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Title	On the newer tests of renal effeciency
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Qualification	MD
Year	1923

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4 blin June 1921
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ON THE NEWER TESTS OF RENAL EFFICIENCY.

A Thesis submitted for the

M.D. Edinburgh 1923

by

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ON THE NEWER TESTS OF RENAL EFFICIENCY.

I.

In recent years a great advance has been made in the methods of estimating the efficiency of the kidneys both in the different forms of Nephritis and in diseases where the condition of the kidney is of paramount importance.

In recent years diagnosis and prognosis was based upon the clinical condition of the patient and the chemical tests and microscopic appearances of the urine. These have of course not been discarded by any means, but fuller knowledge of kidney conditions has proved that these two methods by themselves are of little or no value and in fact sometimes extremely deceptive.

Take for example the condition which is now known as Non Nephritic Albuminuria, Functional or Orthrostatic Albuminuria

This is a condition where Albumen is present in the urine when the patient is in the erect position, but disappears on assuming the Recumbent position.

There are three theories of the causation of this condition, and they need only be enumerated here:

(1)/

(1) Tessier's theory is that it is due to a developmental defect of the Glomeruli resulting in their increased permeability.

(2) Erlanger and Hooker's theory is that it is due to vasomotor instability - the albuminuria being due to diminished pulse pressure; and

(3) Jehle's theory is that it is a mechanical interference with the Renal circulation and is due to increased LORDOSIS

Whatever the cause, it has been proved by the methods to be mentioned later that there is no pathological condition of the kidney and that the Renal Efficiency is in no way impaired.

Still another non-nephritic condition of the kidney where albumen is present in the urine with no impairment of renal efficiency is that seen in soldiers and athletes.

It was proved that 6 per cent. of soldiers who had finished their training for the War had albumen in the urine, yet these men were able to go through the War with perfect health.

Experiments were done by Borach on marathon athletes. He found that after completing the course, 24 miles, practically every man showed changes analogous to nephritis, i.e. albumen, blood and casts in the urine.

The methods now employed for testing renal efficiency are of two kinds:

(1) Examination of the urine to see if there is any deficiency/

deficiency in the normal constituents of the urine, i.e. Chlorides.

(2) Examination of the blood to see if there is undue retention of any of the waste products which should normally be excreted in the urine, the chief being Urea.

The purpose of these tests may be summarized as follows:

(1) To obtain insight into the existence of any renal disturbance at all. This has been mentioned before in the case of non-nephritic or orthostatic albuminuria. We can prove by the above two methods that there is no renal disturbance of any significance although albumen is present in the urine.

(2) To determine the extent of impairment of the kidneys. This is very important for both prognosis and diagnosis.

a. Diagnosis. It not only enables us to distinguish between albuminuria of no significance and true nephritis, but it also allows us to differentiate between the various kinds of nephritis.

The classification of nephritis has been the subject of a great deal of discussion, but probably the present method is the best:

i. Azotaemic where the main abnormality is found in the blood where there is an increased amount of urea nitrogen.

ii./

ii. Hydraemic where there is little or no retention of urea nitrogen in the blood, but marked deficiencies in the urine, i.e. chlorides.

iii. Mixed, where the two types may be manifest in the same patient.

As a result of many careful investigations the retention of urea nitrogen in the blood is now generally regarded as a reliable diagnostic sign of faulty kidneys, but a certain degree of confusion still exists as to what should be considered the normal and what the pathological urea content of the blood.

Folim and Denis, Tileston and Comfort, Myers and Kellian, McLean and Selling, Gettler and Baker, and Addis and Waterobe have all studied large numbers of cases with slightly varying results.

Generally speaking, however, it can be taken that 20 mgs. of urea nitrogen per 100 ccs. of blood is the upper normal limit of urea in the blood.

b. Prognosis. Three main points are used in the prognosis of a nephritic patient. These are:-

- i. Clinical condition of the patient.
- ii. State of Cardio-vascular system.
- iii. Frequent examinations of the blood and urine.

The clinical condition of the patient and the condition of/

of the cardio-vascular system are no doubt very important points to be considered in the giving of a prognosis, but they are faulty and often deceptive when taken alone, but when taken with the biochemical tests they allow us to give an absolutely correct prognosis.

From the clinical conditions such as Fundal changes - Optic Neuritis and Haemorrhages - one can safely say that the patient is not likely to live longer than 1 year or at the most two, but it has been often seen that patients whose general condition seems to be improving and whose blood pressure is getting lower suddenly die unexpectedly of uraemia.

With regular examinations of the blood and the urine we are not so easily deceived and can give a fairly certain prognosis.

In acute cases of nephritis there is generally some retention of urea in the blood, that is, if it is at all severe. This may range from 50 mgs. per 100 ccs. of blood to 4 - 5 or even 600 mgs. In cases which respond to treatment and in which recovery or marked improvement can be expected, there is a gradual decrease in the amount of urea in the blood. If the urea retention in the blood remains high, the prognosis is very much less favourable, and in cases where it gradually increases, one can only expect a fatal termination. The only fallacy in this method of prognosis is found in the hydraemic variety of nephritis/

nephritis where the urea retention is never high, but by the other biochemical tests we can still give a very definite prognosis.

The value of being able to give a definite prognosis in nephritics cannot be over-estimated. It has given many people a chance of making all important arrangements for the future, i.e. men in important business positions, which not many years ago were never done owing to the inability of their medical advisers to give a definite prognosis. It has also been a great boon to insurance companies.

(3) As a preliminary to undertaking any surgical operation.

Not infrequently the question of operation arises in a patient who is suffering from some form of Renal deficiency. In all such cases the urea retention in the blood should be estimated.

In many cases after an operation the patient progresses satisfactorily for a few days and then suddenly falls into a state which is diagnosed as "Peritonitis with intestinal paralysis," or "Delayed shock."

On closer examination this is found to be really a uraemic condition due entirely to renal deficiency.

Observers who have done systematic examinations before operation have given us rules to follow in these cases. Squier and Myers for example have made observations on sixty/

sixty cases which were examined for renal efficiency before operation and their figures are now generally recognised as being safe to work upon.

Cases showing urea nitrogen figures under 20 mgs. per 100 ccs. of blood can be regarded as good cases for operation as far as the kidneys are concerned. When the urea nitrogen figure is between 20 and 30 mgs. the patient should be operated upon with caution and only after a preliminary course of treatment to relieve urea retention. When the nitrogen retention figure is over 30 mgs. the operative prognosis is bad.

Although as before said, this rule is generally followed, it appears to be rather severe, as many cases with retention of urea of 40-45 mgs. are operated upon with no bad effects. The principle however is correct, in that the nearer the urea retention to 20 mgs. is, the better the operative prognosis.

(4) To assess the danger to life from some other disease than nephritis whose recovery depends on a sound kidney. This need not be discussed in detail as it is only too obvious that with any illness the prognosis is much more unfavourable where the kidney efficiency is not good. One acute illness may be mentioned here, namely Pneumonia. Few cases of pneumonia recover where there is marked renal deficiency. Another ought to be mentioned here, namely Cardiac conditions. There is, as everyone/

everyone knows, a close relationship between nephritis and the cardio-vascular system. In most cases patients who show renal deficiency have an increased blood pressure. In any acute cardiac affection in a patient with renal deficiency, the prognosis must always be unfavourable.

Pregnancy is another condition whose prognosis depends on renal efficiency.

I have studied 25 cases of renal deficiency and these I propose to bring forward in detail. The points I have studied in these cases are the need of regular examination of:

- (a) the urea retention in the blood,
- (b) the urea concentration in the urine,
- (c) Phenolsulphonphthalein Test.

In addition, on the corresponding days I have noted the patients' blood pressure, the amount of urine passed during the twenty-four hours previous to the day of the examination, and the amount of albumen present in the urine in grains per ounce.

Before going on to discuss these cases, it is necessary to give a brief account of the various tests used in estimating renal efficiency.

The methods at present employed are:

- 1) Estimation of Blood Urea.
- 2) Urea concentration test in the urine.
- 3)/

- 3) Phenolsulphonephthalein Test.
- 4) Diastase Tests.
- 5) Two less^{ER}used tests:
 - a. Chloride content of blood and urine.
 - b. ~~Power~~ of the kidney to concentrate uric acid.

Estimation of Blood Urea.

This is carried out by a method originally recommended by Marshall and Van Slyke, but modified by McLean and de Wesselow. The principle of this method depends on the fact that the Soya bean contains a specific enzyme called urease, which converts urea into ammonium carbonate, but has no effect on any other nitrogenous constituent. In the presence of an alkali the ammonium is liberated from the ammonium carbonate.

Technique: 3 ccs. of blood are required. This is obtained in the usual way from the vein of a patient. By the help of a current of air (drawn by an air-pump through the tube in which is the 3 ccs. of blood with .3 grms. of the Soya bean meal which has been placed in a water bath of 37° C. for fifteen minutes) the ammonia is passed through another tube containing 25 ccs. of centi normal acid. The acid is thereafter neutralized by centi normal sodium hydroxide until the indicator (one drop of a saturated solution of methyl red in 50% alcohol) gives a faint yellow colour. The difference between the 25 ccs. of acid originally taken and the number of/

of ccs. of alkali used gives the number of ccs. neutralized by the ammonia evolved.

Each cc. of acid neutralized corresponds to 10 mgs. of urea.

The use of the Soya bean meal simplified the procedure very materially as the commercial enzyme is not easily procured in this country. The bean meal also has the advantage that it can be kept a long time - for several months - whereas the commercial enzyme tends to deteriorate quickly.

This is one of the most valuable of the renal efficiency tests, but it must be done periodically on a patient. It is quite useless if only done once as the urea present in the blood naturally varies with the diet. It is usually higher in quite healthy people of advanced age.

A constantly increased urea retention in the blood is undoubtedly a certain sign of renal deficiency, and it is unfortunate that the teaching at present in vogue, to the effect that urea per se, even in large amount, produces no deleterious effect on the body, is often accepted as indicating that the amount of urea present in the blood is of no clinical importance.

Urea Concentration Test in the Urine.

This test which has been found to give most valuable help in arriving at a conclusion as to renal efficiency, was/

was introduced by McLean and Wesselow. It depends upon the fact that patients with defective kidneys are incapable of secreting urine with a high concentration of urea, and the degree of concentration of urea in the urine appears to be directly proportional to the amount of kidney involvement.

Loss of power to concentrate urea may not be easily detected in ordinary specimens of urine, but by the present-day methods it can readily be calculated.

Technique: The Patient empties his bladder completely at, say, 7 a.m. He is then given 15 grms. of urea in 100 ccs. of water by the mouth. At 8 a.m. (one hour after urea has been taken) the bladder is again emptied, and again at 9 a.m. and 10 a.m. (2 and 3 hours after dose). These three specimens are collected in separate receptacles.

Urea has a marked diuretic effect on the patient, but this should only be apparent in the first specimen. If more than 100 ccs. of urine are passed in the 1st hour, the specimen is discarded. If the diuretic effect of the urea has passed off before the 2nd hour, the second specimen can be used, but as there may still be a slight diuresis, it is probably best to use the third specimen for the test.

4 ccs. of the urine are taken and tested for urea by the ordinary method of decomposing the urea by sodium hypobromite and measuring the nitrogen evolved.

8 ccs. of nitrogen is the equivalent of .5% of urea.

The accepted concentration of urea in a normal patient on ordinary mixed diet is 2 - 4%. Any concentration below 2% shows renal deficiency and below 1.5% the condition is of a serious nature. In Hospital cases, however, these figures are much too high. Tests done on a large number of Hospital patients with healthy kidneys go to prove that the percentage is much nearer 1.6% - 2%.

McLean is of the opinion that when the blood urea is high, it is unnecessary to do this test, as sufficient urea is already present in the blood and all that is required is to estimate the urea concentration in a specimen of urine. Even if 15 grms. of urea be given, he says no increase in urinary urea is obtained.

It is quite clear that no results can be expected from estimations of the daily output of urea in chronic nephritis. In the early stages of acute nephritis also, there is undoubtedly a marked decrease in the amount of urea passed, but at the same time there is a corresponding increase in the urea retention in the blood, but this soon passes off if the condition subsides.

Phenolsulphonephthalein Test.

The principle of this test is founded on the idea that in cases of Renal deficiency the elimination of this drug in the/

the urine is delayed.

Technique.

Half an hour before the test the patient is given a glass of water to drink to ensure free urinary secretion. Immediately before the test the bladder is emptied. Then 1 c.c. of the dye (1 c.c. contains 6 mgrms of the dye made non-irritating by a few drops of alkali) is injected subcutaneously into the arm. Urine is then passed at the end of the first hour and again at the end of the second hour.

The Result is obtained by a reading determined by a comparison of the color, by a colormeter, obtained by a standard solution consisting of 1 c.c. of phenolsulphonaphthalein diluted to a litre with water. With that of the urine voided made up also to a litre with water. To each specimen a little NaO.H. is added as an indicator. This test is quite uninfluenced by the amount of urine passed as it is always made to one litre with water. In a normal person 40% - 60% of the dye should be eliminated in the 1st hour and 20%-25% in the second.

The reason why this test is not always considered of much value, and why it is not always done in the routine examination for Renal efficiency is that fallacies occur frequently in this test through careless technique. These fallacies entirely do away with the value of the test, and should be enumerated here. They/

They are

- (1) That an exact c.c. of the dye is not injected into the patient.
- (2) That the same standard of phenolsulphonephthalein as the standardized solution is not always used in the test.
- (3) The same amount of fluid is not given prior to the test to ensure free urinary secretion.
- (4) The hours of taking specimens are carelessly kept.

This test, although not generally recognised of great value in the prognosis of a case is nevertheless extremely valuable in following the progress of cases of chronic nephritis.

Fressell and Vogel however claim that it is of great importance and from ϕ experiments go so far as to suggest that by plotting the course of a large series of cases it might be possible to arrive at an average expectation of life.

Taken with the two tests previously mentioned, it is generally found that the elimination of the dye is very much diminished where the other tests are also unsatisfactory.

Diastase Test.

Though the presence in the urine of a ferment capable of Hydrolizing Starch was known for a long time, it was not until about 15 years ago that Wohlgemuth devised a method for its quantitative estimation. It was only then that any attention was/

was paid to this test from a clinical standpoint.

The test depends on the fact that normally a certain amount of pancreatic diastase is secreted from the blood and is found in the urine. The amount passed being dependent on the integrity of the kidney.

Technique.

Solutions required for this test are:-

- (1) .1 solution of soluble starch in distilled water.
- (2) Sodium Chloride solution of about 1% strength.
- (3) Solution of Iodine of about .5% strength.

The diastatic activity of any urine is estimated in terms of the amount of starch which a definite volume of the urine will change in a given time. The disappearance of the starch is indicated by the failure of the starch and urine to give a blue color with Iodine.

When the kidneys are working efficiently the urine generally contains 6-20 units of diastase. In defective kidneys the amount is lower in proportion to the renal ~~ineffi~~ insufficiency. This test in conjunction with the other tests is useful but alone it is considered to be too erratic to be of much value.

Other Methods of lesser importance.

- (1) Chloride content of urine and blood.

It must not be forgotten that the function of the kidney
is/

is not entirely restricted to the elimination of waste products, but fulfils another very important office in regulating the concentration of salts in the plasma.

Of the salts the most easily estimated are the chlorides and since the bulk of these salts is represented by Sodium Chloride the Chloride content in the urine and blood is given in terms of Sodium Chloride.

The general method employed is to give the patient 10-15 gms of Sodium Chloride by mouth and then estimate the amount passed in the urine.

To estimate the amount of urinary chlorides Volhard's method is most used, while for the blood, the test suggested by Maclean and Van Slyke is used.

This test is not recognised as of much importance, as it has been proved that ingestion of a large amount of salt does not necessarily mean that an equivalent amount would be excreted by a healthy individual. According to one authority the amount of salt excreted after a given dose depends on the state of the tissues with regard to fluid. If the body happens to be low in fluids, the ingested salt is retained in order to increase the fluids, as it has been shown that 100 ccs. of retained water should contain about .6% sodium chloride.

In/

In a healthy individual the retention of salt is limited to a few days and it is then passed in the urine in equivalent amounts to that taken by the mouth. In a nephritic, however, that does not take place, but instead the fluids in the body go on increasing and marked oedema and ascites follow.

(2) Estimating the power of the kidney to concentrate Uric Acid.

Estimations are made of the uric acid after a certain standard diet, in the blood and urine respectively.

The method of Benedict and Hitchcock is used in these estimations.

While the person with healthy kidneys has a uric acid percentage in the urine 20 times as great as that in the blood, cases of nephritis show a concentration figure of 14 or lower.

Observations were made by Uphain and Higley who endeavoured to arrive at an estimation of renal efficiency by this method. It is much too complicated a test however to be of general clinical value.

Although these tests are all so valuable, either singly or collectively, it must never be forgotten that no prognosis should ever be given, whatever the results of these tests are, without also carefully examining the state of the cardiovascular system.

In the following 25 cases I have endeavoured to give:

(1) a short history of each patient's illness

(2)/

- (2) Clinical signs on admission.
- (3) Patient's symptoms.
- (4) Diet.
- (5) Progress.
- (6) Chart with the following figures:
 - a) Urea retention in the blood.
 - b) Phenolsulphonephthalein test.
 - c) Urea concentration test.
 - d) Amount of urine passed in 24 hours.
 - e) Amount of Albumen in the urine in grams
per ounce.
 - f) Blood pressure.
 - g) Weight.

I have then analysed these tests, and pointed out their importance in diagnosis and prognosis in each case.

CASE No. 1. J. C. aet. 15. Son of Case No. 12.

Date of admission to Hospital: 31st March, 1921.

Complaint: His mother noticed that his urine was like blood and she brought him up to Hospital.

Duration: 1 month.

Previous Health: Has always been a weakly boy but no serious illnesses. No scarlet fever.

Symptoms of Patient: None whatever.

Clinical Examination: No oedema. Patient pale and badly thriven.

Heart: Mitral systolic murmur. No cardiac hypertrophy.

Urine: On admission 40 ozs. in 24 hours. Specific gravity 1012.
Albumen/

Albumen and blood present. Fatty granular and blood casts.

Diet: 31/3/21 - Milk Diet)
 15/4/21 - Milk and Porridge) *
 10/5/21 - Light Diet) see Diet Charts at end
 10/6/21 - Milk Diet)
 17/6/21 - Light Diet) of Cases.

Progress: Boy felt better every day, due no doubt to the proper food at regular times.

Colour improved.

He was very anxious to get out and in fact ran away from Hospital.

Readmitted a month with later with same condition as at first.

Date of Observation.	Blood Urea Retention.	Phenol-sulpho-nephthalein Test.	Urea Concentration.	Amount of Urine in 24 hours.	Albumen in grs. per oz.	Blood pressure	Weight.
2/4/21	63 mgs.	66%	3.2%	20 ozs.	.2 grs. Occult blood present.	115 mms.	5 st.
11/4/21	41 mgs.	90%	4%	40 ozs.	.2 grs. No blood.	115 mms.	4st. 13½ lbs.
26/6/21	64 mgs.	50%	4%	40 ozs.	.1 gr. No blood.	115 mms.	5st. 5½ lbs.
4/7/21	Not taken.	86%	3%	45 ozs.	.06 grs. No blood.	112 mms.	5st. 6 lbs.

The main points in this case are:-

- 1) Symptoms none. Clinical condition emaciated.
- 2) Cardio-vascular system - Mitral systolic murmur.
No cardiac hypertrophy. Blood pressure 112 ms.
remaining high.
- 3) Albumen and blood present in urine gradually diminishing.
- 4) Blood urea retention high and remaining high in spite of
treatment.
- 5) Phenolsulphonaphthalein Excretion slightly below normal,
tending to increase.
- 6) Urea concentration good (3.2%) and remaining good.
- 7) Increase in weight.

The diagnosis was one of Azotaemic nephritis.

The Prognosis was bad owing to the high blood urea retention and the early cardio-vascular changes.

CASE NO. 2. Jas. J. aet. 45. Shaleminer.

Admitted: 22nd April, 1921.

Complaint: Swelling of face, feet, ankles, with shortness of
breath.

Duration: 5 weeks.

History of Case: Five weeks ago he found that he was easily tired with his wirk and was short of breath. Two weeks later he had a choking sensation in bed, especially if he lay on his left side. He was not passing as much urine as usual. A week later he noticed swelling of face and eyelids. This was followed by the same condition of his feet and/

and ankles.

Previous Health: No illness.

Clinical Examination: Oedema of face, eyelids, conjunctiva, ankles, legs and abdominal wall.

Heart: Slight hypertrophy of heart (left side); Mitral systolic murmur. Reduplication of second aortic sound.

Slight arterio sclerosis.

Wasserman: Negative.

Eye symptoms: Nil.

Urine: Specific gravity 1014.

Albumen present.

No blood.

Mucus Deposit in Urine.

Hyaline and granular casts.

Diet: Milk diet for almost 1 month. Light diet later.

Progress: Patient soon lost his oedema. Felt much better.

When going about, no dyspnoea. Heart fully compensated.

Went back to his work as a shaleminer.

Date.	Urea retention in blood	Urea Concentration.	Phenol-sulpho-neph-thalein Test.	Amt. of Urine in 24 hrs.	Albumen in urine in grs. per oz.	Blood Pressure	Weight.
24/4/22	52mgs.	2.5%	68%	30 ozs.	2.4 grs.	180 mms.	9st. 8lbs.
4/5/22	50 "	3%	64%	25 "	.8 "	140 "	9 " 5 "
20/5/22	40 "	3%	71%	55 "	.3 "	115 "	9 " 5½ "
19/6/22	20 "	3.6%	86%	20 "	a trace	115 "	9 " 7 "
2/7/22	20 "	3.4%	70%	60 "	none	115 "	9 " 6½ "

The main points in the case are:-

- 1) Symptoms and clinical condition were oedema and dyspnoea: both gradually disappeared with treatment.
- 2) Cardio-vascular system: mitral systolic and reduplication of second aortic sound. Slight hypertrophy of heart. Blood pressure very high but coming down to normal.
- 3) Albumen present at first but gradually disappearing.
- 4) Blood urea retention very high, but in $2\frac{1}{2}$ months becoming normal.
- 5) Phenolsulphonaphthalein Excretion slightly too low but remaining steady.
- 6) Urea concentration normal on admission and increasing under treatment.
- 7) Weight remaining stationary in spite of loss of oedema.

The diagnosis is one of azotaemic nephritis.

The prognosis in this case is extremely good.

This man has been working as a miner for several months with no return of nephritis.

CASE NO. 3. A. M. aet. 32. Shipyard Plater.

Admitted: 30th May, 1921.

Complaint: Swelling of body and severe headaches.

History of illness: After playing football two weeks ago, he woke up the following morning with swelling of face, feet, ankles and a tight feeling of abdomen. He took a dose of salts and that relieved him. He went to work but at night he had a severe headache, and his body and legs were swollen.

He/

He went to work the following day and improved for two or three days but six days ago he had to give up his work owing to swelling of his legs and ankles, face, eyelids and abdomen. His headaches became severe.

He had a similar attack two years ago, but the condition disappeared in three days. Frequency of micturition. Had to micturate 7 or 8 times during the night.

Previous Health: Only attack two years ago.

Examination: Oedema of feet and ankles, and in abdominal wall. No oedema of face, but slight conjunctival oedema.

Heart: No hypertrophy. Slight accentuation of second aortic sound. No arterio sclerosis.

Abdomen: Ascites present.

Lungs: Moist Râles at both bases.

Wasserman: Negative.

Eyes: No changes.

Urine: Specific gravity 1018.

Albumen, but no blood present.

Epithelial, granular and hyaline casts.

Diet: The usual lines were followed.

Progress: He soon lost all his oedema, and headaches. Felt much better and wanted to get up about the 4th day. He felt so well he could not be persuaded to stay in Hospital any longer and went back to work.

Date.	Urea Retention in blood	Urea concentration.	Phenol-sulph. Test.	Daily amt. of Urine.	Amount of Albumen in grs. per oz.	Blood Pressure.	Weight.
30/8/21	42 mgs.	2.5%	51%	45 ozs.	1.5 grs.	140 mms.	8st.11½lbs
20/10/21	39 mgs.	2.7%	60%	40 ozs.	trace.	115 mms.	8st.10lbs.
29/10/21	40 mgs.	2.5%	60%	45 ozs.	trace	110 mms.	8st.11½lbs

The main points are:-

- 1) History of 2 years' duration.
- 2) Symptoms and Clinical condition: severe headaches and oedema, gradually disappearing.
- 3) Cardio-vascular system: Practically none. Accentuation of 2nd aortic sound. No arterio sclerosis.
- 4) Albumen present: No blood. Albumen disappeared.
- 5) Blood urea retention: high and remained high.
- 6) Phenolsulphonophthalein excretion low and increasing very slightly.
- 7) Urea concentration above the minimal normal and remaining steady.
- 8) Weight remaining steady.

The diagnosis here also is Azotaemic nephritis.

The prognosis here is not good. The blood urea retention remained too high.

The patient was back soon after seeking treatment with a return of his symptoms.

CASE NO. 4. A. W. aet 15. Pit pony boy.

Admitted: 21st April, 1921.

Complaint: Puffiness of face and pain in back.

History of illness: He had influenza 2 weeks before admission. 3 days after returning to work he noticed his feet and ankles were swollen. The next day he had pain in his back and puffiness of the face.

Previous Health: Scarlet fever 1914.

Examination: Oedema of face and eyelids. Slight conjunctival oedema, also of feet and ankles. No ascites.

Heart: No hypertrophy. 2nd pulmonary sound slightly accentuated. All other sounds normal. Pulse 120 per minute.

Lungs: Moist râles both bases.

Wasserman: Negative.

Eyes: No retinal changes.

Urine: Specific gravity 1016.

Mucus deposit.

Blood and Albumen present.

Epithelial and granular casts.

Diet: 22/4/22 - Milk only.

27/4/22 - Milk diet.

1/5/22 - Light diet.

Progress: Patient improved under treatment. Lost oedema and felt quite fit, did all the washing and sweeping of wards and went out to re-start work.

Date.	Urea retention in blood	Urea Concentration.	Phenol-sulpho-neph-thalein Test.	Daily amt. of Urine	Amt. of Albumen grs. per oz.	Blood Pressure.	Weight.
24/4/21	44	2%	64%	15 ozs.	1 gr.	130 mms.	6st. 12½lbs
4/5/21	40	2.2%	79%	40 ozs.	.3" no blood present.	110 "	7 " 2½ "
20/5/21	Specimen spoilt.	2.7%	58%	45 "	.1 gr.	100 "	7 " 4½ "
16/6/21	30	2.6%	51%	45 "	trace.	100 "	7 " 5 "
25/6/21	26	2.6%	55%	45 "	no alb. no casts. no blood.	98 "	7 " 4½ "

The main points are:-

- 1) Duration only 2 weeks.
- 2) Symptoms and clinical condition: swelling of face and pain in back. Both these disappeared with treatment.
- 3) Cardio-vascular system: Slight accentuation of 2nd Pulmonary sound. No cardiac hypertrophy. Blood pressure high at first but coming down to normal.
- 4) Albumen and blood present but both disappeared.
- 5) Blood Urea Retention high at first but decreasing, although never coming down to normal.
- 6) Phenolsulphonephthalein Excretion below normal.
- 7) Urea concentration lowest normal at first but increased slightly.
- 8) Weight increased.

This is still another case of Azotaemic nephritis.

The prognosis in this case has to be guarded. The general outlook, however, is hopeful, and probably if he had stayed in Hospital a few weeks longer it would have been much brighter.

Two months after discharge from Hospital, this boy was working regularly in the pit.

CASE NO. 5. Mrs. P. aet. 22 years. Housewife.

Admitted: 7th July, 1921.

Complaint: Swelling all over body.

History: 2 months ago patient vomited a good deal, and became weakly and pale. Under treatment for vomiting, stopped in 2 weeks/

weeks. A month later feet, ankles, legs and face began to swell, and she passed only small quantities of urine at a time.

Examination: Patient was very anaemic, marked oedema of face, eyelids, conjunctivae, feet, ankles, and abdominal wall.

Heart: No hypertrophy. Slight accentuation of 2nd aortic sound.

Lungs: Moist râles at both bases.

Ascites: Only slight.

Wasserman: Negative.

Eyes: No retinal changes.

Blood Count: Red blood cells: 4,070,000

Haemoglobin: 60%

White blood cells: 7,000

Urine: Specific gravity 1014.

Blood and Albumen present.

Granular, epithelial and hyaline casts.

Bacillus Coli present.

Diet: 7/7/21 Milk only.

21/7/21 Milk diet.

21/8/21 Light diet.

Progress: Not at all satisfactory at first. Oedema kept reappearing and urine contained varying amounts of albumen. Insisted on leaving hospital although feeling little better. She improved the last 2 weeks as far as her oedema and weakness were concerned.

Date.	Blood Urea retention	Urea concentration.	Phenol-sulph. Test.	Daily amt. of Urine.	Albumen present grs. per oz.	Blood Pressure	Weight.
12/7/21	39 mgs	3.1%	49%	20 ozs.	1.7 grs. Blood B. Coli	120 mms.	7st. 4lbs.
23/7/21	30 "	2.5%	45%	50 "	2.3 grs. No Blood Many B. Coli	110 "	7" 4 "
1/8/21	39 "	2.1%	56%	40 "	.4 grs. Only few B. Coli No Blood	110 "	7" 5½"

The main points for consideration here are:

- 1) Duration 2 months.
- 2) Symptoms and clinical condition: oedema and dyspnoea, both getting less, but slowly and inconsistently.
- 3) Cardio-vascular system: no hypertrophy. Accentuation of 2nd aortic sound. Blood pressure 120 mms. and only decreasing slightly.
- 4) Albumen and blood present: blood disappeared and albumen tended to decrease.
- 5) Blood Urea Retention: high and remained stationary.
- 6) Phenolsulphonephthalein excretion low and remained low.
- 7) Urea concentration good.
- 8) Weight: remained stationary.

Another case of Azotaemic nephritis.

The prognosis is bad. Patient was only a few months married, and she was a bad patient as regards discipline.

The patient went out against advice and was admitted later to another ward.

CASE NO. 6. R. D. aet. 63. Miner.

Admitted: 28th July, 1922.

Complaint: Swelling all over with shortness of breath. Pain in stomach and back.

Duration: Illness has lasted for several months. The stomach pain was of a gnawing nature. He vomited regularly after meals but said he was almost always troubled with his stomach. About a week ago he became swollen all over and became very short of/

of breath and he passed only small quantities of blood-stained urine.

Examination: Patient has oedema of his face, hands, feet, ankles, and abdominal wall. Has to be propped up in bed, owing to dyspnoea.

Stomach: Large palpable mass in Gastric region. Tender on pressure. (This was diagnosed as a malignant growth of stomach.)

Heart: Marked hypertrophy left side extended one inch beyond clavicular line. Mitral systolic and aortic systolic murmurs were present.

Lungs: Both oedematous.

Ascites: present.

Wasserman: Negative.

Urine: Smoky. Specific gravity 1015.

Blood and albumen present.

Epithelial and granular casts.

Diet: Milk only.

Progress: Patient died 18/8/22.

Post Mortem: Diagnosis of gastric carcinoma confirmed.

Kidney: Both kidneys were enlarged. Capsule stripped easily.

Cortex and Medulla imperfectly differentiated.

Date.	Blood Urea retention.	Urea Concentration.	Phenol-sulph. Test.	Amt. of Urine daily.	Amt. of Albumen.	Blood Pressure.	Weight.
30/7/21	160 mgs.	1.8%	28%	20 grs.	2.45 grs. per.oz. Blood present.	170 mms.	Not Taken.
7/8/21	290 mgs.	2.2%	11%	25 oz.	2.4 grs. per.oz. Blood present.	170 mms.	
12/8/21	-	1.9%	A trace only.	25 oz.	2.9 grs. per.oz. Blood present.	150 mms.	
17/8/21	-	-	-	10 oz.	4.6 grs. per.oz. Blood present.	120 mms.	

The main points in this case are:

- 1) Duration: several weeks.
- 2) Symptoms and clinical condition: Oedema, dyspnoea and pains in abdomen. (Diagnosed as Gastric Carcinoma).
- 3) Cardio-vascular system: advanced affection.
- 4) Blood and albumen present and remaining in urine.
- 5) Blood urea retention high on admission and increasing enormously.
- 6) Phenolsulphonephthalein excretion very low on admission, and diminishing to a mere trace.
- 7) Urea concentration in the danger zone and remaining there.

This was a case of mixed nephritis - complication, Gastric Carcinoma.

The prognosis from the beginning was hopeless. Operative interference was out of the question.

Death took place 8 days after admission.

CASE NO. 7. Miss M. M. aet. 19. Student.

Admitted: 27th May, 1921.

Complaint: Oedema of eyes, severe headaches. Vomiting, and inability to do reading for her examination.

History: Patient was working for her final M.A. examination and 7 days ago she began to have headaches and vomited on several occasions. She thought it was overwork but kept on studying and two days ago she noticed her face and eyes were puffy in the morning.

Examination:/

Examination: Oedema of eyelids and conjunctivae. Patient anaemic.

Heart: No hypertrophy. 2nd aortic sound slightly accentuated. No arterio sclerosis.

Abdomen: No ascites.

Urine: Specific gravity 1018.

Albumen present.

No Blood.

Bacillus Cöli present.

Epithelial and granular casts.

Wasserman: Negative.

Eyes: No retinal changes.

Blood Count: Red blood corpuscles 3,500,000

Haemoglobin 60%

White blood corpuscles 6,000

Diet: Milk for 3 days.

Milk diet 2 days.

Light diet until discharge.

Progress: Patient lost both oedema and headaches, felt perfectly well after two days studied in bed, and went up for her examination a week after discharge.

The chief points here are:

- 1) Duration: 1 week.
- 2) Symptoms and clinical condition: headaches with slight oedema, both disappeared.
- 3) Cardio-vascular system: no hypertrophy. Accentuation of 2nd aortic sound. Blood pressure 130, coming down slightly (120).
- 4) Albumen present. No blood. Albumen disappeared.
- 5) Blood urea retention a little above normal but remaining steady.
- 6) Phenolsulphonaphthalein excretion low.
- 7) Urea concentration good although tending to decrease.

The prognosis was not very good. High blood urea retention. Low phenolsulphonaphthalein and an early high blood pressure were the unsatisfactory conditions. Patient was lost sight of after her examination.

CASE NO. 8. T. S. aet 30. Miner.

Admitted: 27th August, 1921.

Complaint: Oedema of face, feet, ankles and abdomen with occasional vomiting and passing of blood.

History of Illness: 3 weeks before admission patient noticed his eyelids were swollen in the morning but this disappeared in a few hours. His feet and ankles then began to swell and it was then that he noticed blood in his urine which was scanty in amount. His whole body became swollen and he had been/

been confined to bed for 6 days before admission to Hospital.

Examination: Oedema of face and eyes and both feet and ankles. Slightly anaemic.

Heart: No hypertrophy. All sound closed.

Lungs: Coarse crepitations at both bases.

Abdomen: Abdominal wall oedematous but no free fluid in abdomen.

Wasserman: Negative.

Eyes: No retinal changes.

Urine: Specific gravity 1018

Smoky colour.

Albumen and blood present.

No Bacillus Coli.

Epithelial and granular casts.

Diet: 27/8/21 Milk only.

4/9/21 Milk diet.

9/9/21 Light diet until discharge.

Progress: Patient soon lost his oedema. Blood disappeared from urine. Vomiting entirely stopped. Patient went back to work after two weeks at the convalescent home.

Date.	Blood Urea Retention.	Urea Concentration.	Phenol-sulph: Test.	Daily Amount of Urine.	Albumen in grs. per oz.	Blood pressure.	Weight.
27/8/21	70 mgs.	3.2%	84%	25 ozs.	2.4	180 mms.	10st. 8lbs.
3/9/21	50 "	3.2%	76%	40 "	.8 Blood gone.	170 "	10 " 6 "
10/9/21	30 "	3%	80%	35 "	.1 no blood.	170 "	10 " 4½ "
24/9/21	22 "	3.4%	75%	50 "	None.	168 "	10 " 5 "
16/10/21	20 "	3.2%	78%	55 "	None.	160 "	10 " 7 "

The chief points in this case are:

- 1) Duration: 3 weeks.
- 2) Symptoms and clinical condition: oedema with occasional vomiting and haematuria.
- 3) Cardio-vascular system: Nil. Blood pressure 180 mms. decreasing slightly.
- 4) Albumen and blood present in urine, both gradually disappeared and were absent on discharge.
- 5) Blood urea retention: high on admission, but gradually coming down to normal.
- 6) Phenolsulphonephthalein excretion: good and remaining steady.
- 7) Urea concentration good and stationary.
- 8) Weight steady.

This was another case of Azotaemic nephritis.

The prognosis was good. On admission the only unsatisfactory points were the high blood urea retention and blood pressure, but his renal efficiency was normal before his discharge from Hospital.

CASE NO. 9. Mrs. A. M. aet. 55. Housewife.

Admitted: 10th July, 1921.

Complaint: Patient was admitted in a comatose condition.

History: Her husband stated she had had kidney trouble for years, first associated with pregnancy. She had complained of headaches for two weeks and her memory had been failing for months.

Examination/

Examination: No oedema. Deeply unconscious. Stertorous breathing.

Heart: Loud mitral systolic murmur with great accentuation of 2nd aortic sound. Heart greatly hypertrophied. Arteries thickened and high blood pressure.

Eyes: Reflexes were sluggish, and there was well-marked albumenuric retinitis.

Wasserman: Weak positive.

Urine: Only small amount taken off by catheter. Specific gravity not taken. No blood. Albumen present. Granular and hyaline casts in great numbers.

Treatment: Hot packs. Venesection. Lumbar puncture, etc.

Progress: Death the day following admission with regaining consciousness.

Post Mortem: Refused.

Date.	Urea retention in blood	Urea Concentration.	Phenol-sulpho-neph-thalein Test.	Daily Amt. of Urine.	Amt. of Albumen.	Blood Pressure.	Weight.
18/7/21	180mgs.	1.4%	a trace only	15 ozs.	2.4 grs. per oz.	224	Not taken.

Urine was taken by catheter.

Urea given by mouth, which patient drank slowly.

The chief points are:

- 1) Duration: many years.
- 2) Symptoms and clinical condition: Uraemic condition.
- 3) Cardio-vascular system: marked hypertrophy and advanced valvular disease. Blood pressure very high.
- 4) Large quantity of albumen in urine. No blood.
- 5) Blood urea retention enormously increased.
- 6) Phenolsulphonephthalein excretion was practically nil only a slight trace of the dye was found.
- 7) Urea concentration in danger zone.
- 8) Marked albumenuric retinitis.

In this case the test could only be done but they were so very unsatisfactory and the clinical condition was so bad that the prognosis was hopeless and death was imminent.

CASE NO. 10. Mrs. J. F. aet. 19 $\frac{1}{2}$ years. Housewife.

Admitted: 18th August, 1921.

Complaint: Convulsions and semi-consciousness.

History: Baby six weeks old. Patient had been very oedematous during pregnancy but had gone on to full time and had normal confinement. The following day she took two fits, but until the day before admission had had no more, although she had been in bed all the time on milk diet.

Examination: Oedema all over body. Her eyes were almost closed. Patient was very pale. Only semi-conscious.

Heart: No hypertrophy. Heart sounds closed. Pulse rate 118/

118 per minute.

Lungs: Oedema at both bases.

Wasserman: Negative.

Eyes: No retinal changes; marked conjunctival oedema.

Urine: Specific gravity 1018. Acid.

Smoky. Large amount of albumen.

No B. Coli.

Epithelial and granular casts.

Diet: Milk only.

Progress: Patient took four convulsions in the first ten hours in Hospital and then became quite conscious. She complained of severe headaches but her oedema was relieved with hot packs. She remained fairly well for four days during which time she had no convulsions and was quite conscious.

On the 5th day in Hospital she took three convulsions in about an hour and then relapsed into a comatose condition and died.

Post Mortem: Refused.

Date.	Blood Urea Retention.	Urea Concentration.	Phenol-sulph: Test.	Daily Amt. of Urine.	Albumen in grs. per oz.	Blood Pressure.	Weight.
18/8/21	110mgs.	1.8	20%	16 ozs.	6.4 grs. blood.	140mms.	Not taken.
19/8/21	-	-	-	25 "	5 grs. blood.	-	
21/8/21	-	-	-	20 "	4.5 grs. blood.	-	
23/8/21	100mgs.	1%	25%	20 "	4.5 grs. no blood	125	
24/8/21	-	-	-	a little by catheter.	7 grs. no blood.	-	

The main points of interest in this case are:

- 1) Duration: several months. Associated with pregnancy.
- 2) Symptoms and clinical condition: unconsciousness; recovering slightly for a few days then again lapsing into a comatose condition after several convulsions.
- 3) Cardio-vascular system: accelerated pulse. Blood pressure high. No other cardiac affections. Blood pressure came down slightly.
- 4) Albumen and blood present in urine. Albumen increased but blood gradually disappeared.
- 5) Blood Urea Retention: very high and remaining high.
- 6) Phenolsulphonephthalein excretion low and stationary.
- 7) Urea concentration in danger zone and getting worse.
- 8) Almost suppression of urine before the end.

The prognosis here was grave as although her cardio-vascular system was not much affected, her general clinical condition/

condition and renal tests were very bad and remained bad.

CASE NO. 11. J. W. M. aet. about 60. Pedlar.

Admitted: 1st June, 1921.

Complaint: Patient was admitted to a surgical ward with swelling of hand and a gangrenous middle finger of left hand. On examination in the surgical wards it was discovered that the swelling of the hand was of an oedematous nature and moreover he had oedema of the feet and ankles and conjunctivae. He was transferred to the medical side to have his renal efficiency tests done, and his finger was temporarily dressed.

Duration of Illness and History.

On admission to the medical wards he seemed strange and rather wandering and could give little history of his illness. His hand had been bad for a week, but he had been sick and vomiting the day previous to admission and he had just noticed the swelling that day.

Examination: Oedema of hands, face, abdominal and chest wall, feet, ankles and thighs.

Heart: Great hypertrophy.

Mitral systolic murmur.

Double aortic murmur.

Marked arterio sclerosis.

Abdomen: Ascitis.

Lungs/

Lungs: A few moist sounds over both lungs.

Eyes: Some retinal haemorrhages.

Wasserman: Positive.

Urine: Specific gravity: 1020. No blood. Albumen present.

Casts in great numbers, chiefly hyaline and granular.

Treatment: Hot packs.

Diet: Milk only.

Progress: Patient gradually became comatose. There were no convulsions, although the oedema disappeared in two days and he seemed better. No operation on his finger was performed. His whole finger became gangrenous.

On the 4th day he was deeply unconscious and he died the following morning.

Date.	Blood Urea Retention.	Urea Con- centra- tion.	Phenol- sulph- Test.	Amt. of Urine passed.	Albumen present in grs. per oz.	Blood Pressure	Weight.
1/6/21	90 mgs.	1.6%	10%	10 ozs.	7.6 grs.	100 mms.	Not taken.
3/6/21	-	-	-	25 "	6 grs.	-	
5/6/21	-	-	-	30 "	4.5 grs.	-	
6/6/21	85 mgs.	1.2%	25%	30 "	2.6 "	98 "	
7/6/21	-	-	-	10 "	4.5 "	-	
8/6/21	-	-	-	a little by cath- eter.	8 "	-	

The main points here are:

- 1) Duration: several days (history doubtful).
- 2) Clinical condition: gangrenous finger and oedema.
- 3) Cardio-vascular system: heart hypertrophied. Advanced valvular disease. Blood pressure low (100 mms)
- 4) Great amount of albumen in the urine, which at first got less but latterly increased. No blood present.
- 5) Blood Urea Retention high and although decreasing, never was out of dangerous zone.
- 6) Phenolsulphonaphthalein excretion greatly diminished, increased slightly.
- 7) Urea concentration in danger zone all the time.
- 8) Retinal Haemorrhages.
- 9) Operation on finger was never performed.

Prognosis grave. No operation was considered, owing to the unsatisfactory condition of the kidneys.

CASE NO. 12. J. C. aet. 58. Pedlar. Father of Case No. 1.

Admitted: 24th February, 1922.

Complaint: Shortness of breath, cough.

History of illness: Patient says though always thin he has enjoyed fairly good health. He has usually had a cough in winter time and bad weather, but attributes this to the cold weather. One month before admission his cough became worse and he became very short of breath. He has never had oedema and never remembers passing blood in his urine. Although lately he has been passing more urine and has had to rise two or/

or three times a night. No headaches and no giddiness.

Examination: Patient very thin and pale. No oedema.

Heart: Marked hypertrophy of heart. Both second aortic sound and 2nd pulmonary sounds are accentuated. No murmurs, but first mitral sound roughened. Arterio sclerosis present.

Abdomen: Both kidneys palpable.

Wasserman: Negative.

Eyes: Several retinal haemorrhages.

Urine: Specific gravity 1012.

Albumen present.

All kinds of casts. Granular and hyaline in greatest numbers.

Many renal cells in deposit.

Bacillus Coli present.

Diet: 10/3/21 Milk only.

20/3/21 Milk and Porridge.

30/3/21 Light diet.

16/8/21 Milk diet.

21/8/21 Light diet.

Progress: Patient improved physically and grew stronger and was anxious to go home. He was at home for four months during which time he did no work. About $3\frac{1}{2}$ months after discharge he became much worse and was readmitted. This time he never picked up and gradually became weaker and died, About 2 months after admission.

Date.	Blood Urea retention.	Urea Concentration.	Phenol-sulph: Test.	Daily amt. of Urine.	Albumen present in grs. per oz.	Blood Pressure.	Weight.
9/3/21	129 mgs.	1.3%	16%	20 ozs.	2.6 gr.	242 mms.	8st.4lbs.
4/4/21	164 "	1.3%	only a trace.	35 ozs.	2 grs.	204 "	8 " 2 "
20/4/21	94 "	.8%	5%	75 "	2.1 "	202 "	8 " 4 "
<u>Readmitted.</u>							
16/8/21	141 mgs.	1.7	5%	25 "	2.2 "	152 "	7 " 7 "
28/8/21	98 "	1.4	9%	55 "	2.84	165 "	7 " 7 "
31/8/21	Not done	Not done	12%	60 "	3.06	160 "	-

The main points here are:

- 1) Duration: uncertain, but 1 month really ill.
- 2) Clinical condition and symptoms: dyspnoea. Cough. Weak and emaciated. No oedema.
- 3) Cardio-vascular system: heart hypertrophied. Advanced valvular disease.
- 4) Albumen present and never got less. No blood.
- 5) Blood urea retention: very high and remaining about 100 mgs.
- 6) Phenolsulphonophthalein excretion very low.
- 7) Urea concentration: in danger zone on the whole 5 times test done.
- 8) Retinal haemorrhages.

The prognosis in this case was grave. Not the slightest improvement/

improvement was noticed in any of the tests, although for a little while he felt better himself.

CASE NO. 13. W. H. aet. 24 years. Engineer.

Admitted: 30th May, 1921.

Complaint: Swelling of face and legs: headaches, shortness of breath and inability to carry on his work.

History of condition: 1st attack which was the same as this, 5 months ill at this time.

2nd attack after a chill.

3rd attack after influenza 3 weeks previous to admission.

Examination: Patient very pale. Oedematous face, conjunctivae, abdomen wall, feet and legs all affected. Slight dyspnoea.

Heart: Hypertrophied, 1st mitral sound booming and 2nd aortic accentuated.

Abdomen: Free fluid in abdomen. Abdominal wall oedematous.

Eyes: Conjunctival oedema. No retinitis.

Lungs: moist rales over both lungs, chiefly at bases.

Wasserman: negative.

Urine: Specific gravity 1020

Granular, hyaline and blood casts.

No B. Coli.

Blood and albumen present.

Treatment: On usual line. Dieting, hot packs, etc.

Progress: Great improvement in general condition. His oedema disappeared/

disappeared. His albumen got less. Blood in the urine disappeared. He lost his dyspnoea and was able to get about the wards and felt much stronger. Left Hospital 1/10/21 hoping to work soon.

Date.	Blood Urea retention.	Urea Concentration.	Phenol-sulph: Test.	Daily Amt. of Urine.	Albumen in Urine.	Blood Pressure.	Weight.
18/6/21	25 mgs.	2.2%	55%	32 ozs.	3.2 grs. per oz.	210	10st. 5lbs
26/6/21	79 "	2%	35%	25 "	3.9 "	206	10 " 3 "
10/7/21	40 "	3.5%	54%	60 "	2 "	182	9 " 13 "
25/7/21	33 "	2.2%	49%	42 "	2 "	172	9 " 10 $\frac{3}{4}$ "
4/8/21	40 "	2.1%	31%	60 "	1.8 "	140	9 " 13 $\frac{1}{2}$ "
31/8/21	60 "	2.1%	69%	45 "	1.6 "	130	10 " 2 "

The chief points of interest in this case are:-

- 1) Duration: 2 years.
- 2) Clinical condition and symptoms: headaches, weakness, swelling of face and legs - gradually disappeared.
- 3) Cardio-vascular system: heart slightly hypertrophied. No marked valvular trouble. Blood pressure very high; came down slightly.
- 4) Albumen present in urine which diminished, but never nearly disappeared. Blood present at first only.
- 5) Blood urea retention quite good at first, then suddenly increased and never went back to its first level.
- 6)/

- 6) Phenolsulphonephthalein excretion always decidedly below normal.
- 7) Urea Concentration just above the minimal normal and remaining steady.
- 8) Weight remaining stationary.

The prognosis here was not good; in fact it was graver than on admission.

This would have been a satisfactory case to do decapsulation. The tests here were of use in being able to advise the patient regarding his future.

CASE NO. 14. J. McB. aet. 35. Shipwright.

Admitted: 25th May, 1921.

Complaint: Swelling all over body and giddiness.

History: Patient had an attack like this before. He was treated for 5 days with restricted diet, when he recovered. He has had no more symptoms until four weeks ago when oedema and headaches again appeared. They were more marked than in first attack. A slight cough developed a few days before admission to Hospital.

Examination: Oedema of face and conjunctivae, feet and ankles. No dyspnoea. Patient is a good colour.

Heart: No hypertrophy. Accentuation of 2nd aortic sound. No arterio sclerosis.

Abdomen: No ascitis. Oedema of anterior abdomen wall and also in/



in lumbar region.

Eyes: No retinal changes.

Urine: Specific gravity: 1018.

Blood, hyaline, granular and epithelial casts.

Blood and albumen present.

No Bacillus Coli.

Diet and Treatment: Diet:- 25/5/21 Milk only.

23/6/21 Milk diet.

Light diet &

Milk diet.

Decapsulation of right kidney 30/7/21. Only one kidney done as patient stood anaesthetic badly and there was a good deal of haemorrhage from the kidney. Pulse became very fast and weak.

Progress: Patient improved greatly in his general condition. Oedema and blood in urine disappeared. Headaches better. No giddiness and no cough and he felt absolutely well. As his other tests were not satisfactory it was decided that he would be a suitable case for decapsulation, but it was not a success as only one kidney was done owing to the man's condition under the anaesthetic.

He was very ill for several days following the operation and it looked as if he was going to die. He gradually recovered and regained the condition he was in before the operation/

operation and went out to convalesce before commencing work.

Date.	Blood Urea Retention.	Urea Concentration.	Phenol-sulph: Test.	Daily Amt. of Urine.	Albumen present grs. per oz.	Blood Pressure.	Weight.
28/5/21	131mgs.	2.3%	a trace	35 ozs.	7.4	168 mms.	9st. 9lbs.
17/6/21	134 "	2.5%	25%	35 "	4.8	160 "	9 " 7 "
23/6/21	114 "	2%	22%	40 "	3	152	9 " 8 "
4/7/21	200 "	2.5%	20%	42 "	1.93	180	9 " 6 "
12/7/21	68 "	2.4%	24%	48 "	1.6	170	9 " 3 "
25/7/21	45 "	1.4%	53%	60 "	2.1	170	9 " 3 "
After decapsulation of Right Kidney:							
28/7/21	40mgs.	2%	74% blood pigment present.	40 ozs.	2.1	160 mms.	9st. 3½lbs.
7/8/21	50 "	2%	36%	50 "	1	160 "	9 " 5 "
2/10/21	45 "	2%	54%	45 "	.6	160 "	9 " 8¼ "

The chief points in this case are:-

- 1) Duration: 2 years.
- 2) Clinical condition and symptoms: Oedema, giddiness and dyspnoea; all rapidly disappearing.
- 3) Cardio-vascular system. Only accentuation of 2nd aortic sound. Blood pressure: high. Remained high.
- 4) Albumen: great amount in urine but diminished, although it never entirely disappeared.
- 5)/

- 5) Blood urea retention very high on admission, but diminished rapidly. Increased after decapsulation and never got below 60 mgs. again.
- 6) Phenolsulphonephthalein excretion practically nil on admission but rapidly increased although it never got to normal. Diminished again after decapsulation.
- 7) Urea concentration: above the minimal normal at first but before decapsulation was in danger zone. After decapsulation it remained exactly at 2%.
- 8) Decapsulation done. Not successful. Patient had under anaesthetic and very ill for several days afterwards.

The prognosis in this case was serious and was not improved by decapsulation. This case points out the danger of surgical interference where the renal deficiency is marked.

CASE NO. 15. Mrs. McK. aet. 37 years. Housewife.

Admitted: 9th June, 1921.

Complaint: Pain in back, and progressive weakness.

History: Patient has had intermittent kidney trouble for 7 years. Lately she has felt very weak and unable to carry out her housework. She has had for several years severe attacks of headaches. $5\frac{1}{2}$ months ago patient was pregnant and she began to feel ill and her eyesight got bad. 4 months ago she was seized with fits and she was removed to a maternity home. She was unconscious for 3 days and labour was brought on. She was in hospital 5 weeks.

One month ago she began to have giddy attacks, faintings, and/

and general malaise for 3 days; after that she developed pains in the back and severe headaches. She passed large quantities of pale urine both day and night.

Examination: Patient has no oedema. Is thin and pale and looks in a weak condition.

Heart: Marked hypertrophy. Mitral systolic with reduplicated 2nd sound. Accentuated 2nd aortic and pulmonary. Arterio-sclerosis.

Blood: Red Blood Cells 3,500,000
Haemoglobin 60%
White blood cells 6,000.

Wasserman: negative.

Urine: Specific gravity 1012.

Straw-coloured; mucus deposit. No blood. A little Albumen. Granular and hyaline casts.

Eyes: Both discs show atrophic Polor Fundi sprinkled with patches of pigment. At periphery the patches were much larger and surrounded by areas of Choroidal atrophy. Retinal vessels show thickening and in some places destruction of lumen.

Treatment and Diet: Treatment on general lines.

Diet:- 9/6/21 Milk.
17/6/21 Milk and Porridge.
21/6/21 Light Diet.

Progress: There was not much improvement in patient's general appearance/

appearance, although she lost her headaches and when she was allowed up she felt stronger and could move about the ward and do a little work in the kitchen and felt quite fit for it. She put on a little weight but her eyesight did not improve. She was anxious to leave hospital as she had a young family.

Date.	Blood Urea Retention.	Urea Concentration.	Phenol-sulph. Test.	Amt. of Urine Daily.	Albumen present in Urine.	Blood pressure	Weight.
17/6/21	28 mgs.	1.2%	29%	50 ozs.	1 gr. per oz.	192 mms.	7st.
23/6/21	26 "	1.2%	28%	20 "	.3 "	150 "	7st. 2lb
6/7/21	28 "	1.2%	30%	80 "	.1 "	150 "	7 " 2 "
14/7/21	28 "	1.2%	30%	80 "	a trace	150 "	7 " 4 "

The chief points here are:-

- 1) Duration: 7 years. Associated with pregnancy.
- 2) Clinical condition and symptoms: headaches, faintness, pain in back, impairment of speech.
- 3) Cardio-vascular system: heart hypertrophied and marked valvular affections. Blood pressure high, but came down considerably, in fact to normal.
- 4) Albumen: small amount at first and it diminished until only a trace was left. No blood present.
- 5) Blood urea retention: not much above normal and steady.
- 6) Phenolsulphonophthalein excretion: very low and remaining so.
- 7) Urea concentration: remained steadily in danger zone.
- 8)/

8) Marked retinal changes.

Again in this case one could only give a grave prognosis even though the patient's clinical condition improved slightly.

CASE NO. 16. P. F. aet. 62. Window Cleaner.

Admitted: 14th June, 1921.

Complaint: Giddiness and headaches. Dull aching pain in left groin. Breathlessness. Oedema of feet and ankles and abdominal wall.

History: Patient was very uncertain about commencement of illness, but 5 months ago he began to have giddy attacks. His ankles became swollen. He had headaches and was very breathless. His oedema increased and was now up into the abdominal wall and thighs. He has never had oedema of the face.

Examination: Oedema of legs and abdominal wall. Patient pale.

Heart: Hypertrophy of heart. Reduplication of 2nd mitral sound. 2nd aortic sound accentuated. Only slight thickening of arteries.

Lungs: Coarse crepitations and râles at both bases. Slight dyspnoea.

Abdomen: Little ascitis.

Wasserman: Negative.

Eyes: A few retinal haemorrhages.

Urine: Specific gravity 1016

Albumen present. No blood.

Granular/

Granular and hyaline casts.

Degenerated epithelial cells.

Diet: Usual lines.

Progress: Patient improved greatly under treatment, was soon able to be up and about the wards. No giddiness at present and only slight occasional headaches. Went out hoping soon to follow his employment as a window cleaner.

Date.	Blood Urea Retention.	Urea Con- centra- tion.	Phenol- sulph- Test.	Daily Amt.of Urine.	Albumen in grs. per oz.	Blood Pressure.	Weight.
16/6/22	-	2.3%	48%	30 ozs.	3.4 grs.	160 mms.	7st. 6lbs.
4/7/22	144	2.9%	49%	68 "	.8 "	150 "	7 " 4 "
11/7/22	136	2.4%	44%	30 "	.1 "	150 "	7 " 6 "
20/7/22	-	2.2%	48%	50 "	a trace	150 "	7 " 9½ "

The chief points here are:-

- 1) Duration: uncertain. Felt ill for 5 months.
- 2) Clinical condition and symptoms: oedema; headaches; dyspnoea. These gradually disappeared.
- 3) Cardio-vascular system: marked affection. Blood pressure not very high.
- 4) Albumen: large quantity of albumen which diminished to a trace. No Blood.
- 5) Blood Urea Retention: very high and remained so.
- 6)/

- 6) Phenolsulphonephthalein excretion: very low and remained stationary.
- 7) Urea concentration: always remained above 2%.
- 8) Increase of weight.

This case was sent up by his employers to see if he should carry on with his employment which was window-cleaning. A negative answer was of course given and a very grave prognosis.

CASE NO. 17. P. M. aet. 67. Labourer.

Admitted: 26th February, 1921.

Complaint: Weakness, shortness of breath and oedema. He has had attacks like this every few months for several years and each attack is more severe than the preceding one.

Habits: Alcoholic.

Examination: Oedema of legs and feet. No oedema of face. Patient has constant cough and laboured breathing.

Heart: Great hypertrophy. Booming 1st mitral sound, marked accentuation of 2nd aortic sound. Arteries thickened.

Lungs: Oedema of lungs chiefly at both bases, but coarse crepitations over both lungs.

Eyes: Several retinal haemorrhages - both eyes - with thickening and loss of lumen of vessels.

Wasserman: Negative.

Urine: Specific gravity 1015.

No/

No blood. Albumen present.

Hyaline and granular casts.

Diet: On the same lines as previous cases.

Progress: Patient quickly improved with treatment. Oedema and dyspnoea disappeared. No cough and he felt very well again and could get about the wards comfortably. He was discharged from Hospital but was soon readmitted after an alcoholic bout.

Date.	Blood Urea Retention.	Urea Concentration.	Phenol-sulph. Test.	Daily amt. of Urine.	Albumen present in Urine grs. per oz.	Blood pressure	Weight.
1/3/21	56 mgs.	1.8%	50%	35 ozs.	1.5 grs.	250 mms.	10st. 9½ lbs
8/3/21	54 "	1.7%	80%	40 "	1.5 "	230 "	10 " 10½ "
3/4/21	54 "	3 %	30%	40 "	.8 "	210 "	10 " 12 "
12/5/21	50 "	2.5%	52%	45 "	.6 "	206 "	10 " 12 "
<u>Re-admitted.</u>							
28/7/21	63 "	2.4%	20%	40 "	.8 "	210 "	10 " 4½ "
4/8/21	65 "	1.8%	24%	40 "	.2 "	208 "	10 " 6½ "

The chief points here are:-

- 1) Duration: several years.
- 2) Habits: alcoholic.
- 3) Clinical symptoms and condition: oedema, dyspnoea and general weakness. All improved while in Hospital.
- 4) Cardio-vascular system: marked valvular affection. Arterio sclerosis. Blood pressure very high. Came down slightly but still above 200 mms.
- 5) Blood Urea Retention: high on admission. No improvement, was 65 mgs. on discharge.
- 6) Phenolsulphonaphthalein excretion: too low and became still lower.
- 7) Urea concentration: low. Usually below 2% and never more than 2.5%

Prognosis was grave and with his alcoholic habits there was great danger of a fatal termination, especially with such a high blood pressure.

CASE NO. 18. W. N. aet. 60 years. Labourer.

Admitted: 24th March, 1921.

Complaint: Swelling all over body. Cough and shortness of breath.

History: Patient has been ill for many years with attacks of dyspnoea and cough. He always thought it was his chest - some bronchitis - and did not call in any doctor as it disappeared with a few days' rest and several doses of salts. It was only when his body and especially his legs and scrotum/

scrotum began to swell that he sought a doctor's advice.

Examination: General oedema. Laboured breathing and cough.

Patient very *cyanosed*.

Heart: Great enlargement of heart. Mitral systolic murmur and aortic regurgitation. Pulse irregular and fast - 100 per minute. No arterio sclerosis.

Lungs: Fluid at both bases and rales all over both sides of chest.

Wasserman: Negative.

Eyes: No Retinal changes.

Abdomen: Scrotum almost the size of a football. Abdominal wall oedematous. Ascitis present.

Urine: Specific gravity 1015.

Albumen present. No blood.

No Bacillus Coli.

Hyaline and granular casts.

Treatment: Diet on usual lines. Digitalis and Duretⁿ.

Scrotum tapped.

Progress: Patient did fairly well for several weeks.

Oedema disappeared. Cardiac compensation was re-established, and he felt very well. He died suddenly while washing himself in bed.

Post Mortem: Refused.

Date.	Blood Urea Retention.	Urea Concentration.	Phenol-sulph. Test.	Daily amt. of Urine.	Albumen in Urine grs. per oz.	Blood Pressure.	Weight.
30/3/21	37 mgs.	1.7%	53%	25 ozs.	1 gr.	130 mms.	11st.
4/4/21	38 "	1 %	55%	45 " after diuretin.	.8 "	150 "	10 "10lbs.
1/5/21	36 "	2.2%	51%	36 "	.2 "	130 "	11 " 4 "

The chief points here are:-

- 1) Duration: several years.
- 2) Clinical condition and symptoms: Oedema and dyspnoea.
- 3) Cardio-vascular system: threatened failure of compensation on admission. Improved temporarily with rest and treatment. No arterio sclerosis. Blood pressure too low. Irregular pulse.
- 4) Albumen present but decreasing. No blood.
- 5) Blood urea retention: fairly high and remaining high.
- 6) Phenolsulphonaphthalein excretion: too low and remaining steady.
- 7) Urea concentration: in danger zone at first but got as high as 2.2%.

The prognosis was bad, as the renal tests, clinical condition, and cardio-vascular system showed.

CASE NO. 19. Mrs. McP. aet. 28. Housewife.

Admitted: 21st May, 1921.

Complaint: Severe headaches and swelling all over body.

History: 8 years ago legs became swollen. This condition disappeared in a few days. Nothing more was noticed and she remained in perfect health for 3 years until her first pregnancy 5 years ago. She felt ill and vomited a great deal. She became very breathless and rested in bed for 3 or 4 weeks. Swelling then disappeared. She got up after that and felt better, although her feet became swollen at nights and her eyes were still puffy in the mornings. She had a full-time/

time, normal labour. With her next pregnancy the condition returned and took longer to clear up, but again the labour was normal and she had no fits.

She again became pregnant and this time she was ill practically the whole time, and after her last confinement her condition did not clear up. Her eyes were always puffy. She vomited a great deal, had severe headaches, and she noticed a marked dimness of vision which improved slightly as the day advanced.

Family History: Father has nephritis. 1st child has nephritis.

Examination: Oedema of face and conjunctivae, also of feet and ankles. Laboured breathing and slight cough.

Heart: Apex beat in 6th interspace in mid clavicular line. Both mitral, systolic and presystolic. Aortic systolic.

Lungs: Moist rales at both bases.

Abdomen: Small amount of free fluid.

Eyes: No retinal changes.

Blood Count: R.B.C.'s 3,450,000: Whites 4,500: H.B. 62%.

Wasserman: Negative.

Urine: Specific gravity 1020. Mucus deposit. Albumen present but no blood nor Bac. Coli. Epithelial and granular casts in abundance. A few hyaline casts.

Diet: 21/5/21 Milk only. 10/6/21 Milk diet. 17/6/21 Light diet.

Progress: Patient began to improve immediately. Oedema and headaches disappeared. She said she felt better than she had done for 5 years, and she could go about the wards and do light kitchen work before discharge.

Date.	Blood Urea Retention.	Urea Concentration	Phenol-sulph. Test.	Daily amt. of Urine.	Albumen present. grs. per oz.	Blood pressure.	Weight.
27/5/21	28 mgs.	2.2%	70%	30 ozs.	.6 grs.	150 mms.	7st.4 lbs.
10/6/21	30 "	2.5%	75%	40 "	.2 "	140 "	7 " 2 "
17/6/21	28 "	2.2%	60%	60 "	.1 "	135 "	7 " 4 "
24/6/21	26 "	2.2%	70%	55 "	absent & a trace day about	135 "	7 " 4½ "

The chief points here are:-

- 1) Duration: 8 years. Associated with pregnancy.
- 2) Clinical condition and symptoms: oedema and headaches.
- 3) Cardio-vascular system: marked affection. Slight arterio-sclerosis. Blood pressure high but came down considerably.
- 4) Small amount of albumen in urine - gradually disappeared.
- 5) Blood urea retention: slightly above normal and remaining stationary.
- 6) Phenolsulphonephthalein excretion was lower than normal but never very bad.
- 7) Urea concentration: always just above the minimal normal.
- 8) Weight remained steady.

The prognosis in this case had to be guarded. The renal efficiency was fairly good, but the cardio-vascular system was unsatisfactory. She was warned against subsequent pregnancies.

CASE NO. 20. P. P. aet. 46. Clerk.

Admitted: 15th August, 1921.

Complaint: Sick headaches for 6 years.

History: Patient has had headaches for 6 years. These occurred every week or two. He usually vomited at these times. In 1918 his headaches became worse and he had giddy attacks. These have continued ever since. He has had to pass urine more frequently for 2 years and has had to get up several times during the/

the night.

Examination: No oedema. Patient is thin but looks fairly well.

Heart: Marked hypertrophy of heart. Mitral systolic murmur and 2nd aortic sound accentuated. Pulse 88 per minute.

Arterio sclerosis present.

Eyes: Albumenuric retinitis present.

Wasserman: Negative.

Urine: Specific gravity 1012.

Urine pale. No deposit.

Albumen present. No blood.

No Bacillus Coli.

Granular and hyaline casts.

Diet: 15/8/21 Milk only.

16/8/21 Milk diet.

20/8/21 Light diet.

Progress: Patient improved slightly.

Headaches still occasionally present, but not so severe. Left Hospital as his employer required him back.

Date.	Blood Urea Retention.	Urea Concentration.	Phenol-sulph. Test.	Daily amt. of Urine.	Albumen present, grs. per oz.	Blood pressure.	Weight.
16/8/21	55 mgs.	1.8%	52%	60 ozs.	.4 grs.	230 mms.	9st.10 lbs.
28/8/21	25 "	2 %	65%	50 "	a trace	170 "	9 " 9 "
10/9/21	25 "	2 %	60%	60 "	a trace	160 "	9 " 11 "

The main points here are:-

- 1) Duration: 6 years.
- 2) Clinical condition and symptoms: headaches and giddiness.
No oedema. Depressed.
- 3) Cardio-vascular system: great affection. Arterio sclerosis.
Blood pressure high, but came down to normal.
- 4) Albumen: only small amount present. Decreased but never disappeared completely. No blood.
- 5) Blood urea retention: high on admission, but came down to slightly above normal.
- 6) Phenolsulphonaphthalein excretion: below normal and remained stationary.
- 7)/

- 7) Urea concentration: remained above normal all the time.
- 8) Weight increased.
- 9) Albumenuric retinitis present.

This man was sent in as a doubtful neurotic case, but these results show that he had slight renal deficiency and in view of the retinal changes, the prognosis given was very guarded.

CASE NO. 21. Mrs. P. aet. 35. Housewife.

Admitted: 19th August, 1921.

Complaint: Shortness of breath, swelling of hands, feet and face and severe frontal headaches.

History: 2 weeks ago patient took severe frontal headaches and vomiting and found she could not lie flat in bed without gasping for breath. One week ago she had a uterine haemorrhage but she did not know if it was a miscarriage.

Examination: Patient was oedematous, and face, eyes, legs, and body were all affected. She was propped up in bed and her breathing was laboured and rapid.

Heart: No hypertrophy. All heart sounds closed. No arteriosclerosis.

Lungs: Moist rales all over chest and chiefly at both bases.

Wasserman: Negative.

Eyes: No retinal changes.

Abdomen:

Abdomen: Abdominal wall oedematous. A little ascitis.

Blood: Red Blood Cells 4,000,000
White Blood Cells 6,000
Haemoglobin 42%

Diet: 20/8/21 Milk.
4/9/21 Milk Diet.
11/9/21 Light diet.

Urine: Specific gravity: 1014.
Blood and albumen present.
No Bacillus Coli.
Epithelial and granular casts.

Progress: Patient made rapid progress under treatment.
Her oedema and dyspnoea disappeared. Her albumen and
Blood gradually disappeared and she was able to get about
the wards and do light work and eventually went home
feeling quite well.

Date	Blood Urea Retention	Urea Concentration	Phenol-sulph. Test	Daily amt. of Urine	Albumen present grs. per oz.	Blood Pressure	Weight
20/8/21	68 mgs.	2.2%	74%	20 ozs.	2.6 Blood present	150 mms.	9st. 8 lbs.
27/8/21	60 "	2.4%	70%	40 "	1.6 No Blood	125 "	9 " 4 "
4/9/21	60 "	2.2%	74%	45 "	.4	120 "	9 " 4 "
11/9/21	30 "	2.2%	60%	50 "	.2	120 "	9 " 4½ "
15/9/21	22 "	2.2%	75%	45 "	none	120 "	9 " 7 "
25/9/21	20 "	2.2%	70%	50 "	none	120 "	9 " 6¼ "

The main points here are:-

- 1) Duration: 2 weeks.
- 2) Clinical condition and symptoms: oedema and dyspnoea, both completely disappeared.
- 3) Cardio-vascular system: Nil. Blood pressure 150 mms. on admission. Decreased considerably.
- 4) Albumen: present in urine in fair quantities, but diminished till only a trace was left. Blood present but soon disappeared.
- 5) Blood Urea retention: high on admission, but in the course of a month was normal.
- 6) Phenolsulphonophthalein excretion was only slightly too low, but remained steady.
- 7)/

7) Urea concentration: always above normal.

8) Weight maintained.

The prognosis here is good, every test being practically normal before discharge.

CASE NO. 22. Mrs. McQ. aet. 45. Housewife.

Admitted: 16th July, 1921.

Complaint: Sickness and headaches and shortness of breath with dimness of vision.

History: Patient has had headaches for 25 years, chiefly during menstruation. 2 years ago she had an attack of vomiting and headaches and her face and eyes began to swell. Her eyesight then began to fail. The oedema lasted several months, but it has been entirely absent lately.

Examination: Patient looks very well. No oedema. No anaemia.

Heart: Apex beat in 6th interspace. Mitral systolic murmur. 1st aortic sound slightly roughened and 2nd sound accentuated. Arterio Sclerosis is marked.

Eyes: Show neuro-retinitis with a number of retinal haemorrhages. White exudate from both Fundi.

Urine: Specific gravity 1018.

Albumen present. No blood.

Granular/

Granular and Hyaline casts.

Squamous epithelial cells.

Diet: 17/7/21 Milk Diet.
9/8/21 Light Diet.

Progress: Patient's headaches improved. They were less severe and less frequent. She felt stronger and had no dyspnoea. Her eyesight did not improve. She did not want to stay in Hospital any longer, and was discharged.

Date	Blood Urea Retention.	Urea Concentration.	Phenol-sulph. Test.	Daily amt. of Urine.	Albumen present grs. per oz.	Blood Pressure.	Weight.
16/7/21	60 mgs.	2.8%	40%	50 oz.	.3	230mms.	9 st.
23/7/21	51 mgs.	3.1%	22%	50 oz.	.1	220 "	8 st.13 lb.
1/8/21	54 mgs.	2.6%	36%	40 oz.	A trace	184 "	9 " 2 "
9/8/21	Tests	not done		50 "	A trace	180 "	9 " 2 "

The points of interest here are:-

- 1) Duration: many years.
- 2) Clinical condition and symptoms: sickness and headaches, and dyspnoea, all improved while patient was in Hospital.
- 3) Cardio-vascular system: marked affection. Arteriosclerosis and high blood pressure which diminished with treatment.
- 4) Albumen: a small amount present at first but none before discharge. No blood.
- 5) Blood urea retention: high and remained high.
- 6) Phenolsulphonephthalein excretion: always much too small.
- 7) Urea concentration: satisfactory and steady.
- 8) Albumenuric retinitis.
- 9)/

9) Weight increased.

The prognosis here is grave.

CASE NO. 23. S. S. aet. 57 years. Labourer.

Admitted: 24th June, 1921.

Complaint: Headaches, giddiness, dyspnoea and general weakness.

Duration: Patient has been feeling these symptoms for 4 or 5 years and they are gradually getting worse.

Examination: Patient is pale and thin. No oedema.

Heart: Slight hypertrophy. 1st mitral sound impure. 2nd aortic sound accentuated. Arteries thickened.

Eyes: Several retinal haemorrhages.

Wasserman: Negative.

Urine: Specific gravity 1010.

Albumen present.

No blood.

Hyaline and granular casts.

No Bacillus Coli.

Diet: 24/6/21 Milk.

1/7/21 Milk diet.

14/7/21 Light diet.

Progress: With the rest and treatment and better and more suitable food, patient's general condition improved vastly. His headaches disappeared and when he got up he had no giddiness or dyspnoea and his general strength was better. He left Hospital saying/

saying he felt better than he had done for 10 years and hoped to be back at full duty soon.

Date	Blood Urea Retention.	Urea Concentration.	Phenol-sulph. Test.	Daily amt. of Urine.	Albumen present grs. per oz.	Blood Pressure.	Weight.
28/6/21	144mgs.	4%	63%	50 oz.	1.5	145mms.	9st. 4lbs.
14/7/21	86 "	2.3%	24%	40 "	1	140 "	9 " 5 "
26/7/21	43 "	2.6%	50%	40 "	.6	130 "	not taken.
31/7/21	62 "	2.2%	44%	42 "	.4	130 "	9st. 5lbs.
6/8/21	68 "	2.4%	48%	44 "	A trace	136 "	9 " 6 "

The main points here are:-

- 1) Duration: 4 or 5 years.
- 2) Clinical condition and symptoms: headaches, giddiness, dyspnoea, and general weakness. All three disappeared with treatment.
- 3) Cardio-vascular system: markedly affected. Slight thickening of arterial walls. Blood pressure normal.
- 4) Albumen: small amount on admission. Only a trace on discharge. No blood.
- 5) Blood urea retention: very high on admission but it came down very much, although never nearly normal.
- 6) Phenolsulphonaphthalein excretion: always much too low.
- 7) Urea concentration: very satisfactory at first, but it was normal and no more later.

8)/

8) Weight well maintained.

The prognosis here was bad. The tests were not satisfactory and there was marked cardiac affection.

CASE NO. 24. T. F. aet. 43 years. Lithographer.

Admitted: 8th July, 1921.

Complaint: Giddiness, attacks of palpitation. Headaches. Pain in back and a general nervousness. Unable to do his work.

Duration: These symptoms first appeared 1 year ago and since then they have been gradually getting worse. His nervousness is only of 2 months' duration.

Examination: Patient looks perfectly healthy but seems very depressed and nervous.

Heart: Very slight hypertrophy. 2nd aortic sound accentuated. Slight arterio sclerosis.

Wasserman: negative.

Eyes: normal.

Urine: Specific gravity 1012. Albumen present. No blood.

Hyaline and granular casts. No Bacillus Coli.

Diet: 8/7/21 Milk. 18/7/21 Milk Diet. 21/7/21 Light diet.

Progress: At first patient made little or no progress. His depression and nervousness rather pointed to a neurasthenic condition but eventually he began to improve. He became much less nervous/

nervous and his headaches, giddiness and palpitations gradually disappeared and he went back to his work.

Date.	Blood Urea Retention.	Urea Concentration.	Phenol-sulph. Test.	Daily amt. of Urine.	Albumen present grs. per oz.	Blood Pressure.	Weight.
10/7/21	138 mgs.	4.9%	87%	28 ozs.	1.5	138 mms.	10st. 3½lbs
18/7/21	100 "	4.5%	85%	50 "	.8	136 "	10 " 7 "
26/7/21	80 "	3.2%	87%	48 "	.2	140 "	10 " 6 "
28/7/21	80 "	4 %	87%	40 "	a trace	125 "	10 " 6 "
2/8/21	76 "	3.8%	80%	45 "	.1	125 "	10 " 7 "

The main points here are:-

- 1) Duration: one year.
- 2) Clinical condition and symptoms: general nervousness, headaches, giddiness, palpitations. No oedema. All these conditions improved before discharge.
- 3) Cardio-vascular system: only slight hypertrophy with accentuated 2nd aortic sound. No arterio-sclerosis. Blood pressure normal.
- 4) Albumen present at first but gradually disappeared. No blood.
- 5) Blood urea retention: very high. It diminished slightly but never got below 76 mgs.
- 6)/

- 6) Phenolsulphonephthalein excretion: always normal.
- 7) Urea concentration: always satisfactory and steady.
- 8) Weight well maintained.

The one unsatisfactory point in this case was the very high blood urea retention, but it showed that his condition was genuine, and not one of "nerves" which his employer thought it was.

The prognosis was not good.

CASE NO. 25. J. S. aet. 60 years. Accountant.

Admitted: 10th August, 1922.

Complaint: Shortness of breath, swelling of feet and ankles, headaches and inability to concentrate his attention on his work. His memory was becoming very poor.

History: Patient enjoyed good health up until two years ago, when he began to notice that he could not carry out his work as an accountant as well as he once did. He seemed to forget things easily. About a few *days* ago his feet and ankles began to swell after walking any distance, but they were all right in the morning. Later he became short of breath on exertion and his mental ability seemed to be gradually getting worse. He was ordered 3 months' rest by his manager to see if he would get better, and if not he was going to have to resign his appointment.

Habits/

Habits: Has always been a good "liver" and has taken a good deal of spirits.

Examination: Patient has marked dyspnoea and oedema of feet and ankles.

Heart: Greatly hypertrophied. Rough mitral systolic murmur. 2nd aortic greatly accentuated. Arterio sclerosis.

Eyes: Large number of retinal haemorrhages and the lumen of the vessels partially obliterated.

Wasserman: negative.

Urine: Pale. Specific gravity 1012

No blood. Albumen present.

No Bacillus Coli.

A few hyaline and granular casts.

Diet: On usual lines - at least, he was ordered that, but as a patient he was quite hopeless and followed his own ideas of food.

Progress: With rest his general condition improved greatly, but his mental condition did not improve in the same way. Long before the three months were up, he went back to work, as his salary was of great importance to him.

He took a cerebral haemorrhage three weeks later at his office, and died without regaining consciousness.

Date.	Blood Urea Retention.	Urea Concentration.	Phenol-sulph. Test.	Daily amt. of Urine.	Albumen present grs. per oz.	Blood Pressure.	Weight.
10/8/21	40mgs.	2.2%	72%	45 oz.	1.5	242mms.	11st. 9lbs.
16/8/21	Not taken			40 "	1	240 "	Not taken.
20/5/21	42mgs.	2.2%	68%	60 "	1	244 "	
24/8/21	Not taken			45 "	1.2	242 "	

The main points here are:-

- 1) Duration: a year.
- 2) Clinical condition and symptoms: shortness of breath, oedema and failure of mind concentration.
- 3) Cardio-vascular system: greatly affected. Marked thickening of arteries with high blood pressure, which remained high.
- 4) Albumen: a good deal in urine - little decrease. No blood.
- 5) Blood urea retention: too high all the time.
- 6) Phenolsulphonephthalein excretion fairly satisfactory and steady.
- 7) Urea concentration: always above normal.
- 8)/

8) Large numbers of retinal haemorrhages.

The prognosis here was bad, but the cardio-vascular affections were great compared to the amount of renal deficiency.

I have mentioned diets in the fore-going cases, and the following is a copy of the diet sheet practically always given:-

1) Milk only.

5.30 a.m.	Cup of Milk and Water.	2 ozs. in 8 ozs.
8. a.m.	Cup of Milk.	8 ozs.
11 a.m.	Cup of Milk and Water	2 ozs. in 8 ozs..
1.30 p.m.	Cup of Milk and Water	" " " " "
4.30 p.m.	Cup of Milk	8 ozs.
7 p.m.	Cup of Milk and Water	2 ozs. in 8 ozs.

2) Milk Diet.

5.30 a.m.	Cup of Milk	6 ozs.
8 a.m.	Small plate of porridge and milk.	
11 a.m.	Cup of Milk	6 - 8 ozs.
1.30 p.m.	Small plate of milk pudding with milk (Rice, arrowroot, or sago).	
4.30 p.m.	Cup of milk	6 - 8 ozs., with a thin slice of dry toast ($\frac{1}{2}$ oz.)
7 p.m.	Cup of Milk	6 - 8 ozs.

3) Light Diet.

- 5.30 a.m. Cup of Tea and $\frac{1}{4}$ slice of bread and butter.
- 8 a.m. Plate of porridge with milk, cup of tea, and $\frac{1}{2}$ slice of buttered toast, and $\frac{1}{2}$ slice of bread and butter.
- 11 a.m. Cup of milk or coffee, $\frac{1}{2}$ slice bread and butter.
- 1.30 p.m. Fish, chicken, rabbit or tripe (4 - 6 ozs.)
Plate of chicken soup, and a very small plate of pudding and $\frac{1}{4}$ slice of bread.
- 4.30 p.m. Cup of tea with $\frac{1}{2}$ slice buttered toast and $\frac{1}{2}$ a slice of bread and butter.
- 7 p.m. Cup of milk or coffee with $\frac{1}{4}$ slice of bread and butter.

Roast apples given with Light Diet early.

S U M M A R Y.

In analysing the findings of these 25 cases, the most important points are as follows:-

1) That the renal efficiency tests show immediately whether a case of Functional Albumenuria is being dealt with, or a case of true Nephritis.

2) That the general clinical condition of a patient gives little or no information, but that in following a case/

case of nephritis, we must consider the three following conditions together:-

- (a) The general condition of the patient.
- (b) The physical state of the cardio-vascular system.
- (c) The results of the three biochemical tests.

3) That the renal efficiency tests done once only are of little value. It is only after doing these several times at regular intervals that one can arrive at anything like a correct prognosis.

4) That doing one test alone even several times is not sufficient to find the true state of the kidneys. In one case the blood urea retention may be persistently unsatisfactory while the other two tests are normal, and vice versa.

5) That the phenolsulphonephthalein test is in itself not of much importance, but that with the other two tests it is a useful control. Its usefulness is diminished by the great liability to fallacies.

6) That in all cases where the blood urea retention remains persistently high, or the urea concentration test is always below 2%, the prognosis is grave.

7) That in an early case of nephritis where there is little cardio-vascular disturbance, and where the tests - even though unsatisfactory at first - rapidly become normal, the prognosis is good.

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8) That the cardio-vascular system is sometimes very markedly affected where the amount of renal deficiency is small and that one must not come to the conclusion that when a patient has a high blood pressure, albumen in his urine, and a few casts, that his kidneys are greatly affected.

9) That surgical interference however slight is contra-indicated in any case where there is marked renal deficiency. The great importance of these tests, especially the blood urea retention test, to the surgeon.

10) That although in the case of decapsulation mentioned in my cases, was not a success, this method of treatment should be carefully considered in certain nephritics. It is of no use however in cases of chronic interstitial nephritis. It should not really come under the heading of surgical interference, as at the present time, no other satisfactory treatment has been discovered. *for nephritis*

11) That a very high blood urea retention does not necessarily mean the patient is going into uraemia.

12) That these tests are the only sure guide to treatment in a case of nephritis.

13) That the renal efficiency tests are of immense value not only to the medical profession, but in every walk of life.

The following books and papers were consulted:-

1. Kast and Wardell - Arch. Internal Med. 1918, November.
 2. O'Hare - Journal A. M. A. 1919, July.
 3. American Journal Med. Science. 1918, November.
 4. Mason Am. Journal Med. Science. 1918, December.
 5. Quarterly Journal of Med. 1919, July.
 6. Journal of A. M. A. 1918 L. XXI.
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