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NON-PULMONARY TUBERCULOSIS

One of the main subjects discussed at the last Tuberculosis Workers' Conference related to "Tuberculosis of Bones and Joints" and this issue of the Journal also carries a few articles on this subject. From a perusal of the proceedings of the Tuberculosis Workers' Conferences held in previous years it will be noticed that the main clinical subjects usually discussed were on Pulmonary Tuberculosis. In the national anti-tuberculosis schemes for India emphasis is mainly on measures to combat Pulmonary Tuberculosis. This is only natural as this form of disease is more common, more infectious and therefore more dangerous to the community. Even so, a considerable number of non-pulmonary tuberculous cases do exist, and no special effort seems to have been made to deal with them. The majority of these cases are bone tuberculosis. These are usually referred to general hospitals. Not all general hospitals have facilities for dealing with such cases. Even in institutions having Orthopaedic sections the limited number of beds available are usually occupied by cases of accidents such as fractures etc., which need immediate attention. Cases of bone tuberculosis may therefore have to be satisfied with some sort of treatment that can be given at an outpatients department or in the homes of patients. The two hospitals for children recently started in India are taking care of a few cases of children suffering from tuberculosis of bones and joints, but this is only a small fraction of the cases that need care. It is necessary that those engaged in tuberculosis work should pay more attention to non-pulmonary tuberculosis. The Tuberculosis Association of India has, therefore, recommended that the Government of India and the State

Governments provide beds for persons suffering from tuberculosis of bones and joints in some important centres either by adding beds in large General Hospitals or by converting some of the existing sanatoria into Orthopaedic Hospitals or by starting new Orthopaedic Hospitals in selected centres. It is hoped that the Governments and Tuberculosis Workers in the country will take this question seriously and endeavour to fill the seeming lacuna in our anti-tuberculosis work.

Treatment of Tuberculosis of the Spine

By

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Tuberculosis of the spine is the most common of all forms of skeletal tuberculosis and an increasing dissatisfaction is developing with the results of our present methods of treatment. The harmful effects of prolonged recumbency, especially in adults, are well known and there is a growing tendency towards early operative intervention.

Albee first performed his operation for spinal fusion in 1909. In 1918 Hibbs reported a series of 210 cases of spinal caries treated by surgical fusion during the active phase of the disease.

The recent acquisition of new and apparently effective drugs for treating tuberculosis has made it necessary to review our treatment of cases involving bones and joints. Streptomycin, isocicotinic acid or its derivatives and para-aminosalicyhc acid have given results which in some instances were far better than expected, although they still fell short of being complete cures. In spite of these good results spinal arthrodesis may be necessary in many cases and the value of the drugs lies in increasing the patient's resistance and in making successful surgery more feasible.

During the past two years we have been performing a modified Hibbs' type of spinal fusion operation after suitable drug therapy, using "bank bone" which consisted mostly of ribs from thoracoplasty cases, preserved in an ordinary refrigerator in sterile jars containing 0-2 % solution of streptomycin in normal saline. The streptomycin solution was changed regularly once a fortnight and a sample of it was collected before changing and sent to the bacteriologist for culture for both aerobic and anaerobic organisms and spores. The 'bank bone' was used after verifying that three consecutive culture reports were negative. They were cut into thin slivers approximating to the size of ordinary match sticks.

The essential points in the operative technique employed are as follows: The spinous processes are thoroughly denuded of periosteum and ligaments, split longitudinally and transversely and removed with biting forceps. The articular cartilage and cortical bone are excised from the lateral articulations with special thin osteotomes. By means of a gouge chips are cut from the fossa below each lateral articulation and turned into the gap by the removal of the articular cartilage or a fragment of spinous process is inserted into the gap. With Capener's gouge chips are removed from the laminae and placed in the interlaminal space in contact with raw bone on each side. Fragments from the spinous processes are used to bridge the laminae. At this stage the slivers prepared from "bone bank" ribs as mentioned above are spread over the whole area of fusion and after applying streptomycin powder over the whole area the periosteum and muscles are sutured snugly over the slivers with interrupted sutures and the skin wound closed.

During the past 18 months we have performed 38 posterior spinal fusions as detailed already. Though the results to date have been reasonably satisfactory we have

naturally to follow up these cases for an adequate period before passing our judgment on the efficacy of this method. Fortunately many of these cases can be followed up as they belong to the Central Government Contributory Health Scheme.

Since sending the summary of my paper to the Technical Committee of the Tuberculosis Association of India I have become interested in the method of Anterior Spinal Fusion as followed by Dr. Hodgson and Professor Stock in the Department of Surgery of the Hong Kong University. As you may be aware these surgeons published in November 1956 in the British Journal of Surgery (pp. 266—275) a report of the early results of "a method of treatment of tuberculosis disease of the spine which aims at the complete extirpation of the diseased focus and its replacement by bone grafts in such a position that they are structurally sound." These authors did not claim that their method was entirely new but they stated, "It is a development of ideas conceived by others in the past and made possible by advances in chemotherapy and anaesthesia, and by the adoption of architectural principles in arthrodesis—especially by the recognition of the initial and increasingly developing strength of a bony strut in compression."

I must admit frankly that when I first read the article of Dr. Hodgson and Professor Stock I was rather sceptic regarding the wisdom of placing bone-grafts after extirpation of the tuberculous focus in the spine. However, when I heard the talk of Dr. Hodgson on "Anterior Spinal Fusion—with particular reference to Pott's Disease" at the Seventh Congress of the Pan-Pacific Surgical Association held in Honolulu in November I was impressed with the results achieved by this method. He reported on a series of 100 cases of Pott's Disease which had been treated by evacuation of the diseased fossus and anterior body fusion of the vertebrae. The approach was an anterior one, trans-pleural in the thoracic spine, retro-peritoreal in the lumbar and trans-cerical in the cervical spine. On my way back from Honolulu I stayed for few days in Hong Kong where I had an opportunity not only to witness the operation of anterior spinal fusion but also examined some of the cases who had undergone this operation. I was so impressed with the end-results that soon after my return to Delhi in December I decided to perform the operation on a case of Pott's disease of the dorsal spine (D8-D10) with paraplegia. This man had developed complete paraplegia with loss of sensation and loss of control over micturition and defaecation for seven months before admission to my wards. I was indeed gratified to find that he started to show signs of recovery from his paraplegia rather dramatically after the operation and has been making good progress since. We have planned to perform anterior spinal fusion on suitable cases and compare the results of these cases with those obtained in posterior fusion after the usual treatment with prolonged bed-rest and drug therapy and we will keep an open mind regarding the efficacy of this method till then.

Operative Technique: The cervical spine is approached by an incision along the anterior border of the sternomastoid reflecting the muscle backwards, and the oesophagus, trachaea, larynx, and carotid sheath forwards. The cervicothoracic region is one of the most inaccessible levels but may be approached by a periscapular incision similar to that used for a first-stage thoracoplasty.

Below the level of D4 in both thoracic and lumbar regions it has been found more satisfactory to approach the spine from the *left* side where the pulsating aorta provides an easily identifiable landmark in what may be a mass of fibrous tissue and abscess. In the thoracic region from D4 to D12 the thoracotomy should be performed by rib resection so that the rib is available for the graft. The correct rib is selected from the anteroposterior film of the chest by counting the ribs at the extreme lateral margin of the film and taking the one which at that point is in level with the upper border of the tuberculous lesion. Thus a lesion of D8 to D10 will probably be most easily approached by resecting the 6th or 7th rib. In the thoracic region the abscess cavity has the pleura and the intercostal vessels on its anterior wall. The aorta is mobilized

by dividing the pleura lateral to it and ligating and dividing the intercostal arteries close to their origin together with the tributaries of the hemiazgos vein. As soon as the abscess is opened the pus is evacuated with an electric sucker. All diseased tissues, pus, sequestra, and devitalized intervertebral disks are removed. It is important to make sure that the full extent of the disease has been removed as it is easy to leave some disease behind. When this toilet has been completed, a macroscopically clean and bleeding cavity should remain.

A mortise is made in the vertebrae at either end, the distance measured with dividers and a strut graft of the correct length introduced to keep the vertebrae sprung apart. The interval which remains between the vertebrae is filled with slivers cut from the remaining portion of the rib. Details of the operative technique were illustrated by a cine film then projected.

Osteoarticular Tuberculosis

By

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I am grateful to the convenors of this conference of the Tuberculosis association of India to have given us an opportunity of discussing this important subject of osteo-articular tuberculosis which is one of the major lesions facing the surgeons in the Orthopedic departments of many of our Hospitals in this country.

Incidence

I seek your permission to place before you the incidence of Osteoarticular tuberculosis as seen in the town of Lucknow and dealt with in the Gandhi Memorial & Associated Hospitals, Medical College, *Lucknow.*

An attempt has been made to analyse in our series of cases the frequency of tuberculosis in various parts of the body, and its association with other lesions in different age groups. The following table demonstrating the preponderance of tuberculosis in different communities and the cross section of the population of the town of Lucknow is placed before you from the departmental library of the department of tuberculosis with the kind permission of my esteemed colleague Prof. R. N. Tandon of the K.G's. Medical College, Lucknow.

Table of intrathoracic and extrathoracic lesion with community representation :—

Results of Tuberculin Testing

I have found an average Tuberculosis infection rate of 38.4% for the whole 0—15 years age group in the children of Lucknow. From the 2089 School Children, Tuberculin tested I found an average reactor rate of 46.7 %. The incidence of Tuberculosis infection in 0—5 years, 5—10 years and 10—15 years age group was found to be as follows:—

0—5 years	17.2%
5—10 years	35.3%
10—15 years	63.5%

On an average the infection rate in the Mohammandans has been found to be higher than their counter parts among the Hindu Children. This fact has been found to be statistically significant (Significance test).

The incidence of infection in both the sexes of Hindus, and Muslims are given below.

Age Groups	Hindus		Muslims	
	Males	Females	Males	Females
0—5 years	15.3%	16.06%	22.9%	17.9%
5 — 10 years	32.6%	34.9%	41.2%	42.77%
10—15 years	62.2%	62.5%	67.2%	70.3%

The age of maximum fresh infections, in the children of Lucknow has been found to be, between the ages of 8—10 years.

After detailed Clinical, skiagraphic and Pathological examiriations, it was observed that the disease was located intrathoracically in 52.03% and extra thoracically in 47.97% cases.

Detailed incidence of the disease was found to be as follosjsir—

A. — *Intrathoracic Disease : —*		
1.	Pulmonary infiltration	—80—25.07%
2.	Mediastinal Adenopathy	—34—10.6%
3.	Pleural Lesions	—23-7.1%
4.	Primary Complex	—18— 5.6%
5.	Miliary disease	—11- 3.4%
B. — *Extrathoracic disease : —*		
I.	Glandular lesions	—77—24.1%
2.	Abdominal lessions	—26— 8.1%
3.	Osteoarticular lesions	—19- 5.8%
4.	Skin lesions	—5- 1.5%
5.	Meningitis	—14- 4.3%

In our Department of Orthopedic Surgery the incidence of osteoarticular tuberculosis in the various departments of the same institution have a significant variation which I am inclined to interpret as under:—

(a) That there is obviously a statistical fallacy in our appreciation of the problem of tuberculosis. A group of cases predominantly pulmonary attend the medical clinic while another group predominantly osteoarticular attend the Orthopedic clinic. If there was a greater collaboration to find out the incidence of pulmonary infection associated with skeletal tuberculosis or vice versa our readings may be some what diflerent. I am sure they will

point to a much higher incidence in a composite analysis of tuberculosis in general if all our out patients departments were taken into account.

(b) Patients in our institution come from different areas in the state and knowing full well that they reach the hospital in the late stages and only those who can afford to reach, one is driven to the conclusion that the incidence must be very much higher. This is a plea for persisting in our scheme of health visitors, social workers and the analysis of contacts to be able to assess the magnitude of the problem a shade better.

(c) Keeping in mind the limitations of our institution in the matter of staff and facilities these figures are much less than what they would be if more time could be spent on taking up these cases.

(d) I, therefore feel that these statistical records however carefully compiled are only a rough indication of this difficult problem, which is much bigger and calls for a wider organisation for tackling it.

Nature of the Disease

It is admitted on all hands that skeletal tuberculosis follows a primary complex intrathoracically and therefore it is the manifestation of a pre-existing disease and a hidden focus which has metastasized to the bones or joints. It is, therefore, a secondary lesion in dealing with it, it will be well to remember that the main disease is not in the bones but elsewhere in the body.

Pathology and Bacteriology

While it is justified to enter into a discussion as to the source of tubercular infections and the mode of infection I do not know whether it matters very much for the surgeon to find out as to the type of bacillus tuberculosis which is responsible for the lesion. Whether it is the human or the bovine type, the fact remains that the infection in a large percentage of cases has come through the contacts due to a lack of segregation. We have made repeated attempts to have bacillus tuberculosis cultured in our institution but we have not been successful as a routine. Once the bacillus tuberculosis has come to another individual through a contact it is reasonable to suppose that various a typical types must be operating in different types of patients depending on their age, individual constitution complicated by various individual factors in a particular patient, and therefore his individual reaction is manifested by the various shades of clinical signs and symptoms.

It will perhaps be valuable from an academic stand point to find out as to whether the human or the Bovine type of bacillus tuberculosis is more virulent but in view of the statement made above we are not in a position to offer any opinion.

Whether an embolic focus or an infarcation the following points in the pathology of skeletal tuberculosis may be mentioned:—

(1) The incidence of the disease in our series is much higher in the age group of 15—20 years more commonly in the males, in the order of the spine, hip and knee as shown in the following graphs and tables.

(2) By far the commonest onset of the disease is chronic and this chronicity also differs from patient to patient. In as much as many patients seek relief for a weU developed angular kyphosis in the spine accidentally discovered without any other sign or symptom having been noticed before. Very often there is a relation to the trauma which is accidental pointing to the discovery of skeletal tuberculosis and presenting a clinical difficulty in the beginning to arrive at a diagnosis.

(3) That bacillus tuberculosis has one classical property of not allowing osteogenesis in its neighbourhood is a great help in radio diagnosis. In joint lesions the chronicity of the lesion is so great and the virulence of the organism so adapted that the patient may present himself with a fibrous ankylosis of the joint after some time. The accompanying signs and symptoms, the history and the examination of the lungs as well as the radiograms of the symmetrical parts of the body may present the diagnosis of skeletal tuberculosis in this category of cases.

(4) It has been our observation that the children respond better to treatment than adults or old persons both in the relief of the symptoms as well as the time involved in full recovery.

Sites Of Infection

There are two groups from the clinical pathological stand point:—

(1) Infection in the bone proper not near a joint e.g. Sternum, Shafts of long bones like radius and ulna, metacarpals and phalanges, skull bones and in the bodies of the vertebrae. It may be mentioned here that the tuberculosis of the spine presents a problem by itself due to the complication of Pott's paraplegia.

(2) Infection in the bones near a joint which may be extra or intra articular. This may present varying pictures and as a rule the diarthrodial joints are involved and their incidence is seen on the chart already presented. While net denying the possibility of a synovial tuberculosis the majority of the diarthrodial joints have an esseous focus and a secondary involvement of the synovial membrane.

The various complications that we come across in our series may be grouped as follows:—

General complications

(a)—*Active visceral disease.*—Good number of our cases have shown intrathoracic lesions and it is therefore our routine to seek the advice and the cooperation to take a skiagram of the chest to assess the clinical picture and the line of treatment in our series.

(b)—Genito urinary tuberculosis.—It is important to note that in our series we are not able to demonstrate this particular complication either on the basis of routine urine examination or clinical synptomatology. Only on 3 occasion the involvement of kidney was discovered and therefore it is perhaps to conclude that this particular complication is extremely rare in our patients. It is for you all to verify and find out a reason for this variation from other workers in the United States and the United Kingdom where the genitourinary complications have been found to be as high as 25—35 %.

(c)—*Meningitis.*—We are not in a position to give the actual percentage of this complication but it is not uncommon to see cases of meningitis particularly in children. Their incidence has not actually been worked out and perhaps my physician friends will be in a letter position to assess this point.

(d)—*Miliary tuberculosis and Amyloid disease.*—This again is rare in our series and I can recall only a few cases noted in our history sheets of either a miliary flare up or an actual amyloidosis. There is an obvious fallacy in this statement for J am fully alive to the lack of investigation facilities in very much greater detail in this context but whatever the inference is from a clinical picture has been placed before you as an observation for your scrutiny.

II. Local Complications

It is perhaps unfortunate that a very large number of cases come to us with abscess formation, sinuses, and a well established secondary infection. This justifies the Clinical observation that for various reasons perhaps ignorance, the lack of coordination between the physician and the surgeon, the economic problems, cases of skeletal tuberculosis present themselves late for their treatment. The tragedy of an unwarranted surgery perhaps the lack of appreciation of the clinical signs and the symptoms on the body of the patient produces the high incidence of this picture.

Clinical Diagnosis

I may be permitted to emphasize the following points.

(1) That a careful history taking with particular reference to family history to establish contacts, the onset of the symptoms and their duration, the history of pain and its character and a probe into the past illness of the patient will help in suspecting skeletal tuberculosis. The general examination of the patient, his mental attitude some of them being highly intelligent, the observation of temperature and weight record and the over all picture particularly the palpation of lymph glands, the question of appetite, sleep and bowels habits and above all the signs and symptoms of toxaemia, lassitude and fatigue are extremely helpful in making a diagnosis. We have often relied on the general examination as a pointer till one day interference with the function of a joint has attracted the attention of the patient or his relations.

The local examination of a joint in particular has an important bearing in as much as there is always some interference with function dating back with either actual or assumed history of trauma. The occurance of pain in the joint is a later manifestation. In conducting the clinical examination the following points are found to be useful:—

(a) The way the patient uses his joint and the position in which he sleeps in bed. A typical history of the swelling of the joint after a hard days work, and its return to normal early morning after a nights rest, is of great diagnostic value.

It may well be emphasised that a patient who is not very intelligent may not notice any local affection and not uncommonly deformities or interference of function have been explained away lightly and the patient presents himself before the surgeon with a well established deformity for example in the spine or the shoulder, a marked wasting and limitation of movement just incidently because of an insignificant accidental trauma or routine medical check up, as in insurance cases, or when some body incidentally points to the lesion. Clinically this group of cases may be classified as a symptomatic till they are examined by the surgeon.

(b) I do not wish to take your time in methods of diagnosis ike the montoux test in which a negative result will count against tuberculosis, but it is only in young children that a positive result is of any value. The following special tests are important.

(1) In adults examination for syphilis or Gonorrhoea should always be made.

(2) In all cases particularly children septic foci should be carefully looked after. We have often found tonsilar infections on the general examination of the patient.

(3) In female patients urine culture for B. coli infection of the kindney and chronic constipation may be mentioned as pitfalls in assessing the diagnosis.

(4) *Radiographic examination.* It has been our experience that in several cases radio-diagnosis is negative and we should not expect any radiological signs in the earlier stages when there is perhaps an imperceptible infiltration and negligible decalcification which can not be appreciated on an X-ray plate. It is, therefore, extremely important to realise that the clinical signs and symptoms both general and local are the earliest manifestations of skeletal tuberculosis and it needs some lapse of time before radiological signs will be seen.

In those cases where early radiological evidence is available it will perhaps be well to remember that if both sides of body are X-rayed in identical position at the same time a greater faith can be put on the early rarefaction by comparison. The atrophy of bones its size and shape in children and perhaps alteration in the growth of epiphysis will be additional diagnostic data. It is a useful practice to get the X-rays done in the presence of the surgeon to avoid the fallacy of a symmetrical position of bones and joints.

(5) In suspected cases urine examination, and urography be done.

(6) As far as possible the routine blood test should be carried out. One single examination of E.S.R. is not of much value but repeated examinations with clinical coordination of the signs and symptoms and observation of the patients is useful.

(7) Surgical methods of disgnosis *e.g.* aspiration under a septic precaution, examination of the fluid, smear and culture, guineapig inoculation, histological examination of regional lymph glands or a portion of synovial membrane of the joint after Arthrotomy may be useful in confirming the diagnosis and should be used according to the facilities present and the indication in an individual patient.

(8) It will therefore be clear that the diagnosis of bone and joint tuberculosis is primarily clinical, particularly in the early stages when no other pathological or radiological evidence is of any value. It is therefore our practice to rely on clinical signs and symptoms and to make a provisional diagnosis and follow it up by the observation of the patient till the diagnosis of skeletal tuberculosis is either proved or disproved. In a large majority of cases in our series the Clinical observation has proved to be a real stand by.

It may perhaps be not out of place to mention here that some of our colleagues employed chemotherapy as a method of diagnosis of skeletal tuberculosis. We think this practice is not only unhelpful but actually harmful. It does not clarify the diagnosis but masks it and produces greater difficulties later on when the active treatment has been instituted, and where the value of chemotherapy whould be very great in controlling the disease, its complication or giving a help to the actual surgical procedures that may be indicated.

We, therefore, follow the practice of making a provisional diagnosis and treating the patient from the point of view of the clinical observation till enough time has elapsed to prove the existence of the disease. The actual diagnosis of tuberculosis although it may be established later is better not announced at this stage to the patient or his realations to avoid the psychological trauma and its consequent ill effects.

TREATMENT

(1) It is accepted on all hands that the general measures are the most important in the treatment of osteoarticular tuberculosis. Prophylaxis by fighting poverty over-crowding bad housing, over work and any other factors resulting in the lowering of the resistence of the patient should be essentially dealt with. The question of rest, diet, are important and have to be worked out in individual cases or individual merits. Other prophylactic measures like B.C.G. may have their place for which the physicians testimony will be of value.

From the surgical stand point the sheet anchor of the treatment is:

(2) *Adequate immobilization.—I* am not entering into the details, but I feel it my duty to clarify that the practice of exhibiting chemotherapeutic drugs either for the diagnosis or for cure is not proper. In a large percentage of cases immobilization alone reduces the toxaemia and causes the improvement both in general and local condition of the patient.

(3) Other contributary methods like heliotherapy are useful and should be employed as an adjunct to the institutional treatment. I have seen the T.B. Hospital in Jaipur and Jamnagar particularly the latter and feel that an intelligent use of sunlight is of great value. It may be mentioned here that sunlight should not be given in India in hot weather, not to patients with fever and certainly not to those who feel exhausted after even a short exposure. In any case dehydration of the body should not occur while the best advantages of the photo chemical action should be obtained by proper selection of cases and regulation of the dose of heliotherapy. This necessarily calls for an institutional treatment.

(4) It may be mentioned here that cold abscesses in relation to the skeletal tuberculosis should not be given hot fomentation as warmth tends to flare up the disease. Immobilization to cold abscesses is very useful and our practice is to do repeated aspiration under strict aseptic precautions with instillations of streptomycine with useful results.

Plaster immobilization is by far the most efficient local treatment from various points of view. A properly applied plaster cast, contributes to local and general rest, prevents further destructive changes in bones and joints and ensures a good nursing care so necessary for the patients. With the paucity of beds in our hospitals we have found plaster treatment extremely valuable in our series of cases. It may be mentioned here, that in early and well developed cases of tuberculosis of bones and joints, no other splint is prescribed by us except a plaster cast, in order to have a fullest control on the patient, as we find them in our country. It is therefore important to visualize, the great necessity of establishing Orthopaedic hospitals and sanatoria for osteoarticular tuberculosis.

For the present I feel that an immediate institution of domiciliary Orthopaedic service for cases living outside the hospital wards will be of great benefit. Minor adjustment of the plaster cast on bed, the adjustment of the limbs, instructions regarding the management of the back will help in the prevention of bed sores, plaster sores and prove to be valuable in the ultimate relief of the patient.

CHEMOTHERAPY

As already indicated above, the analysis of our cases and their results show that chemotherapy cannot replace, the standard surgical treatment and Orthopaedic measures in dealing with skeletal tuberculosis. Our predilection is, not to employ chemotherapy as a routine, but only to use it under the following conditions:

(1) In early cases of tuberculosis, where plaster immobilization has been given, and the signs of toxaemias and primary lesions call for the use of drug.

(2) As local instillation in sinuses, again after proper immobilisation with aseptic precautions.

(3) As a pre-operative measure and mainly as a post-operative adjunct to control the disease.

(4) In cases where it is indicated for other associated lesions as advised by the physician.

(5) Chemotherapeutic drugs are of immense value in the control of maningitis miliary tuberculosis, and as a post-operative measure. They have made intra-articular and intra-osseous operations, safe and combined with pencillin where secondary infection is present, they are a great help to the surgeon.

PRECAUTION

A large number of patients come to us where streptomycin has already been given for a long time. We therefore request our pathologist to perform the sensitivity test before giving the drug.

The combination of streptomycin with P.A.S., tibizide, the display of codliver oil, Vit. D, and perhaps calcium and Vit. A in children are useful. It may be summarised that the administration of Chemotherapeutic drugs need a great caution, a proper indication and regulation of dosage for prolonged period under careful observations and should not be used in any and every patient. It has no place in our opinion, as a curative measure unless and until immobilization and the general care of the patient is properly carried out.

The problem of toxicity by streptomycin, resistances of a particular strain of organism, its availability at the local site through the blood stream, make it imperative, to plan out this treatment with great care. Whether or not the topical application, results in increasing the resistance of organism produces another limitation, which has to be properly worked out.

Active surgical treatment

I shall briefly indicate, our observations in this respect. The correction of deformities, the removal of dead material from a bone or a joint, the reconstruction of an excised area, and the stabilisation of healed joint are the main indication. There is one particular lesion of tuberculosis spine producing paraplegia which I am not taking up in this group, as my other esteemed colleague is dealing with it.

The surgery of ablation, has to be done sometimes, for extreme local destruction, *e.g.* tuberculous ankle or knee, where prolonged treatment is not likely to be compatible with general condition of the patient, and hence the sacrifice of a part of the limb is planned to save the life of a patient. Amputations are becoming less and less by more reasonable surgical methods, and their danger if performed is becoming less frightful due to the efficiency of an artificial limb maker.

The excision of a joint, intra and extra articular arthrodesis surgical production of a pseudorathrosis, osteotomies for correction of deformities have all become a common procedure in suitable cases in which the aid of suitable Chemotherapeutic drugs is duely recognised.

The post-operative care, and the ambulatry treatment have also been worked out on the scientific basis making the prognosis much more reasonable. The application of braces or splints during ambulations, need the establishment of proper institutional facilities to help out these crippled patients.

The aim of surgical treatment in osteo-articular tuberculosis

(1) To give a freely mobile joint which is possible if an early diagnosis is made and a proper treatment instituted particularly in children. I have seen a few cases of free mobility of a joint in the hip, knee and elbow, even after cold abscess had formed.

(2) In adults and old people, the aim of the surgical treatment should be the local eradication of the diseased area, reconstruction and stabilisation, so as to ensure proper locomotion and mechanical efficiency.

Rehabilitation of cases of skeletal Tuberculosis

This aspect of treatment needs emphasis in the present stage of our hospital development. It is admitted that physiotherapy, occupational therapy and vocation training are all helpful methods in reconditioning the patient, either for the same job which he held before or to initiate him to a new method of living. I wished such rehabilitation units were taken up in every institution dealing with tuberculosis in general and bone joint tuberculosis in particular.

I have seen that a simple method of regular breathing exercises have contributed very efficiently to the patient suffering from Tuberculosis of the spine. It all emphasises again a great requirement in our scheme of fight against tuberculosis.

CONCLUSION

(1) Osteo-articular tuberculosis is much more wide-spread than is ordinarily thought.

(2) In addition to general measures regarding the sanitation, the standard of living and so on, it will perhaps be more useful to accelerate such activities as that of our health visitors, social workers, medical axamination of children in schools, after-care and check up of cases of permanent tuberculosis, to work out the contact and to implement the notification of the disease as an all round step to prevent osteo-articular tuberculosis.

(3) The early diagnosis of skeletal tuberculosis is mainly clinical and the co-operation of the physician and the surgeon has been emphasised as essential in this scheme of Hospital treatment.

(4) In order to achieve good results every tuberculosis clinic should have a bone joint tuberculosis wing, with facilities for surgical work.

(5) Orthopaedic rehabilitation units are essential and should be taken up by trained Orthopaedic surgeon in the tuberculosis of bone and joint in Tuberculosis Hospitals.

(6) The place of chemotherapy as a therapeutic measure has been evaluated and the importance of the standard treatment by rest and immobilization has been emphasised in Osteo-articular lesions.

(7) All our efforts to establish a team work between the Orthopedic surgeon and in Tuberculosis physician on an integrated basis is called for both in the diagnosis and care and the after-care of tuberculosis cases.

Surgery in the Treatment of Skeletal Tuberculosis

By

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A survey of the treatment of skeletal tuberculosis during the past 100 years reveals a certain trend of thought. The earliest attitude was that of utter helplessness when the disease was called the King's Evil. The disease progressed inexorably, causing increasing debility complication by multiple sinuses, amyloidosis and death. We then find a period when heroic attempts at saving the life was made mainly by amputations of the limbs or radical excisions for lesion of peripheral joints. Attempts at radical excision were followed by non-healing of wounds, infection and spread of disease to meninges ending fatally.

It was at this time that Hugh Owen Thomas of Liverpool propagated his ideas of conservative management of these cases. The importance of constitutional treatment for these conditions was accepted in the early part of this century and this lead to a revolutionary change for the better in the results of treatment. Special Sanatoria were established for treatment of these cases. By 'providing absolute rest to the joint and general treatment to improve body resistance a remarkable improvement was achieved in the number of lives and limbs saved. This necessarily meant a prolonged period of immobilisation which extended upto 3 to 5 years in many cases. In the treatment of Bone and Joint Tuberculosis, this tradition of conservatism has established certain dicta, the total acceptance of which will thwart our progress and condemn many patients to a prolonged invalidism, which is crippling physically, mentally as well as economically. The mortality though much less than before was still as high as 20-30%. The prolonged, uninterrupted enforced immobilisation for long periods gave rise to complications like contractures, wasting, renal calculi, epiphyseal arrest, stunting physically as well as mentally of children.

The advent of anti-tuberculosis drugs raised hopes that we may be able to give up all conservative treatment and eradicate all lesions by the use of drugs alone. These hopes were soon shattered and it became evident that conservative measures are still essential to the treatment and that the drugs can only be adjuvant in the treatment. There has been a dangerous tendency on the part of general practitioners to rely completely on the anti-tuberculosis drugs and neglect the more important measures to improve general resistance of the patient and give absolute rest to the joint.

The fact that between immobilisation of the part and chemotherapy, the former is far more important and essential than the latter, is brought out very well by the following case.

Mr. K., aged 35, complained of pain in the right elbow of one month duration. The joint was swollen, warm with muscle spasm and marked limitation of movement. X-ray revealed a minimal erosion of the lateral condyle of the humerus with generalised rarefaction. At the same time he complained of some pain in the left wrist with a little soft tissue swelling on the dorsum. This was diagnosed as a tuberculous tenosynovitis. The elbow was immobilised in Plaster and systemic chemotherapy started.

He also had intra-articular streptomycin once a week into the right elbow. The left wrist was left alone. He had a total of 45 gms. streptomycin.

The right elbow improved gradually and at the end of 8 months had returned to normal with limitation only of the last 10° of extension and flexion. But the left wrist pain persisted and at this period started getting worse. X-ray revealed an erosion in the carpal bone and radius. This time the left wrist was immobilised in plaster and a second course of streptomycin given. The wrist gradually improved.

This case proved to be a perfect control experiment in the same patient with the right elbow joint haying immobilisation and chemotherapy and the left wrist having the benefit of the systemic chemotherapy but no immobilisation. While the right elbow improved and recovered completely, the left wrist lesion progressed unchecked.

Place of Surgery: Surgery in skeletal tuberculosis may be considered in two aspects:

(1) Surgery done to deal with the late end results of the lesions,
 (i) Arthrodesis.
 (ii) Osteotomies.

(2) Surgery done during the active stage of the disease,
 (i) Diagnositic
 (ii) Cold Abscess
 (iii) Paraplegia
 (iv) Curetting of lesion.

Till recently surgery was still an elective procedure done when the lesion was considered quiescent. This elective surgery consisted mainly of arthrodesis of joints which were in unsound ankylosis. Correction of deformities was done some years after quiescence of the lesion, when ankylosis occurred in bad position.

The ideal method of treatment of any joint condition should arrest the progress of the disease and prevent complications, should be complete in a reasonably short time and should result in a joint with full function.

The treatment accepted as best as present amis at sound ankylosis of the joint in good position. Such a standard is obviously far from the ideal to be desired.

The main reason for such an attitude has been the fact that in most cases the articular surface of the joints had been badly damaged before the condition was diagnosed. Progress towards the ideal of saving the function of the joint can be made only when we succeed in diagnosing the condition in the earliest stages, when the infection is yet in the synovial stage or when the bony focus is minimal.

Exploratory Surgery: The advent of Chemotherapy has made this type of surgery safer and possible earlier. While life and limb saving had been the aims in the earliest periods the saving of function of the joints became the aim after the drugs came into use. Attempts at earlier diagnosis were helped by exploratory surgical procedures.

Streptomycin and other drugs have helped us to undertake safely open biopsies of joints to establish the diagnosis early and start treatment with a view to saving the function of the joints.

It is now an almost routine practice to do an open synovial biopsy in all doubtful cases of Synovial T.B. of Knee where the lesion has not yet spread to the bone.

Synovial biopsy is also done in the hip to eastablish the diagnosis early when the symptoms and signs are minimal.

Such a procedure in addition to providing a piece of tissue for histological study relieves the tension of excessive effusion into the joint capsule and thus improves the blood supply to the synovial membrane. It also gives us an opportunity to instil streptomycin into the joint cavity.

Place of Surgery in the Treatment of T.B. Spine

While the sheet anchor of our treatment of spinal tuberculosis is conservative, surgery has a definite place to help total recovery of a patient. The indications for surgery in T.B. spine can be grouped under the following categories:

1. Treatment of cold abscess
2. To promote complete quiescence of the disease and prevent re-activation, spinal fusion
3. In the treatment of paraplegia.

The majority of cases of spinal tuberculosis heal soundly by conservative treatment. In children the vertebral bodies come together and fuse to form a bony block.

In adults the spontaneous fusion is not always satisfactory and is much slower. In many cases the adjacent vertebral bodies do not come into body contact in spite of prolonged immobilisation and X-ray shows a gap between the vertebral bodies; this gap is filled with fibrous tissue or unabsorbed debris and this corresponds to the fibrous ankylosis in the other joints. Thus we find while most of the cases of T.B. spine in children end up in sound ankylosis by conservative treatment alone, a good percentage of cases go in for unsound ankylosis. No case which has healed with unsound ankylosis can be considered to have been permanently cured. Such cases in course of time go in for increasing deformity and re-activation of the disease. To obtain a total recovery of the patient such cases with unsound ankylosis must have surgical fusion by operation. The purpose of the spinal fusion is to make the affected part of the spine a mechanically sound weight transmitting column. The timing of the operation should be carefully considered as it should not be undertaken till the lesion itself clinically and radiologically enters the quiescent stage.

There are again some cases where after a full period of conservative treatment, one lateral half of the vertebra in antero-posterior view fuses by bony block with the corresponding half of the adjacent vertebra while the other halves remain in a fibrous ankylosis. This results in a socliotic deformity at the site. The mechanical instability of such a position causes persistant pain in the back even while the disease is completely quiescent. Such cases also need a fusion operation to stabilise the spine. In both these situations the operation is done for purely orthopaedic reasons to provide a sound ankylosis and ensure permanent quiescence of the lesion. A special location of the disease like that in the cervico-dorsal region where a sufficient immobilisation in the ambulatory stage is impossible with a brace, a spinal fusion will be essential. Cases which have re-activated after a period of quiescence are also best treated for short period conservatively and then the spine should be fused.

Technique of Spinal fusion

The technique employed is a modified form of Hibb's spinal fusion.

After accurate localisation of level of lesion by preoperative X-rays with a metallic marker in the skin, the spines are exposed including one above and one below the level of lesion. The spinous processes are excised, the laminae made raw by removing cortical bone. The big raw area thus created is packed with cancellous bone chips taken from the posterior half of iliac crest.

Use of Homogeneous bone-graft

In the T.B. Sanatorium where large number of ribs are removed in Thoracoplasty operations, we are using split ribs obtained from another patient as grafts for packing the raw area made in the spine. This procedure saves time and a second operative wound in the patient. Callus formation is very profuse by the use of such cancellous bone and the fusion is quicker and sounder.

As Bone Bank facilities are not available the cases of spinal fusion and thoracoplasty are posted for operation simultaneously in the twin-theatre and the ribs are directly transferred from one patient to the other.

Potts' Paraplegia

Paraplegia is still one of the most serious complications of T.B. Spine. Modern chemotherapy with the conservative treatment has almost eliminated completely the other complications like miliary dissemination, tuberculous meningitis, persistent multiple sinuses with secondary sepsis and amyloid disease, leaving paraplegia as the only serious and dangerous complications of the disease. Before the chemotherapeutic era its incidence was 11 % but now it is much less.

The classical work of Seddon and Butler in 1935 described the causes which produce paraplegia.

Treatment: In children paraplegia has a very good prognosis and they all recover if given the proper immobilisation and chemotherapy. The prognosis is so uniformly good that Hugh Owen Thomas welcomed the onset of paraplegia in children as it compelled the child to be in bed with more perfect immobilisation.

In adults also the basis of treatment is immobilisation and general treatment. The majority of paraplegias recover by such a conservative regime of treatment.

The paraplegic patient is immobilised and chemotherapy started and a careful watch is made to spot any early sign of recovery. Stopping of involuntary spasms, control of bladder function and sensory recovery occur in that order before any motor function of muscle shows reovery. If no signs of recovery are appearing one has to carefully assess the points for and against operation. The difficulty is to say how long one should wait before deciding that it will not recover by conservative treatment. Some believe that if there is no evidence of recovery in one month after immobilisation surgery must be undertaken. Their view is that more waiting means more irreparable damage to the cord. Others will give conservative treatment for six months before deciding about surgery.

It will be reasonable to fix the time-limit somewhere between the two extremes. The general condition of the patient is an important factor to be considered but the threat to viability of the cord and dangers of severe paraplegia have to be balanced against the poor reaction of the patient. The next factor is the completeness of

paraplegia and the presence of a tense paravertebral abscess shadow in the X-ray. On the whole it might be better to operate on a few cases that would perhaps recover without operation rather than to run the serious risk of irreparable permanent damage to the cord through hesitation or delay.

Thus the indications for operation will be:

1. Paraplegia increasing or unimproved in spite of efficient treatment for three months.
2. Paraplegia already very severe and complete with uncontrollable and exhausting involuntary spasms of legs.
3. Paraplegia with very tense para-vertebral abscess as shown in X-ray.
4. Spinal tumour syndrome where lesion is in the posterior segment.

It must be emphasised that the immobilisation of spine must be uninterrupted before, during, and after the operation.

The operative procedures for paraplegia are the following:

1. Costo-transversectomy.
2. Laminectomy.
3. Anterolateral decompression.

In his description of paraplegia Pott wrote in 1779, "The remedy for the most dreadful disease consists in procuring a large discharge of matter and in maintaining such discharge until the patient shall have recovered the use of his legs." Thus in giving the description of the disease Pott also laid the foundation for the surgical drainage of the condition.

1. Costo-transversectomy

This is indicated when there is a tense spherical paraspinal abscess. This is a simple procedure. Through a midline incision centred at the level of lesion the medial 2" of one or two ribs, and the corresponding transverse processes of the vertebrae are excised. The cold abscess is opened by blunt dissection, then drained and completely evacuated of all pus and debris. The wound is partially closed with a gauze wick left in for 48 hours.

2. Laminectomy and spinal fusion

This operation has a limited application in cases where the lesion is in the posterior segment of the vertebrae and when there is no obvious tense abscess shadow particularly in cases of the spinal tumour syndrome type. The pressure in these cases is due to granulation tissue or pus. Laminectomy should be followed by a spinal fusion either in the same sitting or as a second operation.

3. Anterolateral decompression

This procedure also described as lateral Rachotomy is a more severe surgical procedure. The first step is a costo-transversectomy of two ribs and corresponding transverse processes. The cold abscess is evacuated completely. The pedicles of the vertebra are nibbled off. Using the intercostal nerves as guides the lateral surface of

the cord covered with the dura is exposed. The cord is lifted up by using the nerve and the posterior surfaces of vertebral body exposed. The tuberculous focus in the body is scrapped and all debris, sequestra and granulation tissue removed. Local streptomycin is applied and wound closed.

This operation can be completed with an anterior spinal fusion. Chip grafts from iliac crests are applied to the vascular healthy vertebral bodies and wound closed. Thus decompression for paralegia is combined with a stablising spinal fusion which shortens the total period of treatment by a large extent.

Place of Surgery in T.B. hip

Apart from the minor surgical procedures in relation to cold abscess the main indications for surgery in T.B. hip are:

1. Operation to permanently protect the diseased joint from re-activation; Arthrodesis.
2. Operation to correct deformities—Osteotomy.
3. Operation to equalise leg length, when there is excessive shortening.
4. Rarely as a life-saving measure—radical excision.
5. Curetting of active lesion.

Arthrodesis of the hip joint

The production of a mechanically sound fusion of the hip has been a difficult operative problem as the articular surfaces are at great depth. The fear of spread of infection and non-healing of the wound, kept the surgeons from entering the joint cavity. An extra-articular procedure was adopted of which theileo-femoral arthrodesis has been the favourite method till now. In this method, a bone graft was placed between the ileum above the acetabular roof to the greater trochanter. This method suffers from a mechanical defect in that the bone graft being above the joint is under a tension strain as the weight bearing tends to adduct the joint. The graft gave way either at the upper or lower end. In children the greater trochanter being mostly cartilaginous the graft often failed to take in its distal end.

An architecturally sounder method of ischio-femoral arthrodesis was introduced by Britian by placing the graft under compression through an osteotomy gap into the ischium below the acetabulum. This produces better fusion particularly in children.

Para-articular arthrodesis

As the fear of opening the joint capsule in much less now due to the availability of the anti-tuberculous drugs, one can boldly approach the joint as closely as possible in an endeavour to produce a good arthrodesis.

The method followed recently can be described as para-articular as the graft used in placed directly on the neck of the femur. After exposure of the hip joint by a posterolateral approach, the capsule is completely excised from superior aspect of the joint, the cortical bone is removed from the exposed part of the head and upper aspect of the neck of the femur, any sequestrum in the joint cavity is removed. The greater trochanter is chiselled off at the base obliquely. The bone piece is rotated through 180° and laid on the raw surface of the neck and its tip is jammed into a groove made in the acetabular rim. This contact of raw bone surfaces throws good call us and a strong bony

bridge forms between the acetabulum and the trochanteric region in continuity with the neck of femur.

The results of such a para-articular arthrodesis have been uniformly good in all the cases done so far and the post-operative period has been almost afebrile and primary healing of the wounds have been obtained. This has been possible by providing a pre and post-operative course of streptomycin.

Surgery as an adjuvant to Chemotherapy

While chemotherapy has been playing an adjuvant role to conservative treatment as well as in elective surgery it is becoming clear that surgery can be made to play an adjuvant role to the chemotherapy in the treatment of seletal tuberculosis.

It has been recognised that while skeletal lesions discovered in the very early stage responded very well to combined conservative means and chemotherapy the cases discovered late do not respond so well. A study of the microscopic pathology of the tuberculous lesion will explain this difference in response. While cellular response and local hyperaemia were characteristic of the early stages of the tuberculous pathology in the later stage the characteristic picture is that of end-arteritis obliterans and ischaemic necrosis together with fibrotic response surrounding the focus. It follows that ischaemic recrosis is part of the pathology of tuberculosis and unless a path-way is opened surgically, antibiotics cannot have access to the lesion.

Surgery then can play an adjuvant role to breakdown the barrier surrounding the tuberculous focus in bone and produce a local heperemia and help the chemotherapeutic drugs to act on the focus. Thus we see the return of the more radical methods of local attack on the lesion helped by chemotherapy and in turn helping the chemotherrapy to reach the site of lesion and exert the bacteriostatic effect on the tubercle bacilli. Thus we have reached the stage when with the full benefit of constitutional treatment and chemotherapy we approach the skeletal lesion and curette the lesion on completely.

Curetting of the active lesion

In the spine the lesion is approached by a costo-trans versectomy in the thoracic region and transversectomy in the lumbar region. The vertebral body is approached and any paravertebral abscess evacuated. The lesion in the vertebral body is curetted and all granulomatous tissue removed. When healthy bleeding bone is left the raw area is packed with cancellous bone piece from iliac crest_bridging the adjacent vertebra. This results in a good solid anterior spinal fusion.

Such a drastic procedure has been advocated by enthusiasts like Wilkinson for all cases of T.B. Spine. Wilkinson advocates a conservative treatment of 3 to 4 months in adults before central curettage is undertaken. In children particularly in dorsal region when the distruction is more rapid and extensive, conservative treatment is given only for one month and then the curettin, is undertaken. A similar regime is advocated by Mukopadhyaya of Patna.

The average duration of treatment in such cases is reported to be 12 months. It appears unjustifiable to subject every patient to an operation but this curetting can certainly be done in cases which continue grumbling activity in spite of prolonged conservative treatment. Another group of cases where such a treatment will be justified is those cases where there is a reactivation of old lesion.

A similar curetting can be done in other joints like elbow and hip.

Wilkinson has advocated partial synovectomy and curetting of early lesions in the hip. Such a procedure in his hands has given a healed lesion with a good 90° flexion movement in the hip. The follow up period is too short to pronounce a judge-. ment about the curetting procedure particularly in a weight-bearing joint like the hip.

The procedure of curetting the active lesion is so diametrically opposed to the principles and practice of treatment haloed by tradition that it can hardly be accepted on the basis of such short-term follow up. But the further development of such methods will certainly revolutionise the treatment of skeletal tuberculosis; therein lies a great danger because attempts to cure the patient by exterminating the bacilli in the local bone lesion may lead to a precarious recovery if the constitutional treatment is neglected. With the combination of the old knowledge and the development of the new, a new chapter in the treatment of skeletal tuberculosis is opening. At this juncture it is an essential to recollect once again the fact that tuberculosis is a constitutional disease of which the skeletal lesion is only a local manifestation and that tuberculosis is a social disease. The patient came to the hospital because a deep-seated tuberculous lesion became active anbacillamic under her old house and social conditions thus producing the skeletal focus. If we allow the patient to return to the same environment, her vita-lity will return to the old level, the newly acquired resistance will be lost and the lesion is likely to relapse. This only emphasises the need for a long-term rehabilitation which is well within the province of Social medicine and the establishment of a Welfare State.

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Tuberculosis and Anal Fistula

By

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Anal fistulae are of common occurrence and represent a large percentage of the diseases of the rectum and anus. Khanna and Waryam (1955) reviewed 1,000 cases of the diseases of rectum and anus attending out-patients department and found that 14.7% were of anal fistula. However, when we consider the admission to the in-patients' department we find a different picture *viz.* the total number of cases of the anorectal diseases admitted and treated over 51/2 years in the Professor of Surgery's ward, V.J. Hospital, Amritsar show that out of 532 patients of anorectal diseases 160 were of anal fistulae, thus constituting 30.07% of anorectal diseases.

For many years in the past, the common belief was held that majority of anal fistulae are tuberculous. This idea has undergone a revoluitonary change in the last quarter of the century. Recent exhaustive work by various authors has shown that only a small percentage of fistulae are tuberculous in nature. Opinion have varied widely as to the percentage of anal fistulae that are tuberculous in nature and as to the part tuberculosis plays in anal fistula. Jackman and Buie (1946) have described two reasons for this difference of opinion. The first is that the criteria on which the diagnosis is made to differ. At one extreme are those who make demonstration of tubercle bacilli in fistula a requisite for positive diagnosis. At the other extreme are those who feel that the clinical picture or even the demonstration of tuberculosis elsewhere in the body, is enough to establish the diagnosis of a tuberculous fistula. The second reason for the variance of opinion is the difference in the source of material investigated. It is now agreed by all that the laboratory methods are the only exact means of determining the tuberculous nature of fistula. These methods consist of demonstration of tuberculous granulation tissue (fibroblasts, lymphocytes, capillaries, fibrin) with typical Langhans type of giant cell, characteristic tubercle formation with caseation and monocytic and lymphocytic infiltration on histopathological examination, a positive guineapig inoculation or a positive culture of tubercle bacilli.

Gabriel (1948) is of the opinion that only histopathological examination will reveal a lower incidence of tuberculous fistula. In a series of 30 cases which he examined by guineapig inoculation he found 6 cases of tuberculous character, thus giving an incidence of 20.0%. Further he determined the nature of 45 fistulae by histopathologic means alone and encountered only 4 tuberculous fistulae, thus giving an incidence of 9.0%. Jackman and Buie (1946) encountered 600 causes of tuberculous fistulae as determined by histopathology and guineapig inoculation and their incidence in the reported series was 7.8%. In 160 patients of anal fistula treated in the Professor of Surgery's ward from January, 1950 to August, 1956, histopathological examination was done in 121 cases and 16 of these cases (12.8%) showed evidence of tuberculosis. In the last three cases in the series a culture examination for tubercle bacilli revealed two positive cultures. In one of the two a growth of tubercle bacilli was obtained from a direct culture of the pus obtained from the fistula.

In a very large majority of cases of tuberculous anal fistula, the anal infection is secondary to pulmonary tuberculosis. Clarke (1925) found tuberculous fistulae to be thirteen times more common in tuberculous subjects than in non-tuberculous types. The presence of viable and virulent tubercle bacilli in the lower sigmoid and rectum in 30% of patients with pulmonary tuberculosis has been shown by Martin and Sweaney (1940). In this series a roentgenogram of chest showed a lesion in 2 of the three patients who had tuberculous fistula out of the last 25 unselected cases in whom this investigation was carried out.

Pathogenesis: An active extrarectal tuberculous lesion or a history of previous infection can usually be elicited in these patients. Infection leading to fistula is generally supposed to originate in an anal crypt and burrows its way in the perianal tissues. This internal opening cannot always be found. The infection usually occurs from the bowel lumen, the patient swallowing the sputum laden with tubercle bacilli. This is the commonest route of infection in patients suffering from pulmonary tuberculosis. The tubercle bacillus has a predilection for lymphoid tissue and so the infection usually spreads from the rectum through lymph channels and forms an abscess in the perianal tissues, though sometimes it may travel from the rectum to the perianal tissues by blood vessels or by direct extension. The tubercle bacilli may also gain entrance into the blood stream from some extrarectal focus and may lodge in the fat of ischiorectal fossa to start there as an abscess. Rarely cracks and abrasions round the anus may get infected by direct external inoculation. This perianal abscess on rupture leaves a draining fistula. The external opening may be a pinhole or appear as an irregular ulcer of varying size. The fistulous tract is patulous due to the absence of induration. The granulations are pale and flabby. The discharge is frequently continuous and is thin and milky. These form the majority of the tuberculous fistulae and are labelled the superficial variety . All the 16 fistulae seen in the present report conformed to this variety. The deep tuberculous fistula forms a tract with little induration and often leads to a palpable submucous thickening high up. It may be the result of a spread of the infection from the neighbouring organs which are the seat of tuberculosis, e.g. prostate, seminal vesicles, spine or sacroiliac joints.

Age Incidence: Since these fistulae are commonly a complication of pulmonary tuberculosis, the age incidence corresponds to that of later. Martin (1933) and Gerendasy (1948) found the greatest number in the third and fourth decades of life. In our 16 collected cases, the age incidence was as follows:

Age	*No. of cases*
1—10	Nil
11—20	1
21—30	5
31—40	3
41—50	2
51 and over	5
	16 Total

Value of some special investigations

In the last 25 cases of the anal fistula admitted to Professor of Surgery's Ward, B.S.R examination, x-ray of she chest and roentgenographic study of the fistulous tract were carried out. The record of B.S.R, fell into three groups,"

B.S.R *readings*	No. of cases
1 to 7 *mm,* (Normal)	15
8 to 15 mm, (slightly abnormal)	6
16 to 1 10 mm, (grossly abnormal)	4
	25 Total

The grossly abnormal group included 4 patients of which 3 patients were to haromar tuberculous fistula. Skiagrams of chest revealed a lesion of the lung in 2 of these patients. The inference can, however, be drawn that grossly abnormal read-tags of B.S.R. are only suggestive of tuberculous nature of fistula and by no means diagnostic. In these patients the high. level of B.S.R, may he due to pulmonary tuber-culosis and not due to the nature of the fistula. Thus high sedimentation rate may prove the presence of infaction but not its location.

The visulisation of fistula tract after the injection of a wartefr soluable opaque dye was found to be channels that have been responsible for many operative failures in the past (Fig. IK of the greater value in finding out unsuspected and overlooked side traces and

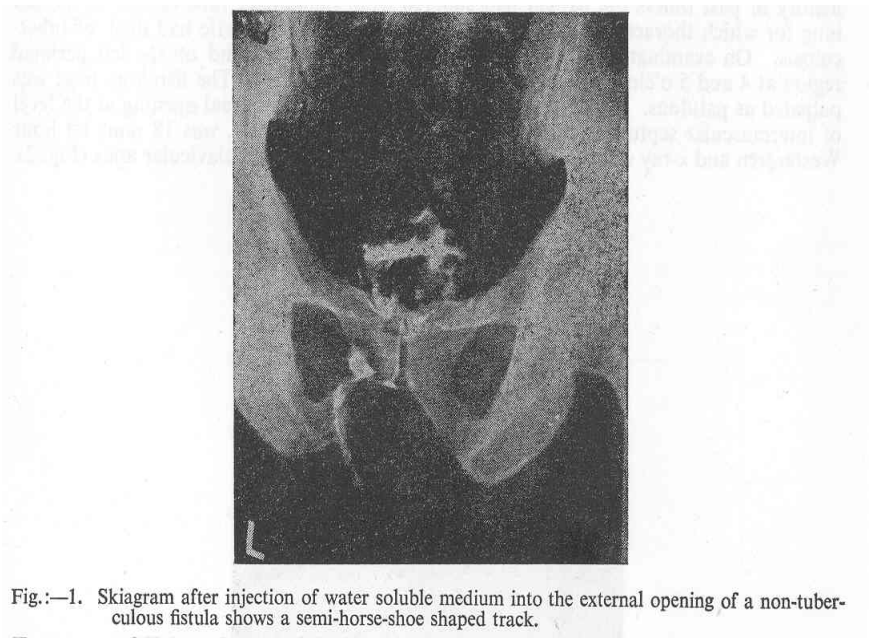

Fig.:—1. Skiagram after injection of water soluble medium into the external opening of a non-tuber-culous fistula shows a semi-horse-shoe shaped track.

Fig.:-1. Skigram after injection of water soluble medium into the external opening of a non- tuber-culous fistula shows a semihorse-shoe shaped track.

For many years it has bees taught that a taberculous fistula should not be opera-ted upon because after operation it is more apt, than not, to recur and if it remains heal-ed, the pulmonary disease, if latent is often activated and if active is often made worse (Martin, 1935), There *is* still a wide spread Feeling against surgery. But proctoiogists have operated on tubercuslous anal fistula for a number of years and have obtained

favourable results. All our cases were operated upon, fistulectomy beeing performed under low spinal anaesthesia.

Streptomycin therapy

The remits obtained in tuberculosis fistulae cases in which surgery was performed and streptomycin, was later supplemented in the post-operative period were most gratifying. It definitely shortens post-operative period required for the healing of the wound, ensures against recurrence and also act as a protective against spread or flare up of the pylmonary tuberculosis daring surgical treatment It is seen that with streptomycin, the wound is healed within four to six weeks. This is in contrast to a reported series of 68 cases of tubercular perianal infection treated by surgical excision alone, with resultant healing in 49 cases, but healing did not occur until after sixteen weeks or so in 14 instance (Granet, 1940). Koontz (194S) re-ported 19 cases in which streptio mycin and-surgery were combined and all of them healed promptly. He believes that the use of streptomycin supplemental to surgery is highly beneficial in the treatment of anorectal tabercuiosis in that it increases the percentage of permanent cures, shorten the period of stay in the hospital by practically eliminating the discharge after a week, or tea days.

Two illustrative cases in the present: series are reported below:

Case No. 1.

S.S-, male, aged 35 years, a salesman was admitted on 3-2-l956, with the complaint of intermittent discharge flowing out of an opening over a small protruberance in the left perianal region, for the last tea years. It started as an abscess which burst spotaneously leading to a constant flow of thin, and watery discharges. In the history of past illness the patient had suffered from, pulmonary tuberculosis of the left lung for which thoracoplasty was done in the year 1945, His wife had died of tuberculosis. On examination two small external opening were found on the left perianal reason at 4 and 5 o'clock about 1" away from the anal verge. The fistulous tract was palpated as patulous. The digital examination revealed an internal openin at the level *of* intrmusucular septum in the midline posteriorly. His B.S.R. was 18 mm 1st hour Westergren and x-ray showed lesion (? active) in the right surpraclavicular apex (Fig. 2).

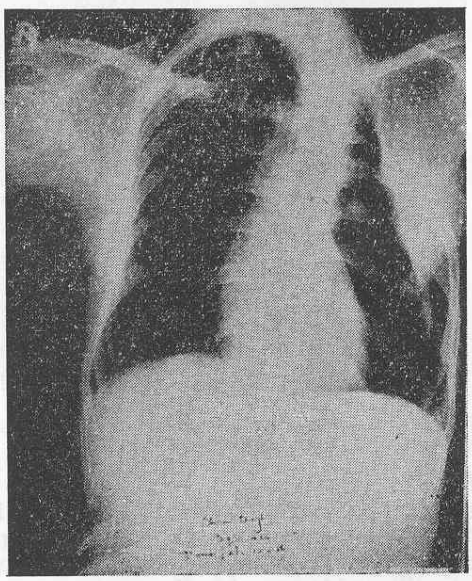

Fig. 2:—Case No: 1. skiagram of chest showing the result of thoracoplasty on left side and doubtful lesion in right supraclavicular apex.

Fig, 2 Case No: 1. skiagram of chest showing the result of thoracoplasty on left side and doubtful Lesion in right supraclavicular apex.

Fistulectomy was performed on 7-2-1956, The histopathology *of* the excised tissue revealed a typical picture of tuberculosis (Fig, 3), The cuture made from the pus discharge revealed a positive growth after 4 weeks. The post-operative period was eventless. Streptomyin was supplemented ON the 4th. post-operative day and the wound healed completely in 5 weeks.

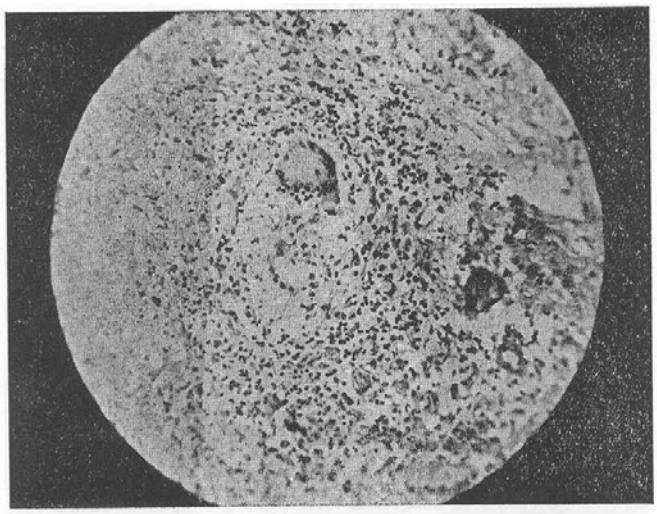

Fig. 3:—Case No: 1. Photomicrograph of section from excised fistulous tract showing a typical picture of tuberculosis.

Case No. 2

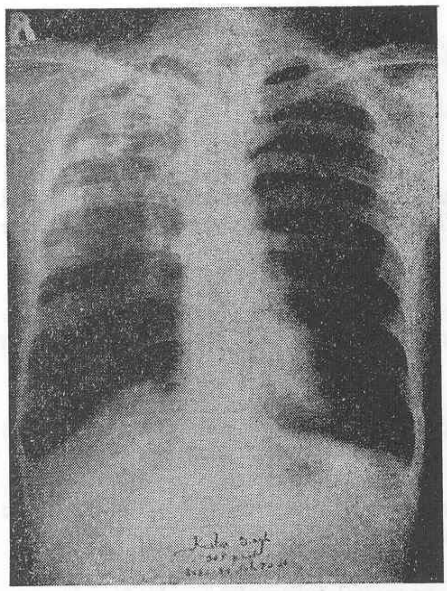

Fig. 4:—Case No: 2. Skiagram of the chest showing lesions in both the lungs. The lesion on theright side is well marked.

K.S., male, aged 40 years, *a* labourer, was admitted on 7-2-1956 with the complaints of a discharging nodule right perianal region along with pruritis ani for the last 5 months. It started as an abscess which was accompanied by pain and slight rise of temperature. He got u incised from *a* barber and since then the world had not healed properly and a thin, watery discharge was constantly flowing from the opening. No history of tuberculosis was present in the family. On local examination a small nodule of the size of a pea, situated over a scar on the right perianal region at 8 o'clock about 1¼ away from the anal margin, was noticed. A small external opening was seen over this nodule. The fistoulous tract was palpated as firm cord leading towards the anal canal. On digital examinatopm the internal openning was felt as adepression at the level of the intermuscular septum in the midline posteriorly. His B.S.R.was 95 mm 1st hour westergren and skiagram of the chest showed a well marked lision with infiltration. (fig.4). fistulectomy was performed and the fistula was

Found to be of low level anal type. On histopathological examination of the tissue, the picture suggestive of tuberculosis was seen (Fig.5). but the growth of A.F.B. obtained five weeks after culture clinched the diagnosis. The post-operative period was eventless except that the wound showed little progress towards healing for the first ten days at which time streptomycin was substituted. There was a rapid improvement and the wound completely healed in six weeks.

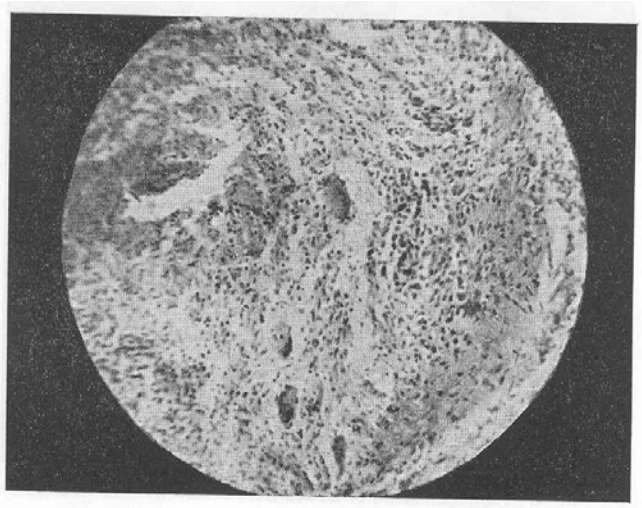

Fig. 5:—Case No: 2. Photomicrograph of the section showing chronic inflamation with groups of giant-cells with central casecation and surrounding epitheloid cells typical of tuberculosis.

COMMENTS

1. Not all the fistulae are tuberculous. Incidence of tuberculous fistulae was found to be only 12.8% in our series.

2, Tuberculosis fistule are usually secondary on tuberculosis of the lung and the infection in them has reached the rectum from swallowing of the sputum ;laden with tubercule bacilli.

3 The diagnosis of tuberculous fistulae should depend on the laboratory examinations, because the gross and clinical findings may be indefinite as in Case report no.2

4. Abnormal readings of B.S.R, are only suggestive of presence of ttsberculosis infection.

5. X-ray *of* the chest often, yields valuable information which may be quite significant in determining the nature of fistula,

6. Surgery is not contraindicated in anorectal tuberculisis. In fact surgery should be performed in all cases unless the patients pulmonary disease or some other condition contra-indicates the procedure .

7. The tuberculous wounds take longer time to heal than the pyogenic variety. But streptomycin therapy, supplemental to surgery, definitely shortens the opst-operative period required for their healing.

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References on Tuberculosis work in India (1938-1950)

By

A.C. UKIL, CALCUTTA

The subject may be conveniently divided under several heads as indicated below.

Epidemiology

The incidence, types of tuberculosis and factors in its Causation continued to be studied by means of tuberculin tests and chest skiagraphy in selected groups of population in different parts of India (Benjamin, P. V.—1938, Riste, R. A.—1938, Coramins, L.—1939, Sanjivi, K. S.—1939, Cruickshank, M. M.—1939, Benjamin *et al*—1939, Government Bengal—1939, Ray, K. S.—1941, Strain, R. E.—1941, Wig, K. L. and Riyaz, R. A.—1941, Shah, R. A.—1942, Shahni, C. L.—1942, Lal, R. B. *et al*—1943, Taylor, G.—1944, Ukil, A. C.—1944, Ghosh, P. K.—1944, Nayyar, B. R.—1944, Aspin, J.—1945, Misra, S. S.—1946, Ukil, A. C.—1948, 1949, Frimodt-Mollar, J.—1949). The later Surveys were gradually dealing with both infection and morbidity rates based on scientific planning, but no surveys could yet be undertaken on an all-India basis until later.

The technique of scientifically designed surveys began to be considered and several reports on the technique were published (Report of I.R.F.A. Committee—1940, Taylor, G. F.—1939, Lal, R. B.—1940, Benjamin, P. V.—1940, Chandra Sekhar, C. and Sen, P. K.—1945, Ukil A. C.—1948 and Ahmed, S. N.—1948).

Several papers on the determination of types of tubercle bacilli isolated from pulmonary and non-pulmonary lesions in man were published (Pandalai, N. G.—1940, Mallick, S.M.K. *et al*—1942, Jit, Indra—1946, Ukil, A. C—1948). It is interesting to record that out of 221 strains tubercle bacilli isolated by Ukil and 141 strains isolated by other workers from non-pulmonary sources, all proved to belong to the *Human type.* The incidence and types of osteo-articular tuberculosis were dealt with by Strain, R. E. (1941), Kini, M. G. (1948) and Narasimhan, N. S. (1948).

The question of silicosis and dust hazards was studied by Sen, P. K. (1939), Ukil, A. C. (1948) and Sikand, B. K. (1949). In a survey on the relation of jute industry in Bengal, Ukil and Sen (1948) tried to find out the infection and morbidity rate in 4816 mill operatives (A) 1107 relatives of workers living in the mill area (B), 1100 relatives of workers living further out of the mill area (C) and 1200 rural population, as contrast, living in distant villages (D). The highest infection and morbidity rate was found in the first group *(\),* progressively diminishing in groups B, C and D. Both the infection and morbidity rate was highest in the spinning section of the mill, where the dust hazard was the worst

The influence of sunlight on experimental tuberculosis was studied by Ukil (1938). The relation of climate to tuberculosis was dealt with by Bose, P. (1945). The question of the application of actinotherapy and the role of solaria was dealt with by Jayaram, B. and Sheriff, A. K.—1938 ; Ahmed, R—1945 and Talwalkar—1948.

Clinical Pathology and Diagnosis

As is natural, a fairly large number of papers were published on the early recognition, standards and technique of diagnosis (including differential diagnosis) of pulmonary and non-pulmonary tuberculosis. For references, please see Bibliography at the end of this section.

Several papers on pathological concepts, instrumental technique and laboratory studies in the diagnosis, prognosis and treatment of tuberculosis were contributed. Papers on biochemical changes in blood were contributed by Reddy, D.V.S. and Venkataramiah (1942), Billimoria, R. B. and Jacoby, H. (1945), Ray K. S. (1948) and Ray K. S. *et al* (1949).

Attempts to standardise methods of diagnosis, prognosis and treatment were made by Ukil, A. C. (1939, 1940-41, 1945), Sen, P. K. (1939, 1948) and the Tuberculosis Association of India (Report on Classification—1940). The after-results of cases discharged from institutions were studied by Barton, R. M. (1939), Benjamin, P. V. (1939,1942, 1948) and Hamid, A. (1946).

Association of tuberculosis with other conditions

The adverse association of tuberculosis and Kala-azar was noted by Ukil, A.C. (1939). The association of diabetes with tuberculosis was studied by Benjamin, P.V. and yerghese, M.C. (1940), Billimoria, R.B. (1940) and Neogy, B.P. and Ray, K.S. (.1944). The question of pregnancy and tuberculosis was studied by Ghosh, L.S. (1940), Chowdhury, K.L. (1944) and Ghosh, P.K. (1948). Abdominal tuberculosis was studied by Viswanathan, R. (1940), Anderson, F.J. (1940), Ukil, A.C. (1942), Frimodt-moller, J. (1943), Misra, S.S. (1946), Datta Gupta, A.K. (1948) and Tribedi, B.P. and Gupta, D.M. (1941), Lymph-node tuberculosis was dealt with by Cruickshank, M.M. (1939). Osteo-articular tuberculosis by Strain, R.E. (1941), Kirn, M.G. (1948) and Narasimham, N.S. (1948); and Renal tuberculosis by Basu, A.K. (1949).

Several papers on non-tuberculosis pulmonary diseases like pulmonary abscess, bronchiectasis, bronchial asthma, "eosinophilic lung", hydatid disease, pulmonary amoebiasis, carcinoma and syphilis, endothelioma of the pleura and pulmonary moniliasis were contributed.

Treatment

The subject can be conveniently considered under the following headings:

Chemotherapy: Several papers were published on the use of gold therapy (Chatterjee, P.K. and Ukil, A.C.—1938-39: Shrikhande, Y.G.—1939; Sanyal, D.N.—1939), Cadmium Salts (Nizamuddin, S.—1942) and Promin (Benjamin, P.V. and Frimodt-moller, J.—1946), but these soon yielded place to para-amino salicylic acid (Dempsey, T.G.—1948; Frimodt-moller, J.—1949; Ukil, A.C.—1949; Sahgal, H.N.—1949) and Streptomycin, either singly or combined with PAS (Ray, K.S. *et. al*—1948, 1949; Ray, K.S.—1948; Sanjivi, K.S.—1949; Patel, B.—1949; Sen, P.K.—1949; Rao, K.V.—1949; Sen, S.K.—1949; Singh, K.—1949; Billimoria, R.B. *et* a/—1949).

Surgical therapy of pulmonary tuberculosis

Several papers appeared on Suction drainage; Artificial Pneumpthorax—intra-and extra-pleural, including pneumolysis and complications of A.P.; I Phrenic exairesis, Pneumoperitoneum, Thoracoplasty, and Pulmonary Resection, under Indian conditions, references to which will be found in the Bibliography.

Treatment of osteo-articular tuberculosis

Treatment of osteo-articular tuberculosis was dealt with by Strain, R.E. (1941), Kini, M.G. (1948), Narasimham, N.S. (1948) and Guha, A.C. (1948).

Prevention

The *public health aspects* were emphasized in a number of papers (Frimodt-moller, C.—1938, 1939; Ukil, A.C.—1938, 1939; Ram Shri—1940; Patel, B.—1944; Lal, R.B.—1948; Viswanathan, R.—1948, 1949). The problem of *Wartime tuberculosis* was dealt with in two papers: S.R.A. Shah (1945), Joseph, T.J. (1943, 1945), *Tuberculosis in relation to Life Insurance* was dealt with by Rao, M.V.—(1949). The *social aspects of tuberculosis* were considered by Banerjee, Miss G. (1948), Majumdar S. (1948), and Buck, Miss M. (1948). The subject of *after-care* was dealt with by Mani, J.T. (1939); Bartan, R.M (1939), Hamid, A. (1946), and Benjamin, P.V. (1948). The subject of *Rehabilitation* was discussed by McDougall, J.B. (1949), Rao, K.V. (1949), Chowdhury, A.R. (1949), and Dwarkadas,K. (1949).

B.C.G. VACCINATION

Apart from other methods of prevention, a plea for the use of B.C.G. Vaccine in immunisation was first made by Ukil, A.C. (1946) in a paper giving an account of Us use in a group of subjects as far back as 1934. A coordinated programme on a nation-wide scale was evolved and introduced in 1948. Since then a number of papers on its preparation and trial appeared [Benjamin, P.V. (1948), Lal, R.B. (1948), Svendsen, S.K. (1948), Ranganathan, K.S. (1948), Gellner, W. (1948), Patel. B. (1949), Rao, K.V. (1949), Wig, K.L. (1949), and Frimodt-moller, J. (1949)].

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NEWS & NOTES

Meeting of the Eastern Regional Committee of the International Union Against Tuberculosis

A meeting of the Eastern Regional Committee of the International Union Against Tuberculosis will be held in the Royal Singapore Chest Clinic on the 18th and 19th October, 1958. Dr. P.V. Benjamin and Shri B.M. Cariappa are President and Secretary, respectively of the Committee. This meeting will review the work of the existing National Tuberculosis Associations in the various countries in the Eastern Region and the progress made in regard to the establishment of similar Associations where these do not exist. Some of the other important items which will come up for consideration at this meeting are appointment of an Executive Committee, Programme Committee and Finance Committee, consideration of the sources of income and expenditure, drawing up of a programme of work for the Committee, location of its Secretariat, etc. Almost all the countries in the Eastern Region are members of this Committee.

Ninth Tuberculosis Seal Sale Campaign

The Ninth Tuberculosis Seal Sale Campaign will commence on October 2,1958, Mahatma Gandhi's birthday and terminate on January 26,1959, Republic day.

Post-Graduate Refresher Coarse in Hyderabad

A post-graduate refresher course for medical practitioners will be organised in Hyderabad, Andhra Pradesh from November 3, 1958 to November 28, 1958 (both days inclusive). The arrangements for the course are being made by the Honorary Secretary, Tuberculosis Association of Andhra Pradesh, Public Health Directorate, Sultan Bazar, Hyderabad-A.P.

Health Visitor's Course

The 1959 Health Visitor's Course will be held from January 1959 and last till September, 1959. The course is organised under the auspices of the Tuberculosis Association of India in the New Delhi Tuberculosis Centre, New Delhi and Lady Linlithgow Sanatorium, Kasauli. Training is also imparted in the College of Nursing, New Delhi and Lady Reading Health School, Delhi. Printed prospectus and application form can be had from Secretary, Tuberculosis Association of India, 3-Red Cross Road, New Delhi. Applications will be received here upto October 31, 1958.

Symposium on "Fungus Diseases in India"

It is proposed to hold a symposium on "Fungus Diseases in India" under the auspices of the School of Tropical Medicine, Calcutta, on February 5 & 6, 1959. The symposium will be divided in the following sections:—

1. Internal medicine.
2. Paediatrics.
3. Gynaecology.

4. Surgery.
5. Medical mycology.

Papers are invited for presentation at the symposium. Last dates for sending abstracts (not exceeding 300 words) and full papers are October 30 and December 15, 1958 respectively. Dr. C. G. Pandit, Director, Indian Council of Medical Research, New Delhi, has kindly consented to preside over the symposium. Scientists from the USA and the UK are expected to participate in the symposium. For any further information and details regarding the symposium kindly write to the Director.

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ABSTRACTS

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Pathology and Bacteriology of Resected Tuberculous Lung Lesions After Chemotherapy

Two hundred and forty resection specimens from 218 patients treated with anti-tuberculosis' drugs were examined bacteriologically. 95% of the patients were over 15 years and in the uiajority, the disease was under three years. The radiological extent of the disease varied from the solitary lesion 1 c.m. and over in diameter to bilateral cavitated disease.

At the time of operation, Cultures were positive in only six of the 218 patients and of these, four were resistant to one or more of the standard drug.

All the cases were classified in four groups according to the Chemotherapy regimes.

Group 'A'

Had drugs in recognized combinations and dosages for a minimum period of eight months.

Group 'C'

Had regimes, which are known to be ineffective in preventing the emergence of resistant organism, for example, single drug therapy, inadequate dosage of drugs, twice weekly streptomycin with another drug daily, etc.

Group 'D'

Good regimes but of less than five months duration.

Group 'B'

Consisting of acceptable regimes continuously for five to eight months or for a total of more than five months with interruptions.

Ancillary treatment:

Consisted of strict posture of lying on the affected side in a plaster Cast to maintain the cavity in dependent position relative to its drainning bronchus throughout the day and during sleep.

Results:

In 65 % of the lesions, acid fast bacilli could be seen on direct examination but only 12% were positive in Culture. Of the 200 guinea pigs inoculated, 10'7% of those escaping intercurrent infection were positive.

Chemotherapy and Consistency:

There were 12 calcified, 142 solid and 86 pultaceous lesions.

There were slightly more calcified and slightly fewer pultaceous lesions in those patients who had received 'A' type Chemotherapy. Those patients with disease of more than three years' duration had solid lesions as opposed to pultaceous lesions in the 'D' Chemotherapy group; while in patients receiving 'A' type Chemotherapy the influence of duration of disease was negligible suggesting that A type chemotherapy caused an alteration in Consistency which outweighed the influence of the duration of disease.

12 out of 240 cases showed calcification indicating that chemotherapy has no influence on calcification but with longer periods of chemotherapy lesions tend to solidify.

Chemotherapy and Histology of Capsule:

87 lesions were limited by collagen (Group I), 114 limited by collagen and a cellular zone (Group II) and only nine limited by a purely cellular zone (Group III).

Group 'A' type chemotherapy possessed collagenous capsules (Group I and II). Those who had cellular Capsule (Group III) received either D or C Chemotherapy. Thus efficient chemotherapy has a definite influence on the histology of the capsule effecting a change towards collagenous encapsulation. It accelerates the change that can occur naturally in favourable circumstances.

Chemotherapy and Bacteriology:

There is marked reduction in the percentage of lesions positive on cultures with improving chemotherapy and of the 41 patients receiving A Chemotherapy only one was positive on culture. Duration of chemotherapy is equally important. Those with C type Chemotherapy had an average duration approaching that of A type and of longer average duration than B type and yielded a higher percentage of positives on smear and culture.

There was great majority of positive lesions with resistant organisms in patients after C type Chemotherapy. There was only one example of resistant organism in lesions after 'A' Chemotherapy and one after B type Chemotherapy.

Size of lesion in relation to Bacteriology:

The size of the lesions influenced the bacteriology, larger lesions being more frequently positive on direct examination and culture. After proper chemotherapy, however, even the largest lesions failed to yield positive cultures.

Consistence and Bacteriology:

There was a co-relation between the consistence and bacteriology, the pultaceous lesions having more direct culture and guinea pig positives than others. Seven of 12 calcified lesions were positive on direct examination, none was positive on culture. From a purely bacteriological standpoint patients with calcified lesions would benefit from chemotherapy.

Histology and Bacteriology:

Lesions limited by a cellular zone (Group III) were all culture positive, while those limited by Collagen only (Group I) were all culture negative. Lesions limited by endothelial cells, giant cells and an outer collagenous Capsules (Group II) were negative on culture after 'A' Chemotherapy. Proper chemotherapy given long enough, greatly hastens the histological and bacteriological changes occurring naturally under favourable conditions, achieving in one year, what in the unaided host takes 10 years or more.

Cavity State:

In 93 patients known to have cavitated disease, cavity closure was achieved in 80%: this good result was largely attributed to postural reduction rather than to the chemotherapy administered.

(The Pathology and Bacteriology of Resected Tuberculous lung lesions After Chemotherapy:— Cotter, D.J., Foreman, H.H., Seal, R.M.E. Thorax, Vol. 13, No. 2 of June, 1956.)

The Fate of the Patient with Persistent Cavitation and non-Infectious Sputum (Open-Nagative) after Discharge from the Hospital.

The Fate of 159 patients with cavitary disease, sputum negative for tubercle bacilli and Pulmonary lesions stable on roentgenography, discharged and continued on drug therapy has been reviewed.

All but 9 had medical sanction on discharge.

The average duration of hospitalization for each patient approximated two years and the majority of the patients received chemotherapy for the same period.

One patient received Isoniazid alone, 68 received Isoniazid P.A.S., 7 received streptomycin P.A.S., one received Isoniazid streptomycin and 82 received streptomycin, Isoniazid and P.A.S.

As a group, the patients had attained a non-infectious status for a year to year and a half prior to discharge from the hospital.

Of the 159, surgery was recommended for 37, but they refused, the rest were unsuitable surgical risks because of the extent of disease or of age or poor vital functions.

123 patients had single cavity, 11 had more than one cavity and 25 of them had bilateral cavitations. The patients with single cavity had cavities of about 5 cm. in diameter. The patient with multiple cavities in one lung had cavities that were approximately 10 cm. in aggregate diameter. The patients who had bilateral cavities had a combined diameter of about 9 cm.

28 patients have been followed for one year, 35 for 18 months, 18 for 2 years, 21 for 30 months, 23 for a period of 3 years, 7 for a period of 42 months and one for a period of 4 years. During this period of observation, 17 of the 159 patients have been re-admitted for re-evaluation.

A total of 11 of the 159 patients have had tubercle bacilli re-appearing in sputum, 6 people died, one died of burns, one of cerebral accident and 4 died of heart disease.

Of the 153 living, 3 were confined to their homes, 75 had restricted activity and 69 had unlimited activity.

As regards their ability for work, 76 were unable to work, 32 were working part time and 44 were working full time.

71 of this group required complete public assistance, 18 required partial public assistance and 63 were entirely self supporting.

Of 153 living, 110 had their Roentgenograms taken and compared with those taken in the Sanatorium, in 43 there was roentgenographic worsening in 6 patients, 9 showed improvement and in 6 the cavity had completely disappeared.

The average duration of chemotherapy was 37'7 months. In the 159 living patients the relapse rate was 8*8 percent and 7 percent had bacteriologic relapse. In 3 patients there was roentgenographic reactivation or clinical worsening without changes in bacteriologic status.

Regarding reactivation, there was 1 case of reactivation in 58 females discharged and 13 reactivations among 101 discharged males.

The death rate of 3-8 percent occurred in the group who had no bacteriologic or roentgenographic relapse.

Hence it is safe to discharge the patients with open negative syndrome to their home environments without creating public health problem. Regarding how long to continue drug therapy it should be individualized, but it should be as long as possible.

(Corpe R F. and Blalock, F.A. Amer. Rev. Tub., Vol. 77, No. S, May, 1958.)

Extra Periosrial Plombage in the Treatment of Pulmonary Tuberculosis

Results of 71 Extra Periostial Plombage operations done in 66 patients are presented. In 30 the disease was advanced and the other side was unstable. In 37 preoperative culture was positive. All the patients except one had cavitation of the plombage side and in 50, cavitation existed at the time of operation.

Average duration of follow up was five years.

Of the 66 patients, 54 are satisfactory without further operation, 7 are satisfactory after further operation and 3 died, of which 2 had coronary thrombosis, but at necropsy the space was uninfected and cavities closed. One patient died of Progressive Pulmonary tuberculosis. Among 54 classified as satisfactory, three have a reduced pulmonary function which makes them unfit for remunerative work but are fit to do their house work at home.

Of the 71 operations, one died because of a surgical tragedy, 62 are apparently satisfactory without evidence of space infection. In two the balls were removed and a resection performed for unclosed cavities, five were converted to a thoracoplasty because of space infection, one died of pulmonary tuberculosis. In one, following pernicious aneamia, needling of space produced pus with degenerate cells.

In those who had inadequate preoperative drug therapy, five out of 24 patients (20%) had become infected and those who had adequate drug treatment, one of 46 (2i%) became infected.

Adequate pre-operative therapy is an important factor in avoiding space infection. This operation is often preferable to thoracoplasty; it is preferable to resection in some cases where the risk of the latter is high.

(Extra Periostial Plombage in the Treatment of Pulmonary Tuberculosis:—Young, F.H., Thorax Vol. 13, No. 2 of June, 1958.)

A Controlled Trial of Chemotherapy in Pulmonary Tuberculosis of Doubtful Activity.

‘ Two hundred and nineteen patients with pulmonary tuberculosis of doubtful activity were allocated at random to two groups. One group was treated with sodium P.A.S. 5G combined with Isoniazid 100 mgm both twice daily for at least six months, the other group was observed without treatment. Patients in both groups continued to lead normal lives. For various reasons, mostly positive initial cultures, a number of patients had to be withdrawn from the trial leaving 95 in the observation and 94 in the treatment group.

The trial was conducted with the idea to investigate whether it was worthwhile treating such cases with a prophylactic chemotherapy in an attempt to reduce the incidence of breakdown.

Patients were accepted for trial if (a) the chest radiograph showed an abnormality considered to be tuberculous, (b) patients to be observed without advising modification in their customary mode of life, (c) patients had been known at the clinic for not more than three months, (d) patients above 15 years of age were accepted.

All patients showing tubercle bacilli by smear or culture, cavitation demonstrated by X-ray, disease due to primary infection, co-existing active non respiratory tuberculosis, pregnancy, recent parturition or diabetes were excluded.

All patients have been in the trial for at least a year, 61 per cent for at least eighteen months and 29 per cent for two years or more.

Results:— Radiographically there was deterioration in 12-6 per cent in the observation group compared with 8*1 per cent in the treatment group. But 6 out of 7 patients showing deterioration in the treatment group admitted that they had failed to take drugs as directed.

Bacteriological investigation showed one positive culture in the observation group, compared with one in the treated. The latter was a patient, who failed to take chemotherapy as directed.

Total deterioration, radiographic and bacteriological was seen in 17-8 per cent in the observation group and 8- 5 per cent in the treatment group.

By life table methods radiographic improvement at two years was estimated at 31 per cent in the treated, compared with 18 per cent in the control. Most improvement or deterioration occurred in the first eighteen months of observation.

Age:— Among patients under 30 years of age 10 put of 33 (30 per cent) deteriorated in the observation group and only 1 out of 35 (3 per cent) deteriorated in the treatment group.

Among patients over 30 years there was deterioration rate of 11 and 12 per cent, respectively, in the observation and treatment groups.

Marital Status:— 22 per cent deteriorated in the observation group while there was one deterioration, (4 per cent) in the treatment group.

Acuteness of lesions:— In the treatment group the acute cases had only 3 per cent deterioration rate as compared with 11 per cent among chronic cases.

Extent of lesion:— There was no tendency in either group for the deterioration rate to increase with increasing size of the lesion.

Chemotherapy is not recommended for all patients with doubtful active disease as some will fail to take their drugs. But it should be given to some patients at great risk of relapse and the importance of taking chemotherapy must be stressed to the patients.

(A controlled trial of chemotherapy in Pulmonary Tuberculosis of doubtful activity. Report from the Research Committee of the Tuberculosis Society of Scotland. Tubercle. Vol. XXXIX June, 58. No. 3)

Trial of Dipasic in Chronic Pulmonary Tuberculosis

Twenty one patients with chronic pulmonary tuberculosis whose tubercle bacilli were resistant to one or more of the commonly used anti-tuberculosis drugs were given dipasic (600 mgm or 800 mgm daily according to weight) for periods ranging from 6—12 months.

Assessment prior to treatment included clinical examination, E.S.R., weight, X-ray chest, bacteriological examination of sputum and measurement of the volume of sputum produced in 24 hours; these investigations were repeated after two, four, six, nine and twelve months period.

Five patients were in good general condition prior to treatment, 12 in fair and 4 in poor condition. The E.S.R. was elevated in all but 2 patients. The amount of sputum produced in twenty four hours varied from 4 oz to a trace. All but one patient had at least four lung zones affected. Obvious cavitation was present in fifteen. One patient had a tuberculous empyema and 3 had had thoracic surgery at an earlier date.

Withdrawals from the Trials:— Five were withdrawn from the trial before and 3 after completing 6 months. In another, treatment was stopped after 9 months. Thus 16 patients had dipasic for 6 months and 12 for twelve months.

There was no clinical or radiographic improvement. The bacteriological results were disappointing. Sputum conversion was acheived in only 2 patients. Resistance to P.A.S. did not develop in any case during treatment. 4 patients who had isoniazid sensitive strains became jsoniazid resistant. In 2 cases cultures originally partially resistant to isoniazid became fully resistant to isoniazid, but in one of these partial resistance later returned.

Dipasic is less effective in patients with drug resistant organisms than it is against similar organisms invitro.

(Trial of Dipasic in chronic Pulmonary Tuberculosis:—Cuthbert, Robert J., Drimmie, Alison M.T., Urghart, Kenneth, R. Tuber. Vol. XXXIX July, 1958.)