copy where there is a suspicion of malignancy. Chronic Inflammatory conditions of the lung are to be distinguished from malignant disease by their long duration and the absence of severe constitutional symptoms and bronchoscopic examination.

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Diagnosis and Treatment of Pulmonary Tuberculosis

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An attempt will be made to discuss this subject in its entirety, briefly but as completely as possible. The treatment of pulmonary tuberculosis should cover the entire field of tuberculosis and not any one particular portion. While it would be physically impossible for any one person to be directly responsible for all of the factors that will be mentioned in the treatment of pulmonary tuberculosis, I feel that all of us should have a generalized idea of the subject. We should have a complete cycle before us regardless of whether we are medically or surgically interested. We should treat the subject progressively the same as we would teach a child to first crawl, then walk, etc. The treatment of tuberculosis begins with case finding and ends with rehabilitation.

Case Finding

Large sums of money have been spent in routine school examinations, i.e., skin tests and x-rays. The cost of finding each case of pulmonary tuberculosis in school children has been estimated as between $1,000 to $1,500. School examinations should be encouraged in communities financially able to support such a program. Where finances are limited then a strong attempt should be made to have all known contacts examined.

Contacts

As soon as a diagnosis of tuberculosis has been made every effort should be made to examine each member of the family, especially a chest x-ray and sputum examination if possible, and any other persons with whom the patient has been in close contact. In this way a higher portion of positive cases will be found, treatment can begin early, contacts broken, and the spread of the disease limited. Much difficulty is often encountered in having a whole family examined. Many persons feel it is a disgrace to have tuberculosis and do not want other relatives and friends to know they or one of their relatives have this disease. Many times a contact will say, "There is nothing wrong with me, I never cough, etc." Many do not want to know whether they are infected or not.

When the diagnosis of tuberculosis is made in a clinic the family physician should be immediately notified and a complete record of the case sent to him with any recommendations indicated. There should at all times be the closest co-operation between the clinic and family physician. Each can be of great help in many ways to the other. A good social service will eliminate all persons attending the clinic except those who are financially unable to pay for an x-ray or physical examination. In this way there will be better co-operation between all concerned. Family physicians should be advised of the course their patients are following after admission to a sanatorium and invited to visit the institution frequently. Thus, a broader knowledge of the physician's problem and the sanator-
ium's problem will be understood. By doing this the family physician, sanatorium and patient will benefit immeasurably.

Tuberculosis is still a major public-health problem in Massachusetts and in 1939, with 1602 deaths, ranked seventh as a cause of death; but this number of deaths, large as it is, does not serve to measure the full significance of the disease.

Tuberculosis is the leading cause of death in this State at the most productive period of life. More persons between nineteen and thirty-five years of age succumbed from tuberculosis than from any other single cause in 1938. The death rate from the pulmonary form of the disease in this age group rises to about 40 per 100,000 population and tends to rise still higher in the remaining years of life.

The relative importance of the pulmonary form of the disease is increasing and that of the extrapulmonary form diminishing. In 1921, deaths from pulmonary tuberculosis comprised about 83 per cent and those from extrapulmonary forms about 17 per cent. In 1939, the figures were 94 and 6 per cent respectively. Though extrapulmonary tuberculosis is frequently secondary to pulmonary lesions, infected milk is a factor. Elimination of the disease in cattle and pasteurization of milk are largely responsible for the diminishing proportion of deaths from extrapulmonary tuberculosis. To eliminate the chance of human infection from tubercle bacilli or other organisms in milk, all milk should be pasteurized.

The spread of tuberculosis is more readily prevented in institutions than in the home, and it is of interest to note that in 1938 about 80 per cent of the deaths from the disease occurred in institutions and only about 20 per cent in the home. For the benefit of the individual, and the protection of the family and the community, patients with tuberculosis should be urged to go to institutions.

The degree to which tuberculosis is a menace is not the same in all counties. In general, those counties having the highest density of population have the highest death rates.

Churchill states the problem very clearly when he says, "The goal in the therapy of pulmonary tuberculosis is the conversion of a positive sputum to one that is free of the tubercle bacillus. This requires the obliteration of cavities; and collapse therapy, either with artificial pneumothorax or by surgical measures, is largely concerned with the closure of cavities."

Collapse therapy is fortunately no longer on trial, but public institutions are from time to time obliged to show justification for the additional expense necessary to maintain an adequate surgical program. Until the advent of collapse therapy in the treatment of pulmonary tuberculosis many patients received only bed rest, fresh air, and good food. We still consider these of the greatest importance. However, in many cases this type of treatment alone is not sufficient.

**Collapse Therapy**

Collapse therapy is the only important addition to the treatment of pulmonary tuberculosis since the sanatorium was introduced more than fifty years ago. This form of treatment offers the majority of tuberculous patients the chance of defeating this disease. However, many cases of tuberculosis have been cured by sanatorium care alone. Also, the sanatorium is as necessary to the success of surgery as surgery is to the sanatorium. They are inseparable in the modern effective treatment of tuberculosis.

As recently as fifteen years ago surgery was occasionally used by only a few physicians. At the present time it is used by most sanatoriums in from 35 to 80 per cent of the cases. The combination of sanatorium care and surgery is very important since tuberculosis never seems as serious as it is to the family or patient.

Surgical operations in the treatment of pulmonary tuberculosis endeavor to accomplish rest, immobilization and compression of the lung. When successful they accomplish only what nature's efforts have attempted. It is an old observation that patients with chronic fibroid tuberculosis reveal a diminution in size and a relative immobility of the corresponding side of the thorax. The diminution in the size of the hemithorax is due to a narrowing of the intercostal space, often with overriding of the ribs, an elevation or a relative immobility of the diaphragm and a displacement of the mediastinal structures over the affected side. Therefore, the surgical treatment of pulmonary tuberculosis plays...
an important part in the treatment of tuberculosis in aiding nature’s efforts. In addition to the rest, immobilization and compression provided, other important effects are produced, such as alteration of the blood and lymph circulations of the diseased lung with the result that the general intoxication of the body is diminished and the healing of local lesions is facilitated.

**Pneumothorax**

Pneumothorax is the most vital contribution to the treatment of pulmonary tuberculosis since 1870. It was first suggested by James Carson of Liverpool in 1820 but did not receive serious attention until 1882 when advocated by Forlanini. Some of the purposes of this form of treatment are:
1. Augments existing tendencies to shrinkage.
2. Approximates walls of cavity.
3. Prevents extension of Tuberculous process along the lymph and bronchial channels.
4. Facilitates and augments expectoration.
5. Proliferation of connective tissue.
6. Tends to change an exudative process into a productive process.

**Pneumolysis**

Unfortunately, in the majority of cases pleuritic adhesions prevent satisfactory collapse or closure of the cavity and it becomes necessary to sever these adhesions with a cautery or other methods of choice of the operator. About 40 per cent of cases of pneumothorax are unsatisfactory due to these adhesions which are most often distributed over the more diseased parts of the lung. All of us are impressed with the advisability of converting an unsatisfactory pneumothorax into a satisfactory one, hence this operation.

**Operation on the Phrenic Nerve**

A large number of surgeons now feel that phrenic crushing producing a temporary paralysis of the phrenic nerve for a period of a few months is the operation of choice rather than phrenicectomy or evulsion. Purpose of the operation is to paralyze the leaf of the diaphragm. As a result an additional amount of rest is accomplished because of the diminution of the respiratory excursion. Paralyzing the diaphragm also relaxes the lung and forces it upward, and increases pressure on the lung helping cavity to close by relaxing adhesions. It also produces alterations in blood and lymph flow. Phrenic operations have failed to justify the expectations of many. However, it has a definite place especially in basal lesions, unsatisfactory pneumothorax and early lesions. Also in conjunction with pneumothorax and preparatory to thoracoplasty.

**Oleothorax**

Antiseptic oil first used by Berson in 1922. This form of treatment has been praised by some and condemned by others. In many sections of this country this form of treatment is condemned. However, many men have reported favorable results and are quite enthusiastic as to its value. I feel that many failures are due to improper technique, selection of cases and lack of experience. Oleothorax requires more skill, keener judgment and proper selection of cases than other forms of collapse.

The chief uses of oleothorax are:
1. As disinfection, also for treatment of pneumothorax empyema.
2. As an inhibition oleo to inhibit expansion of lung in cases wherein a satisfactory pneumothorax cannot be maintained.
3. As a compression pneumothorax.

Gomenol which is used a great deal is derived from leaves of a tree belonging to the Myrtle tree family. Paraffin or olive oil may be used as a base. The best method to follow is usually to use 20 cc. of a 5 per cent solution in order to first test the sensitivity of the pleura, gastric upsets, prevention of fistula, etc.

I realize that a great many men do not advocate the use of oleothorax. Also, that some of the results have been very unsatisfactory. However, I will soon present approximately one hundred cases of successful oleothorax cases before the Trudeau Society of Boston. Complications in these cases have been few. A large number of these patients will present pneumothorax on one side and oleothorax on the opposite. One case will be oleothorax on one side followed by thoracoplasty on the opposite. I will not attempt to go into this subject more thoroughly at
this time, but would like to add that I am enthusiastic about this form of treatment, this enthusiasm being justified by the results obtained.

**Thoracoplasty**

The first attempt to close a lung cavity by the removal of the overlying ribs was made in 1885. As a rule this operation is performed when pneumothorax or other forms of collapse have proved unsuccessful or unsatisfactory. In the early days radical operations were done with removal of several ribs, usually five to ten. This technique has been changed considerably and much better results are being obtained. Larger sections of the ribs are being removed and a complete operation now usually requires but two stages, this being due to extra pleural and fascial apicolysis. We are now leaving the 1st rib when possible. Also, we have in our records two cases of bilateral thoracoplasty, one patient having had the first three ribs removed from each side and the other patient having seven ribs removed from one side and three on the opposite.

**Plombage**

I have tried this method of collapse in about fifteen cases, all of which have been far advanced, usually bilateral in which no other form of collapse could be obtained or was indicated. Considering the seriousness of each case the results have been encouraging. Out of this number there have been two cases in which the paraffin has ruptured into the cavity and the patients have spit up small pieces of paraffin (this occurred several months after the operation). When this first occurred removal of the paraffin was advised and refused by the patients. One patient later died with a massive spread of the disease to the opposite lung. The other patient now has a satisfactory pneumothorax on the opposite side but refuses to enter the hospital for removal of the paraffin.

**Extrapleural Pneumothorax**

So much has been written on this subject that it is not necessary for further comment. My experience with this form of collapse therapy has been rather discouraging. Of the two operations, I much prefer plombage to extrapleural pneumothorax. Other surgical methods have at times been advocated but I have only attempted to mention the most common used.

**Rehabilitation**

To me, this is one of the most important aspects in the treatment of tuberculosis. Many of us are inclined not to think what the patients will do when they leave the sanatorium, how they will live, the difficulties of readjustment, and the means of earning a livelihood. We attempt at this institution, when the patient's condition warrants, to place them in training for some desirable position suitable to their condition in order that they may become self-supporting. Since tuberculosis is not a respecter of race, person, or position, it is sometimes quite difficult to place these people in some gainful occupation. Many employers still do not want a former tuberculous patient working for them because of the fear of this disease. I would much rather work with a person who has had tuberculosis and is apparently arrested, and knows how to take care of himself and protect his fellow men than to work with someone who has the disease and does not know it. Disability from this disease requires more care and careful scrutiny than any other type of disability.

In giving a tuberculous person vocational guidance it is first necessary to give a medical report showing that such person is an apparently arrested case and is in such condition that he or she is physically capable of performing a normal day's work. Each person presents an entirely different problem and must be handled as such. The age, height, and weight must all be given due consideration. In the case of pulmonary tuberculosis whether it is bilateral or unilateral must also be considered. Whether the person is receiving pneumothorax or has had a thoracoplasty performed also has its bearing. The home environment and the persons own ability to readjust himself must be checked very carefully. All these factors must be carefully scrutinized individually and the results put together as a whole before a plan of rehabilitation can be put into operation. Once a decision has been made as to the vocation a man is physically capable of performing a training program may be arranged under careful supervision. The person is checked in...
his course at least once a month in order to observe the progress that is being made and to give any further suggestions if needed. When the training course is completed the problem of obtaining employment presents a new picture which must be handled with care.

The main problem is the person's ability to adjust himself anew, and the first and most important thing is obtaining employment in a locality where the environment is such as to reasonably preclude another breakdown. This must be accomplished both from the standpoint of work environment and home surroundings, because it is a well known fact that even though a person's working surroundings would be such as to normally preclude a flaring up of an arrested condition the home surroundings might be such as to react adversely, or vice versa. Once suitable arrangements have been made in these two respects the next consideration is proper medical care afterwards. It may be that the tuberculous person needs pneumothorax bi-weekly or monthly. The rehabilitation section outlines the entire situation to the prospective employer in order to avert any possible disturbance of the moral of other employees.

Generally speaking, my experience has been that employers as a whole, after the first natural resistance to the employment of a tuberculous person has been broken down, can be made to see that under the proper surroundings and with a hand picked job that such a person can do as good, and quite frequently a better job, than a person who is physically perfect.

Summary

1. We should all have some knowledge of public health problems involved in the spread and early diagnosis of pulmonary tuberculosis.
2. Indications and complications of collapse therapy have not been discussed.
3. The main object in the treatment is to convert a positive sputum into a negative sputum.
4. Only a general description of surgical managements have been attempted.
5. I attempted to only briefly discuss the problem of tuberculosis.

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The Monaldi Procedure—A Progress Note*

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This presentation consists of two parts: the first based upon our experience with cavity aspiration and the second a summary of Dr. Monaldi's own results with his procedure.

Our experience in Los Angeles comprises more than thirty cases. It is our intention to review here the first seventeen patients, operated between September 1939 and April 1940. These were originally reported a year ago before the American Trudeau Society. The series comprises three Caucasian men and fourteen women, of whom three were Mexican, two Negro, and nine Caucasian, aged seventeen to fifty-one. All of the cavities were in the upper lung, ten on the right and seven on the left, and varied in size from 4x5 cm. to 10x16 cm. They were punctured anteriorly by the standard Monaldi technique, and suction was exerted through a rubber catheter by a two-bottle pump. The duration of suction was two months to twelve months. The period of time since each patient was placed under aspiration varies from fifteen to twenty-one months and now allows a more significant perspective than before.

The cavities of three patients were closed by the treatment. One patient, however, developed a second cavity in the lower part of the same lobe during the suction, and subsequent thoracoplasty failed to close this second cavity, although the sputum has remained negative. In one who closed a cavity 10x16 cm. in size with dramatic disappearance of symptoms, it was felt that a thoracoplasty should be done at once for fear of reopening, but unfortunately the cavity reappeared (as a small slit, 1x2 cm.) after the thoracoplasty was started, although this spu-