ON THE TREATMENT OF EMPYEMA BY LISTER'S ANTISEPTIC METHOD.*

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THERE have been, I believe, not more than three or four cases recorded in which Lister's antiseptic method has been applied to the treatment of empyema; and I cannot but think that its more extended use would result in substantial evidence of its value. My object in relating the details of this case is to call attention specially to the antiseptic treatment of this disease, and to point out what appear to me to be its peculiar advantages.

The patient was a boy, eight years of age, admitted on December 1st, 1874, into one of the children's wards in University College Hospital, under Dr. Sydney Ringer, who has kindly placed the notes of the case at my disposal. During the month of October previously, pus had been twice withdrawn from the left side of the chest by aspiration, with much temporary benefit. On admission, the ordinary signs of left pleuritic effusion were well marked; the heart's apex was at the epigastrium, the side was enlarged and dull throughout, and mucous rales and weak breath-sounds were faintly audible. Evening temperature, 98 deg.

Next day, December 2nd, I inserted the aspirator-trocar in the sixth interspace in the anterior axillary line, and withdrew twenty-eight ounces of greenish-yellow sweet pus. The apex of the heart came back to its normal position, the breath-sounds returned, and the boy was much relieved. The evening temperature was 98.4 deg.

In two or three days, however, the temperature became irregular, and examination of the chest showed that fluid was reaccumulating; and on the 23rd, three weeks after the previous aspiration, the heart's apex was to the right of the ensiform cartilage, and the whole left side was again enlarged and dull on percussion. On that day, I removed thirty ounces of pus by aspiration, and the heart returned to its normal position.

The boy was much relieved, but it was soon evident that the pleural cavity was filling again, and symptoms of hectic became marked; on several occasions there was a difference of about 4 deg. between the morning and evening temperatures, the highest temperature being 104.2 deg. on the evening of the 31st. By January 6th, the heart's apex was again to the right of the epigastrium, and the side was as full as ever.

Accordingly, on the 9th, at Dr. Ringer's visit, the patient was put under chloroform, and I inserted a drainage-tube in the sixth interspace in the anterior axillary line, letting out about twenty-eight ounces of pus. The operation was performed strictly according to the antiseptic method, and the usual dressing was applied. For several days, the free discharge of pus necessitated the change of the dressing morning and evening; but the amount of discharge rapidly decreased, and for the next week one dressing a day proved enough. After that, for the next sixteen days, the dressing was changed every other day only. As the discharge had now become very scanty, from this time to the removal of the drainage-tube on March 9th, the side was dressed once in every three or four days only. On the 17th, the wound had completely closed.

Thus the patient was cured in a little more than two months; and I believe that, in our anxiety to avoid the opposite error, we kept the drainage-tube in too long, and thus prevented the wound from closing before. During this time, the boy had been improving rapidly, gaining in flesh, and strength, and spirits; the symptoms of hectic disappeared directly the free opening was made; and from that time the temperature gradually fell, till, on the removal of the tube and the closure of the wound, it came down to normal.

I believe I am speaking in accordance with general experience, when I say that we have no evidence to lead us to hope that the absorption of pus from the pleural cavity can be obtained by any internal use of drugs or external applications alone; and nature herself indicates, by the establishment of fistulous communications with that cavity, that the fluid must be removed by some other way than by absorption. As it, therefore, seems that we cannot expect to cure empyema without effecting the escape of the fluid by operation, the question arises, What method is to be adopted in any given case for the removal of the fluid, and what line of after-treatment will give the best results?

There are two ways in which the fluid may be evacuated. The first is, by such means as to limit the escape of pus to the time of the operation

—the object being to prevent the entrance of air, and so guard against decomposition in the cavity.

The case that I have related illustrates what is well known—that tapping alone cannot be relied upon to effect the cure of empyema; the aspirator had been used four times in three months, each time with marked temporary benefit; but the repeated reaccumulation of fluid and the gradual onset of hectic, indicated that recovery, if it took place at all under this mode of treatment, would be very protracted; and that it was impossible to say how often the tapping might have to be repeated before that end was attained, and how great might be the drain upon the patient's system owing to the long-continued suppuration.

My experience, however, would not lead me to coincide with the opinion expressed by some writers of authority, that the *only* cure for empyema is a free opening. There have been a sufficient number of cases recorded to show that tapping alone may be successful; and this, as would be expected, is especially likely to be the case in children, in whom I have repeatedly seen recovery follow the use of the aspirator.

The *second* way in which the fluid may be evacuated is by the establishment of a fistulous opening in the chest-wall. It is to the mode in which this may be done that I wish specially to direct attention.

The method that has usually been adopted is to make an opening into the pleural cavity, through which pus and fibrinous coagula and caseous masses may freely escape, while no attempt is made in any way to alter the character of the external air which enters the cavity at each inspiration. A drainage-tube is generally inserted to keep up the communication. In some cases, no local after-treatment seems necessary, and there may appear to be no great harm done by admitting air freely into the cavity. It would seem that many cases do well thus. But there are other instances in which, as a result of the communication with the external air, there follow all the evil effects of the presence of putrid pus in the cavity, and its absorption into the blood; the temperature rises, and the symptoms of the septicemic state follow in varying degrees of intensity. In these cases it is found necessary to wash out the pleura with some disinfecting solution, in order to keep the cavity sweet.

Trousseau gives the details of a case of empyema treated by injections, which he plainly considers evidence in favour of this method. The patient, a girl, six years old, was cured at last, after free suppuration for a year and eight months; as he himself says: "In this remarkable case, purulent effusion three times necessitated recourse to paracentesis; perforation of the lung took place; a solution of iodine was injected more than two hundred times, and there were nearly as many chlorinated and aromatic injections used; in the end, however, the cure was complete. Let me draw your attention to the extraordinary amount of the purulent secretion, which may be estimated at a daily average of two hundred *grammes* (about eight ounces) for about two hundred days, which is the enormous total of forty thousand *grammes* (more than eighty pints)." He very pertinently adds, "you can understand how essential was constant and copious nourishment to enable the child to struggle with this prodigious drain upon the system".

The question somewhat naturally arises, What effect upon the process of suppuration had all these more than four hundred injections? What would be the effect on any open suppurating wound of the diligent application of irritating washes? The idea cannot but suggest itself, that there may have been some association as cause and effect between this most diligent use of irritating solutions and the free and prolonged suppuration. And yet it was essential to keep the cavity sweet.

What does this process of washing-out entail, both to patient and to doctor? Either once or twice every day, the performance has to be gone through; there are the necessary preliminaries of arrangement of macintosh and various receptacles, and of the patient himself in a certain position with relation to these accessories; then follows the injection of the fluid, either through the drainage-tube or through a catheter, introduced with more or less pain to the patient; now and again the irritation of the pleura excites cough, which sends a volley of mingled injection and pus through the opening, to the discomfiture of the medical man, if experience have not taught him the precaution of "standing out of the line of fire". After all this, the patient and his surroundings have to be made clean and dry from the effects of both the injection and the cough.

Evidently this process, repeated once or twice every day, must have an injurious effect upon a patient whose condition is probably one in which it is important that all sources of disturbance, of local irritation, and of consequent exhaustion, should be carefully guarded against.

During the course of treatment, it will probably happen at intervals that, in spite of the injections, the discharge will putrefy in the pleura, or that some decomposing pus will be temporarily retained; when this occurs, the elevated temperature and the general condition of the patient

* Read before the Bath and Bristol Branch.

will at once indicate the absorption of poisonous matter; and immediate removal of the cause of the mischief is necessary.

In these cases, where a free vent for the pus is imperative, and where the ill effects of decomposition in the pleura have been manifested, we have had to decide between two evils: the evil of letting the patient alone, and the evil of adopting a mode of treatment that is disturbing and exhausting to him, and a source of irritation, and probably of increased suppuration as regards the pleura itself. As, however, the former evil is by far the greater, we have had to put up with the latter.

The problem is, therefore, set before us: How can we allow free exit to discharges, and, at the same time, prevent decomposition in the pleura? I believe that Professor Lister has found the solution of this problem for us in his antiseptic method.

To return to the case I have brought before you. Within three months more than ten pints of pus had been withdrawn from the chest, and the rapid reaccumulation of fluid, together with the onset of hectic, made it evident that there was no tendency to that speedy cure of empyema that sometimes takes place in children. The drainage-tube was then inserted antiseptically, and the details of the after-treatment were carefully carried out. The discharge, at first profuse, rapidly diminished, and in about two months the boy was practically cured. His general condition had, meanwhile, undergone the most marked improvement. There was no decomposition of the pus throughout.

What amount of disturbance did the treatment entail upon the patient? Simply the removal of the old dressings under the spray, and the substitution of fresh. No pain was given to the patient; and at no time was it necessary to use any injections into the cavity, and there was no evidence of any irritation of the pleura. Thus the physical and moral disturbance of the patient was reduced to a minimum.

Contrast this with the treatment by injections that I have before described, and the result is surely favourable to the antiseptic method.

Again, whilst the injections have to be persevered in once or twice every day, the intervals between the antiseptic dressings gradually lengthen as the discharge decreases; at first, the dressings must be renewed twice a day, soon only once, then every other day, then once in two, three, or four days. The frequent repetition of injections is unavoidable, owing to the rapidity of decomposition; whilst the antiseptic dressing is renewed only when the amount of discharge makes it necessary—decomposition being excluded from consideration.

It appears to me that the antiseptic method is especially applicable to the treatment of empyema; in this disease, the conditions are much the same as in chronic abscess, as, for example, psoas abscess. In both the course of the disease is more or less chronic—in both there is a large suppurating surface, communicating with the external air by a small opening only, and it is specially easy, by the use of antiseptics, to guard this small opening against the entrance of the excitors of putrefaction, whatever they may be; in both, the large extent of internal surface and the small vent for discharges, make the presence of putrid matter proportionally dangerous; and in both will the antiseptic treatment ward off the constitutional disturbance that the absorption of septic matter is well known to produce, and which too often ends in the exhaustion and death of the patient.

There is yet another advantage that I would claim for the treatment I have advocated. We know now that thoracentesis is not the absolutely safe operation that it was once hoped to be. Every now and then we hear of a case where sudden death has occurred, either during or immediately after the operation, or during the after-treatment.

In the first class of cases, where death occurs either during the operation or immediately after it, the fatal result is evidently due, in one way or another, to the removal of the fluid; and against these cases the antiseptic treatment manifestly affords no safeguard.

In the second class, sudden death has taken place during the after-treatment; and, in a large proportion of the reported instances, this has occurred during or immediately after the washing-out of the pleura. We are, therefore, led to seek for an explanation of the causal relationship of the injection to the fatal result. As stated in the BRITISH MEDICAL JOURNAL of February 12th, the probable hypothesis is that the long-continued compression of the lung favours the formation of clots in the pulmonary veins or in the left auricle; and that, during the process of washing-out the pleura, fragments of these may be detached, conveyed into the left ventricle, and thence into the cerebral arteries. Vallin reports a case where this was probably the cause of death, but there was no autopsy. Dr. Balthazar Foster, in the *Medical Times and Gazette* for 1874, relates a remarkable instance that is strong evidence of the truth of this theory; in his case, after thoracentesis, gangrene of both legs set in, together with symptoms of suppression of urine. *Post mortem*, both common iliac arteries were found blocked by embola, and similar obstructions existed in the kidney and spleen. On examination of the heart, a branched clot was found lying loose in the left ventricle,

and the mouths of the pulmonary veins were partially blocked by coagula, one of which hung down into the left auricle. The clots in these pulmonary veins were evidently the source of the embola.

Hence the conclusion: if we avoid injections, we avoid the probable cause of so serious an accident as sudden death during the after-treatment of empyema. By adopting the antiseptic method, we avert the necessity for any disturbance of the pleura by injections.

To sum up: in all cases of empyema, where it is necessary to establish a fistulous opening, I strongly advocate a fair trial of the antiseptic treatment. To the objection, that many patients do well without any use of injections, I reply that, in a given case of empyema, it is impossible to say what will be the course of the disease after the opening is established—whether cure will be effected without any further local treatment, or whether a long course of injections will be needed; and that it is prudent to adopt that method which, while benefiting the simplest cases, will place the most severe under the best conditions for recovery.

The advantages of the antiseptic treatment are these.

1. A free discharge is allowed.
2. Decomposition and consequent absorption of the products of putrefaction are prevented.
3. The treatment is very much less disturbing and exhausting to the patient, both because the process itself is much simpler, and also because it is less frequently repeated.
4. There is no irritation of the pleura.
5. One, and perhaps the chief, cause of sudden death during the after-treatment is avoided.

In a word, by the application of the antiseptic method to empyema, we are enabled to secure all the advantages of a free opening, without any of its disadvantages.

NOTES OF A CASE OF EMPYEMA: THORACENTESIS: ALBUMINOUS EXPECTORATION.*

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THE following case of empyema presents a few points likely to be of interest to the members of this Society. The case was carefully watched throughout its course, and I had the benefit of repeated consultations with Dr. Gairdner.

The patient was a young married lady, living in the country, of active and healthy habits. Her health, prior to this attack, had always been good, though her appearance gave the impression of delicacy. Her family history was upon the whole good. A brother had died a few months before my attendance began, from heart-disease. Rather curiously, also, a married sister, while in attendance upon my patient, had a sharp attack of pleurisy of the left side, with well marked effusion, accompanied with rusty and muco-purulent expectoration. From this illness she made an early and good recovery.

On March 26th, 1875, after exposure to cold, my patient was taken ill with symptoms of a severe feverish attack, which in a few days declared itself as a pleurisy of the left side, which went on to effusion. The temperature in the axilla on the eighth day of the disease was 102.8 deg. Fahr. I need not weary you with the ordinary details as to physical signs and treatment. I may note, however, that a blister, applied, with the approval of Dr. Gairdner, gave rise to a severe strangury, with hæmaturia; the urine for a few days being highly albuminous, and showing abundance of renal epithelium.

On the thirteenth day, the evening temperature fell two degrees. On the fifteenth, a rise again took place, accompanied by rusty expectoration. From this time the fever increased, and maintained the character of hectic pyrexia; the average morning temperature being 100 deg. Fahr., the evening 103 deg. (see chart†); pulse between 120 and 130. An abundant frothy mucous expectoration, occasionally rusty, prevailed up to the thirty-seventh day. The effusion continued steadily to increase, pushing the heart more and more to the right side, till, by the twenty-sixth day, it was beating under the right nipple. There was complete dulness to percussion over all but the apex-region; no respiratory murmur, save in the same region, while in the infraclavicular space there was to be heard a mucous *râle*, with a suspiciously hollow sound. On measurement, the left side was found to be three-quarters of an inch greater in circumference than the right. The right lung remained free from any indications of collateral fluxion. There

* Read before the Glasgow Medico-Chirurgical Society.

† A chart, showing the temperature, pulse, and general course of the case, was handed round in the society.