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Prostatism: how useful is routine imaging of the urinary tract?

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Abstract

The clinical effects of routinely imaging the renal tract (by intravenous urography and ultrasonography) were evaluated prospectively in 128 consecutive patients with prostatism. Patients with haematuria, previous renal disease, or infection were excluded. Urologists completed a standard questionnaire in the patient's notes stating the diagnosis and the intended management. The patient then had intravenous urography and abdominal ultrasonography, urine was analysed, and plasma urea and serum creatinine concentrations and acid phosphatase activity were determined. From six months to a year later the eventual management was compared with the intended management to see the effect of these routine investigations on the outcome. For four out of 28 patients whose management was intended to be conservative the decision was changed; for only three of them was this because of the results of urography, ultrasonography, and biochemical determinations. For 31 patients the management was to be decided by cystoscopic findings, and for none of these was the final decision altered by the results from the investigations after the initial consultation. Similarly for five patients who were assessed urodynamically the final management was not changed by the results of these investigations. The planned management was changed in three of the remaining 64 patients but not because of the results of the initial investigations.

Thus no indication was found for either routine urography or ultrasonography, but the total abandonment of imaging of the renal tract would be unwise. Patients scheduled for conservative management (about a quarter of the patients in this study) should have ultrasonography to detect unsuspected hydronephrosis, but in all other patients urography or ultrasonography, or both,

is an unhelpful ritual. Moreover, urography is becoming more expensive, and has a recognised (albeit small) mortality.

Introduction

Routine intravenous urography remains a common procedure for patients presenting with prostatic symptoms, but controversy exists about this practice.¹⁻⁶ An important drawback when assessing the differing claims is that most surveys on the usefulness of urography have either been retrospective, assessing small numbers of patients, or included patients with acute retention or haematuria, or both. Several surveys have concentrated less on the question of who needs to have the urinary tract imaged and more on whether ultrasonography provides as much useful information as urography.^{7,9} A recent trend has been to replace routine urography with routine ultrasonography. The purpose of our survey was to assess prospectively the influence on clinical management of both imaging procedures.

Patients and methods

We studied 128 consecutive patients with prostatic symptoms presenting to this urology outpatient clinic between January 1984 and March 1986. Those patients with a history of haematuria, acute urinary retention, preexisting renal disease, urinary tract infection, and obvious prostatic malignancy were excluded. Also excluded were those who had recently had urography or ultrasonography as this might have led to inadvertent bias from the urologist viewing the films or reading the report.

After clinical assessment and before any investigations the urologist completed a standard questionnaire stamped on to the patient's notes stating the provisional diagnosis and the intended management (fig 1). All patients then had intravenous urography and abdominal ultrasonography of the kidneys, bladder, and prostate and their urine was analysed and plasma urea concentrations, serum creatinine concentration, and acid phosphatase activity determined. Some 45 items of information for each patient were entered on computer sheets.

Between six months and one year later the notes of each patient were reviewed to assess the influence that the investigations had had on the original management decision recorded by the urologist at the first attendance in the outpatient clinic.

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Results

The mean age of the patients was 70 years (range 45-90). The presenting symptoms were poor stream (100 patients), frequency (100), nocturia (92), hesitancy (67), urgency (35), dysuria (16), terminal dribbling (14), pain (seven), incontinence (two), and malaise (one). None of the 16 patients who complained of dysuria showed evidence of a urinary tract infection on analysis of urine.

Bladder study..... Please tick	
4 Frequency	8 Poor stream
5 Urgency	9 Dysuria
6 Nocturia	10 Haematuria
7 Hesitancy	11 Other (specify)
16 Present diagnosis:	
Benign prostate/detrusor/both/other	
1	2 3 4
17 If no intravenous pyelogram available treatment will be:	
1 Conservative	
2 Transurethral resection	
3 Open prostatectomy	
4 Cystoscopic decision	
5 Other (specify)	

FIG 1—Standard questionnaire stamped on to patient's notes and completed by urologist at initial outpatient visit.

The urogram was normal in 102 patients and abnormal in 26. Altogether 104 of the ultrasonographic examinations of the upper tracts showed normal results and 24 abnormal results. Obstruction of the upper tract was diagnosed on urography in six patients and all of the obstructions were detected by ultrasonography. Ultrasonography falsely indicated obstruction in three patients. All six patients with hydronephrosis had normal plasma urea concentrations, though one had a raised serum creatinine concentration.

The table gives the incidental abnormalities detected on urography and ultrasonography. Bladder diverticula were diagnosed in 17 patients on urography and in five of these patients by ultrasonography. Bladder trabeculation was reported on urography as slight in 38 patients and severe in 11. Ultrasonography detected slight trabeculation in 38 patients, which was described as severe in seven patients on urography. Ultrasonography detected severe bladder trabeculation in two patients.

For 28 patients management was initially planned as conservative, and for four of these the decision was changed. One patient had dilated upper tracts on both urography and ultrasonography and, as a result, was scheduled for a transurethral prostatectomy. Another was seen at his second visit by a different clinician, who considered that the symptoms warranted a transurethral resection of the prostate rather than conservative management; results on urography and ultrasonography in this patient were normal. A third patient had raised acid phosphatase activity; a transurethral resection was performed and histological results were normal. A fourth patient had a prostatectomy because the clinician considered trabeculation and the residuum after micturition to be indicative of obstruction; the upper tracts were normal.

Incidental abnormalities detected by urography and ultrasonography in 128 patients with prostatic symptoms. Values are numbers of patients

Abnormality	Urography	Ultra-sonography
Renal calculi	6	1
Simple cysts	17	27
Renal scarring	1	
Prostatic calcification	8	
Possible ureteric stricture	1	
Gall stones		1
Calcified abdominal aneurysm	1	

The two patients for whom open prostatectomy was planned had the operation. Fifty nine of the 62 patients initially scheduled for transurethral resection had the operation; of the remaining three patients, one had an open prostatectomy because of a large gland at cystoscopy and the two others had urethrotomies for unsuspected urethral stricture diagnosed at urethroscopy.

For 31 patients management was to be decided from the results of cystoscopy. Twelve patients had transurethral resection and five open prostatectomy. One patient had a urethrotomy for an unsuspected urethral stricture, and one underwent incision of the bladder neck. The remaining 12 patients were managed conservatively. None of the investigations altered the initial management decision in these patients. Five other patients with suspected detrusor instability had urodynamic investigations; two eventually had transurethral resection, two were managed conservatively, and one had incision of the bladder neck. The results from urography and ultrasonography did not change the initial management decision in any of these five patients.

Overall the planned management was changed in only two patients because of the results from routine urography and ultrasonography.

Discussion

We emphasise that the purpose of this survey was not to compare the usefulness of urography and ultrasonography in prostatism. This has been done by others.⁷⁻⁹ Urographic findings do not provide useful information or influence management in patients presenting with acute retention,¹⁰⁻¹² and we were therefore concerned solely with the usefulness of the common practice of requesting routine urography (or ultrasonography) for patients with prostatism.

Perhaps the most common reason why urologists request urography in prostatism is to detect unsuspected hydronephrosis in a patient who might be managed conservatively. Indeed, in our study it was only in this subgroup of patients that any imaging was found to affect the original management decision. Though Bauer *et al* suggested that the blood urea concentration could be useful in predicting those patients with obstruction of the upper tract,¹ none of our six patients with dilatation of the upper tract had abnormal blood urea values and only one had a raised serum creatinine concentration. Although the numbers with obstruction were small, our results indicated that plasma urea and serum creatinine concentrations were, not unexpectedly, unreliable indicators of early obstruction.

The detection of an incidental and unsuspected abnormality of the renal tract is claimed as justification for imaging the renal tract.^{3,6,9} That haematuria and, arguably, previous renal disease or infection remain indications for urography seems sensible,² and patients with these were excluded from our study. In all the patients studied we did not detect any incidental abnormality that altered management. Nevertheless, it is the occasional finding of an unsuspected renal malignancy that leads to most debate about the value of routine imaging. A recent prospective survey from the United States evaluated 180 patients with prostatism, including some with acute urinary retention.⁶ In four patients (2.2%) the findings on urography resulted in a change in the management of a patient, and three of the four had asymptomatic malignancies in the upper tract. From these results the authors concluded that routine screening was justified. In a comment in the same issue of the journal Talner expressed reservations about this conclusion and advised caution in accepting the comparatively high incidence of malignancy.¹³ In this regard, Talner reported that Harvey when looking for incidental renal cancers found eight in 4529 necropsies, or a prevalence of 0.18%.¹⁴ From the surveillance epidemiology and end results study the age specific yearly incidence of renal cancer in the United States (including ureteral cancer) per 100 000 men was 0.017% in those aged 50-54, 0.033% in those aged 60-64, 0.054% in those aged 70-74, and 0.060% in those aged 80-84.¹⁵ Even if the prevalence of renal cancer in men with prostatism is slightly increased (and at present no good evidence of such an increase exists), Talner asked whether that in itself would be sufficient reason to justify routine urography. O'Reilly, in a recent article on assessment before prostatectomy, supports this view, emphasising that there is no other condition for which an investigation is recommended simply because it might result in the chance finding of disease distant from the focus of clinical attention.¹⁶

FIG 2—Suggested protocol for investigating patients with prostatic symptoms.

Fidas *et al* suggested that routine abdominal radiography should be part of the investigation of patients with prostatism to detect bladder calculi because the size of a stone may affect treatment.⁹ This is arguable. When bladder calculi are present results of analysis of urine would probably not be normal, and patients with calculi would, with our protocol, be selected for urography on the basis of abnormal results from analysis of urine (see fig 2). Renal calculi, on the other hand, may be present with normal urinalysis, but in the six patients with renal calculi in our study the original management decision was not altered by this finding. We suggest that the arguments for routine abdominal radiography in prostatism are not compelling and that costs should be weighed against benefits.

Some urologists consider that radiography after micturition to assess the residual volume is useful in management, though considerable doubt¹⁶ and confusion¹⁷ exist. Indeed, in one of our patients the initial management decision was altered because of the x ray film after voiding. Those who may continue to value obtaining a film after micturition should, however, note that Morewood and Scally showed that a residual volume is equally well shown in a control film of the abdomen, and that intravenous contrast is unnecessary.¹⁸ For urologists who wish to be certain both whether a calculus is present and whether the residual volume is large a plain abdominal film after voiding should provide all this information.

Routine intravenous urography might occasionally be helpful in distinguishing between patients with detrusor instability and those with prostatic hypertrophy. Detrusor instability is common in patients with prostatic obstruction of the bladder's outflow,¹⁹ and the persistence of instability seems to be responsible for many of the symptoms after prostatectomy.²⁰ Abrams *et al* reported that trabeculation and diverticula were associated with bladder instability but not with obstruction of outflow.¹⁹ Shah *et al* found, however, that, though this was a strong association, trabeculation did occur in the presence of obstruction of outflow even in the absence of detrusor instability.²¹ Of course urodynamic investigations provide a more reliable assessment of the presence or absence of detrusor instability than the appearance of the bladder in a urogram, but these procedures are not widely available at present. In any case, it is not clinically necessary,¹⁶ economic, or practical for all patients presenting with prostatism to have this investigation as part of their routine assessment.

Advantages would accrue from abandoning routine urography and ultrasonography, particularly urography. Firstly, urography for prostatism can represent a large proportion of all urograms in many district hospitals (during this study it was about 14% in our hospital). Urography with conventional contrast media can be

unpleasant, causing flushing, nausea, vomiting, and occasionally death. Though all intravenous contrast agents are remarkably safe, a small mortality from their use is recognised, which has been estimated at one in 40 000.²² Economics should also be considered. Bauer *et al* in their 1980 survey estimated that abandoning routine urography in patients with prostatism would save \$75m in the United States each year.¹ Recent recommendations suggest that the new low osmolar contrast agents should be used routinely,^{23 24} and these agents are four times more expensive than the conventional contrast media. Those hospitals that have adopted this recommendation and continue to perform routine urography in prostatism are not only carrying out a clinically unnecessary ritual but also using up their budgets unnecessarily. The total abandonment of preoperative urography, however, as seemingly advocated by Bauer¹ and already implemented by some hospitals in Britain, would be unwise. Our survey has clearly shown that hydronephrosis can be present with normal biochemical results. If urologists schedule some of their patients for conservative management (a quarter in our study) a few may have unsuspected obstruction of the upper tract that could eventually lead to renal damage. Routine ultrasonography would be sensible for all patients scheduled for conservative management (fig 2). Similarly, screening for hydronephrosis might also be advisable when a surgeon has a particularly long waiting list. We also suggest that when mild evidence of obstruction is reported on ultrasonography it should be confirmed by urography as some ultrasonologists will occasionally interpret a normal but large extrarenal pelvis, or the effect of a filled bladder in a well hydrated patient,²⁵ as indicating hydronephrosis. This occurred in three of our patients.

We conclude that routine urography is unnecessary. In hospitals performing routine urography our protocol (fig 2) would produce as much as a 90% reduction in the number of urograms routinely obtained for prostatism. We conclude also that routine urography should not be replaced with equally unnecessary routine ultrasonography.

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