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CLINICAL VALUE OF RENAL ULTRASONOGRAPHY WITH URODYNAMIC EVALUATION

Hypothesis / aims of study

The study intent was to determine the incidence of clinically significant upper urinary tract abnormalities detected through renal ultrasonography at time of preoperative urodynamic evaluation. This correlation has not been thoroughly explored in prior literature.

Study design, materials and methods

476 patients assessed during consultation in the outpatient Urogynaecology clinic of our institution from September 1997 to November 2001 were studied through retrospective chart review. Outcome measures and demographic indices were recorded in a database formulated from patients undergoing preoperative urodynamic assessment. A divisional protocol exists for concurrent multichannel cystometry, urethral pressure profilometry, uroflowmetry, and renal ultrasonography. Group means were compared using the 2-tailed Student's t-test; population proportions were analyzed using χ^2 and Fisher's exact test with an alpha error of 0.05.

Table 1. Patient Demographics

Characteristic	Mean (SD*)
Age (y†)	56.72 (13.67)
premenopausal	17.1%
postmenopausal	82.9%
Parity	2.67 (1.52)
Stage of POP	2.02 (0.97)
Renal function (Cr‡)	68.01 (10.71)

*standard deviation; †years; ‡creatinine

Results

Means of age and parity of study subjects were 56.72 ($^{+}$/-13.67) years and 2.67 ($^{+}$/-1.52), respectively. 101 (21.22%) upper urinary tract findings included 16 cases of hydronephrosis (3.36%), 8 cases of renal atrophy (1.68%), 46 cystic renal lesions (9.66%), 6 solid renal lesions (1.26%), 5 angiomyolipomata (1.05%), 8 echogenic foci (1.68%), 1 case each of renal cystic dysplasia and polycystic kidney disease (0.21%), 3 cases of renal agenesis (0.63%), and 7 other (1.47%). The occurrence of such findings is significantly more frequent than previously reported in the general population.

Table 2. History of Renal Disease

Pathology	N (%)
Hypertension	132 (27.73)
CRF*	8 (1.68)
Duplication	2 (0.42)
SLE† + proteinuria	2 (0.42)
PCKD‡	1 (0.21)
Nephrectomy/absence	2 (0.42)
Pyelonephritis	4 (0.84)
Glomerulonephritis	1 (0.21)
Calculi	11 (2.31)
Family history	51 (10.71)

*Chronic renal failure; †systemic lupus erythematosus; ‡polycystic kidney disease

Table 3. Prior pelvic surgery

Procedure	N (%)
TAH ± BSO ± ASC	168 (35.29)
VH ± APR ± apex	102 (21.43)
Anti-incontinence	
RPU	81 (17.02)

Needle suspensions	23 (4.83)
A-V slings	2 (0.42)
Resection-rectopexy	1 (0.21)
AAA	1 (0.21)

Table 4. Renal Ultrasound Findings

Measurements	Mean (SD)
L kidney	10.84 (1.19)
R kidney	10.64 (1.18)
Lesion	**N (%)**
Total	101 (21.2)
Hydronephrosis	16 (3.36)
Renal atrophy	8 (1.68)
Masses	
cystic	46 (9.66)
solid	6 (1.26)
Angiomyolipomata	5 (1.05)
Echogenic foci	8 (1.68)
Renal agenesis	3 (0.63)
Cystic dysplasia	1 (0.21)
PCKD	1 (0.21)
Other	7 (1.47)

*standard deviation

Interpretation of results

Patients with pre-existing clinically evident renal disease were much more likely to manifest upper urinary tract abnormality ($^{45}/_{101}$=44.6%) than those without ($^{100}/_{383}$=26.1%), p=0.0005. The cases of hydronephrosis were associated with a significantly greater degree of pelvic organ prolapse (Baden-Walker grade 3) than those without hydronephrosis (< grade 2), p=0.03. A history of previous pelvic surgery was equivalent in both groups of patients with and without hydronephrosis ($^{7}/_{16}$=43.8% and $^{274}/_{460}$=59.6%, respectively), p>0.3. There was a trend toward increased likelihood of having undergone prior pelvic surgery in patients with evidence of renal atrophy ($^{7}/_{8}$=87.5%) than those with no renal atrophy ($^{274}/_{468}$=58.5%), p=0.19.

Concluding message

Routine renal ultrasonography at time of preoperative urodynamic assessment may detect unsuspected clinically significant pathology. Potential correlation with pre-existing renal disease, greater degree of pelvic organ prolapse, and a history of prior pelvic surgery may render these patients appropriate candidates for concurrent imaging of the upper urinary tract.

FUNDING: None

HUMAN SUBJECTS: This study did not need ethical approval because Not necessary. but followed the Declaration of Helsinki Informed consent was not obtained from the patients.