

THE CLASSIFICATION OF PULMONARY TUBERCULOSIS.

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IN selecting a suitable classification for pulmonary tuberculosis one must bear in mind the objects of the classification.

Methods of Classification.

From the point of view of one arranging museum specimens a basis of morbid anatomy is clearly indicated, and one would found the classification on such changes as excavation, caseation, or the amount of lung involved. This is an unsuitable method when dealing with the living subject. Not only is it difficult to determine clinically how much lung is involved and exactly in what condition the lung is, but the extent of the disease, and more especially the anatomical stage, are often poor indications of the condition of the patient. For instance, excavation, a late stage in the morbid anatomy, is often found in most satisfactory cases.

A classification based on the systemic disturbance is more useful for the clinician. This may be combined with the anatomical changes which accompany the disease, as in the classification of Sir Robert Philip.

The Turban classification which is based on morbid anatomy may be modified (as suggested by Meissen) by the addition of the letters F or f to denote severe or slight pyrexia.

Dr. A. C. Inman's classification is based on pyrexia, and he divides the cases into: (1) resting febrile; (2) resting afebrile, ambulant febrile; (3) ambulant afebrile. This classification has the great advantage of being simple, definite, and not dependent on the opinion of the examining physician. It does not, however, differentiate between the fever found in early cases and that found in late, nor can one easily place the large number of chronic cases who have occasional bouts of fever but live a long time and get into an advanced stage of the disease with little or no pyrexia.

Dr. R. C. Wingfield has modified the Inman classification by adding letters to indicate the patient's fitness for work. This certainly gives a better picture of the patient's condition.

Stages in Life-history of a Consumptive.

A classification might well be based on the vital capacity constants as worked out by Professor G. Dreyer, and by this means one could define the exact condition of the patient. One could say he was so much per cent. below normal. This method seems to me to be of the greatest value, but to employ it as a standard method of classification at present is open to several objections. It does, however, enable one to follow the life-history of the patient.

If we follow the life-history of a consumptive from the time when the disease is first recognised until the end we find three distinct stages.

In the first the patient is receiving institutional treatment with a view to improving his condition or curing the disease. Sooner or later the patient reaches the second stage, when, having received as much benefit as possible from institutional treatment, he returns home and probably to work. He usually requires no special treatment, though he may be kept under observation at some out-patient department, and perhaps have some symptomatic treatment. He may require some special treatment, such as tuberculin or artificial pneumothorax, but this is now carried on whilst he is outside the institution. Then comes the third stage, when he begins to lose ground, and although the progress of the disease is often not a gradual decline, but consists of periods of ill-health alternating with periods of slight improvement, it is found that every six months the patient is worse.

Suggested Classification.

The classification I suggest is based on this life history. The first stage, A, is subdivided into (1) the hospital stage, and (2) the sanatorium stage.

The hospital stage includes patients in whom pulmonary tuberculosis has just been diagnosed and who require observation in hospital or in bed at home to enable the physician to determine the proper treatment and to see the patient's response to treatment. It may be regarded as the stage of initial rest. If the patient improves sufficiently to stand a sanatorium life he passes into the sanatorium stage. Here the patient remains until he reaches the stage of maximum improvement. He then passes into the second stage, B. This includes all patients who, having received the maximum benefit from institutional treatment, are holding their own, but in whom the disease is not arrested.

Stage 3 is the stage of decline, and includes patients who are losing ground in spite of treatment.

These stages are subdivided as follows:—

A. *Stage of institutional treatment.*—1. *Hospital stage.*
 a. In bed, or up less than two hours a day. β. Up from two to six hours a day.

2. *Sanatorium stage.*—α. Capable of less than half a day's work. β. Capable of half a day's work. γ. Capable of a full day's work.

B. *Stage of maximum improvement.*—1. Capable of a full day's work. 2. Capable of part-time work. 3. Unable to work.

C. *Period of decline.*—1. Able to do some work. 2. Unable to work. 3. Bedridden.

Discussion of Method.

When, therefore, the physician first diagnoses pulmonary tuberculosis he classifies the patient A1α. Whether the treatment is actually given in hospital or in the patient's private house does not matter. Possibly the patient is found to have acute tuberculosis and rapidly gets worse; in this case he would, of course, come into Class C3. On the other hand, it may be found that he can pass quickly through Classes A1α and A1β, and is suitable for sanatorium treatment. The hospital stage is therefore that period of the disease during which the physician can observe the patient's response to treatment, and can decide whether he is fit for sanatorium treatment or not, and if fit, for which sanatorium he is best suited. If he is not fit he goes into Class B or Class C.

It may be thought that Class A could better be subdivided without the terms hospital and sanatorium. The names may be misleading, for many a sanatorium has a hospital side, and some hospitals give what is practically sanatorium treatment. I think, however, that the subdivisions are important. The true functions of hospital and sanatorium are entirely separate, and this subdivision serves a useful purpose if it emphasises the importance of the initial stage of rest and observation, a stage so often forgotten. Many a patient is hurried into a sanatorium when the correct treatment is rest, and often the wrong sanatorium is selected because the period of observation has been ignored.

Some patients in B Class may sooner or later require further institutional treatment with a view to patching them up again. Such cases should, I think, be classified B3, and the words hospital or sanatorium added to distinguish them from the ordinary B Class, where no institutional treatment is required, and from those who are having institutional treatment in the early or A stage. This would not be such a large group as one might suppose, for it is usually found that such breakdowns are the beginning of the stage of decline. Thus, one would write B3 Sanatorium, or B3 S. After a short time one could decide whether the case should belong to the C Class or could be restored to the ordinary B Class again.

Advantages of Method.

In this classification there is no place for doubtful cases. Such cases are best referred to as cases for diagnosis. In a classification of any disease obviously no case should be included until it has been proved to be a case of that disease.

Similarly, if the disease is cured it cannot be included, and such cases are best referred to as arrested cases. If the disease breaks out again then the patient can once more be classified.

I have entirely ignored physical signs, but there is a chest diagram in all report sheets on patients, and a glance at these will give a more accurate idea of the amount of disease than any classification based on anatomy.

The classification I have suggested is simple and avoids matters about which there can be much difference of opinion. It enables one to classify an early case with no physical signs; for instance, after hæmoptysis with T.B. present. One can also distinguish between the good case with severe signs and the bad case with few, and between the A1 α and C3 cases, both of which are bed cases. Moreover, one can follow the course of the disease. For example, if one received monthly reports of a patient and found after six months the following classifications, A1 α , A2 α , A2 γ , A2 γ , B1, B1, one could at once see that the patient has soon gone to a sanatorium where he did well, and that after some three months still had active disease, but was keeping at full work.

SULFARSENOL IN THE TREATMENT OF SYPHILIS,

WITH SPECIAL REFERENCE TO ITS ADMINISTRATION BY HYPODERMIC INJECTIONS.

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SULFARSENOL is a French preparation, manufactured by M. R. Pluchon at his bio-chemical laboratory in the Rue Michel Ange, Paris. It has the formula— $C_{12}H_{11}As_2N_2CH_2OSO_2Na$, and is a pale yellow, finely-divided powder, smelling rather like galyl. It dissolves very easily in water, making a very stable neutral solution.

Notes from Latest French and Belgian Literature.

(a) MM. Levy-Bing, Lehnhoff-Wyld, and Gerbay have given a large number of injections by the intravenous, intramuscular, and subcutaneous routes. By the last method they have given doses of 0.12 g. and 0.18 g. in 1 c.cm. distilled water.

(b) MM. Yernaux and R. Bernard, of Brussels, have studied the methods of subcutaneous injections.

They make a solution of the strength of 0.06 g. per c.cm. of distilled water, and have injected at one time as much as 1.20 g. in 20 c.cm. of distilled water. The largest amount given by them in one month without any sign of intolerance has been 12 g. For intramuscular injections they at first dissolved the drug in a glucose mixture, but distilled water was found to be better, as the sulfarsenol was easier to dissolve, the solution was less sticky, and the results were equally good.

Their method of injection was as follows. Starting with 0.12 g. to 0.18 g. to test the susceptibility of the patient, the dose was rapidly increased to 0.3 g., 0.48 g., and 0.6 g., giving not more than 0.3 g. into one buttock. As the patients complained of having an injection into both buttocks on the same day, the full dose was injected into one. Later on they arrived at the fair-sized dose of 0.6 g. in 1 c.cm. of distilled water in one buttock every 6-7 days. Some of the injections seem to have been painful; sometimes pain was complained of at the site of the injections, at other times down the thigh or in the foot. Numbness was caused in a few cases. In from 6 to 10 hours these sensations usually disappeared suddenly, and did not interfere with walking or stop the patient from working. Rarely was he unable to carry out his occupation on the day following the injection. The results of using local anæsthetics, such as novocaine or stovaine, were not good.

The injection of these very concentrated solutions did not cause many reactions, either local or general. All the primary sores on the penis healed 24 or 25 days after 2 g.; chancres of the lip in from 25 to 30 days.

In summing up, they state that sulfarsenol is equal to, if not better than, N.A.B. Sores heal up quickly and the induration and enlargement of the glands rapidly disappear. It is equally useful in secondary syphilis. They state that in tertiary syphilis it acts as quickly as N.A.B. They had no Herxheimer reaction in any of their cases. It was unusual to find the *Spirochæta pallidum* in the sore on the day

after the injection, and it was never found on the third day. After a total of 4 g. at most these workers have obtained a negative Wassermann. One of their patients had two slight nitritoid crises, showing that they are not caused by intravenous injections, but are due to arsenic, and can be produced without a Herxheimer reaction. They also got good results in acute and chronic eczema, a stubborn psoriasis, and a Vincent's angina.

M. Galonnier has shown that the elimination of arsenic was nearly the same when sulfarsenol was administered intramuscularly as intravenously.

The Method Employed: Efficacy of Treatment.

After reading the latest French and Belgian literature on this drug, and finding that injections dissolved in 10 c.cm. of distilled water were comparatively painless, I decided to try to decrease the amount of fluid, and were in a short time giving 0.42 g., 0.48 g., and 0.6 g. dissolved in 8 to 10 minims of distilled water practically painlessly.

The following was the technique employed. The ampoule is filed through evenly half-way up the neck. From 8 to 10 minims of distilled water is injected into the ampoule with a hypodermic syringe. A thumb is then placed over the opening and the ampoule is well shaken until the drug is completely dissolved; this only takes a few seconds. The fluid is then sucked up into the syringe and injected through a hypodermic needle into the loose skin of the forearm and the site gently massaged.

The spirochæta is present in the sore on the day following the injection, sometimes on the second day, but never on the third day.

In all cases the juice from the sore or rash has been examined daily under the dark ground, using an Edison and Swan "Pointolite," until the sore has healed or the rash has faded.

The results are about the same as we obtained in primary and secondary syphilis with silver-soda, salvarsan. In tertiary cases, especially if ulcerated, the latter drug appears to be the best. Up to the present all sores have been completely healed after the third injection, usually after the first or second.

A few cases, contrary to the experience of the French with this drug, have shown a Herxheimer reaction, but only a very slight and transitory one. In one case, with a very faint early roseolar eruption on the day following the injection of 0.48 g. sulfarsenol hypodermically, the rash was much more marked and looked as if it had been painted on. On the next day the rash was completely gone.

In one case of a man with a relapse after six injections of kharsivan intravenously and five intramuscular injections of mercury in 1917, with large condylomata and sores on his penis and scrotum, the condylomata had gone and the sores completely healed six days after the first injection of 0.42 g. sulfarsenol hypodermically.

In all our cases so far the Wassermann has been negative after the fifth injection, with a total of from 2.2 g. to 2.4 g. of sulfarsenol.

Mercury was given in all cases, although probably not necessary in cases with a negative Wassermann, which remain negative from five to ten days after the first injection. It will take some time to prove whether or no cases will relapse more readily after treatment with this drug than with "606" or "914," as happened in the case of galyl.

Summary.

Sulfarsenol appears to be equal to any other form of salvarsan or neosalvarsan except as regards speed of disappearance of the *Spirochæta pallidum*, at any rate in primary and secondary cases. The hypodermic method of administration is foolproof and practically painless. It seems an ideal method for infants and those with difficult veins. Up to now I have had no side-effects, not even a slight rise in temperature; the usual contraindications do not appear to be applicable in anything like the same degree as "606" or "914."

Intramuscularly it is less painful than "914," and can be given dissolved in distilled water. Intravenously the slightness of the Herxheimer renders less danger in cases with central nervous symptoms.

I have also used this drug intravenously in acute gonorrhœal epididymitis. One large or medium-sized dose appears to cause more pain shortly after the injection, but in two days the pain has completely gone. With two small injections at two days interval the results were wonderful. I tried 0.12 g., and 48 hours afterwards 0.18 g. The day after the second injection all pain had gone, and the testicle could be freely handled and even squeezed without any complaint from the patient.