

# Lower Urinary Tract Dysfunction With Vesicoureteral Reflux: A More Significant Factor Predicting Recurrent Febrile UTI in Infants.

Su Chia-Cheng<sup>1</sup>, Shang-Jen Chang <sup>2</sup>, Stephen S. Yang<sup>2</sup>

<sup>1</sup>Division of Urology, Chi-Mei Medical center , Tainan, Taiwan and department of Senior Citizen service management, Chia Nan University

<sup>2</sup>Division of Urology, Taipei Tzu Chi Hospital, New Taipei, Taiwan and Medical College of Buddhist Tzu Chi University, Hualien, Taiwan

- **Introduction:** Lower urinary tract dysfunction (LUTD) is a recognized risk factor of recurrent UTI. We examined the effects of LUTD alone and LUTD + vesicoureteral reflux (VUR) on the recurrence of UTI in infants.
- **Materials and Methods:**
  - Infants with febrile UTI, without urogenital or neurological disorders, were prospectively enrolled for study. All underwent VCUG and 4 hours voiding observation with immediate PVR after each voiding. We did the 4 hours voiding observation usually one month after treatment of febrile UTI. Spinning top sign on voiding cystography and/ or interrupted free flow are regarded as LUTD. What is the interrupted flow? It means revoiding withing 5 minutes. Actually, this definition is different from that of staccato flow. (1,2)
- **Results:** Totally 38 infants (M:F=26:11) with a mean age of 10.1+/-6.7 months were enrolled for study (Table 1 ). Mean followup period was 42.7+/-12.8 months. LUTD was present and absent in 27 and 11 children respectively. Of the 27 children with LUTD 21 (77.8%) had VUR, including 16 (59.3%) high grade VUR and 11 (40.7%) bilateral VUR. Of the 11 children without LUTD 5 (45.5%) had VUR, including 5 (45.5%) high grade VUR and 1 (9.1%) bilateral VUR. Anti-reflux treatment was performed in 5 (18.5%) children with LUTD and 1 (9.1%) child without LUTD. Recurrent UTI was observed in 13 (48.2%) with LUTD and 4 (36.4%) without UTI (p=0.51). Recurrent febrile UTI was noted in 6 (22.2%) children with LUTD and 0 (0.0%) without LUTD (p=0.088). LUTD with and without VUR were observed in 22 and 16 children respectively. Febrile UTI occurred in 6 (27.3%) and 0 (0.0%) of children with and without LUTD and VUR (p=0.023).

	All	LUTD+	LUTD-	p-value
N	38	27	11	
(M:F)	26:12	20:6	6:6	0.1735
Age in months at VCUG	10.1±6.7	10.74±6.79	8.64±6.36	0.3848
VUR all grade (n, %)	26 (68.4%)	21 (77.8%)	5 (45.5%)	0.0519
VUR ≥3 (n, %)	21 (55.3%)	16 (59.3%)	5 (45.5%)	0.4376
Bilateral VUR (n, %)	12 (31.6%)	11 (40.7%)	1 (9.1%)	0.0570
Follow-up (months)	42.7±12.8	42.1±11.9	44.1±15.2	0.6673
Anti reflux surgery (n, %)	6 (15.8%)	5 (18.5%)	1 (9.1%)	0.4698
Recurrent UTI (n, %)	17 (44.7%)	13 (48.2%)	4 (36.4%)	0.5076
Recurrent febrile UTI (n, %)	6 (15.8%)	6 (22.2%)	0 (0%)	0.0884

- **Discussion :**

- Urinary tract infection (UTI) is one of the most common pediatric infections. It distresses the child, concerns the parents, and may cause permanent kidney damage. The incidence of UTI is highest in the first year of life for all children (1%) but decreases substantially among boys after infancy (3). In this study we evaluation of Lower Urinary Tract Dysfunction With Vesicoureteral Reflux to see if it will be the risk factor on recurrence febrile UTI in children. Secondary VUR develops when abnormal lower urinary tract function and elevated intravesical pressures lead to retrograde flow of urine, and is associated with conditions such as posterior urethral valves, urethral obstruction, or neurogenic bladder dysfunction.
- Secondary VUR may also be seen in children with no anatomic genitourinary or neurologic abnormality, but suffer from bladder and bowel dysfunction.(4) From the table 2 we see the LUTD based on VCUG or interrupted flow was not related to recurrence of UTI.

Table 3. showed no obvious relation between LUTD+ VUR and UTI . We didn't see any significant increase on the recurrence of UTI from table 4 even adding the high PVR or repeat BOD as a risk factor. However we can only see the LUTD + VUR having statistically higher rate of recurrent febrile UTI in infants, probably may due to some bladder bowel dysfunction in this group was more predominant. So we may discuss with the treatment of voiding LUT dysfunction and its effect on VUR in children with bladder control .

- The results of treatment of overactivity in relation to VUR resolution are conflicting. Scholtmeijer and Nijman (5) found only a slightly higher rate of improved grade of VUR in the group treated for detrusor overactivity. Recurrent UTIs have been shown in many studies to be higher in VUR patients with bladder dysfunction than in VUR children without such dysfunction (6). This was most obvious in children with emptying problems such as in DV and DES as well as in children with congenital high-grade reflux and incomplete emptying.(7,8)

- **Conclusions:** LUTD with VUR may represent severe BBD and were associated with statistically higher rate of recurrent febrile UTI in infants.

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**Table 2. LUTD & UTI**

		LUTD		Subtotal
		+	-	
UTI	+	13 (76.47%)	4 (23.53%)	17 (44.74%)
	-	14 (66.67%)	7 (33.33%)	21 (55.26%)
	Subtotal	27 (71.05%)	11 (28.95%)	38

*p=0.5076*

**Table 3. LUTD + VUR & UTI**

		LUTD and any VUR (actually all grade VUR ≥2)		Subtotal
		+	-	
UTI	+	11 (64.71%)	6 (35.29%)	17 (44.74%)
	-	11 (52.38%)	10 (47.62%)	21 (55.26%)
	Subtotal	22 (57.89%)	16 (42.11%)	38

*p=0.4442*

**Table 4. LUTD + high PVR/ BOD & UTI**

		LUTD by VUCG + interrupted voiding +high mean PVR + repeat BOD		Subtotal
		+	-	
UTI	+	15 (88.24%)	2 (11.76%)	17 (44.74%)
	-	18 (85.71%)	3 (14.29%)	21 (55.26%)
	Subtotal	33 (86.84%)	5 (13.16%)	38

*p=0.8192*

**Table 5. LUTD & febrile UTI**

		LUTD		Subtotal
		+	-	
Febrile UTI	+	6 (100.00%)	0 (0.00%)	6 (15.8%)
	-	21 (65.63%)	11 (34.38%)	32 (84.21%)
	Subtotal	27 (71.05%)	11 (28.95%)	38

*p=0.0884*

**Table 6. LUTD + VUR & febrile UTI**

		LUTD and any VUR (actually all ≥2)		Subtotal
		+	-	
Febrile UTI	+	6 (100.00%)	0 (0.00%)	6 (15.8%)
	-	16 (50.00%)	16 (50.00%)	32 (84.21%)
	Subtotal	22 (57.89%)	16 (42.11%)	38

*p=0.0228*

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