Section of Urology

President—Professor CHARLES WELLS

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Studies in Chronic Retention

PRESIDENT'S ADDRESS

By Professor CHARLES WELLS

IN my Unit, we have, for three years, been considering renal function in prostatism and other obstructive states. This is an account of a small group of patients studied in considerable detail over a period of a year, certain of the cases having been followed for a longer period. The labour of research has been borne chiefly by Mr. Raphael Marcus. The operative procedure has, in all cases, been that advocated by Mr. Wilson Hey, with certain minor modifications. No patient has been refused operation, and cases of complete obstruction have been dealt with by immediate prostatectomy without preliminary catheterization. Intravenous pyelography has preceded surgery in all cases.

The smooth convalescence usual after the Wilson Hey procedure has enabled us to make comparable observations in all our cases.

Availing ourselves of the evidence of intravenous pyelography we have for our own purposes classified our cases pre-operatively into:

(1) Those in whom the upper urinary tract is normal, or almost normal.

(2) Those in whom there is a marked degree of hydronephrosis due to back pressure, and

(3) Those in whom there is such back pressure that there is no renal shadow and very little evidence of any excretory activity visible in any part of the urinary tract.

It is surprising that with even the highest degrees of chronic retention we have found a number of cases with completely intact upper urinary tracts.

The following are four striking examples:

CASE I.—W. H. M., aged 72. He reported with his bladder distended to above the umbilicus and he looked gravely ill. His intravenous pyelograms disclosed a normal upper tract.

CASE II, F. R., and CASE III, J. D., were two patients who were catheterized in Canada for the relief of chronic retention which had become complete. They crossed the Atlantic without mishap with catheters tied in and successfully underwent prostatectomy. The anatomy of the upper tract was normal.

CASE IV.—C. C. W., aged 65. This patient was rushed into hospital because of his greatly distended bladder. Intravenous pyelograms showed normal kidneys (*see* Fig. 1 which illustrates this case and is typical also of the other three).

It is of interest that two of these patients actually crossed the Atlantic with catheters tied in the urethra and arrived in this country in perfect condition. I think it is a fair assumption that their easy journey was due to the fact that their kidneys and ureters were intact. Two other assumptions follow. Firstly, that patients fortunate enough to have suffered no renal damage due to back pressure should do well whatever the basis of their operative treatment, and, further, that to subject such patients to a tedious two-stage procedure because the bladder is dilated is unjustifiable and a waste of time.

When the figure is available at the time of pre-operative assessment it will be found that these patients, even with a high degree of bladder distension, mostly have a relatively low blood urea. In the two non-catheterized patients described, the figures were 35 mg.% and 38 mg.%. The condition is a clinical entity which should be carefully considered because of its favourable operative prognosis.

The intermediate group in which there is a moderate degree of back pressure is naturally not easy to define. Amongst the examples which I quote is one which demonstrates that a low blood urea alone is not proof of an intact upper tract.

CASE V.—C. W. H., aged 71, had had overflow incontinence for six weeks. His blood urea was 35 mg.%. Intravenous pyelograms at five minutes revealed no collection of "Pyelectan". At fifteen minutes the dilated calyces were seen and the pyelogram at thirty minutes showed gross hydronephrotic changes and tortuous and dilated ureters (Fig. 2). Figs. 4 and 5 show his progress after operation.

How this change in the upper urinary tract becomes established is a matter about which we have insufficient evidence to be dogmatic. We have attempted a few experiments in producing reflux up the ureters both in man and experimental animals. So far as our evidence goes it suggests that the intact ureter does not allow fluid to be forced up and it suggests further that in the prostatic subject, once the process starts, there is a preliminary period in which the lower ureter only is dilated. We think it likely that once established this progresses relatively quickly to affect the whole ureter, including the renal pelvis, with the production of hydronephrosis. My impression is that blood ureas are normally either below 40, indicating little back pressure, or up to 100 or more, indicating hydronephrosis. Few are caught in between. I am not prepared to place much emphasis upon the significance of the preliminary stage of back pressure change, except in so far as it elucidates the mechanism of production of hydronephrosis and the ascent of infection to the kidney level. Fig. 3 (*a*) (Case VI) shows an example of ureteric reflux and (*b*) the increased back pressure caused by attempting micturition with the urethra clipped.

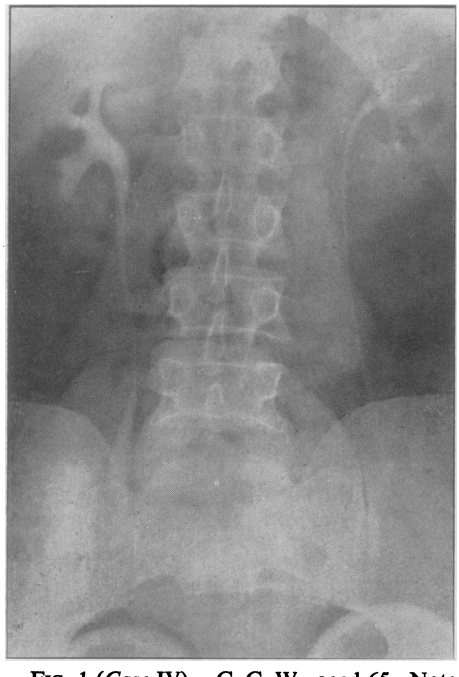

FIG. 1 (*Case* IV).—C. C. W., aged 65. Note bladder distended to level of interspace L 3/4 with anatomically normal ureters and kidneys.

FIG. 2 (*Case* V).—C. W. H., aged 71. Gross dilatation of the upper tract associated with chronic retention due to enlargement of the prostate. Film at thirty minutes after injection of dye.

Altogether there have been amongst our cases, during the relevant year of research, 28 with such a degree of residual urine as to qualify for the description of "chronic retention". 80 to 100 ounces of urine have usually been found in the bladder. Of these 28, 5 have fallen into the first category with normal pyelograms, 16 into the second with dilated pelves, and 7 into the third with no demonstrable function. Every case has been subjected to operation, 9 as emergencies[1] without previous investigation, other than intravenous pyelography, and 19 as elective procedures. Of 18 consecutive cases operated upon by me personally none has died. (One other prostatectomy, a known carcinoma who had failed to respond to stilbœstrol, did die. His death was due to dehydration with œdema.) Of the 10 operated upon by others of the team one died. He was too ill to co-operate and could not be got out of bed. He developed hypostatic pneumonia to which he succumbed. He was one of the 7 in the small third group, with no demonstrable function. He should have been refused prostatectomy because of his inability to co-operate (Wells, 1949).

[1] These do not represent all the patients operated upon as emergencies. Simple acute retentions without previous chronic retention are not included in this study.

When we realized what a uniform and smooth convalescence could with confidence be expected in these cases we decided to intensify our investigations during and after the time of operation.

It will serve our purpose best if we turn now to illustrate this by describing in detail one of the patients whose X-ray, Fig. 2, has already been shown above.

C. W. H. (Case V), aged 71, had had overflow incontinence for six weeks. We have already seen in fig. 2 the hydronephrosis present before operation. His blood urea at that time was 35 mg.% Fig. 4 shows his pyelogram eighteen days after prostatectomy. Fig 5 is one year after operation. His blood urea was then 29 mg.%

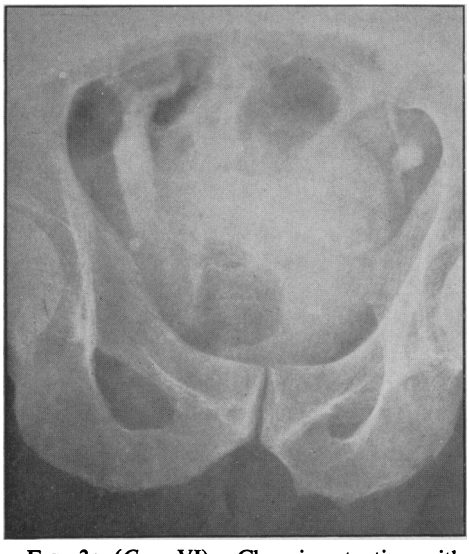

FIG. 3A (*Case* VI).—Chronic retention with reflux up the right ureter.

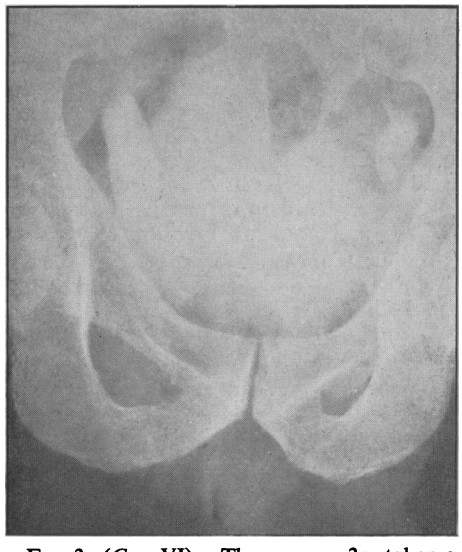

FIG. 3B (*Case* VI).—The same as 3A, taken a few moments later, on attempting to micturate with the urethra clamped. Increased ureteric reflux is demonstrated.

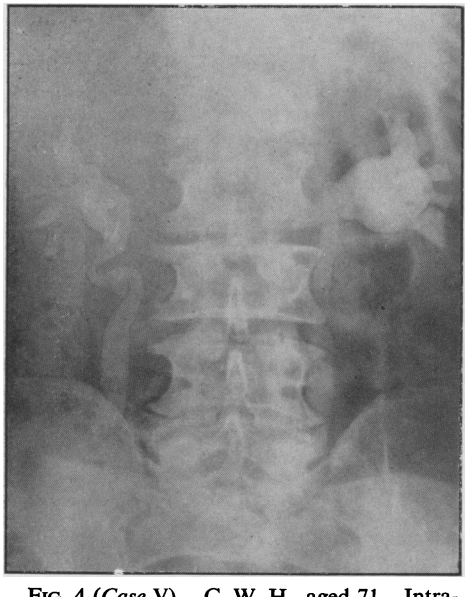

FIG. 4 (*Case* V).—C. W. H., aged 71. Intravenous pyelogram showing improved condition of upper tract eighteen days after operation.

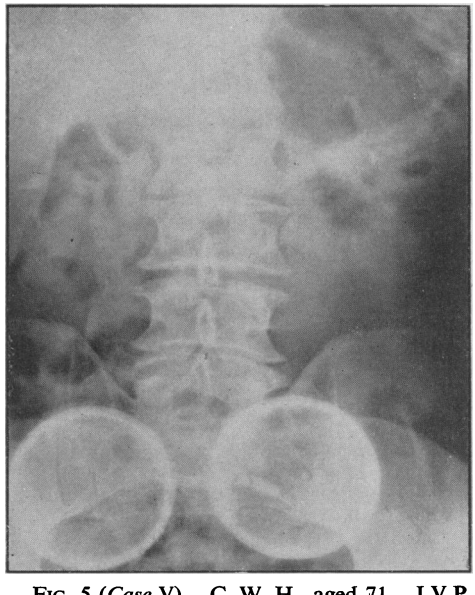

FIG. 5 (*Case* V).—C. W. H., aged 71. I.V.P. Ten minutes after injection of dye one year after prostatectomy.

Probably the most impressive single fact in this case is the amount of recovery which has taken place in the previously dilated upper urinary tract. The blood urea was never seriously raised and fluctuated very little. Although it has come down the change was not great. The change in his general condition has been quite remarkable. At the time of operation there was marked œdema of the legs below the knee, and this cleared rapidly during the first few days. This is a phenomenon which we have observed in a small number of cases. In one in particular (Case VII, G. M., aged 74) both legs were very heavily waterlogged and there was œdema round the pelvis and sacrum. The urinary output, without forcing fluids, during the first few days was as follows: First day – 108 oz., second day – 142 oz., third day – 130 oz. Within one day the œdema of the legs had disappeared. The blood urea was 120 mg.% at operation ; 50 mg.% next morning ; and 45 mg.% forty-eight hours after prostatectomy.

It would appear that in the presence of prostatic obstruction water can be voided from the bladder only at a certain rate and therefore in a certain limited total quantity in the course of twenty-four hours. Any excess of water becomes locked up in the tissues as œdema. The moment the obstruction is released the fluid shifts back from the tissue spaces into the circulation and is voided with a consequent diuresis out of proportion to the fluid taken by mouth.

The very striking change in the pyelograms in the case I have just described is characteristic of the patients in whom there is demonstrable function with some back pressure.

In Case VIII (Mr. D., aged 68) Fig. 6 shows the condition before operation (A) and ten days after operation (B). Case IX (Mr. L.) had a large diverticulum which we were able to remove cleanly and completely.

The opportunity to do this at a first-stage operation is a great advantage, since the diverticulum becomes gravely infected in the course of catheter or suprapubic drainage. Once infected, its removal is fraught with difficulty and, indeed, with danger.

One of the most striking examples of rapid recovery of renal and ureteric anatomy is instanced in Case X, K. W. P. (Fig. 7 A and B). The very considerable degree of improvement within a period of five weeks in this case is most striking. Another feature of the case, however, points an even more important lesson. During his convalescence he developed a severe urinary infection with *Bacillus pyocyaneus*. In the presence of dilated ureters this infection ascended rapidly to the kidney level and with a sharp rise in temperature he became oliguric and then virtually anuric. His blood urea rose from 40 to 120 mg.%. The organism was tested for streptomycin sensitivity and a course of that antibiotic immediately instituted. At the end of the first six-hour period the urine was almost sterile and after each of the two ensuing six-hour periods it was completely sterile. Concurrently with this bacteriological improvement the general condition became better, and the excretion of urine was resumed. The infection relapsed after the withdrawal of streptomycin but not at the kidney level, and there was no further check to the excretion of urine.

Here was a clear example of surgical kidney. The advent of pyelonephritis was associated with depression of renal function and in the old days would have proved fatal. Not only does the case illustrate the value of streptomycin in relieving this previously fatal condition, but it also suggests strongly that failure of renal function is not due to rapid decompression but to the introduction of sepsis. Amongst the cases which we have observed in our own service and that of others, we have seen a number of other examples of patients in a precarious state with mounting blood urea and diminished urinary output associated with infection. In every instance the fact that the failure of renal function was due to infection has been made immediately clear by the rapid response to streptomycin. In some instances where preliminary drainage had been instituted, the improvement after streptomycin enabled the surgeon to proceed at once, and successfully, to the prostatectomy at which he had baulked in the beginning when the case was uninfected. (When sepsis has been checked with streptomycin it may be necessary to act quickly before a relapse occurs.)

It is not my purpose to discuss the merits of streptomycin in the management of urinary sepsis, but to demonstrate how the control of infection is followed by a return of renal function.

Here is a further example:

Case XI.—T. C. W., aged 68. This patient was admitted with retention of urine and cystitis following previous catheterization. His blood urea was 42 mg.% and culture of urine grew *Staph. aureus*.

20.6.48: Prostatectomy with closure of bladder.

28.6.48: Blood urea 107 mg.%. Culture of urine—*B. pyocyaneus* and *B. proteus*. Colonies too numerous to count. Both organisms inhibited by streptomycin, 32 units per millilitre.

29.6.48: Patient's condition deteriorating. Rigors and anuria. Streptomycin treatment commenced.

30.6.48: Culture of urine sterile. Blood urea 228 mg.%.

7.7.48: Blood urea 57 mg.%. Condition much improved.

18.11.48: Sterility of urine maintained. Blood urea 33 mg.%.

The next feature to which I wish to draw attention is the change in blood-urea figures after the relief of prostatic obstruction, and more particularly the rate at which that change occurs. Up to a few years ago I had always imagined that blood urea moved rather slowly and that under catheter or suprapubic drainage it was desirable to take readings at intervals of about a week. I imagined that by comparing these readings one could construct a graph which would show roughly the improvement in the case under consideration. It is now apparent that such a conception is quite valueless. Blood-urea levels change not from week to week, nor yet from day to day, but from hour to hour. In order to obtain a true picture of the relief of azotæmia following the relief of obstruction it is necessary to take very frequent readings. I have already quoted one example (Case VII, G. M.).

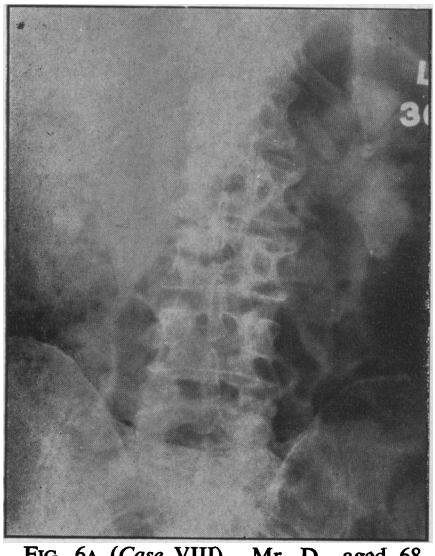

FIG. 6A (*Case* VIII).—Mr. D., aged 68. Condition of upper tract before prostatectomy.

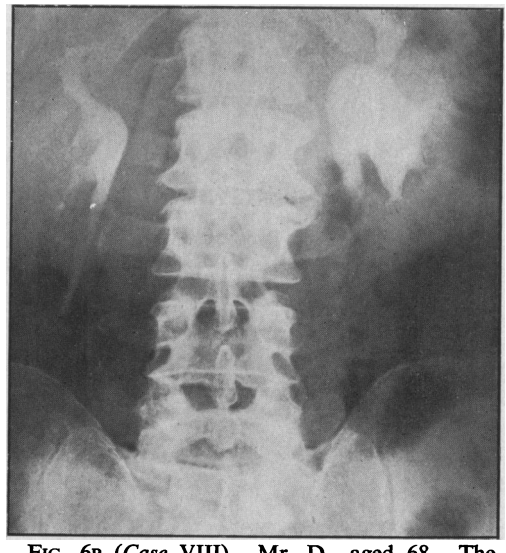

FIG. 6B (*Case* VIII).—Mr. D., aged 68. The same case ten days after operation.

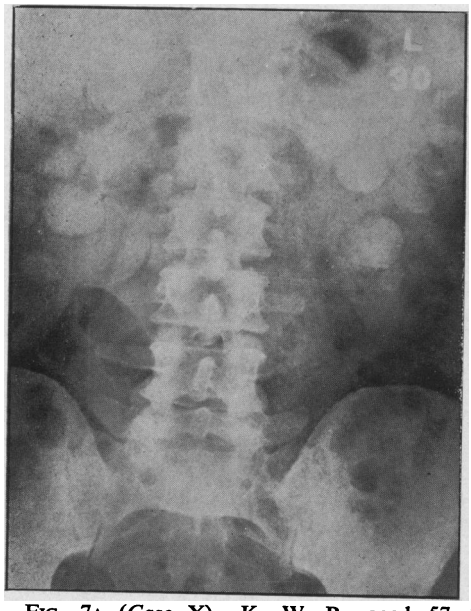

FIG. 7A (*Case* X).—K. W. P., aged 57. I.V.P. at thirty minutes after injection, before prostatectomy.

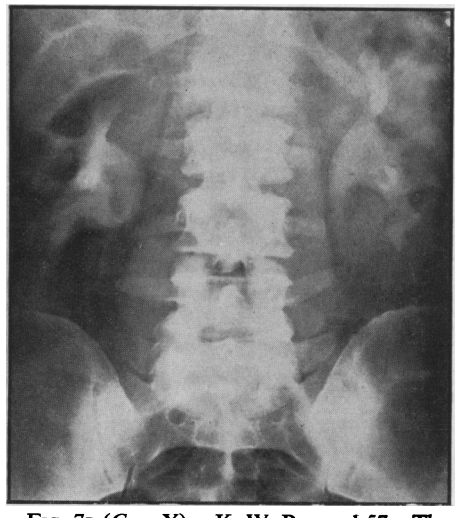

FIG. 7B (*Case* X).—K. W. P., aged 57. The same as 7A. Five weeks after operation.

I cannot better illustrate my point than by describing 3 of the most advanced cases of chronic retention with which we have dealt.

CASE XII.—C. W., aged 63, had had slight nocturnal incontinence for four years. His general condition was poor with urinary urea 0·9 grammes %, and blood urea 115 mg.%. The day after prostatectomy the blood urea rose to 150 mg.%. The following day it was back to 115 and the day after that down to 90 mg.%. One year after the operation the blood urea was stable at 57 mg.%, the urinary urea was unchanged and the kidneys just visible in i.v.p.

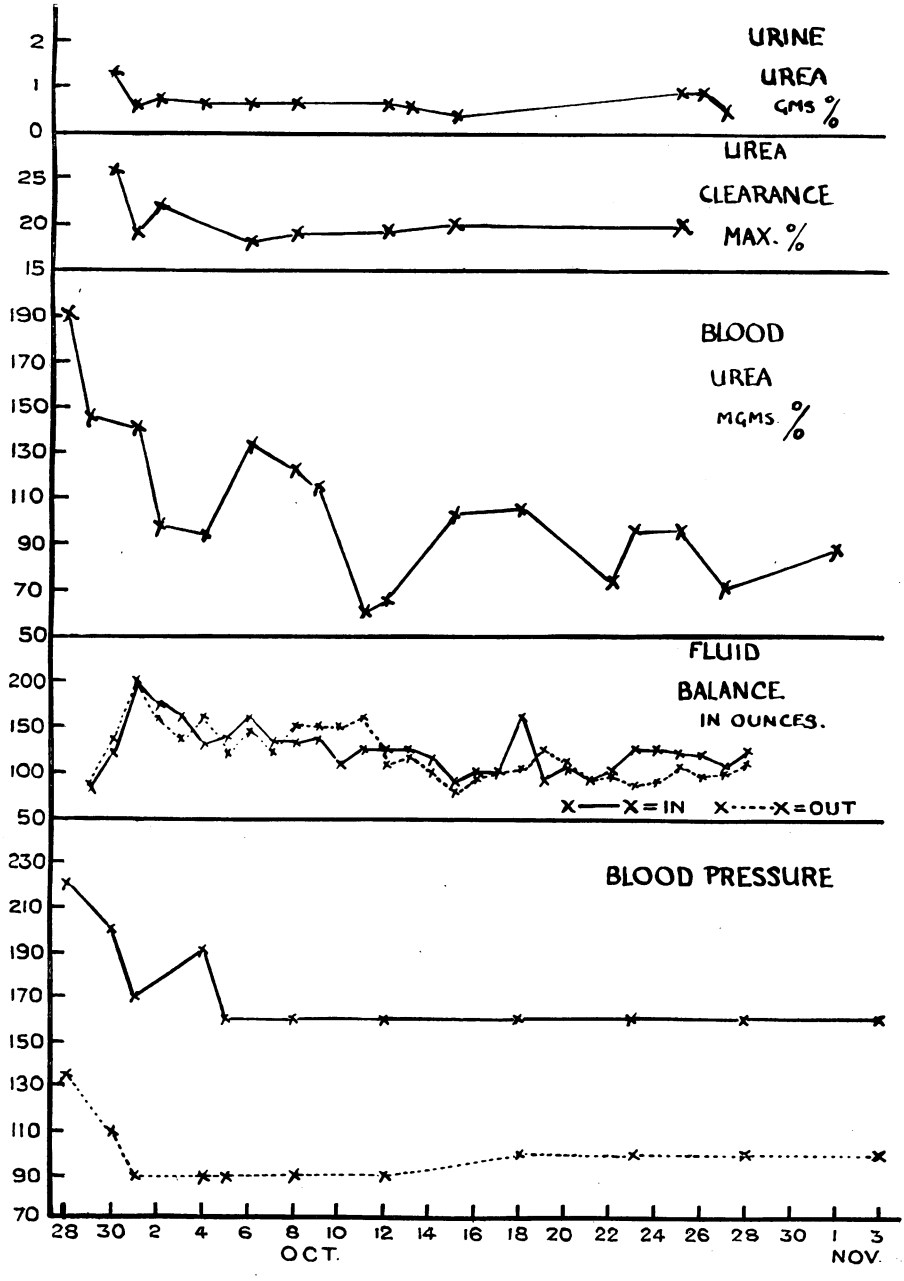

TABLE A (*Case* XIII).—J. B. N., aged 64. Note the rapid rate of fall of blood urea during the first forty-eight hours in association with forced fluids and free diuresis. The percentage urea in the urine remains steady throughout. This patient was able for discharge fourteen days after prostatectomy but was retained for further observations to be made.

CASE XIII.—J. B. N., aged 64, had had overflow incontinence and uræmic dyspepsia for one year. Before operation his blood urea was 190 mg.%, and the intravenous pyelogram showed no function at all. Prostatectomy was performed and the next day the blood urea was 146 mg.%. One year after prostatectomy the blood urea is stable at 100 mg.% with urinary urea 0·7 gramme%; no residual urine but a mild persistent *B. coli* infection. Almost nothing is visible in the i.v.p. but the patient is well and working (*see* Table A).

CASE XIV.—E. J. E., aged 78, had had overflow incontinence and generalized œdema for nine months. Vitamin-C deficiency and senile Parkinsonian tremor were manifest. Blood-urea levels immediately before and after prostatectomy (i.e. at an interval of only two hours) were 160 and 130 mg.% respectively. The intravenous pyelogram before operation showed no function. There was a greater urinary output than fluid intake in the post-operative period, the œdema disappearing rapidly. Six months after operation the blood urea was still 105 mg.%, but improved to 72 mg.% on increasing the daily fluid intake by three pints. There was a persistent infection with *B. pyocyaneus* (*see* Table B).

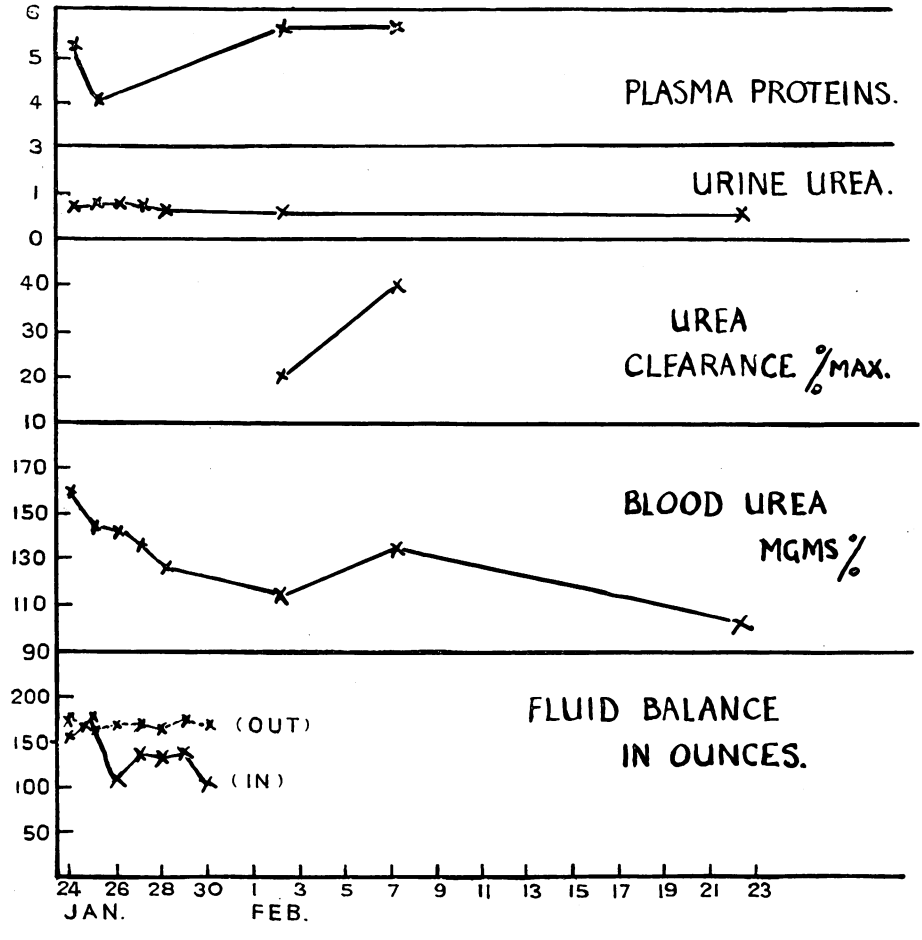

TABLE B (*Case* XIV).—E. J. E., aged 78. Note the rapid fall of blood urea in the first few days with free diuresis in marked excess over the fluid intake but associated with rapid disappearance of œdema.

It is important to realize that in these cases the improvement in the blood-urea levels, that is the relief of azotæmia, is due not to an improvement in renal function so much as to the fact that the urine can be got away. Once the obstruction is relieved it is possible to pass water through the kidneys almost as though they were simple dialysing membranes. The level of urinary urea does not rise during the period of observation. The clearance of waste products from the blood is effected by heavy diuresis.

The sensitivity of blood-urea readings to variations of fluid intake was well illustrated in a patient who had a nephrectomy for tuberculosis. The remaining ureter became obstructed and the ureterostomy was needed as a life-saving measure. This gave relief

only so long as a copious fluid intake was maintained. Shortening of the fluid intake was reflected within a few hours by a sharp rise in the blood urea.

The extent to which this diuresis needs to be pushed in prostatism has not been sufficiently realized hitherto. Once the obstruction has been relieved, provided the patient is not suffering from chronic interstitial nephritis, and provided that he has not got pyelonephritis, fluids can be given in almost unlimited quantities without any danger of drowning.

The amount of fluid required during the first few days in order to ensure a rapidly and steadily falling blood-urea level is so great that it cannot possibly all be taken by mouth, and intravenous therapy is an essential part of the management of these very severely damaged cases. Ten and eleven pints of fluid in twenty-four hours are the highest figures which we have hitherto given and it has been remarkable in the cases in which these large quantities have been prescribed to observe a fading away of existing œdema rather than an appearance of new œdema.

On the question of electrolyte balance, I will merely say that there is a risk both of giving too much sodium chloride and of giving too little sodium chloride. If too little is given a state of alkalosis appears and urea is retained in the circulation. If too much sodium chloride is given the kidney is unable to get rid of it, and large quantities of fluid are retained in the body as œdema in order to look after the excess of salt. It is indeed possible in these cases, we believe, to have œdema of the intercellular tissues with an excess of chloride, and at the same time to have dehydration of the cellular organs. This state of affairs exists because the total electrolyte content of the cell is stable and in order to remain in something like isotonicity with the surrounding tissues the cell has to give up fluid. (Compare the crenation of red blood cells when placed in hypertonic saline.) The clinical picture of this state is one of œdema with a dry rough skin and a dry mouth. In spite of the presence of œdema these patients are in urgent need of fluid which should be given in the form of 5 or 6% glucose. Another thing to remember is that in the presence of very heavy diuresis chlorides may be excreted from the body in large quantities. It is necessary, therefore, in the management of these patients to keep an eye upon the chloride level and this is most easily done by estimating the amount coming away in the urine by the simple drop technique of Fantus (1936.)

If the chloride situation is satisfactory, the governing factor in the amount of fluid required is the percentage of urea found in the urine. A simple mathematical equation will enable one to estimate the volume of urinary output required to get rid of the daily intake of protein, and at the same time to carry off a portion of the accumulated excess of nitrogenous waste products.

I have discussed three cardinal points in the maintenance of good renal function, namely the relief of obstruction, the control of infection and the supply of adequate fluid. There is one other factor of great importance. The blood supply to the kidney must be maintained at an adequate pressure. We have long suspected that a severe fall of blood pressure associated with the operation may interrupt the output of urine and that its re-establishment may take an appreciable time which the uræmic patient cannot afford. Whether or not this is true, we can at least demonstrate the effect of careful blood-pressure control during and after the operation.

Our anæsthetic technique is based on the desirability, indeed the absolute necessity as we think, for maintaining an even blood-pressure level. We do this by means of a continuous intravenous drip containing adrenaline in a solution of 1/250,000. By adjusting the rate of the drip it is possible to control the systolic blood pressure with a very considerable degree of nicety (*see Brit. J. Anaes.*, 1949, **21**, 182). Using this technique we have again and again demonstrated the continued excretion of indigo-carmine from the kidney during the operative procedure. In a series of 20 cases, there was little or no difference in the time taken for excretion of dye during operation, compared with the intervals observed before and after operation.

Since using this technique we have similarly observed repeatedly the output of very large quantities of water in the hours immediately following the operative interference. We have demonstrated that with careful management renal function is not interrupted by the operation and this is constantly reflected in the immediate post-operative fall in blood-urea levels when previously raised and the absence of any rise when previously normal.

The anæsthetist gives a spinal anæsthetic and in addition we like our patients to be asleep with a little pentothal. I have no doubt that there are other satisfactory anæsthetic combinations, but by employing the means I have described, viz. pentothal, spinal and adrenaline, we ensure a number of desiderata:

(1) We get complete relaxation. The spinal anæsthetic is controlled so as to extend to about the level of the umbilicus.

(2) We get a peaceful patient who is not worried by the operative procedure.

(3) We get a relatively dry field in spite of maintenance of a steady blood-pressure level.

(4) We have an anæsthetic which, once given, lasts for a couple of hours so that there is no need to hurry the operation and nothing to be gained by getting away quickly.

(5) The patient recovers consciousness and recovers the use of his legs in an orderly and gradual fashion with the minimum of excitability and post-operative disturbance.

What I have said really completes my case. We began this work with a view to finding out what happens in the patient with chronic retention who has his prostate removed. We started with certain preconceived notions which we were anxious to test. Our theories were:

(1) That renal failure due to obstruction could best be relieved by immediate and complete removal of that obstruction. All our observations have confirmed this belief. Incidentally, on opening the bladder we have often seen a deep flush over its whole surface and a readiness to bleed from the surface of the prostate. We have often seen fountains of water coming down the ureters, but we have never seen any blood come down them.

(2) That interruption of the favourable course of events after the relief of obstruction is due to some intervening cause of which sepsis is the most probable. This is a somewhat difficult thesis to substantiate beyond all question, but our experience with streptomycin in ascending pyelonephritis has satisfied us of the validity of the contention. An episode of low blood pressure is the second most probable cause.

(3) That given a known level of urinary urea and blood urea it should be possible to estimate the amount of fluid necessary to produce a steady improvement in the level of waste products in the blood. This we have found to be the case, and in studying this notion we have learned a great deal about the sort of care it is necessary to take in the management of the balance of fluid in these patients.

Certain other interesting points have emerged from our studies. We have now followed some of these patients for about two years. We have observed the steady improvement in their general condition and we have taken repeated samples of urine and repeated readings of blood pressure. We have satisfied ourselves that rapid and valuable recovery of renal function is possible in patients whom we would include in our middle group. It seems equally clear that those falling into the third group never recover concentrating power and depend entirely upon free diuresis for the adequate clearance of waste products from the blood-stream. In these cases, high blood-urea levels may persist for many months, but are compatible with a comfortable and useful life.

The urinary samples show us that the patients who leave hospital with a sterile urine remain sterile. Of the remainder who leave with infection, the infection persists in 4 out of 5 cases. In one case we have observed infection cause a gradual deterioration ending in death from insidious ascending urinary sepsis at the end of about a year. We think it probable that patients who show persistent sepsis three months or even less after prostatectomy should be readmitted to hospital, fully investigated, and subsequently treated by every known means with a view to clearing their urine.

In passing, and in regard to sepsis, we have reviewed our notes in order to clear up a point of doubt which is repeatedly arising in conversation, namely whether the patient with chronic retention is likely to have a sterile or an infected urine. A review of our cases has confirmed our contention that with very few exceptions the urine is sterile in chronic retention and in prostatics generally, unless there has been previous instrumentation. In relation to this point I would point out that we have not refused operative interference in any of our cases on account of previous catheterization although we deplore it and think it should be avoided whenever possible. The previously catheterized patients have certainly given us more trouble than the others. In this connexion I might mention the post-mortem findings in a patient with severe chronic retention who was cystoscoped for diagnostic purposes: he died from pyelonephritis within a few days of this simple examination. We have, during the period under review, seen more than one other case in which catheterization in chronic retention without any further interference has led to a fatal issue. It is our belief that these simple procedures are dangerous for the reason that the obstruction to the neck of the bladder is not removed and recurrence of retention with massive reflux up the ureters is a very likely sequel.

These last observations I have made as a reminder that the more conservative approach to these cases is not itself without danger. I am, however, fully aware that if the same rules of management which I have described are applied we may hope to see equally favourable improvements in the upper urinary tract following the relief of obstruction by other techniques than those I have described and with different timing. My purpose was not to discuss the technique of the operation, nor even to debate the relative merits of single versus staged procedures, but to describe the changes which ensue when obstruction has been relieved.

My last word but one has to do with blood-pressure levels. I came to this work with a preconceived notion that in chronic retention the blood pressure was raised and that following its relief the tendency was for the blood pressure to fall to a lower level. In the cases under review the results have been so capricious that I now feel at a loss to predict the change likely to occur. For every two that have gone down, one has gone up to a higher level (Table C).

TABLE C

		Blood pressure in mm.Hg		
No.*	Name	Before operation	On discharge or one month after operation	Six to eighteen months after operation
1	J. G. F.	120/80	180/90	220/120
2	J. B. N.	220/135	170/100	170/110
3	C. W.	230/130	140/85	170/100
4	J. W. B.	120/80	110/75	170/110
5	W. E. K.	200/100	170/90	250/90
6	K. W. P.	130/100	110/75	160/90
7	A. W. D.	150/70	120/80	150/80
8	E. T.	190/90	160/90	170/90
9	B. C.	140/80	120/80	160/70
10	L. W. D.	215/110	190/110	190/110
11	M. M.	220/110	190/100	190/110
12	J. J.	145/80	130/80	130/90
13	W. S.	170/110	140/100	200/120
14	C. W. H.	200/90	160/80	180/90
15	Mr. L.	170/100	120/70	140/80
16	C. C. W.	160/110	160/110	200/110
17	T. B.	260/145	200/120	Died
18	E. J. E.	240/130	200/110	220/90
19	H. O.	190/100	135/90	170/100
20	J. F.	200/100	180/90	140/90
21	J. M.	165/90	Died	—

* The case numbers in this Table do *not* accord with those given elsewhere in the text.

I must finish by sounding a note of warning for any who may feel disposed to take a more radical approach towards their prostatic problems. I believe there is one contra-indication which is likely to defeat the surgeon no matter what technique he employs. I speak of the arteriosclerotic patient who is incapable of co-operation. Any procedure which involves post-operative apparatus of any kind is likely to get us into trouble with cases of this character, and so far no one has devised any operation for the prostatic patient which does not involve some sort of apparatus. Probably transurethral resection most nearly approaches this ideal

Whatever is done, the operation is only a step in treatment. After-care, immediate and remote, is all-important and there is no field of work in which close attention to detail will prove more rewarding. Many workers such as Cook, Creevy, Lane, and D. K. Rose have kicked against the bogey of slow decompression. Wilson Hey has provoked us to further thought and further enquiry. I hope the studies here presented will be adjudged a useful and objective contribution.

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