

NEPHRITIS IN THE BRITISH TROOPS IN FLANDERS

A PRELIMINARY NOTE

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DURING the earlier months of the campaign the number of cases of nephritis seen in the base hospitals was remarkably small, and in a group of such hospitals under my observation, where there were several thousand beds, I only saw, at this period, a few isolated cases of no great clinical interest. These were principally cases of chronic renal disease in men who had rejoined the army from the reserve, and where, under the stress of the campaign, the chronic malady had progressed more rapidly than usual, or where recrudescence of an old renal lesion occurred. These cases presented obvious physical signs of cardio-vascular changes such as high tension and arterial degeneration, and often other physical signs of chronic renal disease, e.g. the anaemia and such retinal changes as albuminuric retinitis. One of the most striking features of the medical cases admitted to hospital in the autumn and winter of 1914 was the rarity of renal dropsy. During this period, however, other maladies commonly reputed to be due to, or associated with, exposure to inclement weather were by no means rare. Thus, bronchitis and other pulmonary affections were prevalent, and there were also numerous cases of enteritis and colitis. Further, during the wet and cold winter months, very large numbers of men were admitted with the so-called 'trench foot' resulting from exposure to cold and wet in the trenches. Even during this period, when the climatic conditions were very unfavourable owing to long-continued cold rain, and the hardships suffered by the troops were considerable, there was, so far as my experience went, no considerable number of cases of nephritis accompanied by obvious renal dropsy. Speaking generally, it may be said that the cases of nephritis were few in number until the months of March and April 1915. In these two months far more cases were admitted to hospital than the total admissions for the whole period of the war up to that date. The April admissions were greater in number than those of March, and the April admissions alone were not far short of the total admissions for the whole duration of the War to April. Further, if only the admissions from the troops that had been at the front since the commencement of the war were taken into account, the same conclusion is arrived at—the incidence of the disease

in March and April in these divisions is in marked excess to what obtained in the same divisions in the earlier months. Hence it is quite certain that the increase in the number of cases of nephritis was not due merely to the increase in the numbers of the British troops in the field in the later months, as compared with the numbers in the earlier months. It is impossible for several reasons to give the actual numbers in this preliminary communication, but not only in the early spring but also in the summer the increase in the nephritis cases was far greater relatively than the increase in the number of the troops in the field. Further, emphasis must be laid on the fact that not only did a great increase in the number of cases occur in the spring, i. e. in March and April, as compared with the earlier months, but the cases were also of a different type. Cases were now seen in large numbers with typical renal dropsy in so far as its distribution was concerned, and, as mentioned above, dropsical cases had been quite rare up to that time.

It may therefore be said that this outbreak of nephritis occurred in the spring of 1915, especially in March and April; the number of cases admitted increased still further in later months, and the occurrence of these cases has persisted until the present time with some fluctuations. The incidence was especially high in the summer months of 1915, but owing to increases in the strength of the forces in the field it is not possible at present to speak with certainty as to the actual case incidence. Again, during the later months more attention has been directed to the occurrence of the malady, more hospitals and further facilities for examination both at the front and at the bases have been provided, and hence the disease is doubtless more often recognized, especially in its slighter forms, owing to more thorough examination of cases of illness.

A special case-sheet was drawn up and issued, and all cases diagnosed as 'nephritis' were entered on such sheets, and the present preliminary paper is the result of a study of these case-sheets dealing with 1,455 cases under treatment at various periods since the outbreak in all the base hospitals of the Expeditionary Force in France. Further, at one of the bases all the cases of nephritis were segregated in one hospital, and these cases were seen repeatedly by me, and I also saw large numbers of cases in hospitals at other bases, so that in addition to the study of the case-sheets I have seen clinically some hundreds of cases. It is not possible to make such detailed and thorough examination of the cases in the hospitals with the forces in France, as is possible in the base hospitals in England, but some few points of clinical interest have emerged in the work here and form the substance of this communication. It is hoped that a more detailed analysis of the cases may be made later. When the early cases were first observed, two prominent symptoms attracted notice, the occurrence of oedema and the presence of dyspnoea. Often the soldier stated that the onset of the dropsy was quite sudden, absent on one day and very markedly present the next, and attracting the attention of his fellows. Not uncommonly the first sign of illness was the presence of dyspnoea, and, so far as my observations went, many men complained especially of nocturnal dyspnoea. This was quite a marked

feature of the onset and sometimes it persisted in a lesser degree for a few days. Others complained of dyspnoea on exertion, e.g. on the march. Objective dyspnoea was not, however, a very marked feature of the majority of the cases clinically, when the patients came under observation in base hospitals—always several days after the onset of the illness. In some of the earlier observations, although albuminuria was present, casts were said to be absent, and this at one time gave rise to doubts in the minds of some observers as to the real nature of the dropsy. More extended observation has shown, however, that casts are very frequently present, and it is probable for several reasons that the percentage of cases in which the urine contains casts is really much greater than appears at first sight. In a series of 1,455 cases, casts were present in 794 cases, they were stated to be absent in 507 cases, and were not looked for in 154 cases.

The present paper will deal only with a series of 571 cases where casts were found to be present, although many of the statements made would apply to cases where casts were absent. I have thought it better not to include such cases, as doubts might be raised as to the accuracy of the diagnosis of nephritis in such instances. In the great majority of the 571 cases the casts were of the hyaline and granular varieties. In some, however, hyaline casts only are noted. In a considerable number, epithelial casts are also recorded as present. In most cases where casts were present they were readily found, and it was not infrequent for them to be present in abundance—this was especially the case with granular and hyaline casts. Blood corpuscles were also frequently found, but definite blood casts are not often recorded. White blood-cells are of course frequently found. In some instances, especially if the case is seen early, the urine is definitely smoky, and in others, but not in many, it may contain a large quantity of blood, so as to be obviously red to the eye. The latter condition, I would say from my own observations, is exceptional. Such cases present a rather different clinical picture to the general run of cases, in that with them dropsy is neither so frequent nor when present so marked a feature of the case.

Further, these haemorrhagic cases more frequently have pyrexia and resemble much more closely in their course infective nephritis dependent upon some microbic invasion. In some instances of this type of case the *Bacillus coli communis* has been recovered from the urine. In a few instances the haematuria and pyrexia have been intermittent and recurrent, producing a clinical picture closely resembling that seen in renal embolism; but these patients have not been suffering from any condition liable to cause embolism, and have presented no physical signs justifying such a diagnosis, and it seems more probable that the condition is due to some bacillary infection. These cases, however, are few in number and are quite different from the ordinary form of nephritis with which this communication deals, and where dropsy is really the dominant physical sign; in these cases any considerable amount of blood in the urine is decidedly exceptional. The quantity of urine is notably decreased in all cases where dropsy is present, and especially so in the earlier stages of the malady whilst the dropsy is increasing. Quantities less than twenty ounces in the twenty-four hours are not

uncommon, and it is not unusual for a greater degree of suppression of the urinary flow to occur during short periods. In some cases complete suppression for periods of twelve to twenty-four hours has been observed, and in such cases it is usual for uraemic manifestations of considerable severity to be present. Even in these very severe cases it is most exceptional for death to take place. More often the suppression only lasts a few hours, and the urinary flow is fully re-established in 24-48 hours. Only three fatal cases have fallen under my direct observation in a series of several hundred cases of nephritis, and in all these suppression, together with uraemia, occurred, but none of these three fatal cases was really a case of simple nephritis. In one the condition was really the terminal stage of chronic Bright's disease which had run a more or less latent course and was only recognized in its last stage when uraemia had occurred. In the second case, which presented clinically the picture of an acute simple nephritis with dropsy, and where fatal uraemia ensued, post-mortem examination revealed the presence of congenitally malformed, atrophied, and hydronephritic kidneys with dilated ureters. Here the nephritis was implanted on kidneys already much impaired by a congenital lesion. In the third case it was found on post-mortem examination that one kidney only was present, the absence of the second was due here also to a congenital anomaly, and the one kidney present was deformed, either as the result of the atrophy of a portion of its substance as the result of an old infarct, or possibly congenitally. In this case also the nephritis had affected a kidney already impaired.

In all the other cases under my observation where suppression of varying degrees of severity developed, the patient recovered from any uraemic phenomena present and was ultimately well enough to be evacuated to England. It may be stated here that these three deaths are the only ones that occurred amongst the cases under my direct observation.

Dropsy occurs in the great majority of cases and is usually well marked, and, as mentioned above, it is, in a large proportion of cases, the initial phenomenon that leads the soldier to seek medical advice. The dropsy may first attract attention by affecting the face, the patient giving the usual history of not being able to open his eyes in the morning, or not infrequently the dropsy is first noticed in the legs. Some of the patients complained greatly of the swelling of the abdomen, and anasarca of the abdominal wall was often well marked. Ascites, usually only of moderate degree, was present in a certain number of cases, but so far as my own observations went, it was not present in the bulk of the cases, and when present was never large in amount, and no case calling for paracentesis abdominis occurred. Much of the swelling of the abdomen complained of by the patients was really due to the oedema of the parietes. Oedema of the scrotum was not uncommon, and the well-known cushion of oedema over the sacrum and loins, so often seen in kidney disease, also occurred, but it was very exceptional for the dropsy to develop to the extent that is so often seen in nephritis in civil practice. Hydrothorax has occurred, but only in a very few instances, and pulmonary oedema with marked physical signs has been observed

not only in the cases with severe uraemic manifestations, but also in slighter degree in other cases with far less urgent symptoms of uraemia.

In all the above points, the dropsy seen in these cases of nephritis resembles very closely the nephritis as seen in civil practice. Thus it is most marked in the subcutaneous tissue and is prone to affect the face, scrotum, sacrum, and loins, and when marked to be accompanied with some collection of fluid in the great serous cavities, especially the peritoneum, and, finally, pulmonary oedema is not infrequent. There are, however, so far as my experience goes, certain points of difference. The most striking is the transitory duration of the dropsy; in some cases it might more properly be described as evanescent, as it may last only some two or three days. In a very large proportion of the cases, it does not persist for more than a week or ten days. There are some cases, but not a large number, where it is more persistent, lasting several weeks, but then there is nothing to distinguish such cases from those that every physician is familiar with in civil practice. The point of main clinical interest in the nephritis as seen in the hospitals in the field, is that large numbers of cases are seen where, notwithstanding the fact that the dropsy is quite marked in amount, it disappears rapidly with the most simple treatment. It is exceptional for it to be still present a fortnight after the onset, and it is only in a quite small proportion of cases that the dropsy resembles in its clinical course the form seen to accompany acute nephritis in civil practice.

It is remarkable, seeing the very large number of cases that have occurred, that the well-known facies of acute renal disease is so exceptional. The pale waxy or pasty swollen face so often seen in acute nephritis is, I would say, quite exceptional; this peculiarity may perhaps be associated with, or due to, the short duration of the dropsy. Further, although the dropsy is quite marked and obvious, I have seen no case where it was extreme in amount, and no case where any special methods of treatment, such as puncture, were necessary for its relief. This also is rather remarkable seeing the considerable number of cases that have come under observation. Lastly, no complications—such as secondary infections of the oedematous legs, gangrene, &c.—have come under my observation.

The dropsy accompanying this form of nephritis may therefore be said to be very frequent, the great majority of the cases suffering from it; it is marked in amount but never extreme. It is remarkable for its comparatively short duration and for not being accompanied with the marked anaemia and cachexia so usual in renal disease.

The albuminuria varied greatly in amount, especially as many of the observations were made on single casual specimens and not on a twenty-four hours' sample. Usually the amount present was very considerable, and in some cases the urine became solid on boiling. This was exceptional, and more usually an estimate formed by observing the amount of coagulum after boiling and subsequent standing of the urine would yield a result showing the presence of from $\frac{1}{4}$ to $\frac{2}{3}$ albumin by volume in the more severe cases. In a very consider-

able number of cases the amount was far less, and was described by the medical officer as a 'cloud', or a 'dense cloud'. The amount of albumin was sometimes small even when dropsy was present, but generally, when the albuminuria was slight, the dropsy was also slight or absent. Not infrequently the patient reached the base hospital when the dropsy had subsided and when the urinary flow was re-established, and these cases often presented a lesser degree of albuminuria, since the nephritis was really subsiding. Hence, it may be said that at the onset and during the height of the disease the albuminuria is considerable in amount and comparable to what is usually seen in the acute nephritis of civil practice. The albuminuria is much more persistent than the dropsy, and even in the cases where it disappears before the transference of the patient to England, it has usually lasted several weeks. The great bulk of the cases were, however, evacuated to England after the subsidence of the dropsy, and at a time when the urine still contained a variable quantity of albumin. It is not possible at the present time to speak with certainty as to the duration of the albuminuria, but the impression formed from the study of this large series of cases was that, in the great majority, the albuminuria was subsiding at the time of evacuation, and such reports as have as yet been received from England as to the subsequent history of these cases confirms this view, as the albumin is reported to have disappeared after a few weeks. It would seem, therefore, that in the majority of cases the nephritis subsides rapidly. Uraemic complications of varying degrees of severity are common, and sometimes they have been of great intensity. Many of the patients have a distinct urinous or ammoniacal odour, and in one case of only moderate severity the patient complained not only of headache, nausea, and dyspnoea, but also of a strong taste of ammonia in the mouth, this last symptom being the one that caused the most discomfort, and it was present within the first few days of illness, at a period when dropsy was present and the quantity of urine excreted daily amounted to thirty ounces. In this case the urine increased to fifty ounces with the subsidence of the dropsy, and with this increase the unpleasant taste disappeared rapidly, and no serious uraemic phenomena developed.

Apathy, slight drowsiness, and a subnormal temperature are the most usual uraemic symptoms present, together with headache and nausea. Vomiting of course occurs, but it is not usually severe, and it is quite exceptional to see cases with the severe vomiting that causes so much difficulty in the treatment of renal disease in civil practice. Epileptiform seizures of a considerable degree of severity are by no means rare, and on several occasions such attacks have occurred quite unexpectedly in the course of the malady, when the general condition of the patient did not suggest that such a serious complication was either imminent or probable. Such cases, however, often show a markedly increased pulse-tension, quite appreciable to the finger, and this increased tension subsides rapidly when the uraemic attack has passed off.

These epileptiform attacks occur in cases of the acute disease where there are no physical signs suggestive of old-standing or latent renal disease, and the

fact that, notwithstanding their severity, the patient recovers is confirmatory evidence that they are not complications merely occurring in patients the subjects of chronic renal disease aggravated by a superimposed attack of acute nephritis. If this were the case, the prognosis would certainly be more grave. As already mentioned, three fatal cases have fallen under my observation, and in all of these death occurred from uraemia and old renal lesions were present, but the uraemia was of a different type, coma, dyspnoea, &c., being present. In the acute simple cases the epileptiform seizures occur suddenly, at a time when the patient is not markedly uraemic, or at any rate does not present symptoms of the more grave forms of uraemia. They resemble somewhat closely the attacks seen in eclampsia, and also from time to time those seen in ordinary acute nephritis. In one case transitory acute mania occurred after the seizure. Uraemic amaurosis was seen in one case; it was of a severe type and was accompanied with suppression. The suppression of urine, however, was transitory in its duration, and the next day with its disappearance the amaurosis also cleared up. Headache is a common symptom, and not infrequently it is severe, and is then usually accompanied with high tension. Although dyspnoea, as already mentioned, is of frequent occurrence as an early symptom, the more severe forms of uraemic dyspnoea, such as the well-known hissing type and Cheyne-Stokes breathing, do not occur. In some instances the dyspnoea, although not very marked in amount, has been accompanied by the physical signs of pulmonary oedema, and in a few cases the pulmonary oedema has been quite considerable in degree. In such cases the physical signs of the oedema have been well marked in the upper lobes of the lungs, but this is a well-known phenomenon of pulmonary oedema. No case of death from pulmonary oedema has come under my notice.

In one case extreme dyspnoea of the type known as 'air-hunger', together with drowsiness, was present, and the dyspnoea was so urgent as to suggest the presence of acetonaemia, but post-mortem examination revealed the existence of old-standing chronic renal disease. The kidneys were extremely atrophied and fibroid, and this case was merely one of uraemia in chronic renal disease and belonged, therefore, to quite a different group from that formed by the bulk of the acute cases now under consideration.

Other uraemic phenomena, such as twitchings, cramps, and the various skin eruptions so common in renal disease, when uraemia is present, have not been present in the cases that have fallen under my observation.

Inflammatory complications, due to secondary infections, were decidedly rare in their occurrence. Bronchitis, however, was common, and in a series of 278 cases was present, either at the time of admission or during the short stay of the patient in a base hospital, in some 30 per cent. of the cases. The more serious pulmonary complications, such as pleurisy and pneumonia, were rare, and no case of pericarditis, associated with nephritis, has fallen under my observation.

Observations on the fundus oculi have been made in a small proportion

of the cases, but no changes of the fundus have been observed in the acute cases. In some of the cases of chronic disease that came under observation as apparent acute cases, the well-known phenomena of albuminuric retinitis were observed.

When the cases are reviewed as a whole, the following conclusions would seem to be justified.

Amongst the very large number of cases that come under observation, there are several distinct groups of cases.

First, there are some cases of ordinary chronic renal disease, of the type described as the granular kidneys occurring amongst the older men. These cases present the ordinary clinical picture of the disease, so familiar to all, breathlessness, swelling of the legs, albuminuria, and yield evidence clinically in the heart and blood-vessels of marked cardio-vascular degeneration. Such cases are almost invariably men over thirty years of age, often much older, who have either rejoined the army after following some civil occupation, or else they are some of the older men who joined the army soon after the commencement of the war. In many of these cases the chronic renal lesion was not necessarily very marked, and, as mentioned above, it is quite probable that under the stress of the campaign it has progressed more rapidly, or an acute nephritis may, in some instances, have been engrafted on the underlying chronic mischief.

Secondly, a group may be recognized, consisting, however, of only a few cases, where very serious chronic renal disease of long standing is present, but where the presence of the kidney disease has not been recognized owing to the absence of urgent symptoms prior to the onset of uremia. Such cases are seen from time to time in all varieties of practice, and hence it is not surprising that a few such cases should have occurred in the army in the field. So far as I can judge, the number of such cases is extraordinarily small; I have not seen more than six, two of which were fatal, the others, although very ill, recovered sufficiently to be evacuated to England.

Thirdly, a group, also small in numbers, might perhaps be made where the clinical picture is essentially similar to that seen in the acute nephritis of civil practice. That is to say, the renal dropsy is much more persistent, as is also the marked albuminuria. Further, such cases develop the well-known anaemia and cachexia of acute Bright's disease.

This third group may be thought to be artificial, as it is possible that such cases are really only more severe examples of the typical cases that constitute the great bulk of the cases.

When these three groups are eliminated, the great bulk of the cases remain and seem to belong to one type, and to a type that, so far as my experience goes, is at any rate not common in civil life. The two outstanding features of the malady are the rapid subsidence of the dropsy and the remarkably low mortality when the severity of some of the uraemic attacks is taken into consideration. Renal dropsy does not usually subside in a week or ten days, and I only know of five deaths in a series of many hundred cases. In two of

these the kidneys were abnormal congenitally, and in two old-standing chronic renal disease was present. In the remaining case a post-mortem examination was not made, so no statement of the exact condition can be made.

An attempt was made to gain further insight into the nature of these cases of nephritis by an analysis of 571 cases where casts were present. In sixty-two of these patients there was apparently a distinct history of a previous attack of renal disease. That is to say, in 10·8 per cent. of the cases the patient gave a history of a previous attack of dropsy similar to that present at the time of observation, or else stated that he had been in hospital or under treatment for 'inflammation of the kidneys' or for 'Bright's disease'. Even if it is admitted that such statements were always reliable, 89 per cent. of the cases gave no such history. Previous renal disease can, therefore, scarcely be the cause of the malady in the majority of instances, although doubtless a previous attack of nephritis is a very important factor in the causation of any given attack of nephritis. It might be urged by some that these cases were really instances of acute nephritis occurring as a complication of slight old-standing lesions of the kidney; in other words, that the condition was really an acute exacerbation of slight chronic mischief. The fact that many of the earlier cases occurred among the older men gave some support to this hypothesis, and it is probable, I think, that this view is true for some cases, but not for any large number. If all the cases were examined by one observer, and by the same method, it might be possible to obtain a reliable result, but even then it is extremely difficult to differentiate clinically between a primary acute nephritis and one complicating a chronic lesion, unless the signs of the latter are unequivocal. Two cases have already been alluded to in this paper where clinically the diagnosis was confidently made of acute nephritis, yet the post-mortem showed the presence of congenital lesions—hydronephrosis and atrophy in one case, and a single kidney with marked fibrosis in the other, and the acute nephritis was superimposed on these chronic lesions. A considerable number of the cases have an accentuated aortic second sound, and a smaller number show distinct hardening of the radial artery. In a series of 149 cases, accentuation of the aortic sound was said to be present in 39 per cent., and obvious increased tension in and hardening of the radial artery in 27 per cent. of the cases.

On the other hand, in the great majority of cases, there was no evidence either in the physical signs or in the patient's history to suggest the presence of a latent renal lesion. Further, the clinical cause of the malady, and more especially the rapid subsidence of the dropsy and the rapid disappearance of any anaemic complications, are not consonant with the suggestion of an acute nephritis complicating a chronic lesion of the kidney. Such complications are usually most formidable, protracted in their course, and frequently fatal, and it is interesting that, so far as my experience has gone, the fatal cases have shown chronic lesions in all where post-mortem examinations were made. Another method, but an indirect one, available to try and reach a conclusion on this point is to study the age incidence. If the illness were due mainly to the

nephritis affecting men with damaged kidneys, it might be expected that the bulk of the cases would be amongst the older men.

The age incidence in 571 cases where casts were present was as follows :

Under 20 yrs.	20-25 yrs.	25-30 yrs.	30-35 yrs.	35-40 yrs.	40-45 yrs.	45-50 yrs.
24 cases	123 cases	140 cases	126 cases	96 cases	40 cases	22 cases
4.2 %	21.5 %	24.5 %	22 %	16.8 %	7 %	3.8 %

Thus 25.7 per cent. of the cases occur in men under twenty-five years of age, 50.2 per cent. of cases in men under thirty years, and 72.2 per cent. of cases in men under thirty-five years of age. Hence it is clear that large numbers of cases occur in quite young men. After thirty years of age there is a slight drop in the number of cases, and this drop becomes more marked after thirty-five years of age. In order to deduce really conclusive results, it would be necessary to know the number of men of the ages mentioned in the troops, as it is of course obvious that although only 7 per cent. of the cases occurred in men between forty and forty-five years of age, and nearly 25 per cent. in men between twenty-five and thirty years, yet it is quite possible that the actual incidence of the malady was higher in the older than in the younger men, since the number of the older men in the ranks is probably very much less. It has not been possible to get any accurate information as to the age of the troops as a whole, but I am informed that the great bulk of the men are under thirty-five years of age.

The conclusions are probably warranted that the malady affects men of all ages, that young men are certainly affected in large numbers, and that possibly the actual case incidence may be higher in the older men, but the actual statistics available at the moment do not afford certain proof of this.

The men affected belong to all branches of the service, and although the great bulk of the cases have occurred in men at the front, the malady has been by no means limited to those actually serving in the trenches. Men serving in the Army Service Corps and engaged in transport and supply duties, and men in the ammunition columns, have frequently suffered. Many of these men, although not actually serving in the trenches, have been engaged in duties involving much exposure to severe climatic conditions both by day and by night. Similarly a number of R.A.M.C. orderlies at the front have been affected. The disease has, however, not been limited to the men serving at the front, and has occurred amongst men serving entirely at the bases, who have never been to the front. Further, there have been several cases affecting R.A.M.C. orderlies whose duties have been confined entirely to base hospitals located in good buildings, where there has not been any question of exposure. In a series of 332 cases, 285 cases occurred in men serving at the front, and 25 cases in men whose duties retained them at the base. In the remaining 22 cases no details of service were recorded. Thus it is clear that the malady is not confined to those exposed to the vicissitudes of the actual front. The number of officers affected has been very small, and in the earlier months of the outbreak a large series of cases

occurred amongst the rank and file without any case in an officer falling under my notice; later, some cases occurred amongst officers. These were not limited to the more senior officers; some occurred in the younger men and some in the older. Up to the present time, about 1 per cent. of the cases have occurred amongst officers. The cases were of the same character as those seen in the men. In some there was distinct clinical evidence of old-standing renal disease, or of cardio-vascular degeneration. In others the cases were of the acute type described above, where the dropsy subsided rapidly and the albuminuria more slowly. Uraemic manifestations were sometimes present, and in one case uraemic epileptiform seizures that occurred quite suddenly, in a case of apparently no great severity, were followed by acute maniacal excitement. This, however, was also quite transitory, and the following day the patient was quite rational and had only a vague recollection of the seizure. In this case, as in others, the epileptiform seizure was preceded by a period of intense headache. There was no evidence of previous renal disease in this case, the only one, so far as I know, that presented that rather rare symptom of uraemia—mania.

One of the most striking features of the outbreak of nephritis was that it was confined to the British troops of the Expeditionary Force. It practically did not occur in the Indian troops, as I only know of three cases of nephritis having occurred amongst them. Three large Indian base hospitals, containing in all several thousand beds, were frequently visited by me, and I only saw, in a period extending over twelve months, one case, and this was extremely slight, some albuminuria but no dropsy being present. Two other cases were reported on the case-sheets. This absence of the disease amongst the Indian troops is very striking, as these troops suffered in common with the British troops from other maladies commonly attributed to exposure. Thus, during the winter of 1914 and early spring of 1915, large numbers of cases of so-called frost-bite and trench foot occurred amongst the native Indian troops, and their hospitals contained large numbers of cases of bronchitis, dry pleurisy, and various forms of pneumonia. Bronchitis was especially prevalent and was often of a severe type, but yet nephritis and renal dropsy did not occur.

Some observations were also made on the question whether the incidence of the disease was materially affected by the length of time the men had served in France. In a series of 332 cases, data were available in 326 cases, and, as is seen, the results are not very definite; 195 cases occurred in men who had served six months or less in France, and 131 cases in men who had served from seven to twelve months. A small number of cases occurred in men who had only been out a month or less—in one case only one week. It is difficult to interpret these results, owing to the numerous possible fallacies. Thus the number of men who had only been in France a short time would in certain months be suddenly greatly increased owing to the arrival of fresh troops, and it is probable that the only deduction that is justifiable is that a considerable proportion of the cases occurred in men who had been serving from two to five months in France.

Whether or no the malady had a greater incidence in those who had served ten and eleven months is uncertain, but in view of the smaller numbers of these men in the field it is possible.

Number of months served in France	1	2	3	4	5	6	7	8	9	10	11	12
Number of cases of nephritis	16	43	49	32	37	18	18	20	14	31	40	8
Total												
	6 months or less 195											
	Over 6 months 131											
Grand Total 326											

In one case the malady is said to have recurred, and this is probably correct, since the patient was invalided home after a slight attack and was discharged with the urine free from albumin. After a short furlough he was sent out to France again and there contracted another attack with oedema and albuminuria, but this attack also was not of great severity, and the dropsy speedily subsided. The causation of the disease is obscure. Modern views regard nephritis as usually produced by some toxic agency, and especially as the result of an infection, but the infection is often one that produces so little illness that it is overlooked. A series of 278 cases were analysed to try and ascertain whether any illness, slight or severe, had preceded the onset of the dropsy. In 10.4 per cent. of these cases a history of a severe 'cold', or of 'diarrhoea', or of 'influenza', or 'sore throat' was elicited, and after a few days of illness the dropsy was noticed, but in the remaining 89 per cent. no such symptoms were noticed. On the other hand, in eighty-five cases, i. e. 30 per cent., the patients gave a history of and had distinct signs and symptoms of bronchitis, either at the actual onset or in the early stages of the nephritis when they came under observation in hospital. In some cases the bronchitis was quite severe. Bronchitis, so far as my experience goes, is the only frequent illness prior to the onset of the dropsy, and the bronchitis itself is of the acute type and rapidly followed or accompanied by the nephritis. Tonsillitis preceding the nephritis is very rare, and this was an unexpected result, since it is a well-known recognized cause of nephritis.

A plausible hypothesis might be advanced that the nephritis is causally related to the bronchitis were it not for the fact that bronchitis was common in the Indian troops and that in them no nephritis occurred. Notwithstanding this difficulty I am inclined to view the cases of acute nephritis described in this paper as due to some infection, the infecting agent causing in the first place in many cases some illness such as bronchitis, severe cold, diarrhoea, &c.

Some writers might see in this outbreak of nephritis evidence in favour of the disease being directly due to cold and exposure. Others, seeing the gross contamination of the soil in the field of operations, might seek a cause in a microbial infection of the urinary tract. Such observations as have as yet been made on this point have not yielded concordant results, and the fact that the disease has occurred also at the bases is not in accord with this view.

Pending further observations on the causation of the malady, it may be said that clinically it is a distinct nephritis, characterized (1) by the rapid subsidence of well-marked renal dropsy; (2) by the frequent presence of bronchitis and dyspnoea; (3) by the severity and suddenness of onset of uraemic manifestations such as epileptiform seizures; (4) by the rarity of occurrence of inflammatory complications; and (5) by the extraordinarily low mortality, i.e. between 0·3 and 0·4 per cent. as determined from the total number of cases that have occurred up to the present time. Although the uraemia convulsions are severe when they occur, yet their occurrence is exceptional.