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## Abstract Reproduction Form B-1

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Title (type in CAPITAL LETTERS)	WHAT CAUSES MOST RENAL DAMAGE IN VESICO-URETERAL REFLUX: BACTERIURIA OR DETRUSOR PRESSURE?

**Introduction:** The urinary alpha-1-microglobulin is a highly sensitive marker for proximal tubular renal damage (1-2). The aim of the study was to evaluate the role of bacteriuria and/or bladder pressure in renal damage due to vesico-ureteral reflux.

**Patients and methods:** We evaluated consecutively 53 patients with vesico-ureteral reflux (27 men/24 women, age 29+/-16 years). 29 had a neurogenic bladder, 16 voiding dysfunction and 8 an abnormal ureteral orifice. All patients underwent video-urodynamics (microtip catheters), a urine culture (Kass criterium: >100.000 cfu/ml) and urinary alpha-1-microglobulin/creatinine ratio determination (cut-off value: >9mg/g(2)). Vesico-ureteral reflux was graded according to the international grading scale (grade 1 to 5). In bilateral reflux (n=16) the highest grade of reflux was used in the analysis. Results of microproteinuria are presented as median and 95th percentiles. Statistical analysis was done with a Wilcoxon test and with multinomial logistic regression analysis.

**Results:** In 32 patients, urine cultures were sterile and urinary tract infection without fever was seen in 21 patients. The grade of vesico-ureteral reflux and microproteinuria are presented in Table 1:

	n	Alpha-1-microglobulin/ Creatinine ratio, mg/g
Grade 1	12	9.0 (3.6-15.8)
Grade 2	18	10.0 (7.7-16.4)*
Grade 3	9	46.0 (6.1-104.5)*
Grade 4	8	53.9 (16.1-93.2)*
Grade 5	6	57.3 (15.0-124.5)*

\*Wilcoxon (compared to Grade 1),  $p < 0.01$ , data presented as median (95%)

Risk analysis for proximal tubular renal damage in patients with vesico-ureteral reflux are presented in Table 2:

Alpha-1-microglobulin excretion	t	p
Grade of reflux	3.3991	0.001
Max. detrusor pressure, cmH2O	2.6564	0.014
Compliance	-0.9887	0.092
Age	0.4646	NS
Urinary tract infection	0.4140	NS
Gender	0.3262	NS
Max. bladder pressure, cmH2O	0.3250	NS
Uni-bilateral reflux	-0.1042	NS
Bacterial identification	0.1001	NS
Mean sphincter pressure, cmH2O	0.0810	NS

\*Multinomial logistic regression analysis,  $PseudoR^2 = 0.2785$ ,  $p < 0.0001$

Bacteriuria without fever was not responsible for renal proximal damage in patients with vesico-ureteral reflux. Detrusor pressure and the grade of vesico-ureteral reflux were the most important risk factors of renal damage. In reflux patients, pressure transmitted from

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the bladder to the kidney is be more important in damaging the kidney then does bacteriuria. This is relevant in patients with neurogenic bladder disease who frequently suffer from vesico-ureteral reflux and chronic bacteriuria. Therefore controlling detrusor pressure is more important then antibiotic profylaxis in patients with chronic bacteriuria. This discussion does not evaluate the effect of repetitive upper tract infections with fever on renal damage.

Conclusion: In patients with vesico-ureteral reflux, high detrusor pressure is more harmful for the kidney then is bacteriuria without fever.

## References

- 1) Markers of for the diagnosis and monitoring of renal tubular lesions. Clin Nephrol 1992; 38:3-7.
- 2) Urinary alpha-1-microglobulin detects uropathy. A prospective study in 483 patients. Clin Chem Lab Med 1998; 36:309-315.