Influence of Vesico-Ureteral Reflux on Growth.

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Introduction: Vesico-ureteral reflux (VUR) is the most common urologic abnormality seen in children. It represents the backflow of urine from bladder to upper urinary structures due to a defect in closure of uretero-vesical junction. This condition predisposes children to repetitive pyelonephritis associated with renal scarring.

Literature review

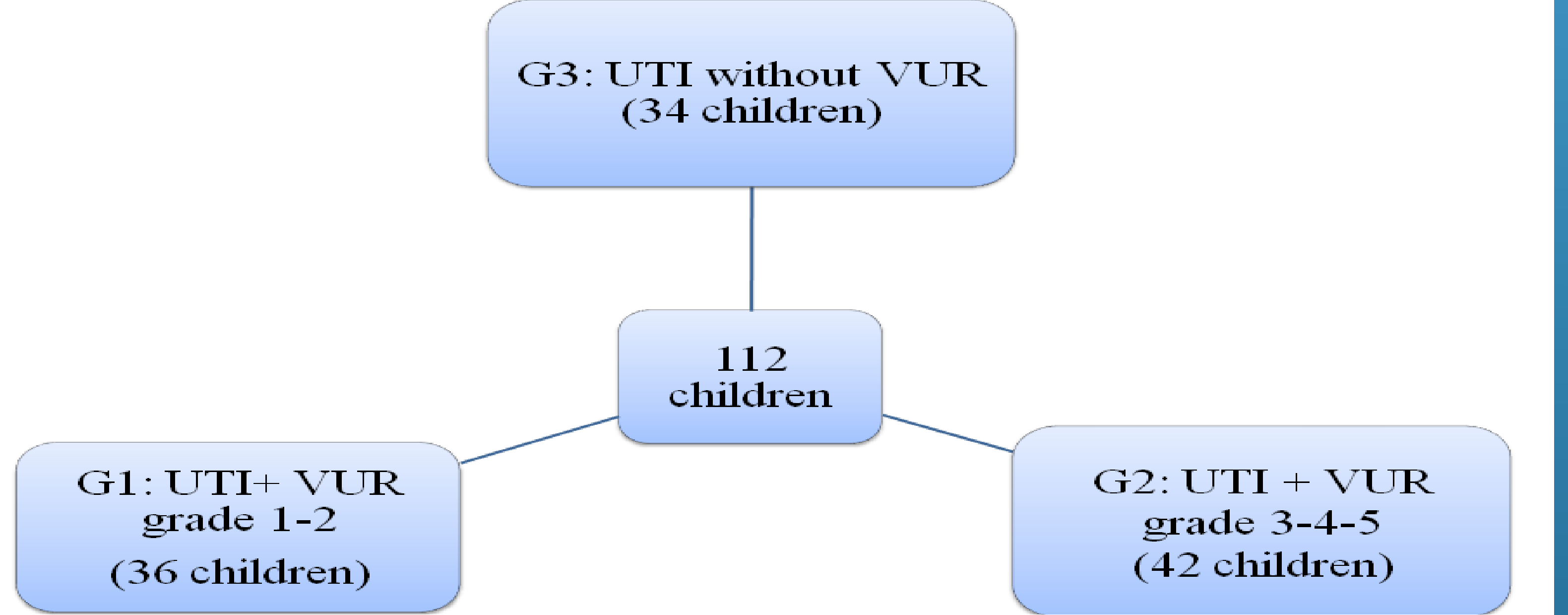|	VUR affecting growth			VUR not affecting growth	
Authors	Year	Growth indices	Authors	Year	Growth indices
Polito et al.	1997	HZ & WHI After surgery	Maliki et al.	2011	HZ & WHI Same
Wingen A-M	1999	HZ After surgery	Parsa et al	2015	Weight & height Better in VUR
Taychang	2008	HZ & WHI			
Lin-shien Fu	2009	HZ & WHI			
Keskinoglo et al.	2014	HZ & WHI			
Guidos et al.	2017	Antibiotic prophylaxis Height			

Objective: We aimed to assess growth indices: height z-score (HZ), Ideal body weight percent (IBWp) and percent of actual weight over median weight for age (MWAp) in children with VUR at presentation and at time of study and to compare them with those of children with pyelonephritis without VUR.

$$\text{Mean Weight for age percent} = \frac{\text{actual weight of child}}{\text{mean weight of child for his chronological age}} \times 100$$

Mean weight for age: child's weight on 50 percentile for same age on CDC curves.
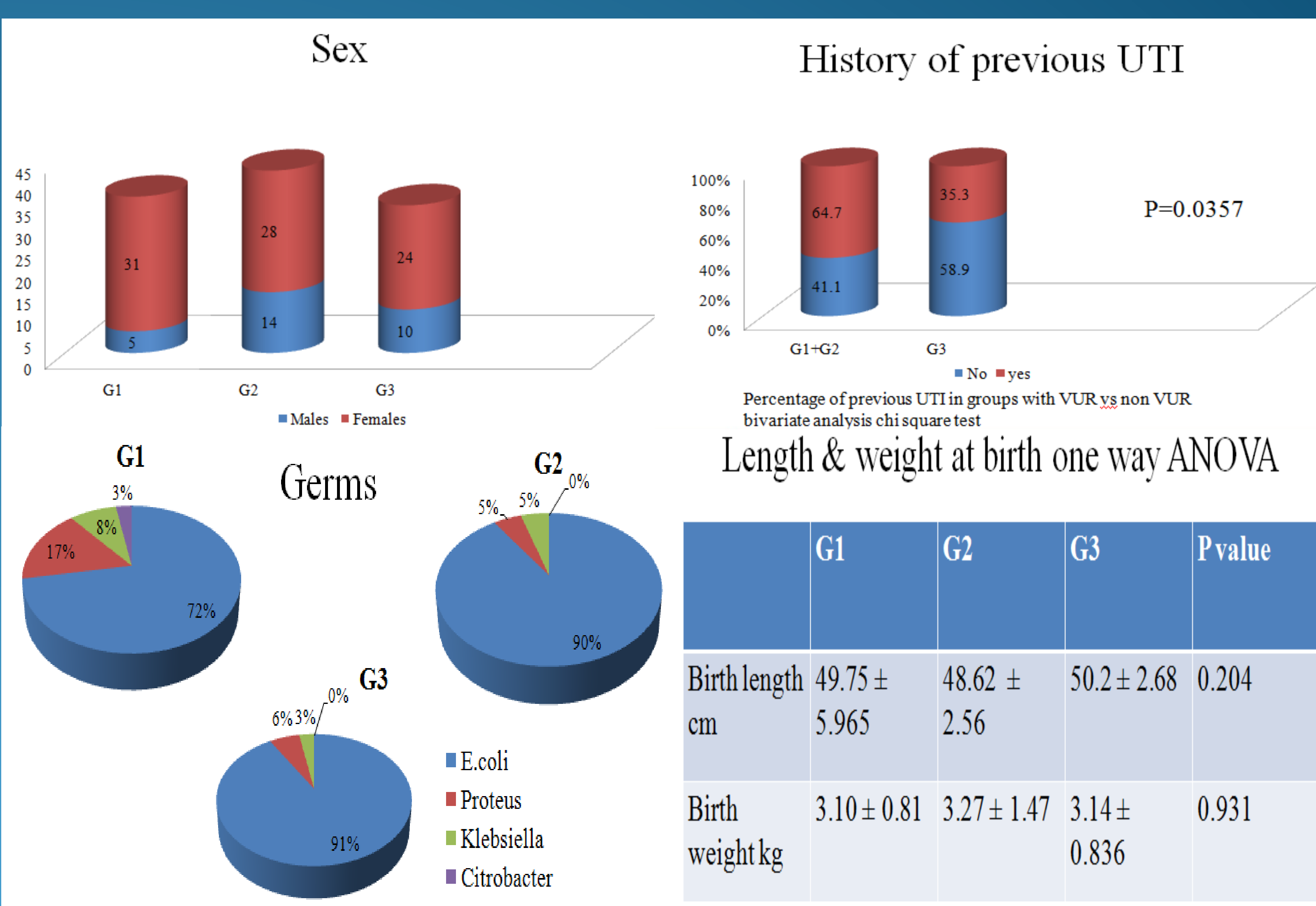
- Type of the study cross sectional
- Recruitment: January 2007 December 2016
- Time of study : December 2017

Materials and Methods: We included children aged between 0 and 6 years old with a normal renal function admitted in our center for pyelonephritis. However, children with chronic diseases affecting growth were excluded. The children who met above criteria (112 children) were divided into 3 groups according to voiding cystography results: G1(VUR grade 1-2), G2(VUR grade 3 , 4 , 5) and

- G3: UTI without VUR (34 children)
- 112 children
- G1: UTI+ VUR grade 1-2 (36 children)
- G2: UTI + VUR grade 3-4-5 (42 children)

IBW p

IBW p	percentage
Obese	>120%
overweight	110-120%
Normal weight growth	90-110%
Minimal weight retardation	80-90%
Moderate weight retardation	70-80%
Severe weight retardation	<70%

Results:

Sex

History of previous UTI

P=0.0357

Percentage of previous UTI in groups with VUR vs non VUR bivariate analysis chi square test

Germs

- E.coli
- Proteus
- Klebsiella
- Citrobacter

Length & weight at birth one way ANOVA

	G1	G2	G3	P value
Birth length cm	49.75 ± 5.965	48.62 ± 2.56	50.2 ± 2.68	0.204
Birth weight kg	3.10 ± 0.81	3.27 ± 1.47	3.14 ± 0.836	0.931

MWAp at presentation & time of study

P=0.0001

MWAp

	G1	G2	G3	P value
MWAp presentation	104.86 ± 10.96	94.77 ± 11.29	111.53 ± 16.63	0.0001
MWAp Time Study	104.72 ± 14.04	97.51 ± 12.96	113.44 ± 15.62	0.0001
Duration of follow up in years	5.85 ± 3.11	5.71 ± 3.23	7.03 ± 2.209	0.116

HZ Presentation & Time Study

P=0.001

HZ at presentation & time study

	G1	G2	G3	P value
HZ presentation	0.163 ± 0.906	-1.1452 ± 0.83	0.541 ± 0.71	0.0001
HZ Time Study	0.064 ± 0.77	-0.202 ± 1.03	0.72 ± 0.796	0.0001
Duration of follow up in years	5.85 ± 3.11	5.71 ± 3.23	7.03 ± 2.209	0.116

IBWp Presentation & Time of Study

	G1	G2	G3	P value
IBWp presentation	101.58± 14.4	103.21 ± 12.14	101.5±13.77	0.815
IBWp Time of Study	96.14±25.92	101.1±119.55	101.8±9.57	0.410
Duration of follow up	5.85±5.71	5.71±3.23	7.03±2.209	0.116

Evolution IBWp Antiobiotic vs Surgery

	IBWp Presentation	IBWp Time Study	P value	Years of follow up after treatment
Antibiotic G1	99.33±12.257	101.625±11.224	0.338	4.75±2.56
Surgery G1+G2	102.93±12.936	104.138±11.65	0.632	2.68±1.3
Antibiotic G2	99.91±7.103	100.58±11.532	0.878	5.3±3.1

Evolution HZ with treatment modalities

	HZ presentation	HZ time study	P value
Antibiotic G1 (N=24)	0.075+/-0.994	-0.013+/-0.759	0.724
Surgery G1 + G2 (N=2) +(N=26)	-1.269+/-0.921	-0.182+/-0.995	<0.001*
Antibiotic G2 (N=12)	-0.6+/-0.566	-0.167+/-1.159	0.186

Evolution MWAp different treatment modalities

	MWAp presentation	MWAp time of study	P-value
AntibioticG1	103.875+/-11.863	105.958+/-15.301	0.606
Surgery G1+G2	92.928+/-12.023	100.357+/-11.593	0.0168*
Antibiotic G2	97.912 +/- 9.13	91.917+/-9.529	0.108

Conclusion:

- HZ & MWAp significantly lower in children with severe VUR
- Significant amelioration by surgical ureteral re-implantation
- Should we reconsider recommendations & indications of VUR treatment