TRENCH NEPHRITIS: A RECORD OF FIVE CASES.

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IN the BRITISH MEDICAL JOURNAL of July 17th, 1915, there appeared a short description of what was called a new disease occurring amongst soldiers who had been for a considerable time in the trenches.

Certainly from my own clinical hospital experience I had not met with such a symptom-complex, and as the etiology of this condition has up to the present remained uncertain, a careful record of cases is desirable.

CASE I.

A soldier, aged 33, was sent down from the front suffering from acute nephritis. He had been in the trenches for seven weeks, and had often been up to his waist in water. He stated that the onset was sudden, and that he first noticed a feeling of chilliness and swelling of face and feet. The urinary changes were characteristic; there was suppression of urine for the first twenty-four hours, and, afterwards, very small quantities (not measured) accompanied by great pain in the back and constant vomiting.

On admission to hospital he presented a typical clinical picture of acute nephritis. Analysis of the urine gave the following results: Specific gravity 1025, smoky, albumin present in large quantity. Microscopically, blood corpuscles, hyaline, and blood casts were seen. No specific micro-organisms could be isolated. Under careful treatment the albumin rapidly disappeared, the symptoms passed off, and he made a complete recovery, the attack only lasting twelve days. He had not previously had any kidney trouble.

CASE II.

A soldier, aged 33, was a much more severe case. He had been in the trenches for several weeks, and had been exposed to very bad weather. On admission he had almost complete suppression of urine, and it was with great difficulty that urinary secretion could be induced. Only after hot pack and hot mustard and linseed poultices had been applied to his loins was there any secretion of urine. It was loaded with albumin, with numerous hyaline casts, but no blood. No distinctive organisms could be isolated.

He remained in a state of eclampsia for three days, with strong convulsions, but these subsided, and he made an excellent recovery. His blood pressure on admission was systolic 230, diastolic 190, soon considerably reduced.

CASE III.

A soldier, aged 27, admitted in a serious condition; continuous vomiting and semi-unconsciousness; urine very deficient, specific gravity 1028, granular casts, albumin, no blood. Headache severe, with general anasarca.

Hot packs and injections of pilocarpine had an excellent effect, the urine increased in quantity, and the albumin was reduced to 1.1 grains per ounce. In sixteen days the albumin had disappeared, and he was well enough to be sent home.

CASE IV.

A soldier, aged 24; had been in the trenches for some weeks, and had been frequently very wet. His condition was much the same as Case III. The urine secreted was only 18 oz. in twenty-four hours, and it was loaded with albumin and granular casts.

The attack, although very acute, passed off rapidly, and the albumin quite disappeared.

CASE V.

A soldier, aged 42. No previous renal trouble. Had been in trenches for several weeks.

On admission he was only passing 10 oz. of urine in twenty-four hours, highly concentrated, and containing a large quantity of albumin and casts; no blood and no special organisms.

Treatment with hot packs and diuretics had the desired effect, and he soon made a quick recovery.

CONCLUSIONS.

1. There seems to be some association between life and conditions in the trenches and the disease.

2. None of these patients had any previous kidney trouble, and they all made a good recovery from what seemed to be a serious lesion of the kidney structure.

3. Bacteriological examinations were negative, and one is inclined to think that some infective process—giving rise to a toxin with a selective action on the renal epithelium—is the cause of this unusual symptom-complex.

**ARTIFICIAL PNEUMOTHORAX:
MANOMETRIC ABERRATIONS.**

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HAPPY is the operator who, on first entering the needle in a primary case, sees the manometer registering -14 to -16 c. in inspiration and -6 or -8 in expiration, and then going on with steady and ample oscillations in time with the patient's regular breathing, the pressure rising very gradually as nitrogen enters the pleural cavity. But things do not always go on in this encouraging way, and the operator who has well impressed upon his mind a wholesome fear of gas embolism will often find the aberrations of the manometer providing him with anxious problems.

A slight *minus* pressure inspiration, becoming less in expiration, may be produced by the point of the needle not actually entering the pleural cavity at all, but pushing the parietal pleura before it. It would obviously be dangerous to force in gas in such circumstances. But anything between the normal ample oscillations and the abortive manometric readings last described may be produced when the point of the needle is in a very small "pocket" in the pleura surrounded by adhesions. A pocket of very moderate size may give fairly normal manometric readings at the outset, but the pressure rises very rapidly with the entrance of gas in comparatively small quantity. We may hope for adhesions to give way, yielding either suddenly or gradually to gas pressure, but the smaller the space into which gas enters the less chance there will be of this taking place. For a given pressure to the square inch the pull upon the surrounding adhesions must be small when the space containing gas is small, increasing as the pressure is exerted over a larger area. It follows that when the "pocket" is very small the prospect of benefit is small; and the risks are increased. The indication is to abandon the attempt to induce a pneumothorax at that point; puncture somewhere else may be more successful.

In a primary operation, where the pleura is fairly free from adhesions, 300 c.cm. of nitrogen will not produce a *plus* pressure, even in expiration. And it is not, as a general rule, advisable to exceed this quantity at first. The exception is in haemorrhage from a cavity. It is then imperative to induce a complete pneumothorax at once, if possible, because to do so is the most effectual means of restraining haemorrhages. The risk from haemorrhage is greater than that from rapidly filling the pleura with gas.

On first inserting the needle in a primary case a *plus* pressure in expiration is proof that the needle has gone through into the lung.

The reading found at the commencement of a secondary operation (or "refill") will be the pressure left at the conclusion of the previous operation, modified by what has since taken place. Usually the pressure will have fallen, owing to absorption of gas. But the occurrence of pleural effusion (which takes place in a considerable proportion of these cases) may actually raise the intrapleural pressure. The rule, therefore, that a *plus* pressure in expiration implies that the needle has gone through into the lung, only applies to a primary operation before any gas has been injected, but it is then a rule absolutely without exception.

There will be no movement of the manometer at all if the opening of the needle is in consolidated lung. But what may be called the typical pulmonary oscillations will be likely to occur when it is in a bronchial tube, or a cavity either tuberculous or bronchiectatic, or the space formed by the fusion of emphysematous vesicles. In the circumstances, the oscillations will approximate to an atmospheric mean—that is, the *minus* pressure in inspiration will be equal to the *plus* pressure in expiration, or nearly so. The amplitude of the oscillations will depend partly upon the nature of the space entered by the needle and partly upon the character of the respirations, whether tranquil or laboured. But when the patient speaks the expiratory effort with a closed glottis produces, while it continues, a greatly increased pressure. And this is greater still in coughing. I may remark in passing that the same thing happens also when the needle is in the pleural cavity after gas has been injected. So that it is

wise always to keep a watch for the approach of a cough, and to pinch the tube leading to the manometer when that is observed. Otherwise it is quite possible for some at least of the water in the manometer to be violently forced out. Which is a somewhat annoying accident, because the lumen of the manometer is sufficiently narrow to make the recharging it with liquid and getting rid of air-bubbles a somewhat troublesome business. Of course, the nitrogen should also be cut off immediately when a cough is imminent, because the act of coughing is very apt to displace the needle. When the patient has done coughing for the present, communication with the manometer should be reopened; but, until its readings are found to be satisfactory, no more gas should be admitted.

In doing a "refill" it is, of course, quite possible to meet with an atmospheric mean pressure in the pleural cavity if the final pressure at the previous operation was higher. But an atmospheric pressure should always be regarded with some suspicion, and special care must be taken to be sure that the point of the needle is in the right place. For this purpose, keeping a record of the depth reached by the needle, for use at subsequent operations, may be useful; but it is not wholly free from possible fallacies.

When it is found that the admission of a large quantity of gas does not raise the pressure, it is evident that this can only be because the gas is escaping as fast as it enters. This, of course, indicates that the opening of the needle is not in the pleural cavity, but in the lung. It has been suggested to scent the gas with peppermint or the like, in the expectation that the patient would recognize the odour in his own breath if the gas should be escaping in that way. In my experience this suggestion has not proved to be of any practical value.

On first inserting the needle, whether in a primary operation or a refill, we may find no movement of the manometer. This may be due simply to our having underestimated the thickness of the chest wall. In that case a little further insertion of the needle might produce normal oscillations. But it is far more often due to the opposite—namely, to going right through into lung. This is certain to happen if the puncture chances to be made at the site of an adhesion. And it may very easily happen anywhere near an adhesion, unless the needle is entered very slowly and cautiously, with the eye on the manometer all the time. On this account (as well as for other reasons) I am opposed to the practice of dispensing with local anaesthesia in refills, and entering the needle with a sudden stab. It by no means follows that the point which was free from adhesions at the first operation will be necessarily clear on the next occasion. This remark applies with especial emphasis when the puncture is made posteriorly, for there the lung may come into contact with the parietal pleura in spite of the presence of a very considerable quantity of gas, especially when the patient is lying on his back. The slight traumatism of the first operation would be very favourable to the production of an adhesion in such conditions. It is often difficult, if not impossible, to recognize the existence of such adhesions by auscultation.

It sometimes happens, when the needle is being entered for the first time, that the manometer leaps up to a normal *minus* pressure of 14 or 16, and there remains stationary. This is so far satisfactory, that it is a clear indication of the absence of adhesion at the point of puncture. The opening of the needle has been, at least momentarily, between two free pleural surfaces, in what may be called the potential pleural cavity. But it would be extremely unsafe to send in gas while the manometer is motionless. For though the *minus* pressure shows that the open end of the needle has been where we wish it to be, through the costal pleura, and pushing the visceral pleura before it, the absence of oscillations suggests that it may not be there still. It may be that some movement of the patient has caused the needle to be slightly withdrawn, so that its opening is now in the chest wall. It is more likely that it has gone through into the lung. It is therefore safer first to withdraw it until we are quite sure that its point is in the intercostal space. Then it may be very cautiously and slowly advanced again, the eye being fixed on the manometer. If still no oscillations occur it is probable that the lumen of the needle is blocked with blood. It is, of course, quite possible that this obstruction might be cleared away by injecting nitrogen. But the attempt would be very risky. In the absence of oscillations there

can be no proof that the open end of the needle is between the parietal and visceral pleura; and while this is uncertain, to inject nitrogen is to risk the possibility of gas embolism. In such circumstances it is recommended to clear the needle by passing in the stylet. But to do this with the ordinary Saugman needle is by no means free from danger. For with that instrument it is impossible to make way for the passage of the stylet without opening communication with the external air, which is, for more reasons than one, more dangerous than admitting nitrogen. To obviate this I have devised a needle with a stylet working through an airtight stuffing-box, as in Potain's aspirator. Only in Potain's instrument the stuffing-box simply plugs into the mount of the needle, which rarely produces an airtight joint. And besides, it is somewhat apt to tumble out at inopportune moments. In my instrument, therefore, the stuffing-box screws into the mount of the needle, with a leather washer to make a perfect joint. As supplied by the manufacturer, the stuffing-boxes in such instruments are provided with a packing made of leather or india-rubber. Leather is damaged by boiling, and india-rubber deteriorates by time, so that neither is reliable. I prefer a packing made of cotton-wool soaked in sterilized vaseline. This is perfectly airtight, and can easily be renewed whenever necessary. The leather washer for the joint should not be boiled. It may be soaked in B.P. glycerine or carbolic acid, not carbolic oil, which sterilizes nothing, not even itself. This special needle is made by Messrs. Allen and Hanbury of London, and by Messrs. Brady and Martin of Newcastle.

In using this needle, it is convenient to insert it without having the stuffing-box attached, because it is only occasionally that the stylet is required. It can easily be attached, with the needle *in situ*, if the occasion to use it arises.

In the absence of such a special needle, rather than use a stylet without a stuffing-box, it is far safer, in the circumstances just described, to withdraw the needle and reinsert it after clearing it thoroughly; or, better still, use a fresh needle. The slight additional traumatism of a second insertion is far less objectionable than the risks involved in making an open communication with the external air.

An abnormality which is at first somewhat puzzling is this: In the course of induction of a pneumothorax the pressure rises on the admission of a very small quantity of gas. But on shutting off the nitrogen and watching the manometer, we find that in the course of a minute or two it falls again. On repeating the process several times, we see that the pressure falls less after each admission of gas, so that eventually there is a permanent rise of pressure. I have seen this in three or four cases. In one the fall of pressure only took place when the patient took very deep breaths. No doubt this is due to gas being admitted into a small "pocket" surrounded and limited by adhesions, except for a narrow communication leading to a large intrapleural space. At the next operation it will be wise to attempt to enter this larger space directly. If auscultation and percussion do not help us to locate this larger space with sufficient clearness *x* rays may be found very useful. Some little care may be needed to distinguish between the phenomena just described and the manometric signs presented when the needle is in the lung. But in the lung there can never be a *minus* pressure during expiration; and the admission of gas will never produce a permanent rise of pressure.

A CASE OF ROTATORY NYSTAGMUS WITH RECOVERY UNDER OPTICAL TREATMENT.

BY

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In June, 1914, a girl, aged 7 years, was brought to me on account of defective vision. There was a slight convergent strabismus of the left eye, but the most striking objective sign was the presence of concomitant rotatory nystagmus, involving both eyes equally, and alleged to have existed from birth. The child was very fair and somewhat deaf, the latter being a sequel to otitis media acuta two years before. The visual acuity of each eye was $\frac{5}{16}$.