RETENTION OF URINE

MODE OF PRESENTATION AND ITS SURGICAL VALUE

BY

J. A. LLOYD DAVIES, M.B., B.S., F.R.C.S.

Senior Surgical Registrar, West London Hospital

Now that immediate prostatectomy for acute on chronic retention of urine and retention overflow is a feasible and accepted method of treatment, the clinical and urological assessment of such patients before operation must be adequate if disappointment and catastrophe are to be avoided.

During the selection of such cases for immediate prostatectomy an impression was gained that patients with acute on chronic retention and retention overflow presented generally with a higher proportion of urological and medical complications than did those with chronic retention of urine. In an endeavour to prove whether this was so, a review was made of a series of 117 consecutive patients admitted to hospital for treatment of retention of urine due to prostatic obstruction. The cases were separated into the clinical groups of acute retention, chronic retention, acute on chronic retention, and retention overflow. The presentation and the assessment of each group were analysed and compared. Marked urological and clinical variations were found between the groups. Although the series was not large, enough evidence was obtained to confirm that from both the urological and the medical aspects patients with acute on chronic retention and retention overflow were worse surgical risks to a significant degree than were those with chronic retention of urine.

The series was drawn from a fairly circumscribed town population over a period of two years, the patients being treated in two general hospitals, one of which had available a number of beds for chronic cases. There were admitted to this hospital some patients who, because of the coexistent infirmities of old age, might not have found a ready welcome in the acute surgical wards of a hospital with a rapid turnover of beds. In this way the series may be regarded as containing an adequate cross-section of cases. The non-progressive and almost non-obstructive type of prostatic enlargement, with no dysuria or residual urine, described by Chapman (1949), and for which expectant treatment is sufficient, is not included in this series.

General Presentation

The manifestations of uncomplicated urinary retention centred on the distension of the bladder. Thus, in general, frequency, urgency, and precipitancy were complained of, and the actual obstruction to the outflow of urine caused hesitancy, dysuria, or a poor stream. When complete retention supervened, the duration and speed of onset of any previous gradual distension of the bladder had a direct relation to the extent of the patient's awareness of his bladder state. This relationship has been expressed as: (a) acute retention—agony; (b) chronic retention—ignorance; (c) acute on chronic retention—discomfort. To make the clinical quartet complete there may be added: (d) chronic retention with overflow—annoyance. This summation is, of course, a general one, and it is appreciated that sometimes separation between groups is not clear-cut. Nevertheless, in practice clinical differentiation was not found difficult, as will be seen when each group is considered further.

In general it was noticed that the patients' ignorance of their painless increasing bladder distension was profound unless any acute episode arose, but that the concomitant symptoms associated with increasing residual urine and prostatic obstruction were often regarded as natural disabilities of middle and old age. Evasive action by the patient was not uncommon: self-restriction of fluids in the evening to avoid getting up to pass water during the night was often adopted. The patient's estimate of the diuretic effects of non-alcoholic or alcoholic fluids varied, and seemed to depend upon individual tastes. In many cases medical advice was not sought until complete inability to micturate, incontinence, haematuria, or urinary infection drove or frightened the patient to this end. This may be partly the reason why 73 (62%) of the 117 cases in this series were admitted to hospital as emergencies. Patients admitted for elective surgery were thus well in the minority.

The average age in the whole series was 68 years. That their urinary troubles should often have been accompanied by illnesses common in old age was understandable. Urinary tract complications were also only too commonly found. These factors are so important that presentation of the four different clinical groups is best considered separately

1. Acute Retention of Urine

This group contained only three cases (2.5%), with an average age of 66 years. This is perhaps a reflexion that alcoholic, dietary, or moral excess, beloved by textbooks as aetiological factors, are no longer very feasible or fashionable. That two of the three cases should have arisen after street accidents in which the patients had suffered soft-tissue injuries is perhaps more in keeping with the times. The third case had clot retention from severe bleeding from prostatic veins.

The suddenness of the obstruction gives the bladder no time to adapt, and the agony caused by its distension is exacerbated by muscular spasm. With palpation of the small hard tender bladder the clinical picture is unmistakable.

It should be added that operative relief of the organic obstruction was needed in all three of these cases. Two patients had noticed slight dysuria before admission to hospital, but none had had increased frequency of micturition.

2. Chronic Retention of Urine

The average age of the 41 patients (35%) in this group was also 66 years when elective treatment was undertaken. The classical features of chronic retention need no emphasis. It was, however, interesting that many patients in this group were confused about their frequency of micturition, regarding it as an ability to pass large quantities of urine, and thus considering it as good evidence of the adequacy of their urinary tract. When the bladder was palpable immediate diagnosis was possible, but otherwise measurement of the residual urine was undertaken. Complicating factors found in this and succeeding groups are discussed below, but emphasis may again be placed on the silentness of the bladder distension by the discovery that six of these patients with chronic retention were uraemic when they were first seen. Sometimes urinary symptoms were minimal, although the distended bladder was easily palpable, being on two occasions discovered during routine clinical examination prior to operation for other conditions.

3. Acute on Chronic Retention

In this stage of retention 58 patients (49.5%) were admitted, all as emergencies. Their average age was 72 years. While the discomfort of the retention was in some cases marked, in no patient was there such pain as to render history-taking impossible. Any difficulties rather arose from the clouding and confusion of uraemia or senility. It was rarely that symptoms of disturbed micturition were admitted to over a longer period than the previous three years. This is interesting in view of the disparity of six years in the average age of this group and the younger group of chronic retention. Only five patients gave a history of one or more

previous attacks of complete retention. In a vain attempt to limit their discomfort it was found that many had avoided drinking fluids for some hours before their admission. For this reason the clinical diagnosis of uraemia by the condition of the tongue was found to be most unreliable.

4. Chronic Retention with Overflow

There were 15 patients (13%) in this group, with an average age of 71 years. The diagnosis of chronic retention with overflow offered no difficulties. The bladder was easily palpable by reason of its gross distension, and the unceasing dribbling of urine was unmistakable. The general condition of these patients was much inferior to those in the other groups. They commonly presented with many complications of urinary retention, and all required urgent admission. Their condition was often pitiable—wet and stinking with infected urine, and fetid and dulled with uraemia. In no case had complete retention supervened once overflow incontinence was established.

Such was the general presentation in all four groups. Proper comparison is possible, however, only by individual consideration of their special features.

Numbers and Average Age of the Four Groups

	No.	Average Age
Acute retention	3 (2.5%)	66 years
Chronic	41 (35%)	66 "
Acute on chronic retention ..	58 (49.5%)	72 "
Chronic retention with overflow ..	15 (13%)	71 "

Mention has already been made of the small numbers in the group of acute retention. That their average age was the same as that of the group with chronic retention suggested that prostatic enlargement might have been present even in the absence of residual urine. Thus it is possible that such cases might have come into the category of non-progressive prostatic obstruction described by Chapman if spontaneous return of normal micturition had been achieved, a happy ending which was not obtained in the cases reviewed.

From comparison of the average age of the chronic retention group with that of the acute on chronic retention and chronic retention with overflow groups, it is tempting to infer that both these latter complications, arising at approximately the same age, occur as a result of parallel progress in untreated cases of chronic retention. In the absence of other evidence the occurrence of acute retention or superimposed overflow is presumably fortuitous, the anatomical arrangement of the prostatic block varying in its completeness.

Urinary Tract Complications

In this and the following sections the group of acute retention has been excluded, the smallness of their numbers rendering comparison unwise. The varying features of urinary tract complications found in the remaining three groups merit further consideration and comparison.

Urinary Infection

Some aspects of urinary infection as it occurred in this series have already been considered (Lloyd Davies, 1953). High figures of urinary infection were found in this investigation, and these were explicable only when the part played by previous catheterization was taken into account. The urine was regarded as infected when pus cells were found in it and when pathogens were grown on culture. The results were:

Total No. of cases	117	No. infected	31 (26%)
Uncatheterized ..	86 (73%)	" "	15 (17%)
Catheterized ..	31 (27%)	" "	16 (52%)

The infection rate of 17% occurring spontaneously is therefore more than doubled by previous catheterization.

It was found also that the frequency of any previous catheterization also exerted a profound effect:

No. catheterized once ..	13 (11%)	No. infected	3 (23%)
" " repeatedly ..	18 (15%)	" "	13 (72%)

Thus repeated catheterization is almost certain to result in infection of urine. Such infection is particularly grave in those patients in whom back pressure of urine in the

bladder has caused incompetence of the ureteric orifices with hydronephrosis and hydronephrosis to varying extent, for in such cases ascending infection is only too prone to occur. Three cases in this series were admitted with pyelonephritis, and in each case there was a history of previous repeated catheterization.

It was thought probable that infection would be most likely to occur in acute on chronic retention, since catheterization for the relief of this condition is commonly employed. The group figures show this to be correct:

Acute retention ..	3	No. infected	0
Chronic ..	41	" "	10 (24%)
Acute on chronic retention	58	" "	19 (33%)
Chronic retention with overflow ..	15	" "	2 (13%)

The proportion of mixed bacterial infections was also greatly increased in those patients who had been catheterized as opposed to those in which infection was apparently spontaneous. Of the 16 catheterized and infected patients, 12 had mixed infections and the remaining 4 had *Bact. coli* infections only. Of the 15 uncatheterized but infected patients, 5 had mixed infections and 10 had *Bact. coli* infections only.

Renal Damage

The state of function of the kidneys was generally measured in this series by blood urea estimation and by excretion pyelography. The blood urea levels obtained were:

	15-40 mg. per 100 ml.	41-69 mg. per 100 ml.	70+ mg. per 100 ml.
Chronic retention ..	25 (61%)	9 (22%)	7 (17%)
Acute on chronic retention ..	27 (47%)	17 (29%)	14 (24%)
Chronic retention with overflow	2 (13%)	6 (40%)	7 (47%)

The gradual shift to higher levels will be noted in the groups of acute on chronic retention and overflow retention.

Excretion pyelography was carried out in 75 cases. The incompleteness of this investigation throughout the whole series is accounted for by its omission in the earlier cases in the series treated by immediate prostatectomy, reliance being placed solely on the clinical picture and the blood urea level. Also, pyelography was not performed in the not uncommon cases of gross renal failure admitted to hospital as a terminal event in their illness.

The cases that did have excretion pyelograms done could be separated into the following categories:

Stage 1: Normal caliceal outline and function ..	44 (58.7%)
" 2: Mild hydronephrosis ..	13 (17.3%)
" 3: Gross hydronephrosis or absence of excretion ..	18 (24%)

The correlation of blood urea figures with pyelogram appearances (Table I) showed that a high blood urea level might be associated with normal caliceal outline and func-

TABLE I

Pyelogram Grading	Total No.	Blood Urea in mg. per 100 ml.		
		15-40	41-69	70+
Stage 1	44	29	12	3
" 2	13	4	5	4
" 3	18	5	5	8

tion, or, alternatively, that gross hydronephrosis or complete absence of dye excretion might coexist with a normal blood urea.

Elevation of the blood urea above the normal 15-40 mg. per 100 ml. therefore appeared to bear no direct and certain relationship to pyelographic function. The taking into account of such factors as the electrolyte and water metabolism were all-important for complete assessment, but even with these essential considerations the blood urea level by itself could be regarded as giving only an approximate level of renal embarrassment at any one time. Mention has already been made of the difficulties found in the clinical diagnosis of renal failure by the condition of the tongue, and it was also confirmed that there was no correlation between the size of the distended bladder or length of history and the extent of the renal damage.

Prostatic Pathology

Of the nine patients with carcinoma of the prostate proved histologically, seven presented with acute on chronic retention and two with chronic retention. No case of prostatic neoplasm presented with overflow retention, and malignant infiltration, if uncontrolled, is by its progressiveness most unlikely to permit such urinary leakage for any long period.

Other Urinary Tract Complications

The other urinary tract complications that were found are summarized in Table II. It will be seen that the ratio of these complications per patient is lowest in chronic retention, higher in acute on chronic retention, and highest in retention with overflow.

TABLE II.—General Urological Complications

	Chronic Retention	Acute on Chronic Retention	Chronic Retention with Overflow
Urinary tract infection ..	10 (24%)	19 (33%)	2 (13%)
Renal damage and uraemia ..	7 (17%)	14 (24%)	7 (46%)
Urethral stricture ..	2	2	1
Haematuria ..	3	8	3
Vesical calculi ..	4	0	0
Renal calculi ..	0	1	0
Prostatic calculi ..	1	1	1
Diverticulum of bladder ..	4	2	0
Ratio of complications per patient ..	0.75	0.81	0.93

tion with overflow. The figures for infection and renal damage are included for each group, and it will be seen that it is these latter complications which are responsible for the increased figures in acute on chronic retention and in retention overflow. When infection and renal damage are excluded there is no great variation in the urological complication rate between the groups.

Medical Complications

Those medical complications were recorded which had a direct bearing on the surgical and nursing management and on operative risk. They are summarized in Table III.

TABLE III.—General Medical Complications

	Chronic Retention	Acute on Chronic Retention	Chronic Retention with Overflow
Cardiovascular:			
Congestive cardiac failure ..	2	8	1
Auricular fibrillation ..	1	4	0
Aneurysm ..	0	2	0
Gross hypertension ..	1	7	1
Neurological:			
Hemiplegia ..	0	3	1
Mania ..	1	0	0
Tuberculous ..	0	0	1
Parkinsonism ..	0	1	0
Respiratory:			
Bronchitis and emphysema ..	2	4	1
Phthisis ..	2	0	0
Chronic empyema ..	0	1	0
Metabolic:			
Gross obesity ..	3	1	0
Senility ..	2	5	2
Anaemia ..	0	1	0
Ratio of complications per patient ..	0.34	0.63	0.46

It will be seen that patients with chronic retention of urine have a lower ratio of medical complications per case than the other two groups. It has already been pointed out that patients with acute on chronic retention and overflow retention were six and five years older than those with chronic retention on the average. The degenerative diseases are likely to be more advanced for this reason, and gradually increasing renal dysfunction during this time will certainly not ameliorate or slow down the progress of such diseases. It was in fact remarkable how some of these patients had

survived to reach the advanced age at which they presented. This hidden toughness in apparently frail old men was sometimes a definite credit feature in their final assessment.

Special Considerations

From this survey arose many points worthy of special emphasis. With the very small group of acute retention excluded, it was found that only 41 patients (36%) presented with chronic retention for elective surgery.

The remaining 64% were admitted as emergencies, with acute on chronic retention or retention overflow, and were six and five years respectively older than those with chronic retention. Not only for this reason might they be regarded as worse surgical risks, but also because of the higher incidence of urological and medical complications with which they presented. From the urological aspect this increased complication rate in acute on chronic retention and retention overflow was found to be due to urinary infection and renal damage, both of which often coexisted. The increased infection rate was directly related to previous catheterization, which more than doubled the rate of spontaneous urinary sepsis. Investigation of renal function showed the necessity for correlating blood urea figures with electrolyte and water balance and with excretion pyelography if assessment was not to be inaccurate.

Further Conclusions

The observations made in this series are no less important from the point of view of the practitioner. The desirability of prostatectomy needs no emphasis if this procedure is feasible. The present mortality from prostatectomy is as low as 3.5% (Millin *et al.*, 1949). Further progress in reducing the overall mortality of urinary retention must mainly come by increasing the number of cases in which safe prostatectomy is possible. This must therefore depend on earlier reference of patients for surgical treatment, before acute on chronic retention and overflow retention, with all their complications, have occurred. It has been shown that the diagnosis of chronic retention of urine is sometimes by no means straightforward. However, it is felt that any increase in the early discovery of this condition must in part come from the patients themselves. The natural disinclination of many to seek medical advice for apparently minor symptoms is perhaps enhanced by their memory of the horrors of permanent suprapubic drainage suffered by near relatives in the past. The dispelling of this fear can be achieved only by the excellent results of early treatment of early cases, an aphorism which applies to the management of retention of urine no less than it does to the whole field of medicine.

I wish to thank the surgical staff of the Peace Memorial Hospital and Shrods Hospital, Watford, for permission to review their cases, and in particular Mr. J. E. Semple and Mr. A. S. Gough, under whose care the majority of patients in this series were admitted.

REFERENCES

- Chapman, T. L. (1949). *Lancet*, 2, 684.
 Davies, J. A. Lloyd (1953). *British Medical Journal*, 1, 257.
 Millin, T., Macalister, C. L. O., and Kelly, P. M. (1949). *Lancet*, 1, 381.

According to the report of the National Spastics Society for 1953 there are twice as many spastic children as blind in Britain, and nearly three times as many as deaf. The total is about 20,000, half being children under 16. The Society was formed about 18 months ago, its first object being to acquaint the general public with the facts concerning cerebral palsy. Next, spastics and their parents were found and enlisted into local groups which are being welded into 19 areas in England and Wales. Nearly £20,000 has so far been raised to help spastics, and the Society has opened a clinic in Croydon, a home school unit in Reading, and a school in Swansea. The North-East Metropolitan Regional Hospital Board is to open a spastic unit and a spastic clinic, and other projects are planned by the Society and by other interested bodies.