

œstrogenic effectiveness when administered by mouth, this is an interesting observation. It demonstrates that natural œstrogens are comparably active when given by mouth. These observations are in keeping with those of Gray¹³ and Freed *et al.*,¹⁴ recently published. These workers reported that for the treatment of menopausal patients 1.25 mgm. natural œstrogen was equivalent to 1.0 mgm. of diethylstilbœstrol in the case of Gray, and at least 0.5 mgm. (probably more) in the case of Freed. Glass and Rosenblum¹⁵ and Sevringhaus and St. John¹⁶ have also demonstrated satisfactory response when natural œstrogen was given for the relief of menopausal symptoms. There would seem to be no doubt that the œstrogen used in this study is much more active when given by mouth than any other preparation from natural sources heretofore available.

CONCLUSIONS

1. Natural œstrogen by the oral route in doses of 3 tablets every 4 hours for 5 doses has proved effective for the prevention of breast engorgement during the post-partum inhibition of lactation.

2. According to this study it would appear that 1.25 mgm. of natural œstrogen is at least the equivalent of 1 mgm. of diethylstilbœstrol when inhibition of breast engorgement is used as a criterion of œstrogenic effectiveness.

3. Both natural œstrogen and diethylstilbœstrol proved quite efficient and both preparations were well tolerated in all cases.

4. Œstrogens or testosterone have not proved to be helpful if given two or more months after delivery. They are most effective when given in the early post-partum period.

We are indebted to Ayerst, McKenna and Harrison Ltd. for a supply of premarin, the natural œstrogen used in this investigation. It is a mixture of conjugated œstrogens, the principal one being œstrone sulphate. It also contains smaller quantities of other œstrogens, such as œstradiol equiline, equilenine and hippulin, probably as sulphates.

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RÉSUMÉ

L'œstrogène naturel par voie buccale à la dose de 3 comprimés toutes les 4 heures, à raison de 5 doses a été trouvé efficace pour prévenir l'engorgement mammaire durant la phase d'inhibition de la lactation qui suit la délivrance.

1.25 mgm. d'œstrogène naturel équivaldrait à 1 mgm. de diéthylstilbœstrol, d'après le critère d'empêchement de l'engorgement mammaire. Les œstrogènes, naturel et synthétique, sont également efficaces. Les œstrogènes et le testostérone doivent être administrés très tôt après la délivrance si l'on veut obtenir les meilleurs effets.

JEAN SAUCIER

THE NEW KNOWLEDGE OF TUBERCULOSIS*

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TUBERCULOSIS is not a spectacular disease, except, perhaps, in a few surgical cases. It is, both for patients and physicians, a slow, tiresome thing to treat, especially when diagnosis has been delayed. It may not be stimulating to physicians who are, after all, just human men. But we at the Sanatorium, who are in the thick of it and see the tragedy of it, so to speak, in concentration, even we are not without hope and encouragement. These, and also the desperate urgency of the matter, I wish to bring to you as well as I can.

For the hope, we shall first take a look backward and count our gains—looking back, not like Lot's wife, with any longing for the bad old days, but to learn, and to draw conclusions; to recognize former mistakes and failures and get a finger on the causes of these. Then we must set the goal at which we are definitely to aim, and keep our eyes and minds upon it. Especially must we understand, grasp and use faithfully all the methods known. Here is where the "new" knowledge comes in.

The national system of vital statistics was not established in Canada until 1921, when the Dominion Bureau reports the death rate from tuberculosis to be 87.6 per 100,000 of the population. Twenty-one years earlier, that is 1900, in Ontario and Quebec, the Provincial rates

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were above 200 per 100,000, and, as these Provinces contained the greater part of the Dominion's population, we can accept these figures as the average Canadian death rate from tuberculosis at that time. It is relevant to note that in the Dominion in 1900 there were hardly any facilities for the diagnosis and treatment of tuberculosis, and, apart from a few tuberculosis dispensaries, there was only one small sanatorium for the care of consumptives in Ontario. By 1940 a network of diagnostic clinics had developed in every Province in Canada. Sanatorium beds have increased almost to 11,000, the capital outlay in building amounting to \$30,000,000 and an annual expenditure for upkeep of some \$8,000,000. The death rate from tuberculosis in 1941 had fallen to 50.6, a reduction of some 75% in forty years.

But some 6,000 persons still die each year in Canada from tuberculosis, and at least 30,000 new cases crop up annually to cost the country some \$8,000,000 yearly, this in spite of the fact that we have today facilities for diagnosis and treatment such as were unheard of twenty years ago. It must be either that these facilities are not properly used, or that they are still inadequate.

Tuberculosis among civilians during world wars I and II.—It is within the memory of many in this audience that there was an appalling increase in tuberculosis in Europe during and immediately following the first world war. Published reports show that the death rate from tuberculosis tripled within two or three years of the commencement of the war in a number of the mid-European countries. In England, the mortality from tuberculosis also had risen, especially among young women employed in war industries, and in 1918 it was 25% higher than in 1913. An even greater rise had taken place in Germany among young women engaged in heavy war industries, and in 1917, it was 75% higher than in 1913.

Public health studies have revealed that the causes of this terrific increase in tuberculosis were, malnutrition; crowded, unsanitary housing; exposure to infection; unaccustomed labour for long hours, both in the battle line and on the home front. The world is again facing war on a scale which has already led to conditions even worse than those in 1914 to 1918. In just the first two war years, 1939 to 1941, the tuberculosis death rate rose in England and Wales 12%; in Scotland 18%; in France and Germany,

while the precise rates are not available, it is known that there has been a marked increase in tuberculosis. In Canada,* there was a rise of 5% between 1940 and 1941. In the United States, there has been no increase and the rate for 1942, 43.6, is slightly lower than that in 1941. On this continent, we have been fortunate enough so far to escape the devastation that is sweeping over Europe, but even here there are strains and stresses that tend to lower the physical resistance.

Thus, while it is true that there has been a steady decline in our death rate from tuberculosis over several decades, we may yet suffer a serious set-back, and the gains of recent years may be lost unless we fully realize the danger early enough and put forth every effort to avoid it, turning all our war-time knowledge toward increasing the former gains. We must make good use of what was learned by mistakes in the former war, and of the accumulating experiences of the one still going on. The hardest physical test for our fighting men, and indeed for all of us, may be yet to come. What we can—and must—do about it, I shall come to in a few moments.

TUBERCULOSIS AMONG SERVICE MEN

It will be recalled that, during the last war, the physical findings of the chest, by percussion and auscultation, were rated of greater worth in diagnosis than the roentgenological examination of the lungs. We were later to find out the fallacy of this view. In a study of deaths among Canadian pensioners from that war, published by the Department of Pensions and National Health in 1939, we find that, of the 600,000 men who enlisted in the service, eventually 8,500 were pensioned for tuberculosis, and that 3,000 had died from this disease. In other words for every hundred men killed in action, six died from tuberculosis, and for each hundred pensioned for wounds, twenty-five were pensioned for tuberculosis. The cost of tuberculosis, to Canada, as a result of the last war has been computed at one hundred and fifty million dollars. In the United States, the total cost of the care of tuberculous veterans for the twenty years, 1921 to 1940, has been computed to be well over \$300,000,000.

* In the preliminary report recently issued by the Vital Statistics Branch of the Bureau of Statistics, Ottawa, 1942, there has been a slight reduction in the death rate from tuberculosis, from 53.1 to 51.5 per 100,000 of the population.

Many of these recruits undoubtedly had tuberculosis at the time of enlistment, but physical examination, alone, carefully as it was given, frequently failed to reveal latent as well as active lesions in the lungs. The lesson learned has been well taken to heart. At the beginning of the present war, the Department of Militia and Defence, following the advice of specialists in diseases of the chest, wisely decided that all recruits enlisting in the Canadian Army should have an x-ray examination of the lungs before they were admitted to the service. Those found with significant tuberculosis were to be rejected. The official report states that up to March, 1942, of the 400,000 men on whom x-ray films were taken, 3,969, or 1%, were rejected on account of past or present pulmonary tuberculosis.

It is further instructive to note in the same report that, among a group of men discovered with minimal tuberculosis, only 270 cases out of 1,334, that is, about one in five, could be diagnosed from the clinical findings alone, when the x-ray film clearly demonstrated significant tuberculosis in the lung. In the moderately advanced cases, only some 357 out of 759, that is, about one-half, could be diagnosed correctly from the clinical examination; in the far advanced group, 117 out of 136. Here it seems worth mentioning that, among all the troops in Canada and overseas, only 114 cases of clinical tuberculosis have developed between September, 1939, and March, 1942. This must be taken as evidence of the value of x-ray examination in the detection of early or latent tuberculosis in the lungs.

While we must by no means set aside the physical examination of the chest, for there are various non-tuberculous diseases in the lungs which cannot be clearly demonstrated from radiological findings alone, we may as well accept the fact, as far as tuberculosis is concerned, that the stethoscope is not to be compared in accuracy to a well-taken x-ray film in bringing to light early active, or silent quiescent lesions in the lungs, which may be the precursors of later disabling disease.

ADVANCES IN DIAGNOSIS

The technical side of radiology has been immensely improved since the time of the last war, and it has been conclusively demonstrated again and again in mass surveys as well as by the hundreds of thousands of examinations conducted on inductees into the army, that the

x-ray is the surest, in fact the only means to rule out the presence of tuberculosis in the lungs.

Now, we have a new advantage in what is called the miniature film. The standard celluloid film, 14 by 17 inches, has been employed in Canada by the Department of National Defence in the examination of the chests of some 500,000 men prior to admission to the army. On the other hand, in the United States, the War Department plans to examine practically all men by means of the photo-roentgenogram, a miniature 4 by 5 inch celluloid film, on account of its speed, exactness, economy and the fact that it will reduce storage space by over 65%. As many hundreds of thousands of x-ray examinations are still to be taken on Canadian service men both at admission as well as at discharge, the 4 x 5 inch photo-roentgenogram will be used more and more as a means of diagnosis as well as a graphic legal record in cases of future pension claims.

The cost of these miniature films is about one-tenth that of the standard size and their use for detection of early tuberculosis opens up new possibilities in public health work. There is little doubt from now on that it will be the accepted practice to have whole communities, sick and well, examined by means of the x-ray, for there is where prevention as well as cure has its first and greatest point of attack. This has been the dream of public health officials for years, and, now that a way has been opened up, the radiographic film will be a permanent record of the chest condition.

THE TUBERCULIN TEST

Our knowledge of the epidemiology of tuberculosis has been gained chiefly through the diagnostic use of tuberculin. The test is of undoubted value in public health, industrial, university and school surveys. Reactors to the tuberculin test are advised to have an x-ray examination of the chest. Non-reactors, with few exceptions, are considered to be free from tuberculosis. Research studies continue to be carried out in America to improve and standardize tuberculin and remove such elements as may cause a non-specific reaction. This new knowledge may become highly valuable, but it is possible that as time goes by the miniature x-ray film, on account of its low cost and universal employment, may make the need of tuberculin testing unnecessary in mass surveys.

SPUTUM EXAMINATIONS

Examination of the sputum is still of great importance in the diagnosis of tuberculosis. The presence of tubercle bacilli in the sputum undoubtedly points to pulmonary tuberculosis. In cases of suspected tuberculosis with a negative sputum it is well to examine the gastric contents for acid-fast bacilli. Sputum should not be considered negative from one examination alone; several specimens should be analyzed by the concentration method. If the reports are negative and tuberculosis is still suspected, request the Public Health laboratory to carry out the "culture" test on a specially prepared medium with further specimens. The test is almost equal in accuracy to guinea pig inoculation. Unfortunately, it requires several weeks for the results of the test to be determined.

BRONCHOSCOPY

Examination of the bronchial tree by means of the bronchoscope has become a common practice in many sanatoria and chest clinics throughout Canada. The examination by the bronchoscope is of undoubted value in determining the presence or absence of tuberculous tracheo-bronchial ulceration. Also, for the differential diagnosis of such conditions as bronchiectasis, unexplained hæmoptysis, malignant neoplasia, pulmonary abscess, bronchial stenosis. The use of the bronchoscope has been of great help, not only as an aid to diagnosis, but in planning treatment to follow, particularly in thoracoplasty. The procedure is a simple and safe one in the hands of an experienced bronchoscopist.

TREATMENT

There is as yet no specific cure for tuberculosis. Until one is found, we must continue with the accepted lines of treatment which have been found to be of benefit in the past, that is, rest, careful regulation of life, good food, fresh air, combined, in suitable cases, with one or other of the various collapse methods to enforce complete or partial rest of a diseased lung. Unfortunately, collapse therapy is available for but a comparatively small proportion of tuberculosis sufferers, as the majority of them, when first discovered, are already in an advanced stage of the disease. This is a matter of deep concern to us all and one which can be remedied if we will only profit from the lessons learned in world wars I and II. The new knowledge gained from service examinations, as well as from mass surveys among apparently healthy

people, shows that approximately 1% of the population have active or healed tuberculous lesions in the lungs. As I have said, many of these lesions are early and minimal in extent and can be brought to light only by means of the x-ray. The truth of this is beyond dispute. Patients with minimal tuberculosis respond readily to the customary sanatorium regimen, and the great majority of them may be completely restored to health when treatment is given at the right time and in the right way. The slogan used in diagnosis campaigns is most appropriate here—early discovery, early recovery.

As to patients who are found to be in a moderately to far advanced stage of tuberculosis, while the outlook for recovery is somewhat gloomy for many of them, much can yet be done in these days, to lengthen out life as well as to enable a considerable proportion of them to take up again some gainful occupation. We have at our disposal the various forms of collapse therapy, as well as a number of surgical procedures, so successfully employed in the leading sanatoria in America, artificial pneumothorax, combined with intrapleural pneumolysis when required, phrenic nerve paralysis, thoracoplasty and its various modifications. These as well as many other procedures are notable advances in comparatively recent years in the treatment of tuberculosis.

CHEMOTHERAPY

There is no chemical agent that has proved of real value in the treatment of tuberculosis. In recent years, the remarkable results obtained in other infections, notably pneumonia and streptococcus infections, from the use of sulfonamide compounds has again aroused the hopes of research workers that the cure of tuberculosis may lie along chemical paths. Recently, several investigators have called attention to one of the sulfa-derivatives "promin". Animal experiments, while encouraging, do not yet warrant the general use of this remedy among patients.

TUBERCULOSIS CONTROL

The eradication of tuberculosis, while still a serious public health problem, is by no means impossible of achievement. Unless the present war continues for some years to come, we have every reason to feel that, with the gains obtained in the past, and the goal in sight, it is not too much to hope that, during the next two decades, tuberculosis may be reduced to a comparatively

minor cause of death in Canada. This can be accomplished through a Dominion-wide scheme of health education and prevention, that is, case findings by means of public health clinics, periodic examination of people, including the common use of x-ray films, treatment facilities for open cases of tuberculosis, and this means free treatment for those who can ill afford the benefit of sanatorium care. The cost of the undertaking is not beyond our resources, and it is hoped, that, when the coming Federal Health Insurance Scheme is finalized it will embrace a comprehensive and effective plan for the prevention and control of tuberculosis in every province of the Dominion.

A new strictness, a new determination in preventive measures are afoot, aroused, perhaps, by this war and by the years of education, but more is needed, and must be kept going. The problem is a social and economic one, a challenge to *all* the people, but the medical profession must be prepared to lead and direct the movement and to provide the inspiration—"Say not the struggle naught availeth".

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VARICOSE VEINS IN THE SOLDIER*

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VARICOSE veins, though not a severe disability, do impair a fighting man's efficiency and reduce his category. In spite of the fact that all men joining the Army have a medical examination, a surprisingly large number present themselves for treatment of varicosities in one or both legs. This may be due to the fact that varicosities were not noted at the time of enlistment, or that only slight varicosities were present, which enlarged under service conditions. Another factor is that men who had injection therapy prior to enlistment, with apparently good results, develop recurrences under arduous training.

INVESTIGATION

The investigation of a case with varicose veins is a relatively simple, but none the less important procedure, if the proper treatment is to be carried out. After ruling out any general con-

dition which would contraindicate treatment, the patient should be examined in a good light, stripped from the waist down. It is very important to remove the boots and socks because so often the symptoms in the legs are due to foot conditions. The patient is best examined standing on a low stretcher or platform. The varicosities can be made to stand out well if the weight is thrown largely on the leg to be examined. The veins are palpated to determine tension and extent, and a careful examination of the popliteal area may reveal an enlarged small saphenous vein. Small saphenous incompetence may be the cause of varicosities of the great saphenous below the knees through the anastomotic channels.

The following tests are useful in the examination:

1. *Cough test*.—With a hand on the larger varicosities, an impulse on coughing indicates valvular incompetence.

2. *Trendelenburg constriction test*.¹—With the patient lying down and the leg elevated to empty the veins, a rubber tube is applied in the upper thigh, tight enough to occlude the superficial but not the deep veins. If on standing the veins remain collapsed, the test is positive and no further test is necessary. On release of the tourniquet the varicosities will be seen or felt to fill from above downwards. A positive test indicates valvular incompetence at the sapheno-femoral junction.

If the varicosities fill rapidly below the constriction in five to fifteen seconds, the following test should be applied to determine where the incompetence between the superficial and deep venous circulation is situated.

3. *The three tourniquet test of Ochsner and Mahorner*.²—In this test three constricting rubber tubes are applied with the patient lying down and the leg elevated, one at the level of the tibial tubercle, one in the lower thigh, and one in the upper thigh. On standing, if the veins still fill rapidly, it indicates that the incompetent communicating vein is below this level. This is clinically rare and was not encountered in our cases, although anatomically there are more communicating veins below the knee. Removal of the lower tourniquet, with rapid filling of the varicosities indicates a small-saphenous incompetence. Removal of the second rubber tube resulting in rapid filling indicates an incompetent communicating vein in the thigh. Removal of the highest tourniquet is

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