show that it was tuberculous, and nothing in the history to show that it had an acute origin.

The prognosis of polyorromenitis in general must depend very much on the cause. The prognosis of pneumococcal polyorromenitis is no doubt very much worse than the prognosis of a pneumococcal pneumonia, or a pneumococcal empyema or pleurisy; that is, the implication of the pericardium is a very unfavourable addition to the case, whether this be from the direct lesion of the heart itself, or from the increased virulence of the organism or organisms which might seem to be implied by its extension to another cavity.

Streptococcal and staphylococcal polyorromenitis is undoubtedly often fatal, and the case of the boy I have recorded just now may be taken as an instance of this. Rheumatic polyorromenitis is of much less serious prognosis. It is true that of the relatively small percentage of deaths in acute rheumatism, a good proportion are in cases where pericarditis and pleurisy coexist; but, on the other hand, of cases of the double inflammation a large proportion recover. But we must remember that it is those cases which may subsequently give rise to serious symptoms either in the form of adherent pericardium, or of combined adhesions of pleura and pericardium, with or without the addition of a mediastinitis.

Of the cases of subacute or chronic multiple inflammations which are attributed to tubercle the prognosis is no doubt more favourable. We know that ordinary uncomplicated tuberculous peritonitis constantly gets well; and the pleurisies which have been until recently regarded as idiopathic or catarrhal, and which are now by many regarded as tuberculous in all cases, also recover completely. So also we see recovery in cases where the serous cavities are associated in a common suffering. The case of the nurse is an instance, and there is at least a possibility that the case I have just described here may leave the hospital practically convalescent. This is not always the case; indeed, I should have thought the fatal cases would be in the majority.

Tuberculous peritonitis is probably fatal in more than half the cases; pleurisy is directly fatal in much less; but the associated lesion is not likely to be less fatal than the more fatal of the two operating alone. The addition of a tuberculous pericarditis probably renders death nearly certain.

But supposing recovery from the immediately inflammatory lesions, there remains the risk from permanent adhesions, whether in pleura, peritoneum, or possibly pericardium; and the risk of the development of tubercle in internal organs, especially the lungs or meninges, in the forms of acute miliary tuberculosis, phthisis, and acute tuberculous meningitis.

The figures given by Picchini are distinctly more favourable than I have here suggested. Out of his 50 cases, he states that there were 22 deaths, 7 cases improved, and 21 cures.

The treatment of the condition of polyorromenitis must be conducted on the lines of the treatment of the separate tuberculous lesions concerned. In suitable cases you would have recourse to perfect conditions of hygiene, to good food, and pure air with all the advantages that are so often seen to accrue from residence either at high levels, or at a bracing sea-coast. For our hospital patients there is no doubt that the residence in a well-ventilated, capacious, and airy ward, with regular and good food, and absence from all work and household cares, often constitutes such an improvement in the surroundings of the patient as to lead at once to a diminution in the activity of the tuberculous process. This at least we see constantly in the case of phthisical patients no less than in cases of tuberculous peritonitis.

Internally as drugs we have administered cod-liver oil, creosote, and iron, and many recommend no other drugs likely to antagonise the pernicious effect of the tubercle bacillus, arsenic, iodine, and mercury. As local measures we have aspirated the left chest, and have applied mercurial ointment to the surface of the abdomen. The former measure was justified partly as a means of diagnosis, partly as a therapeutic measure in view of the large quantity which seemed and was proved to be present. Mercurial inunctions in the treatment of tuberculous peritonitis have often seemed to be valuable, and their use has often been followed by practical cure, that is, by the subsidence of all the symptoms, and the return of the patient, often a child, to the ordinary conditions of healthy life, though it must be allowed that peritoneal adhesions are very probably left behind in many cases. Laparotomy is a method of treatment which I will not now discuss, but which may become desirable, in the event of our present treatment not proving adequate.

P.S.—The tuberculous nature of the lesion was demonstrated by a laparotomy performed on August 7th. For some weeks previous to this a rather ill-defined area of solid resistance had been recognised in the abdomen below and to the right of the umbilicus. The abdomen was opened by a vertical incision. Between four and five pints of clear, yellow serum were discharged. Tubercles in great numbers were found in the peritoneum, and the subperitoneal tissue was greatly thickened. The patient died on November 10th. The lungs were found to be adherent to the parietes; at both apices were deposits of healed tubercle with surrounding emphysema and throughout both lungs were numerous tubercles of firm consistence like small glass beads with no sign of caseation. The stomach and intestines were matted together and completely adherent to the parietes by old fibrous adhesions, and masses of caseating tubercle lay in among them. The peritoneum was much thickened throughout. The intestines were in many places constricted by the adhesions, and there were no tuberculous ulcers. The liver and spleen had thickened capsules and were adherent to adjacent parts. There was no fluid in either pleural or peritoneal cavity.

REFERENCES.

[1] Corazza, Concato, Galvagni, Picchini, and others. [2] *Lancet*, October 29th, 1898 [3] La Poliorromenite subacuta e lenta, in *Il Morgagni*, 1891. [4] *Lancet, loc. cit.*

THE HARVEIAN LECTURES

ON

PROGNOSIS AND TREATMENT IN PULMONARY TUBERCULOSIS.

Delivered before the Harveian Society of London, November, 1900.

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[ABSTRACT.]

LECTURE III.

IN treatment we must still consider the pathology of the condition under discussion, and think of how we can:

(*a*) Increase the normal resistance of the tissues to the invasion of the bacillus and its congeners;

(*b*) Hinder the action of the bacillus by destroying its congeners, the staphylococcus pyogenes, and the pneumococcus;

(*c*) Hinder the action of the bacillus tuberculosis by interfering somewhat with its own vitality; and

(*d*) Attempt to kill the bacillus tuberculosis *in situ*.

(*a*) Increased resistance is obtained by augmenting the vital powers of the body by overfeeding, fresh air, and adjuvant measures. This has been done for many years and with much good effect. Nursing discipline is an important item in such treatment. The open-air treatment is of great value, but it is very necessary that it should be practised with more care and common sense than has hitherto been adopted. Individual cases require individual treatment, and not every case ought to be subjected to the routine of a sanatorium. The digestive powers and the capability of resisting cold require special attention, and without it much harm may be done.

Drugs are of use in the maintenance of general body health. Arsenic is very valuable, and in the form of sodium cacodylate I have used it by the mouth and also subcutaneously. In the latter form it is sometimes more convenient than the older preparation, and thus lends itself to the administration of a somewhat larger dose. Otherwise the cacodylate acts merely as a body stimulant, and is certainly not a cure for tuberculosis of the lungs.

Dr. Habershon has used glycogen subcutaneously, with the object of stimulating the phagocytic properties of the leucocytes. His observations are not yet completed. De Backer

has administered preparations of yeast in various ways, and his results seem to be disappointing. The yeast cells are supposed to act as additional phagocytes. I have used nuclein as hereafter described, in order, again, as in Dr. Habershon's method, to stimulate the phagocytal power of the leucocytes. The effects will presently be mentioned.

There are many similar methods which cannot here be recorded, though those described are the most noteworthy. The remainder of the lecture will be devoted to the description of a new method of treatment which I have devised, taking as a basis the peculiar circulation of blood through the lungs, and it is an attempt to fulfil the indications mentioned under (*b*). (*c*), and (*d*). It proposes (*b*) to kill the congeners of the tubercle bacillus, (*c*) to hinder its action, and (*d*) possibly to kill it, *in situ*.

We may call the method

ASEPSIS OF THE LUNG.

Inhalations of vapours cannot be of sufficient strength to attack lung germs, if they are weak enough to pass the glottis, and even then probably go no farther than the bifurcation of the bronchi. Subcutaneous injections of germicides are so diluted before they reach the lungs as to be then powerless. Germicides given by the mouth are similarly rendered powerless before reaching the lungs, by dilution in the stomach and by alteration in their passage through the liver.

Direct injection of germicides into the lung tissue cannot reach every spot of infection, or cure it when reached. An antitoxin is greatly to be desired, but so far has not been obtained. I have thought that such might be contained in the pleuritic serum of a tuberculous patient, but have failed to separate it. The surgical removal of infected portions of lung tissue is not to be seriously thought of, and is better ignored. But anything injected into the peripheral veins must necessarily first pass to the lungs, diluted only with the contents of the right ventricle at the time of its arrival at that cavity. I have tried to obtain a germicide which might be thus injected. Cyanide of mercury, which has been used for syphilis in a similar manner, was too dangerous to be used on tuberculous patients. Experiments upon animals by Mr. Plimmer showed that potassic iodide and also perchloride of mercury were impossible. These and all other remedies which would appear to be useful were first tried on rabbits to determine their safety before any attempt was made on human beings. It would have been desirable to first infect the animals with pulmonary tuberculosis and then attempt their cure, but this is not easy to do, and would have made the research almost endless. After ascertaining the general safety of the methods on animals I tried most of the methods on myself, so as to ascertain the symptoms likely to arise in patients.

Hearing that diastase could dissolve cellulose, and knowing that cellulose was a constituent of the envelope and protoplasm of the tubercle bacillus, I determined to use this intravenously. Its solution is very difficult to prepare; still more difficult to render aseptic. [Details of the preparation were here given.] At last I obtained a solution of taka-diastase in tricresol and again in formic aldehyde, and found on injection into the veins that some improvement of the lung condition occurred, but also a marked febrile reaction resembling ague. The results were not encouraging.

Cytase, prepared from crushed oats, according to this method of Mr. Horace Brown, F.R.S., is difficult to obtain in limpid solution. [A specimen of such solution was shown, and also sections of barley demonstrating its solvent action upon this cellulose envelope.] At present I have not tried this, but the action of cytase and also of diastase is probably too slow to be of use in therapeusis. Nevertheless, both are worthy of further investigation.

In view of the remarkable effect of the nuclein upon tuberculous glands, I used it by the mouth in patients suffering from tuberculosis of the lungs and with no effects. Afterwards I used it intravenously and with the same effect as with diastase. There was a certain amount of improvement in the general condition, but again a marked febrile reaction. I used it in the form of the liquor nucleinicus of Messrs. Squire and Sons, a solution of nucleinate of soda.

Dr. Habershon found a febrile reaction after the subcutaneous injection of a glycogen, which had not been rendered free from nitrogen. I have seen the same result after employing gelatine intramuscular injections for the treatment of aneurysm of the aorta. Probably the fever is due to the introduction of a foreign albumen into the blood system.

In the foregoing experiments the requisite antiseptics became of all importance, and I determined to try the effect of these alone. Formic aldehyde appeared most likely to be of use. Using first a strength of 1 in 250,000, then of 1 in 100,000, and so on, I at last reached a solution of 1 in 2,000, which could be employed with safety. I found that, at this time, I could inject 30 minims or 2 c.cm. in the space of five heart-beats, and hence one could calculate the strength in the right ventricle. Thus, to each filling of that cavity there was added 0.4 c.cm. of the solution, and in an ordinary man this would mean that for five heart beats the lung would be washed out with a solution of formic aldehyde having a strength of 1 in 500,000. But further attempts allowed me to use a more rapid process of injection and for a longer period, so that one may now hope to get a sluicing of the lung, during a considerable number of heart beats, with a solution of 1 in about 50,000. Some of the solution will remain in the lungs, and another portion will be brought back to the lungs after passing through the general system, so that the effect on the lung tissue will be much greater than that here represented.

At first only 2 c.cm., and after a while 10 c.cm., were injected, and to obtain larger injections special apparatus had to be devised. First a syringe, on the model of a stomach-pump, and here shown (Fig. 1).

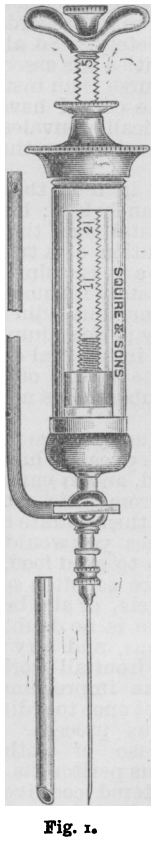

Fig. 1.

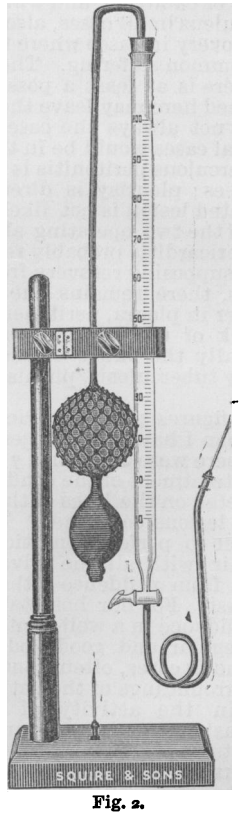

Fig. 2.

This is, even now, useful when the intravenous pressure happens to be unduly great, and I think it might conveniently be used by surgeons for other intravenous injections. But more convenient on most occasions is the burette with a pump arrangement here represented (Fig. 2).

The needle should be of as large a calibre as can possibly be introduced. In order to use as much injection fluid as possible I had it made with normal salt solution, and this, containing 1 in 2,000 of pure formic aldehyde gas, and prepared by Messrs. Squire and Sons with all antiseptic precautions,

we have styled for convenience "hæmasepsin." Of this I have injected 50 c.cm. daily, and with practice this can be done with safety and certainty. But let no one lightly undertake these injections. They seem to be very easy, but they are, in fact, remarkably difficult to do. The vein is prone to roll by the side of the needle. The needle very often pierces the opposite wall of the vein, and so a troublesome hæmatoma is produced and also much pain. The arm should be ligatured as for venesection, the skin anointed with 1 in 12 carbolic and vaseline after having first been cleansed with 1 in 20 solution of carbolic acid. The needle should then be plunged boldly into the vein, the ligature loosened, and the tap of the burette turned. If the injection is not entering the vein a painful swelling will at once be observed, and the needle ought at once to be withdrawn. If the injection succeeds, the needle can be quickly withdrawn, and a little pressure suffices to stop all further hæmorrhage.

I advise that not more than 50 c.cm. of a 1 in 2,000 solution should be injected daily. Larger quantities and greater strength caused, in myself, first albuminuria, next copious hæmaturia, and lastly thrombosis of a vein in the arm.

[Further details of the technique and of the experiments mentioned were here given.]

Cough is generally increased by the injection, and the expectoration becomes thereby more frothy and mucous.

The cases selected for treatment were all such as showed pronounced lesions. Some were treated at the Brompton Hospital, others at St. Mary's Hospital, some as out-patients under Dr. Reid, of Lambeth, and others, again, in the country, at the Hendon Infirmary under Dr. Findlater. In all, results of about 70 cases are now available. Nearly all showed some improvement, and some have demonstrated absolute disappearance of tubercle bacilli from the sputum. One such case I show to-night; he had a marked "multiple pleuritic" outbreak of pulmonary tuberculosis, and I have previously shown that the prognosis of this condition is most grave. Yet he has now no tubercle bacilli in the sputum, he expresses himself as being quite well, and if you examine his chest you will find nothing more than here and there the indications of pleural adhesions. I have treated a few cases of putrid bronchiectasis by this method and with excellent results. I should expect the treatment to be of use in acute pneumonia.

I repeat that the method should not be lightly employed, and that it requires a considerable amount of practice to ensure certainty of injection. The progress of the patient also should be carefully watched.

[Since delivering the lectures I have been able, by modifying the solution, to employ a greater strength of the formic aldehyde.]

THE AFTER-HISTORY OF APPLICANTS REJECTED FOR LIFE ASSURANCE.*

By ANDREW MACPHAIL, B.A., M.D., M.R.C.S.Eng., L.R.C.P.Lond.
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There is one event that happens unto all. The physician expresses it in terms of prognosis, the medical examiner for a life insurance company considers not the event itself, but the probable time of its fulfilment.

The insurance of houses and ships and goods against the casualties of fire and tempest is against a contingency which may not occur; the insurance of a man's life is not against any contingent event, but against that one which happens to all. It is only a question as to when it will arrive, and the medical examiner is to say if it will be delayed until the period prescribed by experience as embodied in the Mortality Tables. According to the "American Table," a man of 35 years of age is expected to live until he is 67 years old; it is the medical examiner's place to say if this be true of each individual case which comes under his hands.

The history of applicants rejected is a subject profitable for study to physicians as such and to medical examiners also. It shows how prone to fallacy our conclusions are when the operations of human life are concerned. When a patient is ordained unto death in the mind of his physicians, the sentence is quickly verified or disproved, but in the case of the medical examiner, it may be delayed for many years. An applicant once rejected quickly passes out of sight, and, as a rule, does not aspire to become a unit in a table of statistics. I do not mean that he quickly passes out of mortal vision, because you will be surprised to know how many rejected applicants go on their way utterly heedless of the opinion some medical examiner has framed.

Another source of difficulty lies in the insurance office itself. It is quite true that these institutions, if you believe what you hear, are purely eleemosynary in their nature, but it is hard to believe, with our knowledge of the conduct of affairs in this present evil world, that the controllers of them are moved by abstract benevolence alone. There may be a rivalry in doing good, and this honourable rivalry exists between insurance companies, but it fosters a disposition on the part of a company to keep its information, its statistics, and results to itself, lest some watchful Pharisee should use it to do good in another way, and so be led to boast himself in his annual statement. For example, all rejected risks used to be registered in one central office, open to all companies. The result was that offices writing impaired lives obtained a clue to the refused business of level premium companies, and appropriated it to themselves.

The history of accepted cases is accessible enough, and sometimes it is a painful study when a policy is too soon transformed into a death claim. It is then an examiner realises his full responsibility, and feels the necessity of bringing his best judgment to the task. But if the fear of a death claim is too prominently before his eyes he will go to the other extreme, doing an injustice to the applicant, and putting obstacles in the way of the company's legitimate aspirations.

A medical examiner is more than a physician; he is an officer of a company which depends not for its success only, but for its very solvency, upon the fidelity with which he does his work. In the main it is the agent's business to induce a man to enter the company; it is the medical examiner's business to keep him out. He is not called upon to give an abstract opinion of a case, he is asked to decide whether his company shall assume a large financial risk. But the object o the examination of applicants is not that none but the absolutely healthy shall be accepted; it is to ensure that those who receive policies shall at least come up to the standard revealed in the tables of mortality. If it were not for this the offices would be crowded with weaklings, for it is they who desire insurance most, and their risk would have to be carried by the healthy subjects until they refused to bear the burden longer. Then comes the receiver.

I feel quite sure that everyone of us has been informed with some degree of particularity, and it may be persistency, of the value of life insurance. It may have escaped us how valuable it is in vital statistics and in medical fees to the profession from which the examiners are drawn. Up to the year 1830 it was not the custom to employ an examiner at all. The directors looked a man over and formed an opinion from their impression alone. Then a certificate from the family attendant was required, but it was the middle of this century before regular examiners were generally appointed. In Great Britain nearly 45 per cent. of the population carry policies of one kind or another, and over a million and a-half of regular policies are in force in that country. In the United States and Canada 300,000 policies were issued last year, from which the medical profession drew a million and a-half dollars in fees. In these millions of recorded lives one would think there is a vast store of information upon the subjects of life and death, which only needed classifying to make it available for important use. It is information of a more or less exact character, and, as the late Sir Francis Johnston used to say, a statement is not necessarily false because it is sworn to. The task to which I have set my hand is this: to deal with a small part of this mass of information for the following particular purposes:

1. To determine the ratio which rejections bear to all applications.
2. To ascertain the causes of rejection.
3. To trace the after-history of such cases.

The records I have used are those of one of the largest life

* Read before the Montreal Medico-Chirurgical Society.