

# The Indian Journal of Tuberculosis

---

Vol. X

New Delhi, December, 1962

No. 1

---

## NEED FOR COORDINATION IN TUBERCULOSIS CONTROL WORK

The place of hospitals and sanatoria in the control of tuberculosis was one of the subjects discussed by a panel at the last Tuberculosis and Chest Diseases Workers Conference in Bangalore. A paper on the subject was also published in the last June issue of this Journal.

The present issue contains notes from three prominent tuberculosis workers in India, about the place of isolation in the treatment or control of this disease. As is evident from these papers, there is considerable divergence of opinion on this question. This difference is not confined only to tuberculosis workers in India, but is widely held by those in other countries as evidenced at the discussions on the subject of tuberculosis control *vis-a-vis* new approach by drug treatment, specially domiciliary treatment. In such discussions it is common that one over-emphasises certain aspects rather than taking a balanced view. It is however important to emphasise, as Dr B. K. Sikand has done in his note published in this issue, that "instead of attaching undue (*any* is the word used by the author) importance to isolation, all efforts should be directed to make anti-microbial drugs available to all the patients, and to take steps to make them take the drugs regularly and for a prolonged period."

There is now no serious divergence of opinion regarding the efficacy of drugs in domiciliary treatment of tuberculosis. While it is essential to have an organisation to make this new approach of treating patients in their homes effective, we in India have not come to a stage when we can ignore the need for more beds for tuberculous patients either for specialised purposes indicated by Dr K. T. Jesudian in his article published in the June issue or for isolation as indicated by two authors in this issue. Yet the crying need seems to be an effective coordination, in which the sanatorium or hospital on

the one hand, and the clinic and domiciliary treatment unit on the other, would work as a coordinated whole instead of working as separate and independent entities as it is often noticed in India at present. The difference between the medical and public health approach has to go as far as tuberculosis is concerned. The problem has to be viewed and dealt with as one complete entity. There is no doubt that domiciliary treatment is one of the main weapons in the armoury of tuberculosis control in India at present, and probably may continue so for many years to come, but there is also urgent need for coordinating the work of hospitals and sanatoria, with that of tuberculosis clinics and domiciliary treatment centres. This can best be done if both were under one authority, whether Public Health or Medical, and till this is done, the efforts we make in the control of tuberculosis in India will not have the full benefit. In fact this bifurcation of duties will lead to unnecessary waste in money and personnel also. Such coordination is obviously a responsibility of Governments and it is hoped that the administrators will give this aspect due consideration in their planning and execution of the schemes for the control of tuberculosis in this country. Till this is done the controversy regarding domiciliary treatment *versus* hospital treatment or isolation is unrealistic and academic.

## TUBERCULOSIS OF THE STOMACH

(With a study of four cases)

D. BHASKARA REDDY and  
M. K. R. KRISHNAN

(Department of Pathology, Andhra Medical College, Visakhapatnam)

Tuberculosis of the stomach is a rare lesion. The first case is said to have been reported by Barkhausen in the year 1824 and since then only about 400 cases have been reported in the literature. Clinical diagnosis of tuberculosis of the stomach presents many difficulties. Even at laparotomy, the lesion may present problems in diagnosis. At autopsy also the same difficulties may be encountered and quite often only histopathology can decide the issue.

In view of the sparsity of recorded cases of tuberculosis of the stomach, a detailed review has been undertaken regarding the incidence, clinical manifestations, pathogenesis and laboratory diagnosis, with a study of four cases of tuberculosis of the stomach that have been encountered in this Institution.

A summary of the clinical, autopsy and histopathological features presented by these four cases are recorded in Table 1.

### DISCUSSION

*Incidence:* It is a remarkable fact that notwithstanding the high incidence of pulmonary tuberculosis, especially so in India, gastric tuberculosis occurs with relative infrequency. The incidence of tuberculosis of the stomach varies with the material being evaluated, namely routine autopsies, autopsies performed on patients with pulmonary tuberculosis or specimens examined after surgical resection. Table 2 gives the analysis of the incidence of gastric tuberculosis in autopsy material as observed by various authors.

The incidence of gastric tuberculosis as seen in patients with pulmonary tuberculosis and on whom autopsies were later performed is shown in Table 3.

Table 4 shows the incidence of gastric tuberculosis as seen during surgical operations.

The rarity of gastric tuberculosis is amply justified by the above figures. In our series, out of a total of 3330 autopsies for the period 1926 to 1962, there were 414 cases of tuberculosis of various organs. Of the latter, there were 304 cases of pulmonary tuberculosis and only 4 cases of gastric tuberculosis in all, giving an incidence of 0.12 per cent among total autopsies, 0.97 per cent among all cases of tuberculosis and 1.3 per cent among cases of pulmonary tuberculosis. Our figures are therefore in close agreement with those of other workers.

*Age and Sex Incidence:* It is accepted by most authors that males are usually more frequently affected than females. Melchior gives the ratio of sex incidence as 5:1. In our series, there were 3 males and only one female. Gastric tuberculosis is more common in adults. Among the four cases seen by us, three occurred in persons aged 35 years and one was in a male aged 40 years.

*Routes of Infection:* Infection of the stomach never occurs through an intact mucous membrane, but it generally occurs through an ulcer, gastritis, erosion, ecchymosis or cancer. There are four possible routes of infection, namely, (a) direct infection through the mucous membrane as occurs when bacilli-rich sputum is being constantly swallowed, (b) haematogenous infection in common with miliary spread, (c) through retrograde lymphatic spread, and (d) by direct spread from contiguous organs. Of all these, direct contact of the gastric mucosa with bacilli-laden sputum has been given serious thought, in view of the fact that intestinal tuberculosis is a common complication of patients with open pulmonary tuberculosis and in whom the swallowed sputum is rich in bacilli. Thus in our series, out of a total of 304 cases of pulmonary tuberculosis, there

TABLE I

Showing summary of clinical, autopsy and histo-pathological features of our cases

Sl. No.	Sex	Age	Complaint	Clinical findings	Autopsy findings	Histo-pathology
1	M.	35	The patient was admitted in a serious condition and died soon after.		Chronic fibro-caseous, bilateral cavitory pulmonary tuberculosis-Tubercular ulcerations of stomach, intestines and trachea.	Shows histological appearances typical of tuberculosis.
2	F.	35	Swelling of abdomen & oedema of feet.	Emaciation - Anemia - Ascites - Palpable abdominal masses - Terminal diarrhoea.	Tubercular ulcerations of stomach and intestines with tabes mesenteries.	Shows appearances characteristic of tuberculosis.
3	M.	35	The patient was admitted in a serious and moribund condition.		Emaciation - anemia -chronic fibrocaceous bilateral pulmonary tuberculosis with cavitation - tubercular ulcerations of stomach, intestines and larynx.	The histological appearances are characteristic of tuberculosis.
4	M.	40	Vomiting-pain in epigastrium-diarrhoea - loss of weight.	Emaciation-palpable liver-irregular temperature. Clinical diagnosis: Cancer Stomach.	Ulcer in region of pylorus causing stenosis of antrum-edges of Ulcer raised-base of ulcer adherent to pancreas and liver enlarged lymphnodes in porta hepatis and curvatures of stomach - enlarged mesenteric lymphnodes-liver studded with multiple lesions looking like secondaries.  Autopsy diagnosis : Cancer stomach with secondaries in liver.	Shows a number of tubercles with areas of caseation, epithelioid and giant cell formation in the wall of the stomach. There is ulceration of stomach and duodenum. Foci of tuberculosis seen extending to duodenum. Acid Fast Organisms demonstrated.

TABLE 2

Showing the incidence of gastric tuberculosis in autopsy material

Author	year	Number of autopsies	Number of cases of gastric tuberculosis	Percentage
Collinson and Stewart	1928	10,000	3	0.03
Cameron	1929	2900	1	0.03
Good	1931	71,871	153	0.21
Sullivan, <i>et al</i> ...	1940	11,481	2	0.02
Authors	1962	3330	4	0.12

were 122 cases of intestinal tuberculosis, an incidence of 4.1 per cent. Nevertheless, tuberculosis of the stomach occurs only as a remote possibility. It has also been experimentally shown that it is not possible to produce gastric tuberculosis by feeding animals with large quantities of bacilli. Browne, *et al* have failed to produce specific changes in the stomach by applying cultured bacilli of unquestionable virulence directly to traumatised mucosa of canine gastric pouches.

As a rule, tuberculosis of the stomach is secondary to tuberculosis elsewhere in the body, usually pulmonary tuberculosis. Primary tuberculosis of the stomach is very rare. Among the 4 cases seen in this institution, the associated tuberculous lesions seen were as follows: Pulmonary tuberculosis in 2 cases, tabes mesenterica in one case and tuberculosis of intestine and liver in one case.

TUBERCULOSIS OF THE STOMACH

TABLE 3

*Showing the incidence of gastric tuberculosis in patients with pulmonary tuberculosis*

Author	Year	Number of autopsies	Number of cases of gastric tuberculosis	Percentage
Good ... ..	1931	15,165	80	0.52
Crawford and Sawyer ... ..	1934	1,400	Nil	Nil
Sullivan, <i>et al</i> ... ..	1940	554	2	0.36
Cullen ... ..	1940	1,043	4	0.38
Hardt and Cohen ... ..	1941	1,102	1	0.09
Browne, <i>et al</i> ... ..	1942	1,321	30	0.22
Gaines, <i>et al</i> ... ..	1952	...	...	0.36 to 2.3
Authors ... ..	1962	304	4	0.13

TABLE 4

*Showing the incidence of gastric tuberculosis as seen in surgical operations*

Author	Year	Number of specimens examined	Number of cases of gastric tuberculosis	Percentage
Clairmont ... ..	1905	258	2	0.77
Broders ... ..	1917	2501	1	0.03
Demel ... ..	1924	1568	3	0.19
Collinson and Stewart ... ..	1928	320	3	0.93
Good ... ..	1931	7416	3	0.04
Knoflach and Pape ... ..	1934	4000	5	0.12
Sullivan, <i>et al</i> ... ..	1940	75,000	1	0.001
Baruah, <i>et al</i> ... ..	1958	8200	1	0.001
Authors ... ..	1962	92	Nil	Nil

*Pathologic Criteria of Diagnosis:* It was in 1917 that Broders, for the first time, reviewed gastric tuberculosis and established the pathologic criteria of diagnosis, that are accepted even to this day. He mentioned that a positive diagnosis could be made if tubercle bacilli could be demonstrated in the depths of the histologically tuberculous lesion, that the diagnosis is probable if there is a good histological picture of tuberculosis without bacilli, and that a diagnosis is possible if there is a

good description of the gross lesions of tuberculosis. All other cases should be rejected. Following these criteria, all the four cases of our series have been diagnosed as positive since tubercle bacilli have been demonstrated in the lesions which are histologically tuberculosis in nature (Photomicrographs 1, 2 and 3). *Distribution of Tuberculous Lesions in Stomach:* Although there is no well defined pre-dilection of site for tuberculous lesions in the stomach, in the large majority of cases, it occurs



FIG. 1  
Photomicrograph illustrating  
a typical tubercle in wall of  
stomach. H & E x'50.

FIG. 2  
Photomicrograph showing  
characteristic tuberculous  
foci in the duodenum.  
H & E x 1000.

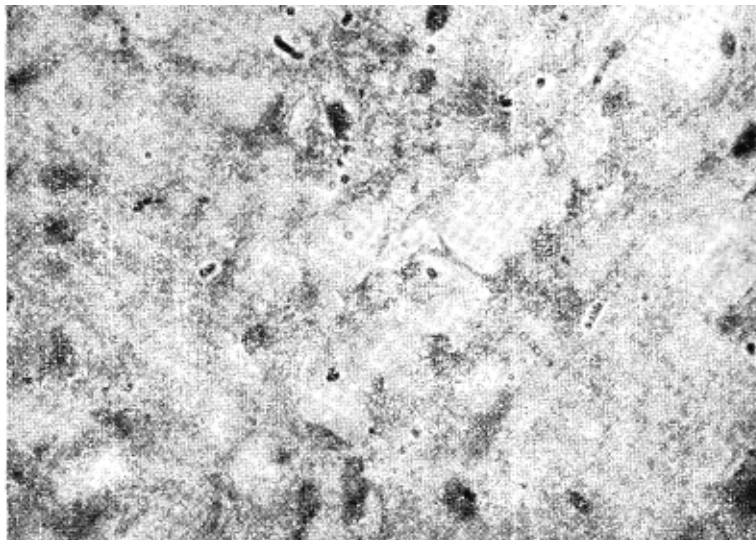


FIG. 3  
Photomicrograph showing  
the presence of acid-fast  
bacilli in the stomach  
(Ziehl-Neelson's stain  
X 1680).

TUBERCULOSIS OF THE STOMACH

in the lesser curvature and the pyloric antrum. The cardiac end appears to be relatively immune to tuberculous infection. Table 5 gives the incidence of gastric tuberculosis in various sites as observed by various authors.

TABLE 5  
Showing the incidence of gastric tuberculosis in various sites

Site	Broders	Binder, et al	Good	Authors	Total
Cardia ... ..	4	11			15
Lesser curvature ...	13	...	9	2	22
Greater curvature ...	8	...	2	...	10
Anterior wall ...	1	...	4	...	5
Posterior wall ...	6	...	7	...	13
Antrum ... ..	...	19	...	...	19
Pylorus ... ..	...	...	...	3	3
Site not mentioned ...	...	...	...	1	1

*Classification of the Gross Pathologic Types:* Tuberculosis may manifest itself in the stomach in the form of multiple erosions or ulcers of the mucosa, or as the infiltrating hypertrophic form, as the sclerosing inflammatory type or as the

acute miliary type. Of these, the ulcerative lesions are the commonest. The ulcer is usually shallow and of small size. The surrounding mucosa is thick, oedematous and hyperemic. The floor is covered with necrotic debris. The peritoneum in the vicinity of the ulcer is considerably thickened. It is believed that the ulcer develops as a result of fistula formation from a submucosal focus. Small submucosal emboli grow as tubercles and with eventual caseation, they produce multiple fistulas through the mucosa into the gastric lumen. Ulcers then develop by numerous irregular rupture of the mucosa which account for the serpiginous outline of the ulcer. Because of this fistulisation process, the ulcers are often multiple. While these ulcers are usually shallow, occasionally they may extend to the serosa. Eventually, cicatricial contraction distorts the area with the production of scarring and adhesion to neighbouring organs. The hypertrophic type is characterised by submucosal infiltration which is usually localised to the antrum. The infiltration may spread through the entire stomach, finally simulating linitis plastica. Subsequent cicatrisation with gastric obstruction is a common sequel. All our cases were of the ulcerating type (Photograph 4).

*Clinical Features of Gastric Tuberculosis:* Gastric tuberculosis does not present any characteristic clinical picture and hence eludes clinical diagnosis quite often. The most frequent abnormality is hypo- or achlorhydria. Gastric tuberculosis may closely simulate

FIG. 4  
Photograph showing the ulcerating lesion in the pylorus and duodenum.



gastritis, peptic ulcer or gastric carcinoma, with such symptoms as pain in the epigastrium coming on after food, vomiting and progressive loss of weight. According to Walters, Kirklin and Clagget, fifty per cent of the patients with gastric tuberculosis have a palpable mass. The vomit may be dark in colour, suggestive of gastric haemorrhage. Diarrhoea, if present, is usually due to simultaneous involvement of the intestines in the tuberculous process. The differential diagnosis usually considered are gastritis, peptic ulcer and gastric carcinoma. Because of the rarity of gastric tuberculosis it is doubtful if it can at all be diagnosed clinically. Even during operation, a diagnosis of gastric tuberculosis is seldom suspected. The gross examination of the stomach at operation suggests malignancy and the correct diagnosis is not suspected till microscopic examination is made. Even at autopsy the issue may not be decided, as was seen in one of our cases reported. In view of the above difficulties and since many patients with pulmonary tuberculosis have gastric symptoms and since the clinical features of gastric tuberculosis are not distinctive, it is said that a diagnosis may be arrived at by the following investigations: (1) gastroscopy, (2) roentgenology and (3) Histo-pathological examination.

*Gastroscopy as an Aid to Diagnosis:* It is said that there are four peculiarities with the gross manifestations of gastric tuberculosis that may be of help in its diagnosis by the use of the gastroscope and by which it may be distinguished from gastric carcinoma. These features are the characteristic undermined eged of the ulcer, the typically serpiginous nature of the ulcer, the multiple fistulous openings through the mucosa and the presence of superficial tubercles in the neighbourhood of the lesion, all of which can be visualised by the gastroscope.

*Roentgenological Features:* All radiologists are agreed on this that there are no characteristic radiological features of gastric tuberculosis and that radiology may suggest a diagnosis of peptic ulcer or gastric carcinoma. This is further complicated by the fact that carcinoma and tuberculosis may coexist, as is discussed below. However, the usually accepted differentiating points are that the radiological shadow in the case of cancer is irregular while the contour is smooth in tuberculosis. Ackerman suggests

that if a fistulous tract can be demonstrated radiologically, it is in favour of a diagnosis of tuberculosis. He also suggests that simultaneous involvement of the stomach and duodenum increases the possibility of it being a tuberculous infection because of the rarity of simultaneous involvement of these in cancer.

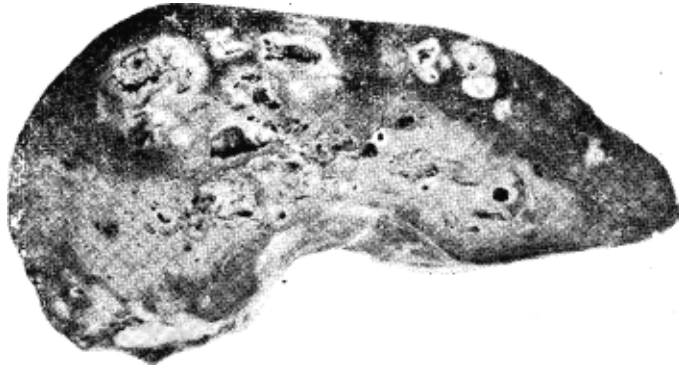
Since a definite diagnosis cannot be made radiologically, a correct correlation between clinical history, clinical examination and radiological findings should be attempted. One should grow suspicious of tuberculosis if one or more of the following features are also present: (a) Tuberculous infection elsewhere in the body, (b) a strongly positive tuberculin reaction in the absence of a demonstrable lesion in other organs, (c) A palpable abdominal mass, (d) Radiological evidence of a gastric fistula or sinus, (e) Presence of tubercle bacilli in the stomach contents in the absence of pulmonary tuberculosis, (f) Absence of response to routine treatment of peptic ulcer and (g) A positive response to anti-tubercular treatment. Biopsy of a lymph node draining the stomach may greatly help in clinching the diagnosis.

*Gastric Tuberculosis and Carcinoma:* Cancer and tuberculosis in the same organ are not antagonistic. So also in the stomach. In fact, their co-existence in the stomach is said to be notoriously common. In 1943, White stated that 10 per cent of the reported cases of gastric tuberculosis had been complicated by cancer. However, among the four cases of gastric tuberculosis seen in this Institution, no co-existing carcinoma has been noticed. So also, among the 107 cases of gastric carcinoma studied, no tuberculosis has been seen to co-exist.

Tanner, *et al* mention that tuberculous nodules in the liver are occasionally met with and that care should be taken not to confuse them with secondary malignant conditions. The last case presented herein is a typical example of one where even at autopsy such a mis-diagnosis was in fact made. (Photograph 5). Such tuberculous lesions in the liver result from portal pyaemia.

*Prognosis:* Prognosis is said to be good after anti-tubercular treatment and more so after surgery in those patients in whom the general condition is good and in whom there is no active tuberculosis elsewhere in the body.

FIG. 5  
Photograph showing cut section  
of liver with multiple necrotic  
nodules.



#### SUMMARY

(1) Tuberculosis of the stomach is a rare lesion. Only four cases of gastric tuberculosis have been met with out of a total of 3330 autopsies, although the total number of cases of tuberculosis of other organs was 414.

(2) Tuberculosis of the stomach is more common in males and occurs more frequently in adulthood.

(3) The routes of infection of the stomach have been discussed, with particular reference to the immunity of the stomach to tuberculous infection in spite of the high incidence of pulmonary tuberculosis.

(4) The pathologic criteria of diagnosis as enunciated by Broders and which hold good even to this day are briefly dealt with.

(5) The anatomic distribution of the tuber-

culous lesions in the stomach and the classification of the gross pathologic types of gastric tuberculosis have been presented.

(6) The clinical features presented by gastric tuberculosis, the difficulties in its clinical diagnosis and the role of gastroscopy and radiology as aids to diagnosis are also discussed. A summary of the salient findings in the four cases studied is also recorded.

#### ACKNOWLEDGEMENTS

We are thankful to Dr D. Govinda Reddy, M.D., Director, Upgraded Institute of Pathology, Andhra Medical College, Visakhapatnam for the valuable help rendered in preparing this paper.

With pleasure we acknowledge the help rendered by Photo Artist K. Ch. Appalaswamy.

#### BIBLIOGRAPHY

1. Ackerman, A. J.: Roentgenological study of gastric tuberculosis: *Am. J. Roentgenol.*; 1940, 44, 59.
2. Ametur, N. R., Roy, H. G. and Chhalva, A. S.: Tuberculosis of stomach; *J.I.M.A.*, 1962, 38, 548.
3. Baruah, B. D. and Mahanta, J.: Primary tuberculosis of the stomach: *J.I.M.A.*, 1958, 31, 436.
4. Binder, I., Ruby, B. M. and Shuman, B. J.: Tuberculosis of the stomach: *Gastroenterol.*; 1945, 5, 474.
5. Broders, A. C.: Tuberculosis of the stomach with a report of a case of multiple tuberculous ulcers: *Surg. Gynec and Obst.*; 1917, 25, 490.
6. Browne, D. C., McHardy, G. and Wilen, C. J. W.: Gastric mucosal changes of tuberculosis; *Am. J. Digest. Dis.*, 1942, 9, 407.
7. Cameron, O. J.: Gastric tuberculosis with report of two cases: *Ann. Int. Med.*; 1929, 2, 1265.
8. Chazan, B. I. and Aitchison, J. D.: Gastric tuberculosis; *B. M.J.*; 1960, Oct. 29, 1288.
9. Clairmont, P.: Bericht uber 258 von Prof. von. Eiselberg ausegelfuhrte Magensoperation: *Arch. f. Klin. Chir.*; 1905, 76, 180.
10. Collinson, H. and Stewart, M. J.: Chronic peptic ulcer of the stomach with acute miliary tuberculosis of the gastric mucosa: *Brit. f. Surg.* 1928, 15, 626.

11. Crawford, P. M. and Sawyer, H. P.: Intestinal tuberculosis in 1400 autopsies: *Am. Rev. Tuberc.* 1934, 30, 568.
12. Cullen, J. H.: Intestinal tuberculosis—A clinical pathological study: *Quart. Bull. Sea View Hosp.*, 1940, 5, 143.
13. Demel, R.: Zur Pylorusstenose auf tuberculo-  
ser Basis; *Deutsche Ztschr. f. Chir.*, 1923, 183,  
348.
14. Gaines, W., Steinbeck, H. L. and Lowenhaupt,  
E.: Tuberculosis of the stomach, *Radio-  
logy*, 1952, 58, 808.
15. Good, R. W.: Tuberculosis of stomach,  
Analysis of cases recently reviewed, *Arch.  
Surg.* 1931, 22, 415.
16. Hardt, L. L. and Cohen, J. J.: Gastrointesti-  
nal complications in pulmonary tubercu-  
losis: *Am. Rev. Tuberc.*, 1941, 43, 628.
17. Knoflach, J. G. and Pape, R.: Ein Fall von  
polyposen nicht ulcerierten Magentubercu-  
lose, *Wien. Klin. Wchnschr.* 1934, 47,  
1288.
18. Melchior, E.: *Mitt. Grenzgeb. Med. u. Chir.*  
1926, 39, 205.
19. Palmer, E. D.: Tuberculosis of the stomach  
and the stomach in tuberculosis: *Am. Rev.  
Tuberc.* 1950, 61, 116.
20. Parameshvara, V.: Tuberculosis of the sto-  
mach, *Antiseptic*, 1959, 56, 695.
21. Sullivan, R. C., Fancona, N. T. and Kirshbaum,  
J. D.: Tuberculosis of stomach—Clinical  
and pathological study, *Ann. Surg.* 1940,  
112, 225.
22. Tanner, N. C. and Swynnerton, B. F.: Gastric  
tuberculosis associated with gastric carci-  
noma: *Brit. y. Surg.*, 1956, 43, 573.
23. Walters, W., Kirklin, B. R. and Clagget, O. T.:  
Tuberculosis of stomach, *Proc. Staff Meet,  
Mayo Clinic*, 1936, 11, 83.
24. White, R. R.: Simultaneous carcinoma and  
tuberculosis of the stomach in a case of  
pernicious anaemia: *Proc. Staff Meet,  
Mayo Clinic*, 1943, 18, 165.

## A HISTOPLASMIN SENSITIVITY SURVEY IN KERALA

N. G. PANDALAI, P. V. KURUP, K. INDIRA DEVI AND K. M. JOSEPH  
(Department of Bacteriology, Medical College, Trivandrum)

### INTRODUCTION

Histoplasmosis was first described clinically by Darling in 1906 and diagnosed as a mycotic infection by Da Rocha Lima in 1912. The causative agent *Histoplasma capsulatum* was cultivated and described by De Monbreum in 1934 (Mochi and Edwards, 1952). For many years histoplasmosis was regarded as an acute, rare and fatal illness of man, presenting a variety of clinical manifestations. Primary histoplasmosis occurs most often in the lung, heals partially by resolution, but leaves multiple areas of calcification in the parenchyma and regional lymph nodes. Progressive histoplasmosis is characterised by irregular pyrexia, emaciation, leucopenia and secondary anaemia.

The distribution appears to be global, but restricted to certain areas. Reports have come from the United States, Central and South America, Europe, Russia, Java and Africa. As the result of extensive surveys, employing the histoplasmin skin sensitivity test, highly endemic areas are reported from the U.S.A. These endemic areas include the central Mississippi Valley, the Ohio Valley and the central part of the United States. Similar high incidence of positive reactors to histoplasmin has been found in Mexico and Panama and a low incidence in other regions such as Venezuela, Netherlands, Norway, Switzerland and Australia. Again, a low incidence has been reported from a few surveys conducted in Africa. Fewer surveys had been carried out in Asia, particularly in India. Tucker and Kvisselgaard (1951) reported a high percentage of reactors in Burma.

It is not known how the infection takes place. The disease has been observed in animals, like dogs, cats, horses and many rodents. But so far there is no verified case of transmission from man to man or from animal to man reported. In recent years the parasite has been isolated from the soil.

Clinical cases have been reported from Java and India. Panja and Sen (1954) appear to be the first describers of the disease from India. Sen Gupta, Rao, Banerjee, Chakraborty

and Ray (1957) reported a case of progressive histoplasmosis from Calcutta. But in both the above cases no attempt had apparently been made to culture the organism. Successful isolation of the organism from the soil was claimed by Kalra, Borcar and Robellow (1957), who isolated two strains of *Histoplasma* from the soil, at Poona. In the United States and other countries, wide skin test surveys were carried out and from the results the exact distribution and the severity of infection were mapped out. In India so far only eleven surveys were undertaken, covering a total of 10,119 persons. Table I shows the regions where histoplasmin sensitivity surveys were done, with details of the antigen used for the testings. This investigation was undertaken in order to cover greater regions in this country.

### MATERIALS AND METHODS

Four hundred and seven persons were tested with histoplasmin (H-42) and tuberculin simultaneously. Histoplasmin (H-42), received from a single source—the United States Public Health Service, was used throughout the survey. The tuberculin employed was received from the King Institute of Preventive Medicine, Guindy, Madras. Both the antigens were stored at 4°C, during the study. Uniform techniques were followed all through. One-tenth millilitre of the antigen was injected intradermally into the forearm. Histoplasmin was given in the right and tuberculin in the left hand. Results were read after forty-eight hours. The diameter of induration was measured with a millimetre scale by placing it over the reaction area. New syringes and needles were used for every injection and precautions were taken to prevent the interchange of equipments.

Medical students and hospitalised patients formed the field of study. The number of students tested formed only one-fourth of the total. They come from different parts of the State. Patients were selected at random from the antenatal wards of the S.A.T. Hospital, attached to the Medical College, Trivandrum.

TABLE I

	Type of subjects studied	Number Tested	Antigen	Percentage positive	Author and year
Agra ... ..	School children, students and out-patients	1331	Lily	1.6	Wahi, 1955
Darjeeling ... ..	Tea plantation workers	1178	H-42	0.2	Edwards, <i>et al</i> , 1956
Sakthikulangara ...	School children	343	H-42	0.0	„
Ramgarh ... ..	School children	218	H-42	0.0	„
Kelur ... ..	...	602	H-42		„
*Calcutta ... ..	Cases of tropical eosinophilia	64		4.7	Dhariwal and Chakraborty, 1954
*Calcutta ... ..	Patients of the Chest Department and workers	4855		0.7	Sen and Ghosh, 1956
Delhi — rural ... ..	...	103	Park Davis & Co.	2.9	Viswanathan, 1960
Delhi — reverie ... ..	...	162		12.3	„
Delhi — urban ... ..	...	301		4.9	„
*No selected place ...	...	962		0.9	Taneja, <i>et al</i> , 1955
Trivandrum ... ..	Medical students and patients	407	H-42	6.0	Present study

\* From Viswanathan, *et al*, 1961

TABLE II

*Incidence of Histoplasmin and Tuberculin Sensitivity Among the People Tested*

Age group (Years)	T - H -		T + H -		T + H +		T - H +		A11H +		A11T +		Total cases tested
	Cases	%	Cases	%	Cases	%	Cases	%	Cases	%	Cases	%	
10-20 ...	16	28.06	36	63.16	4	7.01	1	1.75	5	8.76	40	70.17	57
21-30 ...	100	42.55	125	53.68	8	3.40	2	0.85	10	4.25	133	56.59	235
31-40 ...	42	41.59	50	49.51	9	8.91	...	...	9	8.91	59	58.42	101
41-50 ...	4	36.36	6	54.54	2	...	1	9.09	1	9.09	6	54.54	113
Above 50 ...	1	33.33	66	66	...	...	...	...	...	...	66	66	
Total ...	163	40.05	219	53.80	21	5.16	4	.98	25	6.14	240	58.96	407

T — = Tuberculin negative  
T -f- = Tuberculin positive

H — = Histoplasmin negative  
H + = Histoplasmin positive

These patients represent a region within a radius of twenty miles from the college.

**RESULTS**

Induration measured after forty-eight hours of the histoplasmin injection is represented in Fig. 1. The great majority of the cases (88 per cent) showed no reaction or only a slight discolouration measuring up to 2 mm. Only 6 per cent showed a reaction of five millimetres or above. The largest reaction measured 20 mm., in a female aged 25 years who had a tuberculin reaction of only 8 mm. Among the twenty-five histoplasmin reactors only four showed a negative tuberculin reaction, the rest reacting positively to this antigen.

Sixty per cent of the tested persons gave a positive tuberculin reaction, thirty per cent showed either no reaction

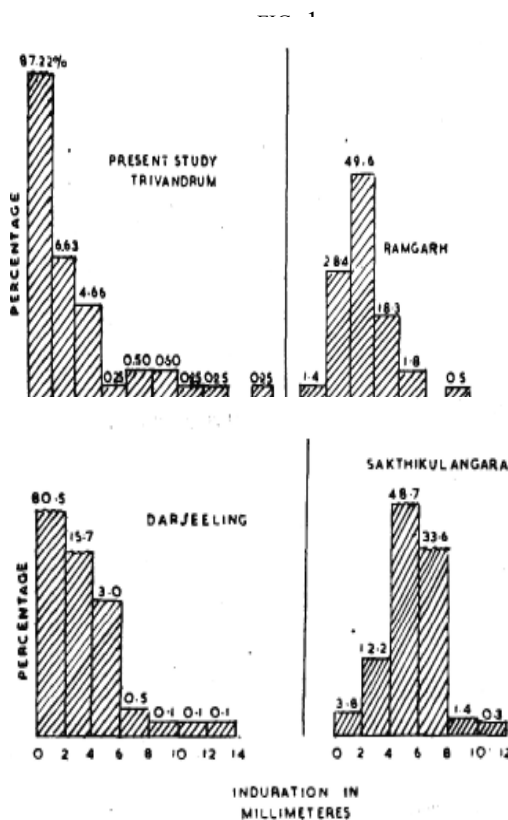
at all or only a slight discolouration and ten per cent showed a reaction intermediate between these two. Out of the 407 cases studied, 167 showed negative tuberculin reaction (less than 5 mm.) and 382 negative histoplasmin reaction; 163 cases were negative for both (Table II). In the listed negatives, 94 cases did not show even a trace of reaction, whether against histoplasmin or tuberculin. Including the common 94 cases, 311 cases showed not even a trace of reaction to histoplasmin and 103 to tuberculin. The reading rates are given in Table II.

In our series only a very small percentage of persons tested showed a reaction above the conventional positive level. Table II shows the incidence of histoplasmin and tuberculin sensitivity among the population tested. The age group from 21-30 years showed more negative reactors among them than the other age groups. The maximum number of histoplasmin reactors came from the age group between 31 and 40. Nearly one per cent of the total cases tested showed a positive reaction to histoplasmin with a negative tuberculin reaction.

**Ind. J. Tub., Vol. X, No. 1**

**DISCUSSION**

Fig. 1 shows the comparative results of the histoplasmin skin test carried out in other parts of India (Edwards, 1956) as well as in the present case. The results obtained from Ramgarh and Sakthikulangara, a place forty-five miles north from here, do not show any similarity of results with those obtained at Darjeeling (Edwards, 1956) and those from the present study. In the former two places, the majority of the persons tested showed a reaction above 5 mm. In our series only very few (25 out of 407) reacted to histoplasmin, with above 5 mm.; so also in Darjeeling where nearly 95 per cent of the tested people reacted poorly to histoplasmin, a finding almost similar to that of ours. More than 70 per cent from both Ramgarh and Sakthikulangara showed a re-



action intensity above 5 mm. This has been explained by the finding that similar reactions had been produced there by injecting the buffer solution alone and the reactions consequently classified as non-specific reactions. Edwards thus concluded that 'there is thus little indication that histoplasmin sensitivity exists in the population in India'. Wahi (1955) found histoplasmin sensitivity in about 2 per cent of his series of 1331 cases. His conclusions were based not only on the skin test but also on roentgenological study.

The histogram constructed from our results shows an interesting point. The histoplasmin positives form a separate group in the picture. The figure reveals that a positive reaction is the one with an induration measuring six millimetres or even 8 millimetres and the use of the five millimetre conventional positive may not be correct in this locality. Even if such a criterion for positiveness is accepted, only two per cent of the cases would be showing positive reaction to histoplasmin.

Wahi (1955) got about 78 per cent of cases having positive tuberculin reaction. But in

our study only 60 per cent showed positive tuberculin reaction. How far this discrepancy could have been influenced by prior B.C.G. vaccination is not known.

#### SUMMARY

407 persons were tested simultaneously with histoplasmin and tuberculin antigens. About six per cent gave positive reaction to histoplasmin and 60 per cent gave positive reaction to tuberculin. Methods used and results obtained are fully described.

#### ACKNOWLEDGEMENTS

We are deeply indebted to Dr Phyllis, Q. Edwards for a liberal supply of histoplasmin. We are very happy to thank the students of this college who have willingly come forward as test personnel. Our thanks are due to the Principal of this college and the Superintendent of the S.A.T. Hospital for the help they have rendered in the conduct of the test. We also thank our colleagues of this Department for their unstinted co-operation throughout this investigation.

#### REFERENCES

1. Dhariwal, G. K. and Chakraborty, N. K. (1954), *Ind. Med. Gas.* 89, 23.
2. Edwards, P. Q., Geser, A. G., Kjolbye, E. H., Meijer, J. H. and Worm Christensen, O. (1956) *Amer. J. trop. Med. Hyg.*, 5, 224.
3. Kalra, S. L., Borcar, M. D. S. and Robellow, E. R. F. (1957) *Indian J. Med. Sci.*, 11, 496.
4. Mochi, A. and Edwards, P. Q. (1952) *Bull. World Hlth. Org.*, 5, 259.
5. Panja, G., Sen, S. (1954) *J. Indian Med. Ass.*, 23, 257.
6. Sen, P. K. and Ghosh, M. B. (1956) *Ind. J. Tuberc.* 3, 78 [Quoted by Randhawa, H. S., Sandhu, R. S. and Viswanathan, R. (1961) *Indian Journal of Chest Disease*, 3, 33.]
7. Sengupta, P. C., Rao, A., Banerjee, A. K., Chakraborty, A. N. and Ray, H. N. (1957). *Bulletin Calcutta School of tropical Medicine*, 5, 54.
8. Taneja, B. L., Kalra, S. L., Waller, S. O. and Sachdeva, L. D. (1955) *A.M.R. year.* 11, 149. [Quoted by Randhawa, H. S. Sandhu, R. S. and Viswanathan, R. (1961) *Indian Journal of Chest Disease*, 3, 33].
9. Tucker, N. A. and Kevissilgaard, N. (1952) *Bull. World Health Org.*, 7, 189.
10. Viswanathan, R., Chakraborty, S. C., Randhawa, H. S. and De Monte, A. J. H., (1960) *Brit. Med. J. Feb.* 6, 399.
11. Wahi, P. N. (1955) *Indian J. Med. Res.*, 43, 139.

## EVALUATION OF METHODS OF SPUTUM COLLECTION IN THE DIAGNOSIS OF PULMONARY TUBERCULOSIS

S. S. MAJUMDAR, A. B. KUNTE AND C. R. N. MENON

(T.B. Control and Training Centre, Nagpur)

For the demonstration of tubercle bacilli in the sputum, whether by direct microscopy or by culture, the quantity expectorated in the early morning or in 24 hours is generally considered to be more suitable than that expectorated at any other time of the day. (Todd, Sanford and Wells—1958) However in our out-patients department in the T.B. Clinic, we were experiencing great difficulty in getting all the patients diagnosed as pulmonary tuberculosis on radiological and other evidence, to bring from home their sputum for examination even when the sputum cups were supplied from the clinic. Some patients brought it irregularly after several days and others failed to bring any specimen for examination. In order to obviate this difficulty, the routine of collecting sputum under our supervision in the clinic itself was started (Spot specimen). Where no sputum was produced, laryngeal swab was taken for culture. Thus this ensured that every patient attending the clinic and diagnosed provisionally as pulmonary tuberculosis gave his sputum (or laryngeal swab if sputum was not available) for bacteriological confirmation of the diagnosis wherever possible. Though convenient, it was not definite if a large proportion of bacillary cases were missed by us because of replacement of home specimen by spot specimen of sputum. A small study of the two types of sputum specimens as regards percentage of positive results for Myco-bacterium tuberculosis was therefore taken up in the tuberculosis control and Training Centre, Nagpur.

### MATERIAL AND METHODS

Results from 76 patients diagnosed as pulmonary tuberculosis and in whom the diagnosis was bacteriologically confirmed by the demonstration of tubercle bacilli from a pair of one spot and one collection specimen are available for analysis. All the patients were above 14 years age, had not taken any treatment before and had first attended the clinic between

May 1959 to October 1960. They all belonged to Nagpur proper. During this period 2772 patients from Nagpur proper were diagnosed as pulmonary tuberculosis and tubercle bacilli demonstrated in the sputum in 1054 of them.

### COLLECTION OF SPECIMEN

Patients were given a sterile waxed cardboard sputum cup and asked to produce a sample of sputum in our presence. If the amount produced was scanty or unsatisfactory, laryngeal swab was taken. It was found that in many cases taking the laryngeal swab led to the production of satisfactory expectoration. These patients were also given at the same time a sterile sputum cup and asked to bring a 24 hours collection of sputum from home. The help of health visitors for obtaining collection specimen was taken.

Both the 'spot' and the 'collection' sputum specimen were examined for the presence of Myco-bacterium tuberculosis using the following procedure.

(1) Direct microscopy of the smears stained by Ziehl Neelsen method with 0.1 per cent malachite green as counterstain.

(2) Culture: Each specimen was inoculated into 2 tubes of Lowenstein Jensen medium, the sputum-swab method (Nassau, 1954) being followed. The tubes were examined for growth every week for 6 weeks—the tubes showing no growth at the end of that period being reported as negative.

From 76 patients, a total 111 pairs of spot and collection sputum specimens, where a positive result was available from any of the specimens in the pair, were obtained. It is to be noted that in 35 patients, 4 specimens or 2 pairs of spot and collection specimens were taken, and in the remaining patients one pair only. These additional specimens in the 35 patients were taken, not for diagnosis which was already made from the first pair, but because initially it was planned to take 4 specimens from each patient. These additional

pairs have been amalgamated with the 76 pairs to give 111 spot and 111 collection specimens for comparison.

## OBSERVATIONS

Results of direct smear and culture of 111 spot and collection specimens are shown in Table I. It is seen that 69 or 62.2 per cent of the spot specimens and 76 or 68.4 per cent of the collection specimens are positive by direct smear. On culture, 98 or 88.3 per cent of the spot specimens and 103 or 92.7 per cent of the collection specimens are positive. These differences in positive result between the two types of specimens are statistically not significant at 1 per cent level. Thus though spot specimens have yielded less number of positive results than collection specimens, the difference is small, and can be due to chance. However the spot specimens have shown their utility in detecting 62.2 per cent by direct smear and 88.3 per cent by culture of the total number of bacillary cases.

To see whether the result of comparison of 2 types of specimens would be different in patients with non-cavitary disease and the possibility of spot specimen having greater disadvantage in such patients, a sub-group of 42 patients with non-cavitary lesion as revealed by single P A skiagram is separated. 58 pairs yielding a positive bacteriological result are available in this sub-group (Table II).

By direct smear 62.1 per cent of spot and 68.9 per cent of collection specimen are positive. By culture 87.9 per cent of spot and 94.8 per cent of collection specimen are positive. These differences are not statistically significant. Though collection specimens have revealed more bacillary cases than spot specimens, the difference as in the entire group, is small and likely to be due to chance. Result of comparison of two types of specimens is not different from that in the entire group. Most of the patients had moderately advanced disease not extending beyond two zones. Even in this type of patients with non-cavitary lesion, spot specimen has shown its utility in revealing a large proportion of bacillary cases.

Forty-seven pairs of spot and collection specimens giving a positive result were available from 32 patients who were treated with PAS 10 g and INH 200 mg. daily for a period of 6-10 weeks. These are shown in Table III. It is seen that the total number of positive results obtained by direct smear of both types of specimens is much less in this group than in the untreated group. Moreover the difference between the results of spot and collection specimens in this group is more marked. On direct smear examination, 21.2 per cent of spot specimens are positive compared with 34 per cent of collection specimens. By culture, 61.7 per cent of spot specimens have revealed the presence of Myco-bacterium tuberculosis

TABLE I

*Results of direct smear and culture examination of 'spot' and 'collection' specimens*

Type of specimen	Direct smear					Culture	
	Positive				Negative	Positive	Negative
	3 Plus	2 Plus	1 Plus	Total			
Spot	4	18	47	69 62.2%	42	98 88.3%	13
Collection	8	20	48	76 68.4%	35	103 92.7%	8
Total 111 specimen of each type ... ..	...	S.E. = 6.38			...	S.E. = 3.92	

TABLE II

*Direct smear and culture results of the sputum specimens from patients with non-cavitated disease*

Type of Specimen	Total No. of specimen	Direct Smear				Culture	
		3 Plus	2 Plus	1 Plus	Total Positive	Positive	Negative
Spot ... ..	58	3	8	25	36 62.1%	51 87.9%	7
Collection ...	58	3	12	25	40 68.9%	55 94.8%	3
		S.E. = 8.79				S.E. = 5.17	

TABLE III

*Results of Direct Smear and culture examination of 47 'spot' and 'Collection' specimens from treated patients*

	Direct Smear				Culture	
	3 Plus	2 Plus	1 Plus	Total Positive	Positive	Negative
Spot. ... ..	...	3	7	10 21.2%	29 61.7%	18
Collection ... ..	...	3	13	16 34.0%	39 82.9%	8
Total 47 pairs of each type	S.E. = 9.12				S.E. = 8.96	

as compared to 82.9 per cent revealed by collection specimen. This difference in culture results is statistically significant. Thus spot specimen appears to be less useful in treated patients for revealing the presence tubercle bacilli.

DISCUSSION

Though in this small study, for diagnostic purpose collection specimens have revealed more bacteriologically positive cases than those revealed by spot specimens, the difference is not marked and there is no significant loss of positive results by spot specimen. The spot specimen has the advantage of simplicity, necessitating minimum attendance of the patient

in the clinic and of ensuring a diagnostic specimen from every patient attending the clinic. Thus all the 2772 newly diagnosed patients attending the clinic during this period gave their sputum for bacteriological confirmation of the diagnosis. Taking into consideration this fact of ensuring a diagnostic specimen from every patient by above routine, and our past experience of difficulty in getting home-specimen, we feel that in actual practice in a T.B. Clinic, spot-specimen of sputum proves more valuable in revealing a large number of bacillary cases.

A large scale study of the two methods of sputum collection was reported earlier from Madras by Andrews and Radhakrishna (1959)

using fluorescence microscopy of smears and culture with 8-9 weeks incubation on four specimens from each patient. Various combinations of spot and collection specimens were studied. They also found that if culture facilities were available a spot specimen could reveal almost the same proportion (90.8 per cent) of positive cases as collection specimen (93.1 per cent)—Our results are similar. (88.3 per cent and 92.7 per cent respectively). In patients with less extensive and non-cavitary disease, they found greater advantage with collection specimen. Thus in 96 pairs of specimens from 48 patients, they found that on microscopy, 30.2 per cent of spot and 45.8 per cent of collection specimens were positive, and on culture, 63.5 per cent of spot and 80.2 per cent of collection specimens were positive. This difference between the results from the two types of specimens in this sub-group was appreciably greater than that in the entire group. Our findings in 42 patients are somewhat different. The higher percentage of positive results by collection specimen is maintained in this sub-group, but the difference in results of the two types of specimens in this sub-group is not greater than that in the entire group. Our finding of 62.6 per cent by direct smear and 87.9 per cent by culture of bacillary cases from spot specimen compared with the corresponding figures of 68.9 per cent and 94.8 per cent respectively from collection specimen show that even in this sub-group results from spot specimen are not different, and spot specimen is useful in such type of cases also. This satisfactory result in spot specimens even from patients with less exten-

sive and non-cavitary disease in our series may be due to our practice of using laryngeal swab for ensuring satisfactory sputum specimen—(laryngeal swab itself can be cultured when there is no satisfactory sputum).

In treated patients however, the results from spot specimen are not so satisfactory and a considerable proportion of bacillary cases may be missed if spot specimen alone is used. These findings are in agreement with those of Andrews and Radhakrishna. (1959).

#### CONCLUSIONS

This study has shown that there is no significant loss of positive results if spot specimen of sputum is used in place of collection specimen for bacteriological confirmation in the newly diagnosed patients of pulmonary tuberculosis. This appears to be so even in patients with less extensive and non-cavitary disease. While collection specimen may be used in individual doubtful case, it is not necessary in every patient. Numerically inferior positive results from spot specimen of sputum are more than made up by its other advantages—mainly that it can be obtained easily from every patient attending the clinic. Hence it can be used as a routine for finding bacillary cases amongst newly diagnosed patients in a TB clinic, taking the aid of laryngeal-swab where necessary, for obtaining satisfactory sputum or culturing the swab itself when no sputum is available.

#### ACKNOWLEDGEMENT

The authors are grateful to the Surgeon General with the Govt. of Maharashtra for giving permission to publish this paper.

#### REFERENCES

1. Andrews R. H. and S. Radhakrishna (1959), *Tubercle*, **40**, 155.
2. Nassau E. (1954) The third Colonial Supplement on Bacteriological Examination in Tuberculosis published by British Tuberculosis Association, London.
3. Tood J., Sanford A. and Wells Benjamin (1958), *Clinical Diagnosis by Laboratory methods*, 12th edition, p. 23, W. B. Saunders, Philadelphia.

## CHEMOTHERAPY IN LARYNGEAL TUBERCULOSIS WITH SPECIAL REFERENCE TO CORTISONE

C. K. CHAUBE

and

J. B. L. MATHUR

(Department of Tuberculosis, K. G. Medical College, Lucknow)

During the early days, the treatment of Laryngeal Tuberculosis was vocal rest, application of galvano-cautery, local sprays, powders, paints and certain types of irradiation therapy; but few had more than a sporadic success. Immediately after the first World War as A.P. treatment came into prominence, it was found to have a beneficial effect on Tuberculous Laryngitis also. From 1925 onwards as the surgery such as Pneumolysis, Thoracoplasty, Phrenic operation etc., made a rapid progress it was observed that an early improvement often resulted in improvement of laryngeal lesions as well. One must bear in mind that Laryngeal Tuberculosis is always secondary to Pulmonary Pathology, and the disease should be treated as a Laryngo-Pulmonary. Complex as such no case with laryngeal involvement could be cured if the patient had an active pulmonary lesion with little resistance to overcome the general infection.

The remarkable advancement in the field of chemotherapy has completely changed the outlook of Laryngeal Tuberculosis. The real advancement came in 1944 after the discovery of streptomycin. After that, other drugs such as P.A.S., Thiosemicarbazone, I.N.H. and Ciazide etc., came in the armamentarium of Physicians and brought a new hope for the workers. Because of the favourable means of treating Laryngeal Tuberculosis today with the powerful chemotherapeutic agents, it makes us alert all the more, to the early detection of this condition, so that the required therapy may be instituted.

The use of cortisone in tuberculosis has been the subject of interesting studies in the recent years. Although a number of workers have reported the results of their study of hormonal therapy in Pulmonary Tuberculosis, very little work has been done in connection with laryngeal tuberculosis and as such it needs a definite evaluation in this direction. There are relatively few forms of tuberculosis in humans, appropriate for such a study. It is a progressive disease with a reasonably predictable course.

Chest skiagrams as the sole means of evaluating changes in a Tuberculous lesion cannot be relied upon. In this situation the extent of viable tissue within a lesion must be determined by a procedure which is highly subjective before proper evaluation of subsequent changes within the lesion can be accomplished. Such is the case, however, when a lesion is available in which changes recurring after the introduction of a variable can be easily observed by more direct visualisation.

### MATERIAL AND METHODS

Out of a total of 600 cases of Pulmonary Tuberculosis, who visited the Kasturba T.B. Clinic and Hospital, a routine indirect laryngoscopy supplemented by direct laryngoscopy where necessary, revealed 94 cases of Laryngeal Tuberculosis. The cases were closely followed each month to observe the effect of various therapy regimens on laryngeal lesion for a period of four months.

The laryngoscopic findings were classified according to the Criteria recommended by William A. Lall (1954).

- (A) Minimal—10 cases, having mild inflammation and pallor.
- (B) Moderate—18 cases, having erosion of mucosa.
- (C) Moderately Advanced—64 cases, having superficial ulceration oedema or early granuloma.
- (D) Far Advanced—2 cases, having destructive changes as perichondritis or necrosis and chronic cases with fibrosis and stenosis.

### THERAPY

The various therapeutic regimen used in this study were:

**I. Sensitive Group:** No. of cases—80. The cases who were sensitive clinically and bacteriologically to the conventional chemotherapeutic drugs like streptomycin, P.A.S. and Isoniazid, were put into 3 groups.

- (a) Streptomycin and Isoniazid—20 cases  
 Streptomycin . . . 1 Gm.  
 O.D. I.M.I. }  
 Isoniazid . . . 100 mgm } for 40 days.  
 B.D. daily.

followed by

- Streptomycin . . . 1 Gm.  
 on alternate days. }  
 Isoniazid . . . 100 mgm. } for the rest of  
 B.D. daily. } the period.
- (b) Isoniazid and P.A.S.—20 cases.  
 Isoniazid . . . 100 mgm B.D. daily.  
 P.A.S. 8 gms daily.
- (c) Isoniazid alone—20 cases.  
 10 mg. per kilogram of body weight  
 with Benadon (Vit. B<sub>6</sub>) 40 mg. daily.

Ciazide . . . 10 mg. per kilogram of body weight.

P.A.S. 8 Gms daily. (d) Special Group (Cortisone)—20 cases.

The cases who were sensitive to the conventional chemotherapeutic drugs were put on cortisone under the cover of suitable chemotherapy. The dose used was:

5 mg. Q.I.D. for 4 weeks.

5 mg. T.D.S. for 2 weeks.

5 mg. B.D. for 1 week.

5 mg. O.D. for 1 week and then withdrawn. Out of 94 cases followed for a period of 4 months 38 cases had not received any treatment prior to the commencement of therapy in this study, while 56 cases had received antitubercular treatment previously for varying periods. In all the treated cases sensitivity test was done and suitable drug combination was prescribed. Vocal rest was maintained to all cases on various regimens.

## II. Resistant Group: 14 cases.

The cases were partially or completely resistant to Streptomycin and Isoniazid, both clinically and bacteriologically.

### OBSERVATIONS

TABLE I. *Effect on Laryngeal disease (Objective relief) as a whole*

Laryngeal Disease	Complete Resolution	Improved	Stationary	Worse	Total
Minimal . . . . .	8	2	0	0	10
Moderate . . . . .	6	8	4	0	18
Moderately Advanced . . . . .	24	30	10	0	64
Far Advanced . . . . .	0	0	0	2	2
Total . . . . .	38	40	14	2	94

TABLE II. *Effect on Laryngeal Symptomatology (Subjective Relief) as a whole*

Laryngeal Symptoms	Before Therapy	After Therapy	Remarks
Change of Voice . . . . .	49	10	3 cases were asymptomatic all through
Dysphagia or odynophagia . . . . .	22	6	
Dryness of Mouth . . . . .	8	4	
Abnormal Sensation in Throat . . . . .	10	2	
Referred pain in ear . . . . .	2	0	
Total . . . . .	91	22	3

TABLE III  
Correlation Between Objective and Subjective Improvements

Objective	No. of Cases	Subjective			Remarks
		Complete	Partial	Worse	
Complete Resolution	38	38	0	0	3 cases were a symptomatic
Improved ...	40	26	12	0	
Stationary ...	14	4	8	1	
Deterioration ...	2	0	0	2	
Total ...	94	68	20	3	3

TABLE IV  
Comparative Efficacy of various Therapy Regimens on Laryngeal Diseases

Laryngeal Diseases	Therapy Regimens					Total
	S.M. & I.N.H.	I.N.H. & P.A.S.	I.N.H. Alone	Cortisone & Chemotherapy	C.A.H. & P.A.S.	
Complete Resolution	10	8	6	12	2	38
Improved... ..	10	10	8	8	4	40
Stationary ...	0	2	6	0	6	14
Deteriorated ...	0	0	0	0	2	2
Total ...	20	20	20	20	14	94

**CHEMOTHERAPY**

(1) Streptomycin and I.N.H.

On the whole out of 20 cases treated with this therapy regimen, 10 cases showed complete resolution, while another 10 cases showed improvement in the laryngeal condition.

*Subjective*

The improvement tended to occur within one month of the institution of treatment. The patients were put on strict vocal rest, hence, it was not possible to determine, whether, the change of voice had improved earlier than other symptoms. Remarkable improvement was observed in all cases who had initially complained of dysphagia or odynophagia. All cases had regained their normal or more or

less normal voice within 2 months of the treatment while other symptoms had improved earlier.

*Objective*

It was remarkable to note that objective improvement in all the cases was registered within six weeks of treatment, while after the completion of three months, the larynx had returned completely to normal in 10 cases and in others it had improved considerably.

**EFFECT ON NATURE OF LARYNGEAL LESION**

All the ulcerative cases showed rapid and a more complete healing than the cases who had predominantly infiltrative lesions.

*Laryngeal condition: Pulmonary Condition Subjective Improvement*

The improvement in the laryngeal lesion was found to coincide with the improvement in the Pulmonary condition. This was noted at the same time after the institution of I.N.H. treatment as that with P.A.S. and I.N.H.

*Over all effects*

This drug combination appeared to be quite effective. Improvement in the subjective symptoms occurred earlier than those of objective symptoms. The ulcerative type of disease tended to heal better than infiltrative type of lesion. Improvement in the Laryngeal condition was synchronous with that of pulmonary lesion.

*P.A.S. & I.N.H.*

This drug combination was administered in 20 cases. 8 of them resolved completely, 10 cases showed an improvement in the laryngeal condition, and in 2 cases the condition remained stationary.

**SUBJECTIVE IMPROVEMENT**

It was noted in about six weeks period. Complete relief was obtained in 10 cases after three months, while 8 cases demonstrated marked improvement in the subjective symptoms, and 2 cases had only slight improvement.

**OBJECTIVE IMPROVEMENT**

It occurred in about 2 months time. As with streptomycin regimen, the improvement in the ulcerative type of disease was more pronounced than the infiltrative type.

*Laryngeal condition: Pulmonary Conditions*

The improvement in the laryngeal condition was noted to run parallel with the Pulmonary lesion.

**OVERALL EFFECTS**

It was similar to that of previous drug combinations.

*I.N.H. Alone*

The single drug therapy treatment was given to 20 cases, 14 of them had a negative sputum before starting the therapy. Six cases showed complete resolution, while 8 cases had improvement in the laryngeal disease. The remaining 6 showed no changes.

*Objective Improvement*

This was noted after 8 weeks of the institution of treatment. The experiences regarding the nature of the laryngeal lesion responding to chemotherapy was similar to those noted in the previous groups.

*Laryngeal condition: Pulmonary Condition*

Out of 14 cases in which there was improvement in the Pulmonary condition, there was improvement in the laryngeal condition in 8 cases and complete resolution in 6 cases. In 2 cases in which Pulmonary condition was stationary, laryngeal condition was also unchanged and in other 2 cases in which pulmonary condition was stationary, laryngeal condition was improved. In one case while the pulmonary condition showed deterioration, the laryngeal condition was improved.

*Overall Effect*

Single drug I.N.H. treatment registered an improvement in lesser percentage of cases, and the result on the whole was poorer than the previous two therapeutic regimens.

*C.A.H. & P.A.S.*

This combination was used in only those cases who had developed resistance to other anti-tubercular drugs P.A.S. was used because significant resistance to P.A.S. is known to occur only after prolonged treatment with this drug. The cases on the whole were treated previously irregularly for varying periods of time and therefore had special problems with them. Most of these cases suffered from chronic fibrocaseous type of Pulmonary tuberculosis and therefore their laryngeal condition was also correspondingly more chronic as opposed to that of other groups. Hence the results cannot be compared with those of the other groups. Out of a total of 14 cases studied, all of whom had a positive sputum, complete resolution occurred in 2 cases only, 4 cases improved, 6 cases remained stationary, while 2 cases become worse. The improvement in the subjective symptoms tended to

occur, even as late as 10 weeks after instituting treatment. This was noted in only 4 cases out of which 2 showed a complete resolution.

#### *Objective Improvement*

Only 2 cases showed a complete resolution. Most of the cases suffered from infiltrative or chronic ulcerative type of laryngeal tuberculosis and their condition remained practically the same after 3 months of the treatment. One case who had bilateral extensive pulmonary tuberculosis, had also perichondritis and necrosis of larynx. This patient deteriorated rapidly in spite of the treatment.

#### CORTISONE

20 cases were studied in this group. Out of these, 12 cases showed complete resolution while 8 cases improved considerably.

#### *Subjective Improvement*

It was noted within one week of the institution of therapy, so much so that at times it become impossible to convince the patient that vocal rest was absolutely necessary for his recovery. The dysphagia and odynophagia disappeared rapidly.

#### *Objective Improvement*

With in 2 weeks of therapy, the congestion disappeared, the ulcers started showing evidence of healing and infiltrations became more pronounced owing to the disappearance of the surrounding congestion. The remarkable fact was, that there was minimal of fibrosis and scarring after healing.

#### *Laryngeal condition—Pulmonary condition*

In all the cases improvement in the laryngeal condition had far excelled the improvement in Pulmonary condition.

#### DISCUSSIONS

##### *Chemotherapy in laryngeal tuberculosis*

The literature on laryngeal tuberculosis is enormous. A large number of workers have studied the effect of chemotherapy in laryngeal tuberculosis, but it is very surprising to find that whereas all of them have tried to associate the laryngeal condition with the pulmonary condition, none of them has attempted to

associate the reverse. Laryngeal Tuberculosis is a problem for Pthysiologist and it is worth while, seeing this condition from the point of view of a chest specialist and not that of laryngologist. The condition is so intimately linked with the pulmonary condition that it appears unreasonable to disregard the Pulmonary condition totally. Streptomycin has been said to be very effective in the treatment of laryngeal tuberculosis (Fifi *et al* 1946 Black and Bogen 1947, Lall Wallner *et al* 1954, Liberman 1958, 1957 and Gilbert *et al* 1952). I.N.H. as a single drug has been administered with advantage in laryngeal tuberculosis (Rosen *et al* 1952). P.A.S. was observed to have a minor action on Laryngeal Tuberculosis (Seiler 1949, Salvi 1949, Wallner *et al* 1951, Gilbert *et al* 1952).

It was again surprising to note that very few workers used the drugs in combination, in the treatment of laryngeal tuberculosis. This again reflects the differences in the method of looking at the same condition by a Pthysiologist and a laryngologist; while a Pthysiologist treats the laryngeal condition but gives a primary importance to the Pulmonary lesion, a laryngologist may entirely concentrate on the laryngeal pathology. This point has been stressed here since it is a well known fact that single drug therapy gives rise to resistance very soon and in a high percentage of cases; yet most of the workers have used the single drug treatment. The problem of resistance is getting more and more acute every day and as such it cannot be overlooked. The results with the double drug treatment have been found superior in all respects to that of single drug I.N.H. treatment.

Streptomycin and I.N.H. combination appears to be the most potent. It appears that this action is due to its direct effect on the Pulmonary lesion and due to its primary action on the laryngeal condition, because in all the cases the improvement in the laryngeal condition was found synchronous and even followed the improvement in the pulmonary condition. The streptomycin and I.N.H. is the most potent drug combination in Pulmonary Tuberculosis as has been proved by M.R.C. Trial 1953. It is quite natural that it should be potent on laryngeal condition also because of its superior effects on the pulmonary disease.

P.A.S. and I.N.H. drug combination as expected has a poorer effect than that of

streptomycin and I.N.H. This appears to be due to two factors. Firstly P.A.S. and I.N.H. are less potent on the Pulmonary condition (M.R.C. Trial 1953). Secondly the experiences of the laryngologists show that when used as a single drug, P.A.S. is much less potent than streptomycin (Gilbert *et al* 1952). Hence the results are inferior.

Single I.N.H. has the poorest effect out of these drug regimens. The results are not beyond expectations. Since the combination of I.N.H. with P.A.S. tends to produce a higher blood concentration of I.N.H. because both of them compete for the same metabolic fate and P.A.S. as such has been found to exert some beneficial effect on the laryngeal condition. The streptomycin and I.N.H. combination has been found to exert a synergistic effect on each other. The present study shows that wherever feasible Streptomycin and I.N.H. should be the first line of defence, while the use of single drug therapy such as I.N.H. should be discouraged. Single I.N.H. treatment neither results in a cavity closure in significant percentage of cases, nor it demonstrates a marked improvement in laryngeal condition, hence we do not advocate the use of I.N.H. as a single drug treatment. P.A.S. and I.N.H. treatment can be given where, for one reason or the other, the patient cannot take streptomycin.

Whereas the impression on the whole with C.A.H. appears to be rather encouraging, one important point should not be forgotten, that these cases were treated previously irregularly and failed to respond to the drugs; the second point that must be remembered is that all of them as a result of previous chemotherapy had only chronic fibrocaceous type of disease, the reversible changes having been already occurred with the previous chemotherapy. Under these circumstances it would not be justifiable to conclude hastily that C.A.H. had no effect on the laryngeal lesion. The drug after all caused improvement in 4 cases and complete resolution in 2 cases, which means, that about 50 per cent cases did show improvement in the Laryngeal condition.

The literature is silent about the effect of C.A.H. on laryngeal tuberculosis. The indirect evidences regarding the beneficial effect of the drug on the mucosal lesions could be obtained by the studies of Shah (1956) on Intestinal Tuberculosis and Kanzler (1957),

Karl-ola-obrant and Lind (1957) on Genito-Urinary tract. The studies on endobronchial Tuberculosis in our hospital also confirms this statement. But in our studies it appears that the effect, whatsoever, C.A.H. has on endobronchial disease, is secondary to that of Pulmonary lesion.

#### CORTISONE IN LARYNGEAL TUBERCULOSIS

Cortisone has been tried in various forms of Tuberculosis with varying results. Whereas the experimental studies conducted by earlier workers (Spain and Molumet 1950, Michael *et al* 1957 and Block *et al* 1951), demonstrate a delirious effect, the later studies (La Maistre and Tomsett 1951, Winner and Evans 1952), however, did not confirm it. The enhancing effect of cortisone on the host resistance has also been reported. The references on the use of Cortisone in Laryngeal Tuberculosis are sparse and far from satisfactory (La Mastre *et al* 1951 and Brown *et al* 1954). Whereas La Maistre had used cortisone alone and reported excellent results only as long as cortisone was being given, he found a rebound phenomenon after the cessation of the therapy Brown *et al* used cortisone with only streptomycin with good results. It has already been stated that drug combinations give better results than single drug therapy in laryngeal tuberculosis. Hence it is difficult to assess from these studies the present day status of cortisone. Today we do not use cortisone alone or in combination with a single antituberculous agent.

It would not be out of place here to mention the effect of cortisone on mucosal lesions since after all laryngeal tuberculosis is only one of the mucosal lesions. Hardy (1952) and Tandon *et al* (1958) have reported excellent results with cortisone in endobronchial tuberculosis.

Our studies showed that cortisone had an excellent effect on laryngeal tuberculosis. The outstanding effect was out of proportion to that of those cases who had received chemotherapy alone. Discussing the mechanism of action of cortisone in tuberculosis, McIude, and Riggin (1957), believed that it had three fold actions and they were anti-inflammatory, antiallergic and therapeutic. A fourth action of cortisone has come up recently. In Tuberculosis there is an adreno-cortical deficiency and thus cortisone can also have a replacement action in such cases (Tandon *et al* 1957).

Actually McIude and Riggins (1957) advocated that small doses of cortisone could be given in tuberculosis as a tonic.

The anti-inflammatory effect of cortisone had been studied in detail by Lurie and Zappasode (1956) who attributed it to the alteration in the intercellular ground substance of the capillary wall in such a way that toxic agents emanating from the necrotic foci did not alter its permeability. The anti-allergic effect of cortisone appeared to be due to 3 main factors. Firstly Cortisone prevented anti-body formation, secondly it prevented the transport of antibodies from the reticuloendothelial cells to the diseased site by way of lympholysis or through the prevention of diapedesis of the lymphocytes, and finally cortisone prevented the union of antigen and anti-body at the level of the cells. Both these actions of cortisone were responsible for its direct effect on laryngeal tuberculosis in causing a reduction in oedema and hyperaemia and thereby facilitating the healing of ulcers.

The cortisone appears to have a direct mucosal action in laryngeal tuberculosis. It caused a more rapid resolution of lesions and is particularly of great value in laryngeal tuberculosis because it prevents the multiplication of fibroblasts, hence no deformity or stricture occurs under the treatment of Cortisone. It is very important in laryngeal tuberculosis because even slight deformity of vocal cords may lead to gross disturbances in phonation specially in those who have to use their voice more.

Thus combination of cortisone with conventional chemotherapy is a combination *par excellence* in the treatment of laryngeal tuberculosis.

#### CONCLUSIONS

1. 600 cases of proved Pulmonary Tuberculosis who visited the K.T.B. Clinic and Hospital as indoor or O.P.D. cases were taken up for study. Routine laryngoscopy in those cases revealed the presence of laryngeal disease in 94 cases which were observed for a period of 4 months to find out the effect of various therapy regimens.

2. The cases were classified into 4 groups depending on the extent and type of laryngeal disease.
3. Before starting the therapy, sensitivity test was done in all cases and they were broadly divided into 2 main groups according to the sensitivity results. Out of a total of 80 cases who were sensitive to streptomycin P.A.S. and Isoniazid, 20 were put on Streptomycin and I.N.H. combination, 20 were put on P.A.S. and I.N.H. regimen, 20 were put on single I.N.H. drug therapy and 20 cases were treated by cortisone under cover of adequate anti-tubercular drugs. The 14 cases who were partially or completely resistant to streptomycin and I.N.H. were put on Ciazide and P.S.A. combination.
4. Amongst the drug combinations in a sensitive case, streptomycin and I.N.H. appears to be the combination of choice, P.A.S. and I.N.H. gave slightly poorer results, which was not unexpected.
5. Use of single I.N.H. in the management of Laryngeal Tuberculosis has been deplored.
6. C.A.H. could cause improvement in laryngeal condition in 50 per cent cases who had failed to respond to conventional chemotherapy. Thus it becomes an important line of defence in the resistant cases.
7. The chemotherapy appears to act through their effect on the pulmonary lesion, as well as by a direct action on the laryngeal mucosa, specially with streptomycin and I.N.H.
8. Addition of Cortisone to the chemotherapy enhances the recovery of laryngeal tuberculosis. The recovery and improvement rate shoots up to 100 per cent cortisone appears to exert a direct effect on the laryngeal lesion. Thus cortisone in addition to conventional chemotherapy becomes the treatment of choice in laryngeal tuberculosis.

## BIBLIOGRAPHY

1. Black and Bogen: *American Rev. Tub.* (1947) 56, 405.
2. Brown *et al.*, *Jour. Amer. Med. Science* (1954) 228, 491.
3. Figie and Henshaw: *Jour. Indian Medical Association* (1947) 17, 114.
4. Gilbert and Arnoff: *Indian Medical Gazettee* (1953) 88, 241.
5. Kanzler *et al.*, 14/1 (1957) 54-62, quoted from *Excerpta Medica Chest diseases* (1957) 51, 58.
6. Karl-Ola-Obrant and Lind: *Urologia International* (1957) 4, 16.
7. Lell, W. A.: *Arch. Oto. Laryngology* (1954) 60, 350.
8. Liberman, G. E. and Lell: *Jour. Amer. Med. Assoc.* (1958) 143, 920.
9. Lemaistre *et al.*, *Jour. of Clinical Invest.* (1951) 30, 448.
10. Lurie and Zappasodia: *Science* (1951) 113, 234.
11. Report on M.R.C. Trial; 1953.
12. Mclude and Riggins: *Lancet* (1958) 1, 1370.
13. Shah, N. B.: (1956); Proceedings of Thirteenth Tuberculosis Workers' Conference Trivandrum.
14. Salvi, A. K. E.: *Tubercle* (1949) 30, 225.
15. Thompson and Negus: *Diseases of Nose and Throat* (1955).
16. Tandon *et al.*, *Ind. Jour. of Tub.*, (1957) 4, 116.
17. Wallner *et al.*, *Jour. Amer. Med. Assoc.* (1951) 145, 1252. Wallner, L. J.: *Jour. Amer. Med. Science* (1957) 72, 448.

## COMPARATIVE EVALUATION OF DOMICILIARY AND HOSPITAL TREATMENT IN PULMONARY TUBERCULOSIS\*

K. S. ANEJA  
(Tuberculosis Officer, Chamba, H.P.)

The efficacy of 'Home treatment' in Tuberculosis has been established by many. Comparative studies have also been made and it has been proved that Domiciliary chemotherapy if properly carried out is as effective as given in Hospitals, outstanding of these is that of the Madras Chemotherapy Centre.

The aim of this small study is to justify the usefulness of 'Home service' in a hilly area where its conduct is more difficult and where people are superstitious, economically backward and mostly ignorant. Endeavour has also been made to give comparative evaluation of Domiciliary and Hospital treatment in such an area.

### ORGANISATION OF SCHEME

The attempted study is based on the data collected by such a service as is practised in Chamba Town and a surrounding area of five miles with a population of 13,233. The town and the rural areas were divided into different Sectors and a fixed area was allotted to each Health Visitor who makes a specific number of visits to the Urban and Rural part of his allotted zone. Injections are mainly carried out in the clinic except in the seriously ill and bed ridden cases. The contact is maintained with the patients' families and the community through four Health Visitors under my supervision.

The organisation suffers from the non-existence of voluntary care and after care committees and also of any medico social worker or Health Educator. There is no organised arrangement for socio economic relief to the patient although what is possible is being done with the existing facilities.

### MATERIAL

Of the 2,398 cases who attended the chest clinic during the period between January 1959 to December 1960, 495 were those of Pulmonary Tuberculosis.

\* Though there had been publications of investigations on this subject, this is published to draw the attention of our workers, that even in out of the way places with meagre facilities, one can carry out domiciliary treatment in a systematic way if one is enthusiastic. —Ed.

TABLE I

*Details of Total New Cases Registered between  
Jan. 59 to December, 1960*

2398		
Pulmonary Tuberculosis 4951	Non-Pulmonary Tuberculosis 313	Non- Tuberculous 1590
From Domiciliary Area 128		From other parts of the Dist. 367
Referred by Civil Hosp. and Voluntary Attendance 93	Case finding programme (Contact Examination) 35	

Among these 495 cases, 128 were in the Domiciliary area. The sources of the cases are:

- |                                                            |    |
|------------------------------------------------------------|----|
| (a) Case finding programme                                 | 35 |
| (b) Referred by Civil Hospital and<br>Voluntary Attendance | 93 |

From the above, two points stand out prominently.

1. Nearly 27 per cent of the total cases were discovered during contact examination representing an organised effort for search of new cases.

2. That there were large number of patients, who were referred by other departments of the general hospital indicating excellent co operation between the different departments of the Hospital.

The radiological and Bacteriological assessment of 128 cases is given in Table III.

Of all the cases 45 per cent were far advanced, 33 per cent moderately advanced and 22 per cent minimal. The criteria followed for classification being:

TABLE II  
Details of the case finding Programme

Contacts of Total cases	Total Contacts investigated	Contacts from the Domiciliary Area who have been detected to <i>be</i> suffering from Pul. -Tuberculosis
5654	981	35

*Minimal:* A small unilateral or bilateral lesion without cavitation. The extent of the total lesion being not more than two intercostalspaces. It was only the extent of the lesion and not its age which was considered.

*Moderately Advanced:* Unilateral or Bilateral lesion which involved a total lung tissue between one third to the equivalent of the total volume of one lung. The total area of the Cavity/Cavities if present did not exceed 4sq. cm.

*Far Advanced:* A lesion more extensive than moderately advanced.

The majority of the minimal cases were those who were detected during contact examination showing the importance of case finding programme which forms but one part of domiciliary service in Tuberculosis.

77 per cent of the cases whose Bacteriological examination was completed were found positive on direct smear. The table also shows that 26 per cent of the cases could not be followed for more than 3 months. Nearly half of these cases were reported to have left the locality. They had possibly come in the hope of getting immediate admission to the hospital. The real non-co-operators from the start were 12 i.e., 10 per cent who would not follow the advice howsoever one tried; causes may be superstition and ignorance.

This has left, 95 cases out of which 70 were treated purely under domiciliary service and in the rest 25, treatment was supplemented with hospitalisation.

In general the treatment policy was to give 12 months continuous chemotherapy in different combinations preferably in swing fashion and follow it up to 18 months by maintenance doses of INH. How much this policy could be followed is shown in Table IV.

Regularity in self administration of drugs cannot be of the order of the round the clock

TABLE III  
Radiological and Bacteriological assessment of cases from Domiciliary Area

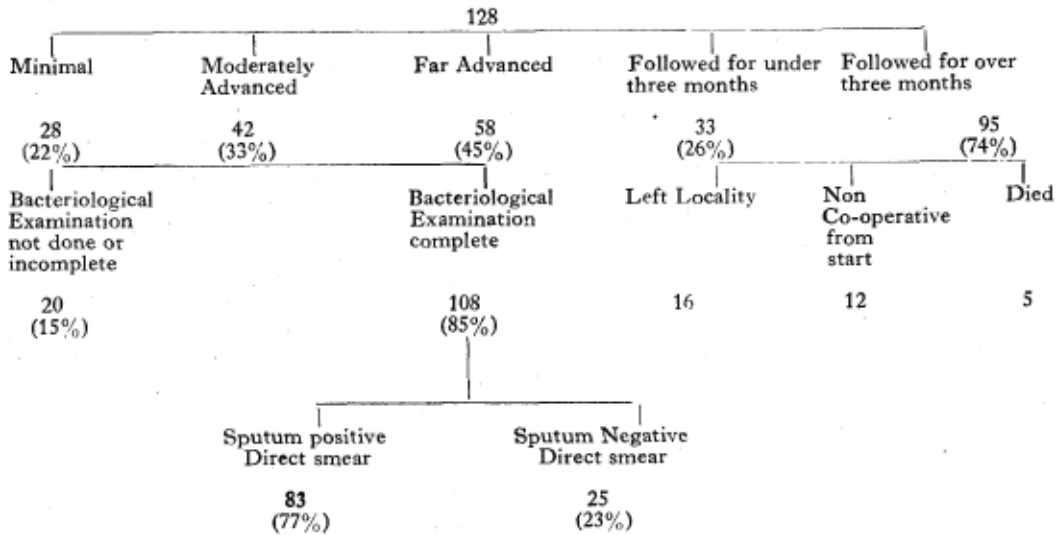


TABLE IV  
*Regularity of treatment*

1. Regular ... ..	41	58%
2, Fairly Regular ... ..	16	23%
3. Inadequate... ..	13	19%

regularity possible in a Hospital. Minor breaks were expected. Keeping that in view 58 per cent of cases can be said to be regular in their treatment, 23 per cent fairly regular and in 19 per cent treatment was very irregular.

In view of the length of treatment, it is not surprising that only 56 per cent of the cases have completed the treatment so far, 18 per cent are still continuing it and 16 per cent have stopped it against medical advice. Seven cases i.e., 10 per cent have died.

Up to date position of the cases irrespective of duration of illness and treatment is:

- (a) Quiescent 53 i.e. 75.7 per cent  
 (b) Still active 7 i.e. 10 per cent  
 (c) Died 7 i.e. 10 per cent  
 (d) Information not available 3 i.e. 4.3 per cent

A very important aspect from Public health point of view however, is sputum conversion. Of the 83 positive cases, 56 became negative giving a conversion percentage of 67. Among the non-convertors are included cases who did not co-operate and those who left the locality. If the non-co-operators are taken out the percentage of converters is still higher. Of all the converters 62 per cent became negative within three months, another 20 per cent within six months and the rest after that period. This indicates that if proper treatment is taken, the patient quickly becomes negative and the symptoms improve soon. This in itself is a problem. Apparently the highest achievement of modern treatment works against itself, when in spite of improvement the treatment has to be continued by the patient on his own, over a long period. To the ignorant the disease and the symptoms are synonymous. No symptoms means no disease to them. The solution lies in extensive health education which

unfortunately is lacking in our district on any organised basis.

## COMPARATIVE RESULTS OF DOMICILIARY AND HOSPITAL TREATMENT

A comparison of the adequacy of the treatment reveals that of the total of 171 admitted into hospital, 25 i.e., 14.5 per cent left the hospital against medical advice as against 16 per cent of the domiciliary service cases who stopped treatment on their own.

TABLE V  
*Treatment under Domiciliary Service*

Treatment completed as		
advised ... ..	39	56%
Treatment continuing ...	13	18%
Treatment stopped against medical advice ... ..	11	16%
Died ... ..	7	10%
Total ...	70	100%

TABLE VI  
*Treatment under Hospital Services*

Total Admissions		
171		
Discharged with advice ...	135	78.9%
Discharged against medical advice ... ..	25	14.6%
Still under treatment	1	0.6%
Died ... ..	10	5.9%
		100%

135 of patients admitted to hospital i.e., 78.9 per cent had to be discharged with advice to continue the treatment, but it is not known how many continued the treatment after discharge. These 135 included 25 cases transferred from domiciliary service.

A comparative statement in respect of sputum test findings shows that conversion rate of

TABLE VII

*Comparative study of the results of Domiciliary and Hospital Treatment in respect of Sputum Test*

Group	Converted Pos. to Neg.	Stationery Pos. to Pos.	Conversion in relation to time period	
Domiciliary... ..	56 (67%)	27 (33%)	1—3 months ... 35	62%
			3—5 months ... 11	20%
			5—7 months ... 4	7%
Total ...	83		Beyond 7 months ... 4	7%
			56	100%
Hospital cases who did not get any treatment before Admission ... ..	46 (74%)	16 (26%)	1—3 months ... 32	70%
			3—5 months ... 7	15%
			Beyond 5 months ... 7	15%
	62		46	100%

Hospital cases is 74 per cent against that of 67 per cent of Domiciliary service. Of the converters 85 per cent converted within five months in hospital as against 82 per cent under domiciliary service.

It is regretted that a comparative study of X-Ray findings could not be made. For want of films, Skiagraphy of domiciliary service cases was not as regular as that of hospital cases. In fact most of the Home treatment cases had fluoroscopic control only. However, considering the result as a whole, it may justifiably be concluded that domiciliary treatment can be carried out even in difficult hilly areas; and the results are not much different from those obtained by hospital treatment in the same place.

#### DISCUSSIONS AND COMMENTS

Admission to the Hospital as and when necessary or as available is an important component of treatment, but how long the patient has to wait? And all that at the risk of spreading the disease in the community. Home treatment therefore, must come in and then what an impact the service makes on the Hospital! Table VIII shows that 58 per cent of the cases who got regular treatment by some standard did not need admission, 14 per cent refused admission, 2 per cent died leaving a figure of 26 per cent for admission. In other words the bed strength can be safely reduced to one half of ordinary estimates and even much less if an organised home service exists. The cases

who may require admission are emergency cases, and those who need surgery or isolation.

TABLE VIII

*Condition of the patients when their turn for admission came*

Did not need admission ... ..	55	58%
Refused admission ... ..	13	14%
Died ... ..	2	2%
Admitted ... ..	25	26%
Total ...	95	100%

There is yet another aspect. Even those cases among the domiciliary group who were admitted to hospital their average stay in the Hospital was between 3 to 6 months against 6 months to one year for those who did not get any domiciliary treatment before admission.

TABLE IX

*Average period of stay in Hospital*

		Average
For cases who did not get treatment at home before admission	6 months to 1 year	71 months
For cases who got home treatment before admission	3 months to 6 months	4H months

The turnover from the hospital is therefore, much quicker, if there is co-ordination between hospital and domiciliary treatment.

In our District the limited Home Service is confined to five mile area, and this has very much enhanced the scope for admission of the cases to hospital from distant areas.

These are definite and positive contributions by domiciliary service.

In conclusion it may be stated that the domiciliary service has entirely changed our outlook for treatment of tuberculosis. It is no longer a sign of helplessness but something positive and really beneficial even in the hilly areas. But for the domiciliary service to become of real value, the clinic service should be designed properly and must meet some minimum requirements:

1. Adequate staff both medical and para medical specially trained for directing the plan and supervising the service.
2. An adequate supply of antituberculosis drugs. Free treatment is a must for such a service.
3. A good Laboratory with culture and sensitivity test facilities in addition to the routine tests would be useful.
4. Facilities for full sized and 70 mm. film Skiagraphy are necessary.

It need not be stressed that antituberculsis drugs must be very judiciously used under the supervision of a specialist or a medical officer specially trained in their use otherwise chemotherapy is likely to do more harm than good and ultimately create the baffling problem of the infection caused by resistant bacilli.

This study is preliminary and very rough. I am conscious that there are many deficiencies and the results are not as reliable as in a controlled study. Even so, if these findings have any bearing, then the question is not where we treat but how to diagnose and how best to treat. But it must be emphasized again even at the cost of repetition that conduct of proper chemotherapy is a Capital Must in domiciliary service and to that end our main efforts should be channelled.

#### ACKNOWLEDGEMENT

I express my gratitude to the Director of Health Services and Principal Medical Officer Himachal Pradesh for their kind permission to publish this article.

I am grateful to Dr Jai Lai, Civil Surgeon, Chamba for his guidance without which the paper would not have been possible.

I am indebted to the Domiciliary Service Staff of the clinic for the fullest co-operation they extended to me during my work.

## THE PLACE OF ISOLATION IN THE TREATMENT AND MANAGEMENT OF TUBERCULOUS PATIENTS IN INDIA

B. K. SIKAND

(New Delhi TB Centre, New Delhi)

Before the advent of Antimicrobial drugs, isolation of the patient and education of both patient and the family in the proper collection and disposal of sputum (sputum hygiene) were the only preventive measures available. These ideas and arguments still continue to be advocated by lay persons and some medical persons in favour of 'isolation'. New discoveries, however, should have changed the entire outlook and action. Nowadays, use of the Antimicrobial drugs brings about such a rapid and marked diminution of cough and reduction in the quantity and bacillary content of sputum and possibly some effect on the bacilli as such, that prevention through treatment becomes really and definitely effective. This is not a purely theoretical concept. Riley and co-workers have carried out a number of experiments on exposure of guinea pigs to droplet nuclei from TB patients. They have come to the conclusion that \* 'Infectiousness of the untreated patients with drug-susceptible organisms was found to be much greater than that of the patients on chemotherapy, regardless of whether the latter harboured resistant or susceptible organisms'. Some people have even postulated that the bacilli excreted by a patient taking antimicrobial treatment regularly and adequately are as if they were maimed, and hence their 'Infective potential' is considerably reduced. Whether they are really maimed or not, this much is certain that the risk of exposure to these bacilli is very slight.

What is more, the Madras Chemotherapy trials have conclusively proved that both in respect of incidence of fresh disease and new Tuberculin conversions, the contacts of a positive case, being treated in the home are at no higher risk, than the contacts of a patient isolated in the hospital immediately after diagnosis. This study has confirmed what had been experienced in the field already i.e., marked reduction of secondary cases amongst contacts

since the introduction of Antimicrobial drugs. Further, the Madras trial has shown that the biggest damage was done prior to the diagnosis and the start of treatment. If the veracity and applicability of the Madras trial is accepted, (and I see no reason why it should not be) then 'isolation', as a preventive measure, has a very minor place, if any at all, in the present day management of pulmonary tuberculosis. It is obvious that instead of attaching any importance to 'isolation' all efforts should be directed to make Antimicrobial drugs available to all the patients, and to take steps to make them take the drugs regularly and for a prolonged period. This would pay much bigger dividends. Further, action for improvement would be in the direction of finding and treating cases before they become infectious, which, of course, is an advice of perfection and not of initial action. Protecting the Community from those excreting Resistant Bacilli is often advocated as an argument for 'isolation'. Obviously it is more important to see that patients take regular and adequate treatment and thus do not fall in the category of 'treatment failures' and discharge Resistant Bacilli. Good treatment reduces and delays the emergence of Resistance. Once, however, the bacilli have become Resistant, there is no point in putting such patients in 'Isolation beds', unless we have the means to treat all of them, with the newer antimicrobial drugs and make them non-infectious. (If at all possible!) These drugs are highly expensive and, therefore, such treatment cannot be accepted as a routine policy at a time when we do not have the means for giving the cheap and effective drugs, to all those with Sensitive Bacilli. If, however, we admit some patients to hospitals for the purpose of trying out certain drugs, then the object of admission would be Research and not 'isolation' for protecting the community. If, in the absence of newer drugs, we admit such patients for isolation, we must be prepared to keep them in the

\* American Review of Respiratory Diseases, 1962, 85, 510-525.

hospital indefinitely, because Resistance, as at present understood, is irreversible. This life-long programme of hospitalisation will, therefore, become a question of custodial care, rather than 'isolation'.

In the absence of newer drugs, education of the Patients in 'Sputum Hygiene' is the only safety measure for such patients. This was the only means of protection from chronic, infectious cases prior to the Antimicrobial drugs. Are we advocating 'isolation beds' for such cases? Effective education in the final analysis depends a great deal on the basic cultural development and sense of social responsibility of the individual, and whatever is possible to awaken this consciousness, can be achieved in the home. One need not be isolated in the hospital for such education, and if this is arranged in the house, where is the need for isolation beds in this context?

There is still another type of patients who have not been covered by the above remarks i.e., destitute, usually advanced patients who have no place to live or nobody to look after them. These patients have to be hospitalised and kept in the hospital till they die or they are rendered fit for work again. Here again, it is obvious that the need of bed is not primarily for isolation, but to provide food, shelter and nursing care for the needy. These objects should not be confused with 'isolation'. What we see in actual practice is that wherever these beds are constructed, they are soon after added to the routine hospital beds. If the original idea of admitting advanced necessitous

patients was to be kept up, then these beds should have been kept apart from routine hospital admission. Further, the patients should be admitted on such beds on a separate priority basis, depending mainly on social reason. And once admitted, the patient should be kept in the hospital till he or she dies or gets cured; otherwise the label of 'isolation' for such beds would be mis-conceived.

The beds for the above purpose may be situated in the compounds of TB or general hospitals or in a separate place. They may be cheaper in construction and the staff may not be on the same scale as in regular TB hospitals; but whatever the case may be, these beds are a separate entity by themselves. Wherever such beds are located, they must not be partially or self dieted beds, but fully dieted like any other hospital bed. Any departure from this rule will be to ignore the social and economic background to such admissions.

To sum up, the need of the present moment is that the bogey of infectiousness and need for 'isolation' must be played down. The present state of our knowledge demands greater emphasis on good and regular treatment rather than 'isolation', which even in pre-antimicrobial era, was of doubtful value. Need for isolation must be clearly separated from need for hospital beds for medical, social or surgical needs and emergencies. 'Isolation' should no more, be an argument for building beds or for admitting cases to the TB Institution. The present thinking and action must be in line with the present day knowledge.

## ISOLATION IN THE TREATMENT OF TUBERCULOUS PATIENTS IN INDIA

P. K. SEN

(Chest Department, Calcutta Medical College, Calcutta)

The principle that patients suffering from communicable diseases should be isolated holds good for tuberculosis also. This isolation is best effected by having such patients admitted in special hospitals. Therefore, it is preferable that tuberculous patients should be segregated in Institutions.

The question of any other kind of isolation can only arise if there is no adequate provision for hospital beds or if such patients are unwilling for hospitalisation for any other reason. The problems that may follow due to inability to hospitalize such patients may differ for tuberculosis from most other infectious diseases. The reasons for this are as follows:

1. The symptoms and signs, and diagnostic measures of tuberculosis are such that it can not be diagnosed as early as other infectious diseases. The result is that there is greater chances of infection to contacts before segregation is effected.

2. After tuberculous infection, the disease may develop any time in later life. There is no sharply defined incubation period. This is why this disease does not occur in epidemics.

3. Tuberculous patients are not generally so acutely ill as most other infectious diseases: so they can move about and disseminate infection far and wide.

4. Lastly, and, to my mind, most important of all, the effect of infection in the development of the disease is significantly different from other diseases. For tuberculosis the soil factor seems to me to be much more important than the seed. So, infection may not have so much importance as in other diseases. This is, however, more a personal impression validity of which is difficult to prove.

Such differences may make the need and manner of isolation somewhat different from other infectious diseases and may permit modification of isolation with fair amount of safety. If hospital isolation is not possible, then home isolation should aim at maximum safety within practical limits.

Good isolation at home would require

segregation of the patient in a separate room along with all the care for sputum collection and disposal—for which a cheap but effective method may be suggested—separation of utensils, clothings etc., and above all education on hygienic regimen for the patient and the family members. Such segregational measures should be carefully observed till the patient is non-infectious in a practical sense, namely, his sputum tests should be consistently negative on repeated examinations for over a minimum period of 3 months, preferably 6 months. Thanks to modern chemotherapy such sputum conversion can be achieved in a comparatively shorter period than before, generally within 3 to 6 months.

It is a matter of regret that for the majority of our clinic cases a separate room cannot be made available as most of them live in only one room tenement. Alternative arrangements to provide such persons with two room tenements with some financial help has been advocated, and attempted at some places but did not meet with success as a programme. In practice, therefore, the real problem of isolation is the problem of patients with one room tenement. For them isolation may be effected in an Institution or in the same room with other members of the family.

As stated before segregation in an Institution is always preferable. If we could hospitalize all sputum positive cases at least, then, the problem could be minimised greatly. The number of such cases, however, is so great and the hospital beds are so few that even a small fraction of such cases cannot be admitted at present. It would, however, be profitable to include this important consideration along with some others for determining the priority in our hospital admission policy.

It has also been advocated to house the infectious cases, specially those who are 'incurables' and those whose sputum are heavily loaded with the bacilli, in a different kind of cheap Institution. In some places such Institutional segregation had been attempted. It did not prove a success. The reasons are

mainly: such houses soon acquire a bad name as 'death houses', and patients, however gravely ill, would not like to go there, and apart from the capital cost the running expenditure is not much less. However, as I believe that most of the demands on our hospital beds are due to social reasons than that of medical, there is a justification for establishment of such Institutions chiefly for the purpose of isolation of bad cases.

At a stage where India is placed today isolation at the homes with one room tenements has to be arranged for vast majority of the patients. We had our justifiable doubts whether mere separation of the patient from others in the same room is effective enough to

advocate this practice. My studies in this regard seem to show that separation of patients' bed and preventing others from sleeping in the same bed afford protection to the home-contacts to a great extent from developing the disease. Such studies should be repeated in a number of places under a common schedule. If similar findings are obtained through these studies, then, this kind of isolation should be much more stressed upon and more vigorously conducted. It may even be better to place an improvised screen in between the patients' bed and that of others. Such simple form of isolation is practicable for mass use and may be effective enough for noteworthy diminution of fresh cases in the community.

## THE ROLE OF ISOLATION IN TUBERCULOSIS CONTROL PROGRAMME

K. SOMAYYA

(Asst. Director of Public Health, Hyderabad, Andhra Pradesh)

Isolation tops the list of measures for the control of infectious diseases. Isolation, quarantine, disinfection, inoculation, education have been the five important preventive control measures used to control an epidemic, since a long time.

As in the body of an individual, infection multiplies rapidly in the society too. By attacking the susceptible population, it progresses in geometric proportion. Isolation and quarantine (or observation of healthy contacts) are aimed at restricting the spread to susceptibles by restricting the movements of the infectious case.

The success of such a measure involving restriction of the freedom of the patient and his contacts, depends upon the public co-operation achieved, which in turn is dependent upon their awareness of the problem. Therefore isolation and education have to be carried simultaneously and extensively.

Since Tuberculosis is an infectious disease, isolation and observation have been used from time immemorial. In the case of Leprosy, which is also an endemic disease, isolation has been carried one step further viz., segregation. Paradoxically public opinion allowed such a compulsory step which not only restricts the freedom of the patient temporarily but even condemns the victim permanently as an out-cast. However, even when there was no proper treatment, a patient suffering from Tuberculosis was not ex-communicated, because T.B. unlike Leprosy is not a disfiguring disease. Attempts at segregating healthy children from the patients were made, especially in France successfully, before the discovery of B.C.G. vaccination. The lay public even now are afraid of the risk of catching infection in a T.B. ward, while marriage alliance within a family known to be suffering from T.B. or employment of a cured patient are shunned and detested. In the present circumstances it is not difficult to secure public co-operation for carrying out isolation, observation or even disinfection i.e., sterilisation of the sputum,

The difficulty if any seems to be with the administrator, whose limited funds are not sufficient to implement the measure adequately. But this should not question the necessity for isolation itself of a T.B. patient. The role of Isolation in T.B. is un-questioned and throughout the history it enjoyed a leading role!

In practice, the shortage of funds has almost relegated Isolation to the background especially after the advent of Anti T.B. drugs and there is a fear of its being discarded altogether, by some in their enthusiasm for the drugs in this treatment Era! The latter question the necessity for Isolation, as drugs are capable of destroying the bacteria (or sterilise the infection). Such a reliance on the drugs—however efficacious they are—is misplaced and even dangerous!

Neglect of Isolation cannot but result in the spread of the disease, because the latter does not respect our financial capacity to tackle the problem. And this is the picture today. An unlimited spread of the disease which nullifies efforts made at controlling the disease such as a five-fold increase in beds and countrywide B.C.G. Vaccination.

A more dangerous situation is fast developing. The RESISTANCE TO DRUGS—thanks to the drug defaulters—is mounting up rapidly and making the drugs ineffective. Very soon, before the public realise the gravity of the situation, resistance to all drugs will develop, when we will revert to the old situation viz., the pre-treatment Era. History will repeat and death will mount up once again!

Thus the gains made through the drugs will be nullified. Even now the longer lease of life given to the patients by the drugs has posed the problem of increased scope for infection! There is no unmixed blessing, and drugs are no exception.

This is not to run down the drugs. They have given us a breathing space, when we have to rally our forces and launch a frontal attack on the enemy. Instead we are relying only on 'Tanks', one limb of the army which

will spell utter defeat. The decrease in the number of deaths due to T.B. is only a temporary victory. This has to be consolidated by a comprehensive attack—launching a complete T.B. Control Programme.

The fact that we cannot even increase the number of 'Tanks' and deploy them country-wide viz., our inability to launch a mass case finding and treatment programme, only heightens the tragedy, and does not warrant pinning our faith on drugs only.

On the other hand, Isolation should be made the hand maiden to Drug Treatment! Treatment failure cases should be isolated, thanks to the drugs for reducing the size of this problem! This is the policy underlying the provision of Isolation beds by the Government of India in National T.B. Control programme. Local Bodies, especially Panchayat Samithies, should be encouraged to provide the cheapest kind of shelters for accommodating cases in single digits at least. Decentralisation of the programme is necessary, since Local Bodies have to feel the programme as their own and induce the patients to co-operate. (It is common knowledge that many hygienic latrines provided by the Government in villages are unused by the public as they feel that it is a departmental programme.)

Fortunately the poverty stricken patient feels the need for such shelters which ensures the success of isolation programme. In fact the poor victim is in utter need of help from the community. Education has to keep pace with the programme

and expose baseless fears about social stigma in this (drug) treatment era! The community is however slow to appreciate the changed Tuberculosis situation. It has to shed-off its horror of the disease and provide amenities for the control of the disease at least from the community-risk aspect of the control problem. *Isolation of drug resistant cases is therefore a minimum obligation of the society.* This also implies the participation of the community in the mass case finding treatment programme.

Thus the various factors that contribute to the success of Isolation are present and could be developed. The situation-demands adequate isolation to strengthen the gains made by the drugs. The victims especially the treatment-failure case—is in dire need of a programme because he has no other alternative. The community has to realise its responsibility in helping such patients out of enlightened self-interest to itself.

Drugs offer Hope as well as pose a dangerous problem to the community. Let not the advantage gained by the drugs be allowed to slip off and a dangerous situation invited, by relegating or discarding isolation due to the placing of exaggerated emphasis on drugs, which is only one of the weapons—however efficacious—in our armamentarium in the fight against Tuberculosis. A T.B. Control programme, unlike a mere curative programme, calls for comprehensive programme combining preventive and curative measures and an all-out attack!

## A TB CLINIC IN AN URBAN AREA\*

B. K. SIKAND

### INTRODUCTION

In dealing with a widespread infectious disease rooted in social living conditions, the attack on tuberculosis has to be on a broad front. To reduce and finally eliminate the infectors, treatment not only of the few individuals, but of all persons, whether actually or potentially sick, has to be the objective. Conditions leading to disease or interfering in the individual's recovery have to be dealt with. Not only sick individuals are to be treated, but the healthy are also to be kept fit. The attack is thus community wise—on a broad front and with broad objectives.

The three effective present day tools of TB prevention are B.C.G., Mass X-ray and Antibiotics (INH). As far as the community wise attack is concerned, a TB Clinic is the field organisation on which the attack against the disease is based. Effective and economic use of these tools will naturally depend on the size, distribution and character of the population the TB Clinic serves.

An urban area is usually a large size population with nests of disease in the poorer sections and over-crowded areas of the population, and the community as a whole is better developed, better organised, economically better than a rural area; more educated, more critical and more receptive to education. An urban TB Clinic as the field organization is in a way, in a better position to more easily and more effectively reach the patient and the community for organizing Public Health measures, treatment, and for participation of voluntary agencies in programmes of social welfare and rehabilitation of TB patients. No matter where and how one organizes a TB control service, the following are its essential contents and these are also the essential requirements of an Urban TB Clinic Service:

- (a) A well-trained whole-time specialist staff in adequate strength;
- (b) Efficient X-ray and Laboratory Services;
- (c) A free diagnostic and treatment service;

\* Paper used for discussion in the panel discussion on TB Control in India at the 18th Conference of TB and Chest Diseases' Workers in Bangalore, January, 1962.

- (d) Sufficient health visiting staff;
- (e) Functional integration with TB Hospital service;
- (f) Full co-operation with the general practitioners;
- (g) A social welfare organization to make treatment effective;
- (h) A statistical organization for planning and evaluation of the results.

The following, points need emphasis:

### 1. Responsibility for Establishing TB Clinics

An essential requirement of an effective attack on TB is that there must be a statutory Public Health Authority for financially supporting, organizing, directing and co-ordinating such a campaign. As community welfare is the objective, all services to the individual have to be provided free of cost. If this is accepted, then it is immaterial whether the service is canalized through an official or voluntary agency. In any case, co-operation of both the sectors is essential. The control in any case has to be central, but the action can be decentralised. The State or the Local Bodies as custodians of public health can subsidise and co-operate with existing agencies engaged in TB control work.

2. History of effective TB control in the Western countries clearly shows that though voluntary agencies initiated the attack and provided substantial help and correctives on many points, TB control became effective only when the State took over the final and the financial responsibility. This must happen in this country as well, and the sooner the better.

### 3. TB Clinic as Specialized Service

At the level of diagnosis and periodic assessment during the prolonged course of treatment and follow-up, TB still remains a specialised service needing specialized equipment e.g.,

X-ray, Laboratory and a specialist with long experience and proper attitude to the disease and its problems. As organiser and supervisor of a mass action, the TB specialist with his team of para-medical staff e.g., Health Visitors, Technicians, Social Workers, Educators, is still the kingpin of the preventive organization. Number of specialists needed can now be cut down tremendously, and if the general practitioner utilises the diagnostic, treatment and preventive facilities offered by the Clinics, TB service can be effectively extended to the periphery. It must, however, combine the curative and preventive functions.

A TB Clinic must be located at a place most convenient to the community; the ideal would be to develop it as a specialized unit in a general hospital. As an instrument of TB control, it must cover a specified area. Resources must be concentrated for effective work in well defined areas, both for practical, as well as, for demonstrative purposes. In areas of high population density and good transport facilities, it can serve a population of 5-6 lakhs (even more) without any undue hardship to the patients and is a better approach than putting up 2-3 smaller ill-equipped and poorly staffed Clinics. As the patient needs attending the Clinic once in 6 to 8 weeks, difficulties of distance need not be over-emphasized in the present situation. New Clinics must, however, come where none exist, and where these exist, the approach should be to add to the efficiency of the existing Clinics by more staff to cover larger population.

It is more economical and effective to organize special laboratory facilities, say Drug Resistance and X-ray Tomography etc., at one central place. No doubt, with sufficient staff, some ancillary functions like drug distribution, day to day care, can be passed to agencies like Dispensaries, Health Centres and the General Practitioners, or with sufficient staff the main Clinic may be in a position to organize 'Sub-Centres' in different parts of the city, either fixed or occasional for drug distribution, giving injections, collection of sputum, Mantoux testing and examinations of contacts. When resources are insufficient, intermediate goals may be accepted as stages towards the final achievement.

No doubt integration of TB service in the general health services at the periphery is

highly desirable. But in this enthusiasm, we may not forget that load of the new services which the health agencies will be required to take over, will need extra staff; otherwise with already overloaded programme of each agency, new duty is likely to be left unattended, thus defeating the very purpose of integration. Two things stand out clearly. Firstly the TB Clinic is a specialist agency and has a responsibility to see that the TB patients get the requisite service. Secondly the TB Clinic as an organizer and supervisor of the mass campaign retains its place as a specialist service.

#### 4. Staff

Preventive community work can only be expected from a whole time and well remunerated staff. In the Western countries when Clinic is under a non-official agency, the Public Health Authority supports and subsidizes to maintain an efficient and well satisfied staff. Excluding the specialized departments like Laboratory and Epidemiology and Administration and Training (Special Staff needed in Training Clinics) a minimum of two Doctors and an, additional one for each 100,000 and one Health Visitor for every 50,000 can at this stage be considered sufficient. With the new drugs the task of the Health Visitors has become simplified and therefore, even a lesser qualified and more easily trained individual can serve the purpose.

A Medical Social Worker is as essential for a TB Clinic, as X-ray or Laboratory Technicians.

#### 5. Case Register

Efficiency of a Clinic Service can be judged from its Case Register, which is not merely for recording and tabulating information, but to exercise supervision and control on all actual and potential sources of infection in the family and the community. Patient's movements and changes in status of the disease and their cooperation or otherwise is available from such a Register; and in fact this Register constitutes the nerve centre of the whole Clinic service. Satisfactory control also needs good clerical help.

#### 6. Case Detection

Chemotherapy to function as a Public Health measure calls for Case-Finding Pro-

grammes, but one has to ensure before-hand that all discovered cases would receive adequate and free treatment. A good Clinic service is by itself an excellent Case-Finding Programme, attracting cases early and in larger numbers. With limited resources, attention has to be focused on special groups with High Prevalence, High Incidence and High Risk to the community e.g., Home Contacts, Hospital and School Staff, Industrial workers, Food Handlers and Domestic Servants, slums and the under-privileged groups. Our experience shows that it is possible to examine without much difficulty 80 to 85 per cent of the total Contacts at the initial examination. And that as a group, Contacts of TB patients have a prevalence and incidence rate nearly four times higher than the general population. No doubt contact examination is an excellent and essential Case-Finding activity of the TB Clinic. But this alone is insufficient in the larger context of the community. For a broader approach, a Mobile X-ray Unit is needed. The Mobile X-ray Unit helps and co-ordinates with the static Clinic service in locating the X-ray abnormalities in special groups of the population. Diagnosis, treatment and follow-up and subsequent disposal is the function of the area Clinic. In any urban area the Mobile X-ray Unit is not to be fitted as an independent diagnostic and treatment unit.

Offer of X-ray and Laboratory facilities at nominal cost (Re. 1 for each person when miniature Radiography and culture facilities exist) to the general practitioners can increase their co-operation, and thus help to locate many early cases.

Where general hospitals have 70 mm. Camera Units, it would be a good investment for the TB organization to have X-ray examination of all admissions and such an activity may be financed by local TB Associations, provided discovered cases are referred to the local TB Clinics. This is a major source of case detection in the Western countries.

With the co-operation of the Irwin Hospital authorities, all indoor patients (except those in the pediatric and orthopaedic wards) of that hospital were X-rayed by us last year. Out of the 750 patients X-rayed, 13 per thousand were found to be bacillary and another 60 per thousand though abacillary were found

to be active cases needing treatment or observation. Total annual admissions in the Irwin Hospital are about 3500. Thus a yield of nearly 2000 cases per year is being lost for want of organization. Such programmes are also essential for the safety of the staff and of other patients in the general hospital.

### 7. Domiciliary Treatment

It is proved to be as effective in home as in hospital. The essential agency for the working of the Domiciliary service is the TB Clinic. Treatment can now be considered an effective weapon of prevention by providing and organizing a Mass Treatment Service. However, adequate and regular treatment must be ensured. In a recent review of cases treated in the New Delhi Tuberculosis Centre, it was found that 73 per cent of the patients took at least one year's treatment regularly. Sputum conversion was obtained in 75 per cent of the patients followed for over three months, irrespective of their regularity and length of treatment. So in spite of the present deficiency, the gain to the community through reduced pool of infection is tremendous. No doubt beginning is made with symptomatic patients, as being the most dangerous, and these programmes are essential as a basis for further progress. An urban population would not be attracted to TB Clinic unless there is a good treatment service. Private medical practice in urban area constitutes a big challenge to the TB Clinic to keep its services up-to-date. Extension of treatment to the asymptomatic, and preventive treatment of lesions of doubtful activity or secondary Chemo-prophylaxis to recently infected, will in due course be essential, if treatment is to be the real tool of prevention.

### 8. Preventive Advice

The family is the unit for all preventive work. Repeat visits for advice, often, though not always succeed in securing co-operation. Our experience shows that only 33 per cent of the positive cases collected and disposed off the sputum properly all through the period of infectiousness. It may, however, be pointed out that with antimicrobial therapy, a large majority of the patients expectorate sputum only for a short period, and in the later phases

only laryngeal swabs are cultured. Further, as nearly 25 per cent of the total cases were diagnosed infectious on L. S. Cultures (Sputum not being available) such patients will not be conscientious and conscious enough to use the sputum disposal outfit for a minimal or an occasional expectoration.

Contact examination constitutes another preventive work in the homes. Nearly 80 to 90 per cent of the total contacts are examined every year. Efforts are made to re-examine the contacts at yearly intervals, though not with the same degree of success as at the initial examination, as by that time the original patient has already become quiescent and the co-operation of the family in all respects becomes less.

### 9. Social Welfare

Thorough drug treatment is the heart of modern treatment, but more is needed in terms of social and rehabilitation programme to make it acceptable and effective. Superstition, ignorance and socio-economic difficulties are responsible for irregularity and inadequate treatment. Social service research is an essential requirement to determine the cause of irregularity and default in drug taking. For a long time to come this must remain a non-official activity. Care Committees formation must be encouraged by the TB Clinics, and it must be considered the latter's essential duty. Only an efficient and disinterested Clinic service can draw non-official persons for such an effort. The object of Care Committee is to help to complete the treatment of the poor patients by various kinds of economic and social helps, through the Clinic social welfare departments. No doubt they can contribute liberally to meet some needs of all people, till in course of time, the State meets all needs of all people. Many activities can be canalized through the Medical Social Workers Organisation, and many individuals and organizations interested in such a relief programme can be roped in. Nearly two lac of rupees are spent every year at our Centre for relief programmes.

Several Care Committees have supplied free antibiotics to poor patients in their areas for nearly 10 years, besides cash helps when the bread-winner is ill. Providing blood for surgical operation warm clothing to the needy, and

books and school fees to the children of the poor patients are some of their useful activities.

As our patients are mostly in their homes, therefore, 'Institutional type of Rehabilitation' is not thinkable in our context. For rehabilitation of the badly employed or those partially or uneconomically employed, schemes for vocational training and employment and rehabilitation have to be encouraged as a Clinic activity. The need and advantage of such an approach for rehabilitation through Work Centres are obvious enough.

A fair number of incapacitated individuals arising from amongst the failures of treatment for various reasons are becoming a peculiar long-term problem. This should be the responsibility of the state social welfare organization, rather than the Clinic social welfare agency. This is a long-term problem and cannot be met by voluntary efforts and has to be passed on to the state.

### 10. Functional Integration of TB Institutions

'Functional Integration' with the hospital system is essential for TB control work of the TB Clinic. Hospitals must remain ancillary to the needs of prevention. Admission to hospitals is not to be offered as a democratic right of the tax-payer, but to serve specific needs e.g., medical and social emergencies and surgery. Number needing surgery is becoming smaller. Five beds per hundred thousand population should meet the surgical needs of the community. TB Hospitals and TB Clinics have distinct functions and these must be adhered to.

There need be no objection to the Sanatorium providing Clinic facilities in the specified adjacent area, but patients admitted in the Sanatorium from other areas must return to the original Clinics for follow-up and preventive advice.

### 11. B.C.G. Vaccination

A mass approach to B.C.G. will for the present remain under the Public Health Department. However, if TB Clinic is to be the centre of TB control in its areas, the area Clinic apart from vaccinating the family contacts should help to B.C.G. vaccinate the toddlers registered at Maternity and Child Welfare Centres and newborns in Maternity Hospitals. We have for the last one year

organised B.C.G. vaccination programme of newborn babies in the Local Maternity Hospitals. The newborns are vaccinated within 3 days of their birth (barring the under-developed and those with obvious disease or deformity). B.C.G. technician visits these places twice a week. Co-operation from the hospital authorities and the mothers has been excellent and complications so far met are nil. It has been possible to vaccinate over 10,000 infants and the conversion rate after 3 to 6 months is 82 per cent. B.C.G. teams must be placed at the disposal of the Clinic to organize house to house B.C.G. vaccination programme.

### **12. Statistical Organization**

A proper statistical organization for planning and evaluating clinic activity is essential.

But obviously this can be a part of a big Clinic, and this can and should give help to smaller units in the areas.

### **13. Research**

A big TB Clinic is suitably placed to undertake field research in social and preventive aspects of domiciliary service. How much and at what cost a Case-Finding Programme influences the TB epidemic in the community, and whether preventive use of antimicrobial drugs for lesions of doubtful activity is beneficial are programmes which should attract attention of research workers in the field and arranged a Service-cum-Research Projects. A TB clinic is best situated for such activities.

## NEWS AND NOTES

**The XIXth Conference of Tuberculosis and Chest Diseases Workers scheduled to be held in February 1963 in Lucknow has been postponed.**

### **Meeting of the Eastern Regional Committee at Bangkok**

The third meeting of the Eastern Regional Committee met on 21st, 22nd and 23rd November, 1962 in the main hall of the ECAFE Building, Bangkok. Delegates from Australia, Ceylon, Hong Kong, India, Japan, South Korea, Malaya, Philippines, Singapore, Thailand and Canada attended. Dr Johs. Holm, Executive Director of the International Union Against Tuberculosis and observers from WHO and UNICEF also attended. The sessions were spread over three days one of which was devoted to business transactions and the rest for presentation and discussion of scientific subjects.

The meeting was inaugurated by the Prime Minister of Thailand and the delegates were welcomed by the Health Minister. The sessions were presided over by Dr P. V. Benjamin of India and Dr W. Cotter Harvey of Australia, President and Vice-President respectively of the Committee. The committee unanimously approved the report and statement of accounts for the period May, 1960 to October, 1962 presented by Mr B. M. Cariappa, Secretary and Treasurer of the Committee. It recommended that efforts should be continued to establish strong and effective National TB Associations in all countries in the East and to further develop the existing National Associations.

The committee re-elected Dr Benjamin as its President, Dr Cotter Harvey as its Vice-President and Mr B. M. Cariappa as its Secretary and Treasurer for a further period of two years. It also decided to continue its headquarters in New Delhi for another term of two years. Detailed proceedings will be published in book form in due course.

### **Secretary's Rangoon Visit**

On way back from Bangkok, Mr Cariappa spent three days in Rangoon studying the

**Ind. J. Tub., Vol. X, No. 1**

work of the Union of Burma TB Association which has been recently organised. He addressed a meeting of the Executive of that Association and the students of the Medical College of Rangoon and the Rangoon Rotary Club. He visited the Ramakrishna Mission Hospital in Rangoon and addressed a group of Social workers on non-official anti-tuberculosis work.

### **Thirteenth TB Seal Sale Campaign**

The Thirteenth TB Seal Sale Campaign commenced on 2nd October, 1962—Mahatma Gandhi's birthday. On the basis of demands made by State Associations a total of 1,00,00,000 Seals have been distributed to the State Associations and Seal Sale Organisation. The Central Association has also supplied to the States Posters, Placards, Slides, etc., for carrying on health education work during the campaign period. The campaign was inaugurated in the States by Governors, Ministers and noted public workers. In Delhi it was inaugurated by Dr Sushila Nayar, the Union Health Minister.

### **Maharashtra Tuberculosis Workers' Conference**

A Tuberculosis Worker's Conference in Maharashtra State was organised in Bombay by the Maharashtra State TB Association from the 1st to 3rd December, 1962. The Conference was inaugurated by Shri M. S. Kannamwar, Chief Minister of Maharashtra State. In addition to the Scientific papers presented, Mr E. J. O'Brien, Executive Secretary of the Ontario TB Association, Toronto, Canada, addressed this Conference.

### **Post-Graduate Refresher Course in TB**

A Post-graduate Refresher Course in Tuberculosis was organised in Calcutta by the Bengal TB Association in November, 1962. Dr P. V. Benjamin, Technical Adviser, Tuberculosis Association of India, participated in this course.

**Tuberculosis Health Visitors' Course**

For the 1963 Health Visitors' Course organised under the auspices of the Tuberculosis Association of India, about 50 applications were received of which 12 have been selected.

**Obituary Note**

We regret to report the unfortunate and premature death on 8th October, 1962 of Dr B. R. Billimoria, a well-known Chest

Surgeon and a former member of the Standing Technical Committee of the Tuberculosis Association of India. The Technical Committee, which met in October last, recorded the following resolution:

"The Committee resolved to place on record its appreciation of Dr B. R. Billimoria's contributions to tuberculosis work and also to the Association as a member of the Standing Technical Committee, and to record its deep grief on the premature and unfortunate death of Dr Billimoria."

# The Indian Journal of Tuberculosis

## ABSTRACTS

Vol. X

December, 1962

Abst No. 1

### **Pulmonary Evaluation of Surgical Patients**

Out of 63 patients selected at random, in 33 patients in whom pre-operative pulmonary function was normal, there was one post operative pulmonary complication. In 30 patients classified as abnormal, there were 21 complications. Decreased maximal expiratory flow rates had the best correlation with respiratory complications.

Elevated alveolar carbon dioxide tension was of great significance and nitrogen meter single breath test was also helpful.

Location of surgical incision and age of the patient were other important factors in determining the development of post-operative complications. A few selected tests of pulmonary function can be helpful to the surgeon and anaesthetist in the selection of patients for operation and in indicating the need for pre-operative and post-operative prophylactic measure.

(Myron Stein, Gordon M. Koota, Morris Sinon and Howard A. Frank. *J.A.M.A.* Vol. 181, No. 9, Sept. 1, 1962.)

### **An Evaluation of segmental resection of the right upper lobe**

Sixty-three per cent of the 88 patients in whom apical and posterior segmental resection of the right upper lobe was done, had complications as compared with 35 per cent of the 97 patients treated with lobectomy.

In 19 patients treated with segmental resection the anterior segment collapsed and remained in that state.

Higher morbidity and minimal effectiveness of the anterior segment, right upper lobectomy is the procedure of choice.

(Neil C. Andrews; Foster, Marshall; and A.J. Christofordis; J. Thor and Card, surg. Vol. 42, No. 1, July 62.)

**Ind. J. Tub., Vol. X, No. 1**

### **Analysis of the fate of patients with the 'Open negative' syndrome**

The Mortality rate in patients discharged with open 'negative syndrome' is excessive.

In 4 per cent the sputum became positive in patients discharged with 'open negative syndrome' within three years of the time the sputum had originally converted. The relapse rate was 10 per cent in patients with thick walled cavities as compared with 1.6 per cent in patients with thin walled cavities.

(Raymond F. Corpe and Frank. A. Blaloch, *Ame. Rev. Resp. Dis.* Vol. 86, No. 6, June 62.)

### **The Effect of Isoniazid Prophylaxis on Tuberculosis Mortality among Household contacts of previously known cases of Tuberculosis.**

In 2814 contacts, 1351 received Placebo and 1463 received Isoniazid with average dose of 5 mgm per k.g.

Three persons assigned Isoniazid developed active tuberculosis during the year compared with 9 among those taking placebo.

During three years of observation after the year of medication, 3 cases of tuberculosis became known in each group.

(Frank W. Mount and Shirley H Ferebue. *Am. Rev. Resp. Dis.* Vol. 85, No. 6, June 62.)

### **Pulmonary Function studies in Pneumonia**

Pulmonary Function studies were Performed in 12 patients with Bacterial Pneumonia. The vital capacity was reduced to an average value of 79 per cent of the predicated. The Helium mixing time was slightly prolonged indicating uneven distribution of the inspired air.

The single breath carbon dioxide diffusing capacity was reduced to an average value of 67 per cent of the predicted and remain reduced in some patients after roentgenographic findings and vital capacity had returned to normal.

The arterial oxygen saturation was below 90 per cent in, all, but in 3 patients, the right to left shunt was less than 10 per cent of the cardiac output.

The arterial alveolar PCO difference was greater than 6 m.m. of mercury in several cases.

(Charlotte. R. Colp; Sung, Sub, Parkard; and M. Henry William. Vol. 85, No. 6, June 1962.)

#### **Asthma: A Study in prognosis of 1,000 patients**

One thousand unselected patients with bronchial asthma have been followed up for an average of 11 years with extremes of 33 years and 3 years.

The average period from the first symptom to the date of follow up was 20.6 years in 562 males and 22.3 years in 438 females with extremes of 72 years and 3 years.

There was no difference between the two sexes. Early age of onset and intermittent asthma were associated and had a favourable prognosis.

2. Childhood bronchitic had a non-favourable outlook than an adult bronchitic.

3. The incidence of bronchitis was higher in the continuous group.

4. Those with bronchitis were in poorer health or follow up than those without.

5. Presence or development of bronchitis in an asthmatic is a serious complication of unfavourable prognosis, conversely lesser tendency to bronchitis which has been found in patients with early onset and in intermittent asthma is the reason for better prognosis.

The presence or absence of demonstrable allergic sensitivity and of specific desensitization treatment has no obvious important influence on long term prognosis. Of the 113 patients with recurrent and childhood bronchitis initially, 41 lost bronchitis in follow up whereas 191 with chronic bronchitis, 13 had lost their bronchitis. 52 of these 54 Bron-

chitis losers were in good health subsequently. Loss of Bronchitis is as favourable as development of Bronchitis is unfavourable.

A chief object of management in bronchial asthma should be the prevention of Bronchitis and chief aim of treatment should be to rid the patients of Bronchitis should he develop it, other factors are secondary though important.

(A. G. Ogilvie, *Thorax: Vol. 17, No. 3, September, 62.*)

#### **The isolation of myco bacteria in cultures from resected lung specimens.**

Thirty-eight per cent of the specimens removed from the patients with infections due to Human Tubercle bacilli were positive for M. Tuberculosis on culture.

The rapidity and consistency of the response to chemotherapy were found to be more significant factors in the recovery of cultures positive for mycobacteria from resected specimens than was the extent of disease at the onset of the treatment.

The lowest yield (22 per cent) of positive culture was found in the specimens obtained from the patients whose sputum or gastric culture became negative for mycobacteria in less than three months of chemotherapy, on the other hand 86 per cent of the specimens were positive on culture where the duration of chemotherapy required to achieve a non infectious status, lengthened beyond nine months.

The duration of negative culture status prior to surgery also played a significant role in the frequency of positive cultures obtained from the resected specimens. Thus 86 per cent of the specimens were positive for mycobacteria on culture when obtained from patients who had positive sputum or gastric cultures within 30 days of surgery. On the other hand only 12.5 per cent of the specimens were positive for mycobacteria on culture when obtained from patients found to have been non infectious for more than six months prior to surgery.

These findings suggest that Pulmonary resection may be less necessary in patients receiving intensive chemotherapy whose specimens quickly became negative from mycobacteria on culture and remain so far adequate periods of time.

But inevitable development of doing resistance may be prevented by early resection under conditions wherein the surgical risk is not great.

*(William Lester. Rosemary, Colton and Geoffrey Kent. Am. Rev. Resp. Dis. Vol. 85, No 6 June 1962)*

**Combined scalene fat pad biopsy and bronchoscopy**

In 61 patients in whom scalene Biopsy was done it proved positive in 19 patients.

In 45 patients in whom Bronchogenic carcinoma was suspected, it was established in 33, though supraclavicular lymph node was not palpable in 45 patients. Of these 33 patients, 30 per cent showed Bronchogenic carcinoma. Scalene fat Biopsy should be done prior to Thoracotomy in all patients with proved or suspected Bronchogenic carcinoma except in those with solitary coin lesion.

*(Roben W. Jamplus, William Mills, Glen A. Lillington, J. Thor and Card. Surg, Vol. 42, No. 7, July 62.)*