collection, or indifference. The poor often tend to think that because of their poverty no one is interested in them and consequently they lose interest in themselves and to them life becomes meaningless and getting well pointless.

While under-treatment is usually responsible for treatment failure, over-treatment is a form of investment without beneficial returns. It would be more rewarding to concentrate on treating every infectious case for at least one year rather than over-treating few cases. Failures to first-line drugs are not necessarily retrieved by second-line drugs since resistance to latter will emerge as surely as it did to standard drugs if treatment is not regular and properly supervised. Control of tuberculosis is not so much a technical problem as an organisational. Rifampicin and Ethambutol are very costly drugs and should, therefore, be used very judiciously. Intermittent regimens are more unsatisfactory than daily regimens because forgetfulness on the part of the patients in a daily regimen will usually be less than in the case of intermittent regimen and secondly if the patient on daily regimen misses a dose, the damage is less than if he misses a dose in the intermittent regimen.

*(Summaries of papers from Drs S.P. Tripathy and Sulastomo not received.)*

## BACILLARY RESISTANCE TO DRUGS IN TUBERCULOSIS —A TREND OVER 13 YEARS

P.K. SEN AND B.N. RAY

(From B.C. Roy Research Institute for TB & Chest Diseases, Calcutta).

An ICMR study (Gangadharam-1968) in Calcutta area and previous study from this Institute (Sana, 1968) on similar material indicated very high resistance status of tubercle bacilli to the common or so-called first line drugs, namely streptomycin, isoniazid and para-amino salicylic acid. It was inferred that irregular and uncontrolled domiciliary treatment may be the main cause for such a dangerous situation and it is likely to be on the rising tide. It is, therefore, necessary to ascertain the trend of this phenomenon. The findings will not only provide information on a section of domiciliary treated cases who seek hospital admission but may also throw light on the wider field of chemotherapy at home.

Indirectly, this information will also provide more precise knowledge of the load on hospitals in relation to such drug-resistant cases. The hospital authorities will also have a clear understanding of their responsibility in undertaking care of such patients in relation to their financial and technical resources. The knowledge may also serve as a guide for formulation of most advantageous hospital-admission policy in the context of the "National Tuberculosis Control Programme".

### Material

The patients belong to the K.S. Ray Tuberculosis Hospital. It is located in the outskirts of Calcutta, has 755 beds and is run by a voluntary organisation named "Calcutta Medical Aid and Research Society." The beds are mostly reserved by different institutions, organisations etc. and the admission of patients is controlled by the reserving authorities. Such a system of admission tends to attract cases for hospitalisation who failed to respond satisfactorily under domiciliary care. The majority of the patients, therefore, belong to such a special group. Every case, on admission, was subjected to the following examination during the years 1961 to 1973 with the exception of 1966 to 1968. The study therefore, extends over 13 years allowing a comparative study of earlier and later 5 year-periods with a gap of 3 years in the middle.

### Method

Samples of sputum were examined by (a) microscopy for acid-fast organism, (b) culture for TB, (c) sensitivity tests against streptomycin,

INH, PAS and thiacetazone of those samples which proved positive to culture.

For microscopy 24 hours' sample of sputum was examined directly by Ziehl Neelsen method, and also by concentration of samples by 6% Sulphuric Acid and by 23 % Trisodium Phosphate. With 23 % Trisodium Phosphate, the homogenisation was completed with overnight incubation but that with 6 % Sulphuric Acid was completed in 20 minutes' incubation at 37°C. The homogenised sputum was centrifuged for 20 minutes at 3,000 revolutions per minute and one portion of the sediment was taken for culture in the Lowenstein-Jensen medium and another portion of the sediment was taken for smear and stained by Ziehl-Neelsen method after washing it with distilled water and again centrifuging as above. When homogenisation was done with 23% Trisodium Phosphate, prior washing with distilled water was not found necessary.

For culture in the Lowenstein-Jensen medium 4 slopes were taken and the culture tubes were observed every 7th day till 8 weeks for the presence of growth. The culture was accepted as positive when more than 20 colonies were seen in the media.

### Sensitivity Tests :

The positive cultures were tested for bacillary sensitivity to streptomycin, INH, PAS and thiacetazone. The sensitivity for thiacetazone was not done in the early period of the study as it was not routinely used. The procedures adopted for sensitivity tests are described hereunder very briefly.

The concentration of drugs used were the following : for Streptomycin 4, 16, 64 meg, for INH: 0.2, 1 and 5 meg., for PAS: 4, 16, 64 meg., and for thiacetazone : 1, 2, 4, 8, 16 meg. per ml. of the medium used. The procedure of incubation was slightly different from customary loop method. A light uniform watery suspension of the culture was made and standardised for turbidity with a photo-electric colorimeter set-up on 80 % light transmission at 6-12  $\mu$  wave length. Single drop was poured into the medium from 50 dropper capillary pipette. The amount of inoculum in this method is 0.005 mg/ml of the suspension. The results were recorded on observation for 8 weeks of incubation at 37°C.

Drug resistance has been denned as the growth in any concentration of the drug similar to that in the corresponding control tube. However, in this study, the criteria for drug resistance were accepted according to some definite concentrations. These are on bacillary growth in the medium containing the following concentrations of drugs:

|     |       |           |              |
|-----|-------|-----------|--------------|
| SM  | ..... | 4mcg/ml   | of the media |
| INH | ..... | 0.2mcg/ml | of the media |
| PAS | ..... | 4mcg/ml   | of the media |
| TZN | ..... | 2mcg/ml   | of the media |

Appearance of only 10 or less big colonies or 20 or less thinner or smaller colonies than usual were not accepted as growth.

**Result**

The results are presented in tabular and diagrammatic forms:

It may be noted that sensitivity tests against PAS and thiacetazone were made in less number of cases as both the drugs were not administered in all cases in the later period.

Table and Figure I show slight increase in the resistance status of bacilli to both streptomycin and INK from 80 % and 73 % to 86 % and 75 % respectively. This, however, is not significant. Resistance status to PAS has diminished from 43 % to 31 %. This is significant and may possibly be due to less use of PAS since thiacetazone replaced PAS in most cases. No comparative study of this phenomenon with regard to thiacetazone was possible as the drug was used very

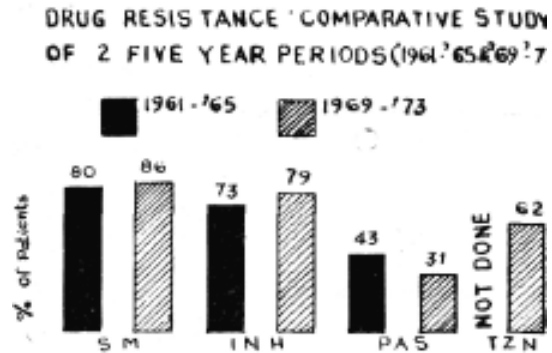


Fig. 1.

sparingly during the earlier period of study. However, as indicated in the later period, the resistance status to this drug has already become quite high — 62.5%.

Tables II, III and Figures II and III present the drug-resistance data year by year with a gap of 3 years. To make a comparative study of 5-year periods this gap was intentionally adopted in the plan of study.

In the earlier period, 1961-65, Thiacetazone was so sparingly used that the resistance study for this drug was not made in every case.

In the later period, Thiacetazone replaced PAS in most cases. This is why in the transitional period of 1969-70 this study against PAS and Thiacetazone was not made for all the positive cultures. However amongst, 120 cultures made in this period only 27 and 62 were

Table 1

Drug resistance status — 5 year periods. (1961-'65 and 1969-'73).

| Year         |             | 1961-65   |    | Year         |                             | 1969-73   |    |
|--------------|-------------|-----------|----|--------------|-----------------------------|-----------|----|
| Drug         | Total No of | Resistant |    | Drug         | Total No of cultures tested | Resistant |    |
|              |             | No.       | %  |              |                             | No.       | %  |
| Streptomycin | 981         | 785       | 80 | Streptomycin | 474                         | 410       | 86 |
| INK          | 981         | 717       | 73 | INK          | 474                         | 376       | 79 |
| PAS          | 981         | 421       | 43 | PAS          | 381                         | 120       | 31 |
| TZN          | Not Done    | —         | —  | TZN          | 416                         | 259       | 62 |

Table 2

*Drug resistance status — 1961-1965*

| Year                            | 1961     | 1962     | 1963     | 1964     | 1965     |
|---------------------------------|----------|----------|----------|----------|----------|
| No of Cultures tested           | 175      | 195      | 200      | 198      | 213      |
| Total Single Drug Resistance to | No (50   | No(%)    | No(%)    | No (%)   | No (50   |
| Streptomycin                    | 151 (86) | 146 (75) | 167 (84) | 167 (84) | 154 (72) |
| INH.                            | 142 (81) | 156 (80) | 152 (76) | 130 (66) | 137 (64) |
| Thiacetazone                    | Not Done | Not Done | Not Done | Not Done | Not Done |
| P.A.S.                          | 96 (55)  | 94 (48)  | 102 (51) | 60 (30)  | 69 (32)  |

Table 3

*Drug resistance status — 1969-1973*

| Year                            | 1969-70 | 1971     | 1972    | 1973    |
|---------------------------------|---------|----------|---------|---------|
| No of cultures tested           | 120     | 165      | 105     | 84      |
| Total Single Drug Resistance to | No ( %) | No (%)   | No (%)  | No (%)  |
| Streptomycin                    | 91 (76) | 151 (91) | 96 (91) | 72 (85) |
| I.N.H.                          | 83 (69) | 142 (86) | 88 (83) | 63 (75) |
| P.A.S.                          | —       | 53 (32)  | 33 (31) | 20 (23) |
| Thiacetazone                    | —       | 125 (75) | 44 (42) | 46 (54) |

Studied and 14 (32%) and 43 (69%) proved resistant to PAS and Thiacetazone respectively

It will be seen from these tables that the bacillary resistance to streptomycin and INH remained

Almost at the same level whereas that to PAS shows some diminution only in later years. As against such high resistance to single drugs the bacilli of few patients only are likely to be sensitive

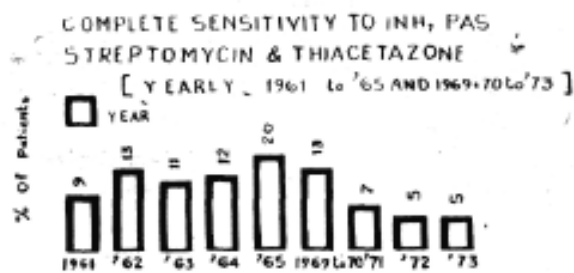


Fig. 4.

to all drugs. Figure IV presents this information according to years.

Table IV and Figure V present the drug-resistance data of earliest and latest 2 year periods with a gap of 9 years. This is shown as there had been some rise and fall and 5 years' periods study might have masked the differences that might have occurred in 10 years. Two years together was accepted for better representation with 9 years' gap.

Table 4

Drug resistance Status — 2 year periods (1961-62 & 1972-73).

| Year                            | 1961 and 1962 | 1972 and 1973 |
|---------------------------------|---------------|---------------|
| Total No of Cultures Tested     | 370           | 189           |
| Total Single Drug Resistance to | No (%)        | No (50)       |
| Streptomycin                    | 297 (80)      | 168 (88)      |
| I.N.H.                          | 298 (80)      | 151 (79)      |
| P.A.S.                          | 190(51)       | 53(28)        |
| Thiacetazone                    | —             | 91 (48)       |

Comparative study of the levels of bacillary resistance to single drugs with an intervening period of 9 years shows the same trend, that is, there had been no significant change in the status except that of PAS.

**Summary**

The bacillary resistance study to streptomycin, INH, PAS and thiacetazone made in every case on admission to a large Tuberculosis Hospital

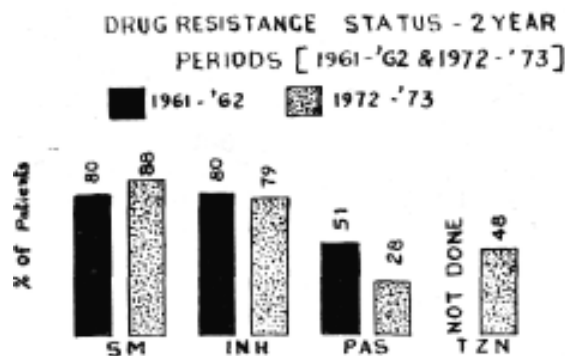


Fig. 5.

for 13 years. Findings were presented in tabular form in two 5 year periods with a gap of 3 years and also in earliest and latest 2 year periods for better comparative study. A gap of 3 years in the middle of the study was kept for facilitating a comparative study between the two periods. The result may indicate the trend of this phenomenon over a decade. The findings indicate very high resistance of about 88 % to Streptomycin, 79 % to INK, and 28 % to PAS. Most serious was the finding that there had been no impact on this high rate by our domiciliary treatment programme.

There had been a diminution of resistance in cases with PAS from 51 % to 28 %. This may be due to less use of the drug as it was largely replaced by thiacetazone in later years. The study on resistance with thiacetazone made during the later 5 year periods already showed to be 62%.

**Conclusion**

The data of the study indicate that :

- (a) there may be very frequent irregularities in domiciliary chemotherapy.
- (b) at least the bacillary cases admitted into hospital beds are of such nature which involve much higher cost of therapy, less turnover and recovery.

These findings should, therefore, lead to a thorough probe into the operation of domiciliary treatment and also to lay down the guidelines of a rational and most beneficial hospital admission policy for our National Tuberculosis Control Programme.

**ACKNOWLEDGEMENT**

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We are also thankful to Shri P.N Mukherjee, the Laboratory Technician, and others of the Bacteriological section of the Institution for their help rendered in connection with the Laboratory work and collection of data for this paper.

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## PROGRESS IN THE CONTROL OF TB Drug Therapy Plays Key Role

ARVIND NAIR

Tuberculosis is one of the traditional scourges of mankind. A highly infectious disease, it used to spread rapidly through whole families, especially when they were overcrowded. This dismal picture has changed dramatically for the better in recent decades, particularly since 1945. Thanks to the discovery by Nobel Laureate Dr. Selman A. Walksman of Streptomycin in 1943, of PAS in 1946 and INH in 1952 — three most potent, anti-T.B. drugs — a breakthrough has been achieved in the control of tuberculosis throughout the world.

Even so, T.B. is still a major health problem in the developing countries and most of the 1.5 to 2 million people dying annually throughout the world belong to these countries. But effective chemotherapy has given the public health authorities the confidence that they can meet the challenge of the disease. In India, nearly half the population is infected with the TB bacilli and 5 to 10 per cent of the people thus infected are liable to develop the dread disease at some point in their life-time. The National T.B. Sample Survey conducted in 1955-58 estimated that there were as many as 8 million active T.B. cases in the country at the time, of which nearly 2 million were infectious.

A comprehensive programme to control T.B. was launched during the first Plan period with the aid of W.H.O. To support this programme effectively, higher production of anti-T.B. drugs such as Streptomycin, PAS and INH was also Planned. The trend of production of anti-T.B. drugs during the 20 year 1952-72 is indicated in Table I below:

Table 1

### *Production of anti-T.B. drugs (1952-72)*

| Name of the drug | Unit  | 1952 | 1972  |
|------------------|-------|------|-------|
| Streptomycin     | Tonne | Nil  | 199.1 |
| PAS              | "     | 9.8  | 460.1 |
| INH              | "     | 1.1  | 53.3  |
| Thiacetazone     | "     | —    | 16.6  |

The likely position at the end of the Fifth Plan

is that there will be 353 District T.B. centres covering all the districts of the country and 40,000 T.B. isolation beds in these centres. The bulk of T.B. patients can thus avail of the facilities for case finding and treatment not too far away from their homes. In the Fifth Plan, the strategy under the T.B. Control Programme would continue to be to detect active cases at an early stage and to protect healthy young people especially in the age groups under 20 years, by BCG vaccination. The expenditure for the programme, which was wholly financed by the Centre during the Fourth Plan, will now be shared by the Centre and the States. The Centre will supply BCG vaccine, anti-T.B. drugs and equipment to State and voluntary T.B. clinics while the States will meet the operational expenditure of T.B. establishments — existing as well as proposed — during the Fifth Plan period. It is expected that, besides preventive care, domiciliary and institutional facilities, so augmented during the Plan period, would cover at least 50 per cent of the acutely ill and infectious patients. For its part, the pharmaceutical industry will have to step up its production of anti-T.B. drugs. The Fifth Plan targets of production envisaged for these drugs are indicated in Table 2:

Table 2

### *Fifth plan targets for anti-T.B. drugs*

| Name of drug | Unit  | Production target<br>(1978-79) |
|--------------|-------|--------------------------------|
| Streptomycin | Tonne | 825                            |
| P.A.S.       | "     | 1,000                          |
| I.N.H.       | "     | 265                            |
| Thiacetazone | "     | 70                             |
| Ethambutol   | "     | 20                             |
| Pyrazinamide | "     | 12                             |
| Ethionamide  | "     | 12                             |
| Cycloserine  | "     | N.A.                           |

### Bigger Role for Anti-TB Drugs

It may be that the targets for some of the anti-T.B. drugs will fall short of the requirements. These requirements as estimated by the Directorate General of Health Services, Government of India are : shown in Table 3.

ed for their manufacture have been established by units in both the sectors.

Most of the raw materials used in the manufacture of anti-T.B. drugs and intermediates are indigenously available in adequate quantities.

Table 3  
*Estimated requirements of anti-TB drugs*  
(In tonnes)

| Year    | Estimated No. of patients to be treated (in million) | Streptomycin | P.A.S. | I.N.H. | Thiacetazone |
|---------|--|--------------|--------|--------|--------------|
| 1974-75 | 1.5  | 75           | 1,500  | 150    | 50           |
| 1975-76 | 1.5  | 75           | 1,500  | 150    | 50           |
| 1976-77 | 1.8  | 100          | 2,000  | 180    | 70           |
| 1977-78 | 1.8  | 100          | 2,000  | 180    | 70           |
| 1978-79 | 2.0  | 125          | 3,000  | 200    | 80           |

It is expected that 5 to 10 per cent of the T.B. patients may develop resistance to the first-line drugs and would, therefore, have to be treated with such second-line drugs as Ethambutol, Pyrazinamide, Ethionamide and Cycloserine. The estimated requirements of the second-line drugs on account of 50,000 first-line drug-resistant patients in each of the five years of the Fifth Plan are, respectively, 7.5 tonnes, 12.5 tonnes, 3.75 tonnes and 3.75 tonnes. As against these requirements, the Fifth Plan targets envisaged for three of them, namely, Ethambutol, Pyrazinamide and Ethionamide are, respectively, 20 tonnes, 12 tonnes and 12 tonnes. The existing capacities of the industry for production of the first-line anti-T.B. drugs would, therefore, have to be expanded during the fifth Plan period. New production capacities may also have to be created for second-line anti-T.B. drugs. The know-how for the production of these drugs is available in India thanks to the high level of technological competence already attained by the industry. Incidentally, installed capacities at the end of 1972 stood at 252 tonnes for Streptomycin, 725 tonnes for P.A.S. 178 tonnes for I.N.H. and 195 tonnes for Thiacetazone. The public sector units — Hindustan Antibiotics and the Rishikesh Plant of IDPL — have the bulk of the capacity for Streptomycin, while the private sector units have an aggregate capacity of 80 tonnes. Installed capacities for the other anti-T.B. drugs and for the main intermediates requir-

It is only in respect of a few raw materials like Benzene, Hydrazine Hydrate, Methyl Alcohol, Methyl Aminophenol, G. Picoline and Sodium Phosphate that indigenous availability is presently inadequate. In a still smaller number of cases (of raw materials), either indigenous capacity for their manufacture can be established or substitutes thereof located indigenously.

In sum, the country is favourably placed in most respects to expand its production of anti-T.B. drugs to meet the requirements of the T.B. control programme during the Fifth Plan period. Only, there should be no delays in the licensing of additional or new capacities, wherever required. Such facilities as may be required for the expeditious installation of these capacities would also have to be provided as a matter of priority.

### Gain to the Community

The T.B. control programme on both the curative and preventive sides may well cost a total of about Rs. 220 crores over the next 20 years (including the Fifth Plan period), or an average of Rs. 11 crores per annum. But the effort represented by that much expenditure will still not be sufficient to reduce substantially the prevalence of the disease, for new cases will continue to arise year after year from the infected half of the population over the next 20 years or so. The most that can be hoped for from the proposed

intensification of control measures is a marked reduction in the T.B. mortality rate, and possibly, some decline in the morbidity rate. As the average period of temporary disability due to tuberculosis is one year, a perceptible decline in the morbidity rate will mean considerable gain to the community by way of productive work by those who have not been so disabled, thanks to the operation of the T.B. Control Programme. The T.B. mortality rate must have at present surely come down substantially from the level of 60 per 1,00,000 in 1962 and may well drop further, probably to 20 or so, over the next decade.

Total eradication of T.B. is still a distant dream in India. This is because tuberculosis, in a way, is a socio-economic disease — a disease of poverty, of consequent under-nourishment and habitation in unhygienic surroundings such as those of urban and rural slums. Its incidence being thus greatly influenced by the socio-economic conditions of the community, only an improvement in living standards, particularly those of the 40 per cent of the population below the 'poverty-line', will enhance the chances of its decline to such a low level that the disease no longer constitutes a serious public health hazard in our country.

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# COMPARATIVE STUDIES OF CULTURAL AND HISTOPATHOLOGICAL ASPECTS OF EXPERIMENTAL H37RV INFECTION IN GUINEAPIGS

N.K. GANGULY And N.L. CHITKARA

(From Postgraduate Institute of Medical Education & Research, Chandigarh)

## Introduction

The tissue reactions in early stages of Mycobacterium tuberculosis infection as seen in biopsy material is largely nonspecific in nature (Davessar and Chitkara, 1971) thereby creating diagnostic difficulties. There are scant reports of correlation of tissue reactions with cultural and histological characteristics at various time periods in experimental animals. This work was done to evaluate comparatively the cultural and histological methods in diagnosis of Mycobacterium tuberculosis in guineapigs right from two hours after infection. Attempt was made to compare the detection of AFB from tissue homogenates as well as in tissue sections after Ziehl-Neelsen's staining.

## Material and Methods

### *Guineapigs :*

Mixed colour breed of guineapigs weighing 200-250 grams reared in animal house of P.G.I. Chandigarh were used. Bhatia (1961) showed that Indian bred guineapigs were as susceptible as their foreign counterparts to H37Rv infection. The guineapigs were divided into five groups consisting of thirteen animals (Grp. I, II & V) and twelve animals (Grp. III & IV). This grouping was done arbitrarily to repeat similar manner of infection at least five times to eliminate individual susceptibility of different animals as well as chance factor in the experiment.

### *Mantoux Test :*

All the animals were tested with 1/100 dilutions of O.T. obtained from Institute of Serobacteriological Production and Research, Budapest, Hungary (Bhatia et al, 1961). All the guineapigs examined were Mantoux negative and hence used for experiment.

### *Strains of Mycobacteria :*

Standard H37Rv strain was obtained from CRI, Kasauli. It was Niacin positive, I.N.H. sensitive, catalase +ve, nitrate reduction +ve strain. This was tested according to Canetti (1963). Indian strains were not used due to variability of virulence as found by Mitchison et al (1960), Bhatia, et al (1961).

### *Media :*

Lowenstein-Jensen Medium was used for the cultural purposes. It was standardised according to Sula and Sundaresan (1963).

### *Inoculation :*

2 mg of moist weight of 15 days growth was suspended in normal saline, tween 80 and bovine albumin so that 2 mg of growth was present in 1 ml in a highly dispersed manner. 0.5 ml of the suspension was inoculated in the guineapig in the right groin. 1 mg dose schedule was adopted according to Singh (1961) who found that lesser doses reduced the rate of virulence.

### *Collection of samples ;*

Animals were sacrificed according to following schedule :

Group I : 2, 3, 4, 8 hrs and 1, 2, 5, 9, 17, 20, 24, 27, 30 days.

Group II : 2, 4, 5, 6 hrs. and 1, 2, 3, 4, 6, 7, 8, 9 and 15 days.

Group III : 2, 4, hrs and 1, 2, 4, 5, 6, 7, 9 days. Two of the animals died at 8 days of inoculation.

Group IV : 1, 2, 4, 7, 10, 13, 18, 21, 24, 27, 30 and 33 days.

Group V : 1, 3, 6, 9, 12, 15, 18, 21, 23, 26, 29 and 32 days.

These time intervals were fixed arbitrarily so that a time span from 2 hours to 33 days was covered as far as possible.

After sacrificing the animals the inguinal lymph nodes and spleen were collected. They were examined for any enlargement or caseation. A portion of the organ was collected roughly five times W/V in normal saline for culture and smear examination, the rest was collected in formal saline for histology.

### *Culture :*

The material for culture was homogenised in a glass homogeniser and was processed by modified

Petroff's method. In the first group 4% NaOH was used for decontamination and in rest of the groups 2% NaOH was used. Always two slopes of L.J. medium were put up for each sample. A direct impression smear and concentration smear was stained by Ziehl Neelsen's method and examined.

*Histological sections* were stained by Ziehl-Neelsen's and Haematoxylin Eorin staining.

Auramine O staining was also tried for histological sections but due to nonspecific fluorescence of background it had to be abandoned.

### Results

Naked eye examination of regional lymphnodes and spleen revealed that upto one day of examination there was no gross pathology or enlargement of organs. From two days to seventeen days of inoculation there was inconsistent enlargement of the organs. The degree of enlargement was one plus. Only three out of thirtyone animals sacrificed during this period showed two plus enlargement. From eighteen to thirty-three days two plus to three plus enlargement was regularly seen, although the pattern of caseation and tubercle formation was not consistent.

#### *Examination of smears from tissue homogenates :-*

AFB staining of homogenates both spleen and lymphnode showed negative result upto 8 hours of inoculation (Table 1). From one day to 14 days, smears from both organs were positive although the pattern was inconsistent. From fifteen days to thirty three days, smears were uniformly positive except for one animal.

#### *Examination of culture from the homogenate :*

Culture of both the organs from two hours, to thirty-three days was uniformly positive. In total 47/57 lymphnodes and 49/57 spleen yielded positive culture (Table 1).

*A.F.B. staining of sections* was negative in all animals upto one day. From two days to fourteen days they showed an irregular pattern of positivity, while from 15 days onwards a consistent pattern of positivity was obtained.

*Histopathology* : Histopathology showed nonspecific reaction with no evidence of tuberculosis upto seventeen days, although one animal on 9th day showed epitheloid cell reaction with minimal caseation. Fifteen days onwards the organs showed lymphoid cell hyperplasia with prominent germinal centre. In all except one of

the animals giant cells and caseation were noticed during this period.

### Discussion

Above results show that lymphnodes and spleen both yielded positive cultures right from two hours to thirtythree days while histopathology of these organs showed specific tuberculous lesions only from fifteen days onwards (Table 2). Even organwise 47/58 lymphnodes and 46/57 spleen gave positive cultures while 19/62 lymphnode and 20/63 spleen of respective number of animals gave specific histology (Table 3). These results corroborate the findings of Davessar and Chitkara (1961) from human lymphnode material. The higher positivity rate of cultures in this study is perhaps due to the use of 2% NaOH instead of 4% NaOH. These negative cultures of 3 hours and eight hours in this study belonged to first group of animals the organs of which were processed in 4 % NaOH. Ziehl-Neelsen's staining of organ homogenates gave better and more regular positivity rate throughout the study than similarly stained tissue sections which were showing inconsistent results throughout. The number of bacilli in homogenates per HPF was also higher than in tissue section of same material.

This study shows that smear examination of organ homogenates and culture is able to pick up infected guineapigs earlier (2 hours onwards) than the histology (15 days onward)- Although Ziehl-Neelsen's stained tissue section showed earlier positivity, yet due to irregular result shown, it does not seem to be very dependable.

Degree of gross pathology and enlargement corroborated well with histological examination while it had no relationship with culture positivity.

In conclusion the diagnosis of tuberculosis will be facilitated with culture and AFB staining of homogenates of biopsy material than histology alone.

### Summary

Sixtythree tuberculin tested guineapigs were inoculated 1 mg. moist weight of H37Rv strain of Mycobact. tuberculosis and were sacrificed from 2 hours to 33 days at regularly spaced time intervals. The experiments were carried out in five sets to get as much reproducibility of results as possible. The original lymph nodes and spleen were studied for histopathology and Ziehl Neelsen's staining of sections and was compared with AFB staining and culture of organ homogenates. It was found that bacteriological methods could pick up an infected organ from 2 hours.

Table I  
Total break up of cases from 1 hour to thirtythree days

| No. of animals       | Enlargement gross |        | Smear homogenate |        | Culture homogenate |                  | Histopathology |        | Sections   |        | A.F.B.     |        |
|----------------------|-------------------|--------|------------------|--------|--------------------|------------------|----------------|--------|------------|--------|------------|--------|
|                      | Lymph node        | Spleen | Lymph node       | Spleen | Lymph node         | Spleen           | Lymph node     | Spleen | Lymph node | Spleen | Lymph node | Spleen |
| 1-8 hrs. (1st day)   | 1/10              | 0/10   | 0/10             | 0/10   | 7/10               | 5/10             | 0/10           | 0/10   | 0/10       | 0/10   | 0/10       | 0/10   |
| 1-7 days (1st wk.)   | 9/22              | 12/22  | 10/22            | 8/22   | 13/19<br>3 cont.   | 14/18<br>4 cont. | 0/22           | 0/22   | 7/22       | 3/22   |            |        |
| 8-14 days (2nd wk.)  | 11/11             | 10/11  | 6/11             | 7/11   | 8/9<br>3 cont.     | 8/9<br>2 cont.   | 1/11           | 1/11   | 5/11       | 2/11   |            |        |
| 15-21 days (3rd wk.) | 9/9               | 9/9    | 9/9              | 9/9    | 8/9                | 7/9              | 7/9            | 8/9    | 7/9        | 6/9    |            |        |
| 22-28 days (4th wk.) | 6/6               | 6/6    | 6/6              | 6/6    | 6/6                | 6/6              | 6/6            | 6/6    | 5/6        | 4/6    |            |        |
| 29-33 days (5th wk.) | 5/5               | 5/5    | 5/5              | 5/5    | 5/5                | 5/5              | 5/5            | 5/5    | 5/5        | 5/5    |            |        |
| 63                   | 41/63             | 42/63  | 36/63            | 35/63  | 47/58              | 49/57            | 19/63          | 20/63  | 29/63      | 20/63  |            |        |

EXPEREMENTAL H37 RV INFECTION IN GUINEAPIGS

Table 2

*Overall comparative positivity*

|                   | No. of animals<br>histopathology | Positivity | Positivity<br>bacteriology |
|-------------------|----------------------------------|------------|----------------------------|
|                   |                                  |            | Smear + Culture            |
| 1 hr. — 8 hr.     | 10                               | 0/10       | 7/10                       |
| 1 day — 7 days    | 22                               | 0/22       | 14/19<br>3 got cont.       |
| 8 days — 14 days  | 11                               | 1/11       | 9/9<br>2 cont.             |
| 15 days — 21 days | 9                                | 8/9        | 8/9                        |
| 22 days — 28 days | 6                                | 6/6        | 6/6                        |
| 29 days — 33 days | 5                                | 5/5        | 5/5                        |

Table 3

*Comparative organ-wise positivity*

|              | No. of animals | Bacteriology |        | Histopathology |        |
|--------------|----------------|--------------|--------|----------------|--------|
|              |                | Lymph node   | Spleen | Lymph node     | Spleen |
| 1 — 8 hrs.   | 10             | 7/10         | 5/10   | 0/10           | 0/10   |
| 1—7 days     | 22             | 13/19        | 14/18  | 0/22           | 0/22   |
| 8 — 14 days  | 11             | 8/9          | 9/9    | 1/11           | 1/11   |
| 15 — 21 days | 9              | 8/9          | 7/9    | 7/9            | 8/9    |
| 22 — 28 days | 6              | 6/6          | 6/6    | 6/6            | 6/6    |
| 29 — 33 days | 5              | 5/5          | 5/5    | 5/5            | 5/5    |
| Total        |                | 47/58        | 46/57  | 19/62          | 20/63  |

onwards the positivity rate being upto eight hours 7/10, and from 1st day to 7th day 4/19 animals. After 7th day bacteriological methods could pick up all the infected organs except one. With histological methods organs did not show any specific lesions upto 15 days except in one animal. After 18 days the positivity rate with bacteriological and histological methods was

same. The positivity rate was almost similar for lymph nodes and spleen with the bacteriology and histopathology, when considered separately.

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(Sd.) B. M. CARIAPPA  
on behalf of the Tuberculosis Association of India

# PERCUTANEOUS LUNG BIOPSY WITH VIM SILVERMAN'S BIOPSY NEEDLE

B.K. KHANNA

(From K.G's. Medical College, Lucknow)

Percutaneous lung biopsy with Vim Silverman's biopsy needle was attempted for the first time in this hospital in 1958. Since then, we have performed the procedure in 49 cases.

The present paper is an attempt to present our experience.

## Material & Method

49 cases with localised or disseminated lesions of lungs were subjected to lung biopsy. The technique of biopsy was the same as that described by Chaubey and Dube (1972). However, the site of biopsy was determined after detailed radioiogi-cal and fluoroscopic studies to localise the lesion. As far as possible, lesions close to heart or neat the hilum were not biopsied for obvious reasons. Only one more puncture was performed if the initial puncture had failed to yield the tissue.

## Results:

Table 1

*Percentage of yeild on lung biopsy*

|                                   |           |
|-----------------------------------|-----------|
| Total number of cases studied     | 49        |
| No lung tissue obtained           | 17(34%)   |
| Insufficient lung tissue obtained | 6(12%)    |
| Sufficient lung tissue available  | 26 (54 %) |

Table 2

*Percentage of diagnostic lung tissue available*

|                                  |         |
|----------------------------------|---------|
| Total number of cases studied    | 49      |
| Sufficient lung tissue available | 26(54%) |
| Diagnosis established.           | 4(8%)   |

## Discussions

The success of any needle biopsy procedure will depend on two main factors :

- (a) How conveniently the involved area of that viscera can be biopsied ?

- (b) How much is t ne risk inherent in puncturing that viscera with the needle ?

Table 3

*Histology of lung tissue obtained*

|  |          |
|--|----------|
| Total number of cases with sufficient lung tissue. | 26       |
| Normal   | 10 (40%) |
| Anthracosis  | 8(32%)   |
| Chronic bronchial inflammation.                    | 3 (12%)  |
| Non-specific inflammation of lung.                 | 1 (4%)   |
| Pulmonary tuberculosis                             | 4(12%)   |

Table 4

*Percentage of complications*

|                                 |         |
|---------------------------------|---------|
| Total number of cases biopsied. | 49      |
| No complications                | 39(78%) |
| Complications recorded.         | 10(22%) |

Table 5

*Nature of complications*

|                                  |     |
|----------------------------------|-----|
| Total number of cases            | 10  |
| Haemoptysis                      | 4   |
| Mild                             | (2) |
| Moderate                         | (2) |
| Pneumothorax                     | 6   |
| Moderate                         | (2) |
| Mild                             | (3) |
| Severe leading to Cor-pulmonale. | (1) |

Vim Silverman's needle was evolved essentially for the biopsy of a solid viscera like liver. However, during subsequent years, its use has been extended to explore kidney and the lungs.

Exploration of lungs with this needle poses certain special problems. Lungs are hollow viscera full of air. Hence, their puncture, very often leads to pneumothorax. Beside, these are among the most vascular structures in the body. Approximation to major vessels and heart not only forbids certain areas of lungs from the scope of needle puncture, but also restricts the ease of manipulation. These problems add up to the pre-existing hazards of blind biopsy.

The results obtained in our series deserve some comments. While the specific tissue diagnosis was available in only 4 (8 %) cases, evidence of non-specific pulmonary and bronchial inflammation was seen in 4 additional cases. If these cases were also included, as they did yield pathological tissues, the overall recovery rate would be around 16%, which is definitely inferior to results obtained by many other workers (Sarin and Bhatnagar, 1959 and Chaubey and Dube, 1972). In 18 cases normal lung tissue was obtained. While, this may indicate our failure to reach the pathological tissue, it may also be because "only a small part of lung and pleura may be involved by the specific diseases" (Klassen 1971).

In order to improve the yield of needle biopsy various modifications to the technique have been suggested. These include: performance of biopsy with the help of image intensification and television monitoring equipment to permit fluoroscopy in any direction (Stein and Evans, 1966) and the use of trephine biopsy needle in place of Vim Silverman's needle (Neff, 1972).

High percentage of complications and their serious nature has led many workers to

Recommend the presence of thoracic surgeon as a stand-by (Klassen 1971) or prophylactic intercostal tube placement in all the cases (Youman et al 1968). Severe emphysema has been considered to be a contraindication by Stein and Evans (1966). In one of our cases with diffuse obstructive emphysema, lung biopsy was followed by persistent and severe pneumothorax, which pushed the patient into cor pulmonale.

The study, therefore, leads us to conclude that percutaneous lung biopsy with Vim Silverman's biopsy needle is neither rewarding, nor safe. In fact it may occasionally lead to hazardous complications. Open lung biopsy, in this context, appears to be the investigation of choice.

### Summary

Percutaneous lung biopsy of 49 cases with disseminated or localised pulmonary lesion with Vim Silverman's biopsy needle resulted in complications in 20 % cases and yielded diagnostic lung tissue in only 8 % cases. On all counts, open lung biopsy appears to be a more practicable and definitive procedure.

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# PSYCHOLOGICAL SURVEY OF TUBERCULOSIS PATIENTS

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## Introduction

Formerly tuberculosis was considered as a fatal disease and patients suffering from this illness were often segregated to protect the other members of the family and society from this disease. Many patients showed associated depression and apprehended death. This depression used to lead to retardation in general behavioural and emotional functioning (Wilmer, 1949.). Thanks to the discoveries of effective chemotherapeutic drugs, the gloomy picture has improved. Now the patients can be adequately treated at home. On the psychological front very few studies have been conducted so far, specially in India, where the work of this nature is very limited. Moudgil and Prasad (1972) had similar opinion and reported that no study on personality of tuberculosis cases in Indian setting has been done.

Davis (1967), Davis et al (1967) reported that patient compliance depends on many psychological and sociological factors, including the age and educational level of the patient, the inter-action between the patient and doctor, and patient's own attitudes and ideas about his disease. Pratt et al (1957), Wilmer (1953) and Barnes (1957) have reported the utility of psychological support, counselling and personality make-up of the patients as a helping factor in the therapeutic plan.

The present study, therefore, was intended to study some of the psychological variables of hospitalised male and female tuberculosis patients and to see how they responded on the Rorschach Ink Blot and Thematic Apperception Tests. Evidence suggesting social rejection, apprehensions about life and unhealthy family relationships was looked for among the responses to the tests.

## Methodology

Two consecutive series of twentyfive male and twentyfive female tuberculosis patients admitted to the T.B. Ward of K.G's Medical College and Gandhi Memorial and Associated Hospitals, Lucknow, from May to November 1968 were studied. They were subjected to a structured interview. History of parental attitudes, parental deprivation and broken home situations were elicited. Administration and interpretation of Rorschach test was done as described by Klopfer (1954), and T.A.T. was administered and inter-

preted as described by Murrey (1943). The data obtained were analysed to find out the extent of disturbed family relationship in these cases.

## Results and Discussion

*Age* : The ages of male patients ranged from 15-53 years with a mean age of 33.2 years; and the ages of female patients ranged from 12-35 years with a mean age of 22.4 years. Thus the peak age in male patients is higher than that of female patients of this series.

*Education* : Sixtyfour percent of female and thirtytwo percent of male patients were illiterate. These differences are statistically significant at .051 level (=5.12;d.f.= 1).

*Occupation* : In our country most of the women are housewives. In this study too none of the female patient had any employment. In the male group, unskilled workers and farmers (each constituting 36%) were predominant. Other occupations were skilled labour 16%, student 8 % and businessmen 4 %. The absence of higher socio-economic strata of patients is probably due to domiciliary treatment with which hospitalisation could be avoided. The findings are supported by the study of Moudgil and Prasad (1972).

*Marital Status* : Seventy percent of the cases were married, twentysix percent single, and only one percent in each group was widow/widower.

*Rubbish Childhood*: Fiftyfour percent of the cases expressed that they had experienced difficult childhood and an attitude of rejection by their parents. This was due either to parental separation, death or due to unhealthy attitude of step-mother. In male cases fortyfive percent perceived difficult childhood whereas seventytwo percent females expressed such ideas. This difference is statistically significant at .02 level (= 6.52; d.f. = 1).

*Rorschach Test*: In general thirtyeight percent of the cases gave indications of disturbed interpersonal relationships with parental figure. There was no difference in male and female patients with regard to this factor. It is more interesting to note here that most of the patients who had lost their fathers or mothers have rejected cards nos. IV & VII which is supposed to represent father-figure and mother-figure respectively, and rejection of these cards suggests disturbed interpersonal relationship with parents.

Table 1

*Demographical data of the series*

| <i>Age</i>                 | Male | Female | Total |
|----------------------------|------|--------|-------|
| 10—14 yrs.                 | —    | 1      | 1     |
| 15—19 yrs.                 | 1    | 6      | 7     |
| 20—24 yrs.                 | 5    | 11     | 16    |
| 25—29 yrs.                 | 6    | 4      | 10    |
| 30—34 yrs.                 | 2    | 2      | 4     |
| 35—39 yrs.                 | 2    | 1      | 3     |
| 40—44 yrs.                 | 5    | —      | 5     |
| 45—49 yrs.                 | 3    | —      | 3     |
| 50—54 yrs.                 | 1    | —      | 1     |
| <i>Education</i>           |      |        |       |
| Illiterate                 | 8    | 16     | 24    |
| Primary level              | 7    | 4      | 11    |
| Matriculate                | 6    | 4      | 10    |
| College                    | 4    | 1      | 5     |
| <i>Occupation</i>          |      |        |       |
| Students                   | 2    | 3      | 5     |
| House wives                | —    | 22     | 22    |
| Agriculture                | 9    | —      | 9     |
| Unskilled labour           | 9    | —      | 9     |
| Skilled labour             | 4    | —      | 4     |
| Businessman                | 1    | —      | 1     |
| <i>Marital Status</i>      |      |        |       |
| Single                     | 6    | 7      | 13    |
| Married                    | 18   | 17     | 35    |
| Widow/Widower              | 1    | 1      | 2     |
| <i>Duration of Illness</i> |      |        |       |
| Upto 6 months              | 2    | 8      | 10    |
| Between 6 mths. — 1 yr.    | 5    | 7      | 12    |
| Between 1-2 years          | 11   | 4      | 15    |
| Over 2 yrs.                | 7    | 6      | 13    |
| <i>Rubbish Childhood</i>   | 6    | 15     | 21    |
| <i>Step-mother</i>         | 3    | 3      | 6     |

Most of the cases had reported difficult childhood and the negative attitudes towards their parents. Apart from this, lack of emotional control, insecurity, anxiety, sexual tension and depressive features were observed in sixty percent of the cases.

*Thematic Apperception Test* : Sixtyeight percent of male cases and 60 % female cases have projected fear of death on T.A.T. themes. Apart from this thirtysix percent male and sixty percent female patients showed the fear of being cast out of the social sphere, which has caused anxiety in

them. These differences are significant at .05 level. The preponderance among female patients is apparently based upon social settings in which the females are economically dependent. Similar conclusion was drawn by Wilmer (1949) where he has reported that patient's major conflict involves emotional difficulties, resulting usually in depression and anxiety.

#### Summary

Two series of consecutive twentyfive male and twentyfive female hospitalised tuberculosis

patients were administered the Rorschach and Thematic Apperception Tests. Male patients were older than the females. Rubbish childhood was significantly high in the female patients. No significant differences were found on Rorschach test. On Thematic Apperception Test more females projected fear of death and fear of being cast out of the social sphere.

#### ACKNOWLEDGEMENT :

I am indebted to Professor Khanna, Deptt. of Tuberculosis and Professor Sethi, Deptt. of Psychiatry, K.G. Medical College, Lucknow for offering the facilities to carry out investigations. My special thanks are due to Dr. V.R. Thacore and S.C. Gupta, psychologist, Deptt. of Psychiatry, for their valuable suggestions.

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## NEWS & NOTES

### ANNUAL MEETINGS

The 36th Annual General Meeting of the Association will be held at 11.45 A.M. on Wednesday, the 23rd April, 1975 in the Conference Hall of the Association, 3, Red Cross Road, New Delhi-110001.

The Conference of Secretaries of State TB Associations will be held at 3.00 P.M. on the 22nd April. The Conference will review the activities of the State TB Associations.

A meeting of the Technical Committee will be held on Tuesday, the 22nd April, 1975 at 9.30 A.M. in the Conference Hall of the Association.

### NATIONAL CONFERENCE

The Thirtieth National Conference on Tuberculosis and Chest Diseases will be held in Hyderabad (Andhra Pradesh) sometime in November/December, 1975. Details regarding the dates will be announced later. Those who wish to present papers at the Conference may please address the Secretary-General, Tuberculosis Association of India, 3, Red Cross Road, New Delhi-110001.

### CHAIRMAN, TECHNICAL COMMITTEE

Dr. H.B. Dingley, Medical Superintendent, Lala Ram Sarup TB Hospital, Mehrauli, Delhi has been nominated as Chairman of the Standing Technical Committee and President of the 30th National Conference on TB and Chest Diseases *vice* Dr. M.S. Chadha.

### S.T.C. MEMBERS

Prof. K.V. Krishnaswami, Director, Government Chest Institute and Training & Demonstration Centre, Madras and Dr. S. Sivaraman, Director, TB Centre and Honorary Secretary of the Kerala State TB Association, Trivandrum, have been taken as members of the Technical Committee *vice* Dr. S.K. Sudarshan Lai and Dr. M.S. Chadha.

### HEALTH VISITORS' COURSE

The 1975 TB Health Visitors' Course will commence in July, 1975. The Course will be of 9 months duration of which five months will be spent in the New Delhi TB Centre, two weeks in L.R.S. TB Hospital, Mehrauli, two weeks for examination (in December) and three months internship which will last from 1st

January to 31st March (including two weeks in a rural centre). The minimum qualification for admission to this course is Higher Secondary/Pre-University with Science or Hygiene and Physiology in Matriculation. Applications for admission to this course should reach the Secretary-General, Tuberculosis Association of India, 3, Red Cross Road, New Delhi-110001 latest by 15th May, 1975.

### CHANCHAL SINGH MEMORIAL AWARD

The Tuberculosis Association of India will award a cash prize of Rs. 500/- to a TB worker below 45 years of age, for an original article not exceeding 30 double-spaced foolscap typed pages (approximately 6000 words) excluding charts and diagrams on a subject relating to tuberculosis. Papers may be sent, in quadruplicate, to reach the Tuberculosis Association of India office on or before 31st August, 1975. The cash prize will be awarded to the author of the selected paper at the 30th National Conference to be held in Hyderabad.

### ESSAY COMPETITION

The Tuberculosis Association of India will award in 1975 a cash prize of Rs. 300/- to a final year medical student in India for an original essay on Tuberculosis, adjudged best by a special committee of this Association. The subject selected for the 1975 competition is 'National TB Control Programme'. The prize will be awarded at the inaugural session of the 30th National Conference on Tuberculosis and Chest Diseases. The essay should be in English, typed in foolscap size, double-spaced and should not exceed 15 pages (approximately 3,000 words) excluding tables, diagrams, etc. if any. Four copies of the manuscript should reach the Secretary-General, Tuberculosis Association of India, 3, Red Cross Road, New Delhi-110001, not later than 31st August, 1975 and should be forwarded through the Dean or Principal of the College/University.

### CONFERENCE/SEMINARS/SHIBIRS

A Seminar on Respiratory Diseases and a Panel Discussion on Pulmonary Tuberculosis organised by the Sangli Branch of the Indian Medical Association was held at Sangli on 2nd February, 1975. Dr. M.D. Deshmukh inaugurated the programme.

The Maharashtra State Anti-TB Association organised its XIIIth TB & Chest Diseases

Conference in Bombay from 20th to 22nd March, 1975.

The Karnataka State TB Association intends to hold a Seminar on Tuberculosis sometime in May next at Hassan.

The Goa, Diu & Daman TB Association proposes to conduct a Seminar on TB during May next in collaboration with the Lions Club of Panaji.

The Salem District Tuberculosis Association of Tamil Nadu donated a 24-bedded TB Ward to the Government Headquarters Hospital, Salem, and brought out a Souvenir on the occasion.

The Maharashtra State Anti-Tuberculosis Camp at Khed, Dist. Ratangiri from 10th to 12th January, 1975. The 59th Anti-TB camp organised by them was held at Goregaon, Dist. Kolaba on 23rd February, 1975. The Diamond Jubilee Shibir (60th Shibir) was held at Uran, Dist. Kolaba on the 3rd day of the XIII Maharashtra State TB & Chest Diseases Conference.

#### **MARY CLUBWALA JADAV**

The Association records with deep sorrow the passing away of Mrs. Mary Clubwala Jadav, a prominent social worker, and an Honorary Secretary of the Tamil Nadu Tuberculosis Association in Bombay on 6-2-1975. She was closely associated with the Tamil Nadu Association as its Honorary Secretary for a number of years.

#### **D'ARCY COWAN MEMORIAL PRIZE 1975**

The Council of the Australian Tuberculosis and Chest Association, Inc. is offering for award during 1975 the D'Arcy Cowan Memorial Prize of \$ 200 to commemorate the memory and achievements of the late Sir D'Arcy Cowan who was the founder in 1948 of the Association.

Further details can be had from Dr. Keith W.H. Harris, Honorary Secretary, A.T.C.A., C/o Tuberculosis Division, Health Commission of N.S.W., 86-88, George Street, Sydney, N.S.W. 2000.

#### **MEMORANDUM**

A Memorandum in regard to the TB Control programme in India was submitted to Dr. Karan Singh, Union Minister for Health and Family Planning, by a deputation consisting of Drs M.S.

Chadha, R. Viswanathan, H.B. Dingley, S.P. Pamra, M.L. Mehrotra and Sri B.M. Cariappa, Secretary-General, Tuberculosis Association of India on 10.3.1975 on behalf of the Standing Technical Committee of the Tuberculosis Association of India.

#### **KHUSHI RAM SHIELD**

The Association has decided to award the RAI SAHEB KHUSHI RAM SHIELD for 1974 to the Bengal Tuberculosis Association in recognition of its outstanding general activities. The Bengal Association wins this Shield for the second year in succession. The Association has also decided to award Certificates of Merit for good performances to the Delhi TB Association and the Maharashtra State Anti-TB Association.

#### **SEAL SALE AWARDS**

The Association has decided to award the Shield for the 24th Seal Sale Campaign to the Tamil Nadu TB Association. As against Rs. 6,26,621.10 collected in the 23rd Campaign the Tamil Nadu Association collected in the 24th Campaign Rs.6,74,278.50. The Tamil Nadu Association is winning this Shield for the eighth time in succession. The Runner-up-cup for the 24th Campaign has been awarded to the Kerala TB Association, which is winning it for the third time in succession. They have improved their collections from Rs. 2,45,283.77 in the 23rd Campaign to Rs. 2,85,930.38 in the 24th Campaign. A Certificate of Merit has been awarded to the Karnataka TB Association for improving their collections in the 24th Campaign.

The Cup offered for the best performance made by smaller States and Union Territories has been won for the second time by the Goa TB Association. A certificate of Merit has been awarded to Tripura for improving its collections in the 24th Campaign.

These awards will be given at the 36th Annual General Meeting of the Association to be held on 23.4.1975.

#### **EXCERPTA MEDICA FOUNDATION CONGRESS**

The first International Congress on Patients Counselling organised by Excerpta Medica Foundation will be held at Amsterdam from 21st—23rd April, 1976. Further details can be had from the Excerpta Medica Foundation, P.O. Box 1126, Amsterdam, Netherlands.

# The Indian Journal of Tuberculosis

## ABSTRACTS

Vol. XXII

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Abst. No. 2

### **Productivity of prolonged follow up after chemotherapy for tuberculosis**

*Williams W. Stead and George H. Jurgens. Amer. Rev. Resp. Dis.; 1973, 108, 314.*

A review is made of the records of 530 patients of pulmonary tuberculosis who were treated in the sanatorium in USA during the period 1958-1960 till the sputum was converted and who thereafter received domiciliary chemotherapy. Forty-seven out of them were lost to follow up within one year. Thus 483 patients were followed for at least one year, 400 for at least 3 years and 181 for at least 10 years. There were 39 relapses amongst these patients and 23 out of these occurred in the first year after discharge from the hospital among patients who were largely irregular in treatment. The greatest number of relapses occurred in patients with advanced disease.

There were 372 patients who had chemotherapy for over 18 months and had remained well for at least 3 years after the discharge from the hospital. There were only 3 relapses amongst them subsequently (0.8% of the total or 0.12% per year). Among 28 similar patients who received chemotherapy for less than 18 months, there were 5 relapses (18%), thus proving that the most significant factor in the occurrence of relapse was adequacy of chemotherapy.

Early relapses were often detected during routine check up at the clinic but only 3 of those occurring later were so detected. The authors conclude that prolonged follow-up of successfully treated patients (who have had at least 18 months chemotherapy regularly) is not very productive and constitutes an avoidable case-load in clinics.

S.P.P.

### **Primary drug-resistance tuberculosis in children, 1961 to 1971.**

*Morris Steiner, Phillip Steiner, Madhu Rao, Rubin Padre and Robert Goldberg. Amer. Rev. Resp. Dis., 1973, 108, 321.*

A study of the frequency of primary drug

resistance among tuberculous children in a community of low socio-economic status was made during a period of short-term hospital treatment for adults in 1969-71 and compared to the frequency of primary drug resistant disease observed among children with tuberculosis who were admitted to the hospital during two prior periods that corresponded to long-term hospital care of adults viz. 1961-1964 and 1965-1968. The increase in the proportion of INH resistant strains was not significant and the rate of increase in streptomycin resistant strains during the present study was not greater than that for the previous two studies. Since tuberculous disease in children is usually the result of a recently acquired infection, these findings indicate that the shorter period of hospital treatment for adults (source cases) did not lead to increased recovery of resistant strains among children in the community.

More cases of serious types of tuberculosis resulting from infection with resistant strains were encountered among children during the study. This is obviously due to the late diagnosis and unsatisfactory treatment of the source cases and calls for intensification of attempts to avoid treatment failures in adults.

S.P.P.

### **A pilot study concerning the infection risk of sputum positive tuberculous patients on chemotherapy**

*Stuart M. Brooks, Nora L. Lassiter and Elizabeth C. Young. Amer. Rev. Resp. Dis.; 1973, 108, 799.*

In order to measure the risk of new infection among contacts, the household contacts of 21 patients with bacteriologically confirmed pulmonary tuberculosis discharged after two weeks hospitalization but still on antimicrobial treatment were followed. The contacts were 107 in all and 74 of these were tuberculin negative. Two of these 74 contacts were converted and in each of them, there was another source which could have been responsible for their tuberculin conversion. No conversions occurred among the other 72 previously tuberculin negative contacts. The authors conclude that after a few weeks of chemotherapy, the patients, even if sputum positive,

do not pose any additional risk to contacts even if they were tuberculin negative.

S.P.P.

**The risk of incidence of pulmonary tuberculosis in "carriers of fibrotic changes"**

*St. Czajka. Gruzlica, Chor. Pule.;* 1973, 41, 673.

A rural population of about 60,000 was kept under surveillance in Poland with the co-operation of WHO and UNICEF, with a view to determine the risk of breakdown of patients with fibrotic lesions. The number of such persons in the total population was about 2 %, the range being 0.09 % in the age group 0-6 years and about 7 % in those 70 years and above in age. During the follow up period of 5 years, the risk of breaking down with sputum positive disease was 11 times higher than amongst those who did not have such fibrotic lesions. Further, the risk was considerably lower in younger women as compared to men of the same age group and older women. The extensiveness of the fibrotic lesion did not seem to influence the rate of breakdown in any way. Chemoprophylaxis however reduced the risk about 3.5 times on the whole and as much as 8 times in younger age groups.

S.P.P.

**The fate of tuberculous patients who on December 31, 1965 were sputum positive for over two years**

*F. Frankiewicz, S. Kosinska-Frankiewicz. Gruzlica, Chor. Pluc.;* 1973, 41, 605.

On December 31, 1965, the tuberculosis dispensary in Konin (Poland) had 183 sputum positive cases on its books. Over 70 % of these had been notified before 1960. Five years later, 92 (50.4 %) of these were alive, 87 (48.6 %) had died. Eighty patients (44.7 %) had been rendered sputum negative during this period and only 17 (9.5%) were still under treatment. Fatality was high within the first 4 years.

S.P.P.

**Morbidity and mortality from pulmonary tuberculosis among the elderly population of Poland from 1960 to 1970**

*J. Szczuka. Gruzlica, Chor. Pluc.;* 1973, 41, 235-242-

During 1960-1970, an increase in the contribution of older age groups to the morbidity and mortality from pulmonary tuberculosis was observed in Poland. In 1960, patients aged 50 and over accounted for 32.9% of all sputum

positive cases; in 1966, patients aged 45 and over accounted for 50.8 % and in 1970 this percentage reached 55.5. In 1966, 14.2% of all sputum positive cases were aged 65 and over, and in 1970 this percentage increased to 18.8. The rate of fall of morbidity in people aged over 50 was considerably slower than that in the younger age groups. During the period under discussion, the elderly patients' contribution to morbidity increased; for patients aged over 50, from 56.1% in 1960 to 78.7% in 1970; and for those aged over 60, from 31.1% to 61.5% respectively.

**Psychic conditioning of failure of pulmonary tuberculosis treatment**

*W. Nartowska. Gruzlica, Chor. Pluc.;* 1973, 41, 803.

The study was aimed at elucidating the relationship between failure of chemotherapy and personality traits in 52 patients of pulmonary tuberculosis who had been sputum positive for a very long time. The results pointed out to an intensification of the anxiety-depressive states, especially hypo-chondiac in 48 % of the patients. The prognosis in this group was most unfavourable. Psychopathic tendencies were found in 29 % of the patients and the remaining 23 % of the patients were within normal limits. The results also indicated lack of perseverance and gratitude, as well as indolence and carelessness in 46% of the patients.

S.P.P.

**The risk of shortening of pre-operative preparation of patients with pulmonary tuberculosis with modern anti-tuberculous drugs in the light of late results.**

*J. Karski, R. Krzywinski, M. Pyczewski. Pol. Przeg. Chor.;* 1973, 45, 989-1002 (Part I & Part II)

The results of surgical treatment in patients after only a short chemotherapy of about 3 months have been compared with those who are operated after conventional chemotherapy for longer periods. The total number of patients was 81; the age range was from 19 to 60 years and they were treated surgically in the years 1969-1971 in a sanatorium in Poland. Pneumonectomy was done in 18.6 %, lobectomy in 32 % and segmentectomy in 49.4%. The indication was tuberculoma in 55.6 % of the cases and fibro-cavernous disease in 34.6%. The good and very good early results were obtained in 96.4 %. Neither the rate of success nor complication rate showed any significant difference in the two groups of patients with varying periods of pre-operative chemotherapy.

The late results as well as the complications arising in the subsequent follow up period were also no different in the two groups. The authors conclude that there is no excessive risk involved in shortening the pre-operative period of chemotherapy.

S.P.P.

#### **Surgical treatment for non-tuberculous indications of patients with pulmonary tuberculosis**

Z. Bednarski, E. Sikora. *Wiad. Lek.*; 1973, 26, 1793.

The problem of surgical treatment for non-tuberculosis complications among patients under treatment for pulmonary tuberculosis is studied in 45 patients. Only in one case (2.2%) transient worsening of the pulmonary lesion was noticed, while in two cases (4.4 %) surgical complications occurred and one patient died. The complications thus are not in any way higher in tuberculous patients under effective chemotherapy than, in nontuberculous patients operated for similar conditions.

S.P.P.

#### **Pulmonary tuberculosis and peptic ulcer**

T. Kleba. *Gruzlica, Chor. Pluc.*; 1973,41,461-469.

The study is based on a series of patients attending a Tuberculosis Clinic in Poland. Among 1,735 tuberculous patients, 63 had peptic ulcer also. This percentage was considerably higher than that among the general population. Nineteen cases of tuberculosis were found among 218 patients with peptic ulcer whereas in the same number i.e. 218 patients of other gastro-intestinal diseases, only 4 had pulmonary tuberculosis in addition. There were 15 cases of tuberculosis among 171 cases of peptic ulcer going in for surgical treatment in 1956-64. In the control group of 321 patients selected at random who underwent abdominal surgery for diseases other than peptic ulcer there were only 7 cases of tuberculosis. Follow up of the operated patients showed that the risk of developing tuberculosis was higher in patients with a peptic ulcer treated surgically than in those treated conservatively. The onset of pulmonary tuberculosis occurred usually 5 to 10 years after the operation and mostly in men aged 45 to 55.

S.P.P.

#### **The fate of chronic bronchitis**

David V. Bates. *Amer. Rev. Resp. Dis.*; 1973, 108, 1043.

Two hundred and sixteen chronic bronchitics in four big cities of Canada were followed for 10 years from 1960 to 1970. The criteria for includ-

ing in the study were "persons having clinical evidence of chronic bronchitis (in accordance with the BMRC definition) with no other known cause of chest disease; blood pressure and ECG within normal limits and earning their own living". They were all males with a mean age of 48.4 years at the start of study and a mean weight of 166 lbs. The number of cigarettes being smoked was 99 to 120 per week and they had started smoking approximately at the age of 18 years. All of them were required to attend for pulmonary function tests once a month during the first year and at least once a year thereafter. X-ray chest was taken every year. Pulmonary function studies were incomplete in the case of 40 persons; 27 died during the period of follow up and all data were complete for the remaining 149. Major cause of death was coronary thrombosis (10 cases). Two died of carcinoma lung and 4 of non-respiratory carcinoma. Respiratory failure accounted for two deaths only. The important conclusions of the study are:

1. In men with chronic bronchitis in middle age who are cigarette smokers with slight ventilatory impairment, the mean rate of pulmonary function test changes and the total death rate are very similar to those of the population at large.

2. The risk of developing "malignant" bronchitis as a complication of this syndrome appears to be small.

3. X-ray films of the chest do not appear to be useful in predicting functional deterioration but are important in the detection of vascular change.

4. Persons with greater function test deterioration were smoking more cigarettes in 1960 than a comparable group and they continued to smoke more during the 10 year period of the study.

5. Function test deterioration occurs quite independently of the occurrence of episodes of acute chest infection.

6. The development of emphysema seems to bear no relationship to the duration of chronic bronchitis.

7. Only 10 % of the 149 for whom complete data is available showed rapid deterioration of the function tests.

S.P.P.

#### **Spontaneous lysis of aspergillomata**

Kenneth J. Hammerman et al. *Chest*; 1973, 64, 697.

A series of 41 cases of intra-cavitary aspergilloma are reported from USA. In 4 cases out

of these 41, there was spontaneous lysis of aspergilloma. The occurrence of lysis in approximately 10% of aspergilloma is significant and should be considered when evaluating claims of medical treatment for aspergilloma.

S.P.P.

**The significance of localized bronchiectasis adjacent to pulmonary coin lesions**

*Richard A. Mintzer et al. Chest; 1973, 64, 155.*

Bronchography was done in 39 cases of a solitary 'coin' pulmonary lesion to determine the presence or otherwise of adjacent bronchiectatic changes. The results suggest that the presence of bronchiectatic changes is a useful criterion favouring inflammatory aetiology while absence of bronchiectatic changes suggests the possibility of a new growth.

S.P.P.

**The management and evaluation of the solitary pulmonary nodule**

*Gary Trunke, Douglas R. Gracey & R.B. Byrd. Chest; 1974, 66, 236.*

One hundred and thirty seven cases of a solitary pulmonary nodule were seen in a hospital in USA from 1963 to 1971. In 22 cases there was evidence of malignancy, 8 were benign tumors, 103 granulomas and 4 miscellaneous. Out of 103 granulomas, 51 were histoplasmosis, 20 other fungus diseases, 13 tuberculosis and in 19 aetiology could not be established. Out of the 22 malignancies, none was below 35 years in age, only one between 35 and 40 and the remaining 21 were above the age of 40 years. Surgical removal of such nodules, therefore, does not appear to be essential in persons below the age of 35. Operation is also not necessary if one can say by previous chest x-rays that the nodule has not enlarged during the preceding two years or the nodule shows calcification.

S.P.P.

**Tuberculosis of the spine**

*Lancet, Editorial No. 7873, Vol. II, 1974.*

Treatment of tuberculosis of spine is empirical, the drugs being used to supplement traditional procedures. Tuberculosis of the spine has long been treated by rest, immobilization in plaster jackets and surgical procedures such as debridement removal from the vertebral bodies of caseous material, sloughs and sequestra but it is not clear whether these conservative measures are indicated or whether chemotherapy itself was sufficient, keeping in mind that hospital and surgical

treatments are expensive and prolonged immobilization is uneconomical. It was clearly important to find out whether expense and economic loss was necessary. Spinal tuberculosis is not common. To obtain enough patients within a reasonable period trials have been done in countries with high prevalence namely, Korea, Rhodesia, South Africa and Hong Kong. Patients with lesions of cervical or sacral vertebrae have been excluded and conclusions relate to thoracic spine. In Korea a controlled comparison between out-patient chemotherapy without restriction of activity and in-patient chemotherapy for the first 6 months with rest in bed but without mechanical restraint at the end of 3 years (including 1½ years of chemotherapy) showed that 88 % of out patients treated and 84% of treated in hospital had a favourable response. Thus 6 months in bed produced no benefit.

In Pusan also as in Korea after 3 years, showed favourable response in 86 % treated with a jacket and 82 % without, the small difference not being significant indicating mechanical restraint produced no benefit.

In third study in Bulawayo, Rhodesia, debridement and chemotherapy showed favourable results in 85% and in 86% without. Thus this form of surgical procedure conferred no benefit.

The conclusions drawn from these studies indicate that controlled chemotherapy is all that is required for routine treatment of tuberculosis of the thoracic spine. Complications may need other treatment but for uncomplicated cases, rest in bed, plaster jackets and debridement are unnecessary. The basic chemotherapy regimen was isoniazid and p-amino salicylic acid (PAS) for 18 months. Initial supplement of streptomycin did not improve the results. The bacterial population of the lesions being much smaller than in cavitated pulmonary tuberculosis, the emergence of bacterial drug resistance was not a limiting factor. The results measured by exacting standards including full physical activity, radiographic stability, absence of abscesses and sinuses or nervous system involvement were very good.

H.B.D.

**Lung Abscess — A study of the results of treatment based on 90 consecutive cases**

*Christopher C. Chidi, Harvey J. Mendelsohn. Jour. Thor. Surg. Vol. 68, No. 1, July 74.*

Ninety patients with primary supportive lung abscess treated, showed a mortality rate of 16 per cent. Of the 71 patients treated medically, 14 died.

The largest number of patients were in the age group from 26 to 50 years (39 percent) and the next largest from 51 to 75 years (34 per cent). However 11 out of 15 patients who died were in the latter group. High mortality rate was in patients with debilitating diseases (14 out of 15 deaths) and the relatively large number of patients with predisposing factors, particularly alcoholism (31) diabetes (18) and steroid therapy (9).

**H.B.D.**

**Controlled clinical trial of four short-course (6 months) regimens of chemotherapy for treatment of pulmonary tuberculosis**

*Third Report of East African British Medical Research Council, Lancet, Aug. 3, 74.*

A comparison was made of relapse rate between 7 and 30 months for 6 months daily of different drug regimens in the treatment of newly diagnosed sputum positive patients of pulmonary tuberculosis along with standard drug regimen for 18 months. All the drug regimens consisted of streptomycin plus isoniazid and three of them contained a third drug—rifampicin, pyrazinamide or thiacetazone.

The bacteriological relapse rates were 29% of 112 patients on the two drug combination, 2 % of 112 patients on the rifampicin, 11 % of 112 on the pyrazinamide, 22 % of 104 on the thiacetazone and 4% of 102 patients on standard regimen. In a large comparison of three most effective regimens the relapse rates were 3 % of 152 rifampicin patients, 8% of 153 pyrazinamide and 3% of standard regimen patients.

The frequency of relapse was at 12 months and almost all patients relapsed with drug sensitive organisms. It is concluded that short—course chemotherapy constitutes a development of major importance in the treatment of tuberculosis.

**H.B.D.**

**Detection of Airway obstruction in exercise induced asthma**

*Jerome M. Buckley, Joseph r. Southrada and Michael T. Kopetzky. Chest. 66, 3 Sept. 74.*

Pulmonary function test results were evaluated in 24 bronchodilator dependant asthmatic boys before treadmill exercise (base line) and at 7 and 30 minutes afterward.

The following pulmonary function parameters were measured; forced vital capacity, forced expiratory volume in one second, maximal mid-expiratory flow, peak expiratory, flow rate thoracic gas volume, airway resistance, specific airway conductance and closing volume. A clinical scoring system based on auscultatory finding was also used to determine the degree of wheezing and respiratory effort, before, during, and after exercise.

Results showed that specific airway conductance, maximal mid-expiratory flow and closing volumes were the most sensitive parameters reflecting changes in airway calibre. Less significant changes appeared in the forced expiratory volume in one second and in the forced vital capacity.

Determination of closing volume, though a sensitive technique could be achieved in only a minority of severely asthmatic children (25 percent of patients).

It was evident that a normal peak flow reading and normal auscultatory findings did not imply a normally functioning lung. It was observed that degree of exercise induced asthma (EIA) depended on work load. Judged by changes in maximal mid-expiratory flow rate, airway resistance, and specific conductance, the incidence of EIA was 75 percent for work load 1, corresponding to 1.26 watts/Kg of body weight and 100 percent for work load 2, corresponding to 1.75 watts/Kg of body weight.

**H.B.D.**

**A clinical study of bronchial asthma in children**

*Wakhlu and Sharma. Ind. Pediat, Vol. XI No. 12, 1974.*

Bronchial asthma in children is a symptom complex with a multi-faceted aetiology of which contact with allergens in a constitutionally predisposed child is the most important. A clinical study of 433 patients showed onset of disease between 6 and 12 months of age in a majority of children, with a decreasing incidence as the age advanced. Both sexes were equally affected. A family history of bronchial asthma was obtained in 53 percent of patients.

**H.B.D.**