THE THYROID AND MANGANESE TREATMENT IN ACUTE PNEUMONIA.

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Two papers on the thyroid and manganese treatment were published in the *BRITISH MEDICAL JOURNAL* last year. The introductory one (March 7th, p. 443) reported a series of cases, presumably of toxic origin, which had shown improvement enough to suggest that the method explained therein might prove useful.

The second (December 26th, p. 1209) was chiefly concerned in describing its influence in the treatment of abnormal blood pressures. An early verdict was asked for on this subject; and it is more than favourable, inasmuch as others have reported that the thyroid and manganese cachets are often successful in lowering high tension. This was not known when the paper was published, and these reports have come from as far as Central Africa.

Both papers were founded on facts observed by others besides myself, and so far no one has controverted them. On the other hand, confirmatory evidence is accumulating and an extension of the treatment has been suggested to other diseases. The present paper is to show the unusual effects which have been obtained when using it in the treatment of acute pneumonia.

What I have to say will be told in narrative form, and, as far as possible, free from details, because no one yet knows why potassium permanganate, held in aqueous solution and injected into the rectum, should give such good results. Besides which, it is undesirable to try the patience of readers with debatable points of a treatment for pneumonia so definite, so practical, and so obviously successful. The explanation will have to be thrashed out in laboratories and hospitals in this and other countries where team work is available.

How has it become possible to state categorically, and with no fear of contradiction, that ordinary pneumonia, unaccompanied by intercurrent affections, or occurring at too advanced an age, is one of the easiest diseases to arrest and cure? Mainly by the cordial co-operation and work of five doctors and two ladies—Drs. Kerr, Farr, and Pennington of Ellesmere Port, Dr. Hanratty my assistant, and myself; helped by the able services of Miss Jeans, matron of the Whitby Cottage Hospital, Ellesmere Port, and her assistant, Miss Barret. Had it not been for the untiring zeal of these two ladies much of what follows could not have been written until months had elapsed. By the courtesy of this group of observers I have been allowed to see some of their cases whilst under treatment, and I have before me notes, histories, and many of their temperature charts which, with our own, together with one from Dr. Grace of Chester, and another from Dr. Pirrie of Maldon, Essex, comprise forty cases.

I will not weary my readers by taking these cases seriatim, or by attempting to classify them, this being unnecessary when all of us have been using a single agent which has controlled every case of undoubted pneumonia treated with it from the age of 6 months to 71 years. Half of them were above the age of 18 and half below; the majority were cases of lobar pneumonia, and two deaths occurred—one a lady aged 60, and the other a man aged 71, both of whom died of intercurrent diseases, seven days after a lysis had been brought about in the first case and two days after a crisis had been induced in the latter. (See Dr. Grace's and Dr. Pirrie's abbreviated reports at the end of this paper.)

It was in March, 1924, that the first case of acute pneumonia was treated by this method.

A youth, aged 16½ years, received half a pint of the standard solution twice daily, beginning on the fourth day of the disease. His was a moderately severe case, with extensive involvement of the left lung. His temperature had reached 103.2°, with all the usual symptoms of distress and a moderate amount of rusty and adhesive sputum. Soon after the first injection had been given and retained he said he felt more comfortable, and could cough up the expectoration more readily. A few hours after the second injection his temperature dropped to 101.2°, and the rusty sputum

suddenly disappeared, never to return. His cough lessened rapidly, the expectoration became frothy and white, and still less difficult to get rid of. Greater relief followed the third injection, and thirty-six hours after beginning the treatment his temperature fell to normal. He was also given a thyroid tablet 1½ grain (dry 1/10 grain) twice daily, and this dose was continued for two weeks, but the injections were stopped on the eighth day. Convalescence was rapid and less exhaustion was observed than is usually seen after pneumonia.

The next case was that of a girl aged 12½ years, suffering from double pneumonia. She was the first to come into the hands of Miss Jeans and Miss Barret. She was treated in a similar way, beginning on the fourth day. Quick relief was experienced, but the temperature did not reach normal until the end of three days. Here again there was less exhaustion than is usual after an illness of such severity.

The third case was a man, aged 24, who had a small localized patch of pneumonia at the base of the left lung; he was sent to the same hospital, where he received two injections on the second day of the disease, three-quarters of a pint of the standard solution being given on each occasion. On the morning of the third day his temperature was 103.2°, but seven hours after the third injection it fell by crisis to normal, and remained normal. He wanted to get up the next day, declaring he had only had a chill and that it was absurd to say he had been suffering from pneumonia. But being assured that there were still signs of pneumonia in his lung he consented to stay in bed ten days, though all crepitations had gone by the third day after the crisis. Treatment was continued for a week.

These three cases suggested that potassium permanganate might have a true specific action on the organisms of pneumonia, so Drs. Kerr and Farr used it in a child aged 4 years in the last stages of pneumococcal meningitis, who was occupying a bed in the Whitby Cottage Hospital. This case was reported in my paper of March 7th, where it was described how the child did well and walked out of the hospital some three months after commencing treatment.

These two doctors, being now thoroughly interested in the subject, sent in quick succession four children suffering from bronchopneumonia, whose ages ranged from 6 months to 6 years. All did well, the disease aborting in two of them within thirty-six hours; and as at this time better results were being seen in the treatment of pneumococcal arthritis by giving three daily injections, more frequent injections became the custom at the hospital, and in private, when treating acute pneumonia. Somewhat later we found that by doubling the strength of the solution even better results were obtained (Figs. 1, 2, 4).

In the meanwhile Dr. Pennington had had good results in the toxæmias of pregnancy, and began using the method in pneumonia.

Recently he treated a man aged 50, a very desperate case, where the pneumonia was accompanied by alcoholic delirium and high fever. Besides Dr. Pennington, Dr. Farr and Dr. Hanratty saw him soon after admission, and all of them thought he was too hopelessly moribund to respond to the treatment. Yet he lived, and went out for walking exercise in the garden three and a half weeks later. He received injections, on an average, every four hours from the time of admission, and his temperature fell from 103° to 101° in ten hours. He was much less delirious, with fitful consciousness, in thirty-six hours. Twenty-four hours later he was completely conscious, with an almost normal temperature, and he began to grumble about the small quantity of food he was being allowed (Fig. 3).

A severe case of septic pneumonia, confirmed by bacteriological examination, has lately been treated.

A youth, aged 17 years, was carefully attended to by two nurses and treated on the principles described below. He was steered through a dangerous illness without undue anxiety to those in attendance. Dr. Murray Cairns of Liverpool saw this youth in consultation, and agreed with the method we were using, saying he had seen a case of streptococcal invasion of the lungs do well with it. No complications occurred in this case, and the patient was out of bed at the end of the third week. Dr. W. H. Grace (honorary pathologist, Chester Royal Infirmary) reported: "This sputum contained many streptococcal chains in the direct films and the cultures gave abundant growths of a *Streptococcus longus*. I considered this a very severe streptococcal pneumonia." (See Fig. 5.)

THE TECHNIQUE.

When this treatment is used for pneumonia aperients are avoided as far as possible for fear of driving intestinal toxins into the circulatory system. The bowels are gradually unloaded by the permanganate injections, or small doses of calomel are given when evacuation is not as complete as it should be. The solution used is made by adding two grains of pure potassium permanganate to one and a half pints of water, which should be comfortably hot; from three ounces to half a pint are used on each occasion,

according to the age of the patient. The fluid should be administered very slowly by means of a funnel and small tube, or by a Higginson's syringe, and the injections repeated from two and a half to four hours during the first

appetite quickly returns, and this has to be anticipated and met by a more substantial diet than is the usual custom.

Too few cases, as yet, have been treated to say anything definite as regards the value of administering thyroid

FIG. 1.—Dr. Kerr's case: Bronchopneumonia; child aged 6.

twenty-four to thirty-six hours. The length of the interval between the injections depends upon what day of the disease the case comes under treatment, much in the same way as the dosage and frequency of the subcutaneous injections of serum are judged in the treatment of diphtheria. In ordinary cases, if the treatment is begun on the first or second day of the disease, intervals of three or four hours can be allowed; but when beginning on the fourth or fifth day, especially when the symptoms are severe, the intervals may be reduced to two and a half or even two hours. One must be guided also by the quantities the patient is able to retain on each occasion, shorter intervals being necessary when the fluid is quickly returned. Once the temperature reaches normal in adults and older children the injections are reduced to two a day for three days, and once a day for three more days, when they can be discontinued; or they can be replaced to the advantage of some by giving the combined thyroid and manganese cachets for a week or so. But in infants and younger children the injections should be continued twice daily for at least ten days after the temperature has reached normal, as there is a tendency to recurrence if they are given up too early.

FIG. 4.—Dr. Hanratty's case: Bronchopneumonia; child aged 5.

A considerable quantity of mucus is seen in the stools, and the sooner it appears the more rapid is the improvement in the patient's condition. When ordinary uncomplicated pneumonia comes early under this treatment nothing more is ordered than a mild expectorant and poultices. Most cases have not needed hypnotics, but cardiac tonics and stimulants may be required, especially in septic cases. Owing to the rapid removal of toxæmia

FIG. 2.—Dr. Farr's case: Bronchopneumonia; child aged 5.

substance during the acute stage of the disease. Lately we have all come to look upon potassium permanganate as being specific in its effect, and most of us have not given thyroid even during convalescence. This is a matter for individual judgement and experience.

Those who, like myself, have seen the results of combining the two drugs in cachet form in treating toxic diseases will not hesitate to use it for a while during convalescence.

If it may be conceded that thyroid efficiency is reduced by the suffocating effects of all toxæmias, whether acute or chronic, then the body should derive benefit from thyroid feeding until the gland has regained its power.

EFFECTS OF THE TREATMENT.

The changes seen in the clinical picture when these permanganate injections are given are very rapid indeed. After the first or second injection the character of the cough alters from a harsh hawking bark to an easier and softer sound; the respirations become deeper and a little slower, with reduction of pleuritic pain in consequence. After the second or third injection the sticky expectoration becomes much looser and more easily raised. The grey or dusky type of cyanosis disappears in eighteen to thirty

hours, being often replaced by a rosy complexion in children, whilst in adults the pneumonia facies gives way to an expression of ease. Sleeplessness, if it has been a predominant symptom, ceases. After the very first injection a child with advanced bronchopneumonia will fall soundly asleep, and can be kept sleeping by repeatedly giving small injections. Reduction of active and noisy delirium is noticed after a few injections; the patient

FIG. 5.—Septic pneumonia; youth aged 17.

quieters and is more readily controlled after three or four doses have been well retained. But the most dramatic change of all is the sudden ceasing of the coloured sputum. It is not uncommon to see a bright red sputum in the morning and to find white frothy expectoration in the evening of the same day.

Sometimes there is a little free haemorrhage for an hour or so just before this change takes place, and as this may alarm parents or attendants they should be warned that it may occur. An hour or two later the sputum may be milky white. The pulse, and respirations settle down according to the course of the temperature, which itself may rise a degree or so before the crisis or lysis sets in. Indications point to mixed infections being rather less responsive, though a sufficient number of bacteriological examinations have not been made to settle the point. Crisis is not infrequent, but descent is by lysis in most cases, taking on an average from two to three and a half days from the commencement of treatment.

A few practical points must be mentioned in connexion with this treatment, whether it is being used for pneumonia or other toxic complaints, which if not carefully attended to may tend against success. In the first place, it is always advisable that the medical attendant be present when the first injection is given, for many mistakes may be made and valuable time lost; besides which it is reassuring to the patient to know that the treatment is being conducted properly. Nurses have been found giving vaginal injections when rectal ones have been ordered; some are too hasty or clumsy in using the syringe, or funnel and tube, and may irritate the patient; whilst others are to be found who frankly express an opinion that they have "no faith in the blue injections," and the fluid is thrown away accordingly. A temperature chart will sometimes clearly disclose mismanagement of this kind, and suspicions raised thereby have been followed by confessions.

A word must be said also as to the awkward situations which naturally occur when a child, who was looking deadly ill with bronchopneumonia three or four days before, is seen half-sitting up reading a book or playing with his toys as unconcernedly as though he had just recovered from an ordinary cold; and when this is accompanied with a ravenous appetite doubting parents may think the diagnosis has been at fault. In some cases it may be better to have confirmation at the outset, in the interests of the child, for, as has been said already, too early cessation of treatment may allow of recurrence. It is disconcerting, too, to find an adult in his fourth or fifth day of the disease, and whose temperature was 103.3° a few hours previously, now with a falling temperature, calmly smiling, and wiping a little blood from his lips, hardly more inconvenienced than if he had been just relieved of a painful tooth under a local anaesthetic. But this tame and unexciting ending is not what the public imagines the crisis of pneumonia to be, and the diagnosis may again be called in question. So what are we to say? Difficult, no doubt; but cannot we reply with a little more faith than of yore, "Perhaps this manganese has raised the patient's power of resistance to pneumonia"? Nor need it prevent our hoping that some day we shall be able to state this as a proven fact.

As the introductory paper referred to above begins by stating that the idea of this treatment originated in the study of Colonel R. McCarrison's works, so this contribution may end by saying that the quelling of the dangers and horrors of pneumonia, with the reduction in its death rate that will follow, has come in the first place from his brilliant book *Studies in Deficiency Diseases*.

Reports from DR. GRACE and DR. PIRRIE.

This man, aged 71, was admitted to the Royal Infirmary, Chester, in a semi-conscious condition on the sixth day of the disease. He was a case one would have expected to lapse into coma. But on receiving two injections of the standard solution of potassium permanganate his temperature dropped by crisis to normal, and he regained consciousness. He died two days later from heart failure, with myocardial degeneration.

W. H. GRACE, M.R.C.P.

This lady, aged 60, was a semi-invalid, and had been suffering from pyelitis and cystitis for some time, which flared up during her attack of pneumonia. Rectal injections of potassium permanganate

were given every four hours in her case, beginning on the third day of the disease; twenty-four hours later the temperature came down by a quick lysis from 103° to subnormal, taking three days to do so. Concurrently her pulse improved, and the respiration rate never exceeded 26; it was usually 22 to 24. She died seven days later from exhaustion caused by the pyelitis and cystitis. I have never seen a true pneumonia with such a remarkable absence of distress and toxæmia.

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MASTOIDITIS AND ITS COMPLICATIONS.

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THIS paper is a review of over 800 cases of mastoiditis operated on in the Leeds General Infirmary during the past six and a half years. In almost every case the operation was performed for an urgent condition, such as acute mastoiditis, obvious cholesteatoma causing symptoms, or recurrent polypi with pain. On account of the difficulties of hospital accommodation, the simple mastoid operation for the cure of persistent otorrhoea of short standing or the radical operation for chronic otorrhoea has been rarely performed. In all but a few of the fatal cases a report of the necropsy has been available.

For purposes of discussion the cases have been classified as follows:

1. *Complicated Cases:* Mastoiditis with, in addition, brain abscess, sinus thrombosis, or meningitis.
2. *Uncomplicated Cases:*
 - (a) The simple acute or chronic case which runs a straightforward course.
 - (b) Cases with extradural abscess and no further lesion.
 - (c) Cases of tuberculous mastoiditis.

COMPLICATED CASES.

For practical purposes it can be said that one out of every four chronic, and one out of every nine acute, cases presents one of the above-mentioned complications for treatment. There is little difference in the mortality rate, that in the acute being slightly greater than in the chronic.

TABLE I.—Incidence of Complications in Mastoiditis.

	Cases.	Percentage of Complicated Cases.	Percentage of Total Cases.
Temporo-sphenoidal abscess ...	46	31.0	5.6
Cerebellar abscess ...	27	18.4	3.3
Meningitis, serous and purulent ...	21	14.3	2.5
Lateral sinus thrombosis ...	41	27.8	5.0
Occipital abscess ...	3	8.5	1.7
No autopsy available or negative ...	2		
Probable sinus thrombosis cases ...	7		
	147	100.0	18.1

Table I illustrates the relative frequency of each complication to mastoiditis as a whole. Fuller details of each complication are given later.

1. *The Meningeal Syndrome.*—Before considering the individual complications it is necessary to comment upon a common manifestation suggestive of infective meningitis, which is nevertheless not necessarily present. Head retraction, vomiting, high temperature with semi-coma and irritability, frequently mask the complicating lesions. Meningeal irritation is undoubtedly present, but whether the condition known as meningitis in the *post-mortem* room causes it is doubtful. After exploration, even where the cerebro-spinal fluid is milky, some of these cases will recover. Others will be found to have a brain abscess or sinus thrombosis, of which the symptoms were not apparent,