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Intravenous urography pre prostatectomy: An evaluation of its use

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Summary

The pre-operative intravenous urograms of 120 consecutive patients who had prostatectomy for benign prostatic hypertrophy (BPH) were studied. Of these, seventy eight patients (65%) had normal intravenous urograms (IVU) while 42 patients had abnormal IVU.

In this study serum creatinine above 2.0mg/dl and blood urea above 35mg/dl proved valuable indices for possible selection of patients with BPH likely to show significant obstructive disease on IVU. This is not only cost saving, but also reduces unnecessary radiation to the patient.

Resume

L'urographie intraveneuse pre-operative a ete etudiee chez 120 patients consecutifs qui ont eu une prostatectomie pour l'hypertrophie benigne de la prostate. Parmi les patients etudies 78 (65%) avaient des urographies normales tandie que l'urographie etait anormale chez 42. Cette etude a demontre que le taux de creatinine serique plus de 2.0mg/dl et un BUN plus de 35mg/dl pouraient servir comme index pour determiner la possibilite chez un patient d'avoir une maladie obstructive a l'urographie intraveneuse, ce quipourralt reduire le cout des examens.

Introduction

The increasing cost of health care in Nigeria and indeed in the developing countries, in the fact of dwindling resources makes it desirable to review some of the routinely requested investigation with a view to ascertaining their necessity and cost-effectiveness. We feel that the value of routine intravenous urography (IVU) in the pre-operative management of patients with benign prostatic hypertrophy (BPH) falls into this category.

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IVU constitutes a significant percentage of contrast investigations in a radiology department. During the period under study, it constituted 59% of all contrast investigations in our department and of these 66.4% were requested for pre-operative evaluation of patients with BPH. IVU has been a routine, important investigation in the pre-operative management of patients with BPH for a long time[1-8] nevertheless opinions differ as to its value. The purpose of this study is therefore to find out if simple laboratory tests (viz: serum creatinine and blood urea) could be used as parameters for selecting those patients who should have IVU carried out on them with the aim of reducing cost and radiation hazards without jeopardizing patient care.

Materials and methods

Excretory urographs of 120 patients who had prostatectomy done for BPH were reviewed.

The age of the patients, the pre-operative presence or absence of acute urinary retention, dysuria, frequency, haematuria and dribbling of urine were obtained from their hospital case notes.

The full blood count was done on all the patients whilst the serum electrolytes and urea were determined in 111 patients and serum creatinine in 69 patients.

Results

Of the 120 IVU's reviewed, 42 (35%) demonstrated some abnormalities which in 38 patients (31.7%) were acquired and related to the prostatic obstruction. The renal lesions comprised of, 6 cases of hydronephrosis, 5 mild to moderate caliectasis, 4 papillary necrosis and 2 cases of renal cysts. The ureteric lesions were bilateral hydroureter in 14 cases and unilateral in one case. In six cases the condition

was advanced and showed severe hydronephrosis with dilated tortous ureters and obstruction of the intramural end of the ureters by hypertrophied bladder wall. These six had blood urea levels over 50mg/dl. All the 38 cases had thickened trabeculated bladders and there was co-existing bladder, diverticulum and vesical calculus in one case each. Four congenital lesions were detected: 2 cases of ureteric duplication and one case each of renal malrotation and ectopic kidney (Table 1).

The serum creatinine estimated in 69 cases and the blood urea in 111 cases both showed a positive correlation with the degree of severity of abnormalities detected on IVU (Tables 2 and 3). The upper limits of these in this hospital are 2.0mg/dl and 35mg/dl respectively. Table 4 shows the relationship between the degree of obstruction and the level of blood urea.

Table 1: Results of 120 IVUs in patients with benign prostatic hypertrophy

Findings	No.	%
Normal IVU	78	65.0
Abnormal IVU	42	35.0
Types of Abnormalities		
A. Renal:	17	14.2
Hydronephrosis	6	
Caliectasis	5	
Papillary necrosis	4	
Cysts	2	
B. Ureter:	15	12.5
Bilateral hydroureter	14	
Unilateral hydroureter	1	
C. Bladder:	38	31.7
Thick wall and Trabeculations only	36	
Diverticulum + Trabeculation	1	
Calculus + Trabeculation	1	
D. Congenital	4	3.3
Ureteric duplication	2	
Renal malrotation	1	
Ectopic Kidney	1	

Table 2: Serum creatinine as a determinant of an abnormal IVU

	Total		Normal		Abnormal	
Serum Creatinine	No.	%+	No.	%*	No.	%*
< 2.0mg/dl	40	33.3	36	90.0	4	10.0
> 2.0mg/dl	29	24.2	18	62.1	11	37.9
Not Done	51	42.5				

P Value = 0.21

+ = % of Total
* = % of Sub Total

Table 3: Blood urea as a determinant of an abnormal IVU

	Total		Normal		Abnormal	
Blood Urea Nitrogen	No.	%+	No.	%*	No.	%*
< 35.0mg/dl	66	55.0	50	75.8	16	24.2
> 35.0mg/dl	45	37.5	25	55.6	20	44.4
Not Done	9	7.5				

P Value = 0.15

+ = % of Total
* = % of Sub Total

Table 4: Level of blood urea in relation to degree of obstruction

Obstruction	Level of Blood Urea (mg/dl)			Total
	31-40	41-50	> 50	
Mild	2	1	—	3
Moderate	1	3	1	5
Severe	—	1	6	7

Discussion

Intravenous urography (IVU) is a routine important investigation in the pre-operative management of patients with BPH; however, opinions differ as to its value. While some authors[1,2,3] recommend that it is an important investigation in the pre-operative evaluation of patients with BPH, others [4,5,6,7,8]

believe that it is not cost effective. The reasons for routine request of IVU in the pre-operative management of patients with BPH include:

((1) To assess the presence and degree of upper tract obstruction,
(2) In the estimation of renal function,
(3) In detecting any incidental asymptomatic renal or ureteral malignancies, and
(4) In the evaluation of associated bladder lesions e.g. malignancy, diverticulum, calculus and to assess the size of the prostate gland.

In this study, abnormalities of the upper renal tract accounted for 26.7% of all the cases. While the blood urea levels were high in patients with hydroureters, it was normal in patients with renal cysts and papillary necrosis.

The estimation of renal function with IVU is regarded as a crude measure[9]. In this study it has been shown that the blood urea and serum creatinine give comparable results with IVU in cases of obstructive uropathy. In those patients who had creatinine levels greater than 2.0mg/dl; 37.9% had abnormal IVU. Similarly among those who had blood urea greater than 35mg/dl; 44.4% had abnormal IVU; this result is similar to that obtained by Bauer *et al.* who had 34.3% of their patients having abnormal IVU[4]. In their series as well as ours, the most severe degree of obstructive uropathy were associated with the highest level of blood urea. Although, mild degrees of elevation of both the creatinine and blood urea may occur in presence of a normal IVU, this study shows that serious degrees of obstruction are invariably accompanied by an increase in both blood urea and creatinine levels. Thus IVU is not indicated in the estimation of renal function.

Intravenous urography is associated with a few but definite mortality rate of 1:50,000[12]. Less severe reactions are commoner. These risks though small must be taken cognisance of. Apart from this, every patient is exposed to radiation, the dose of which depends on the number of films taken. Thus there is a good reason for rationalising the request of IVU in the pre-operative management of patients with BPH.

It is thus clear from the foregoing that IVU pre-prostatectomy is necessary but in order to reduce cost as well as reduce radiation dose to patient, blood urea and serum creatinine should be used as important parameters for determining those who should have IVU carried out on them. Most patients who had abnormalities detected on IVU which were not related to obstructive uropathy had either normal or mild degrees of elevation of both the serum creatinine and the blood urea levels. Thus this group would not benefit from having IVU carried out on them. On the contrary, those patients who had severe elevation of both the serum creatinine and blood urea levels also showed evidence of obstructive uropathy on IVU and therefore it is this group that should have IVU in their pre- operative work up.

Conclusion

On the basis of our study, it is concluded that:

1. Routine use of IVU in pre-prostatectomy patients should be restricted to those patients who have elevated serum creatinine and blood urea levels.
2. In patients with BPH but who have normal serum creatinine and/or blood urea level, routine IVU may be excluded in their pre-operative work up.

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