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CUSTOMIZED MEDICATION FOR MILD TO MODERATE MALE LOWER URINARY TRACT SYMPTOMS BASED ON INTERNATIONAL PROSTATE SYMPTOM SCORE VOIDING TO STORAGE RATIO

Hypothesis / aims of study
Lower urinary tract symptoms (LUTS) are common in elderly men. Measuring International Prostate Symptom Score (IPSS) and calculating the voiding-to-storage subscore ratio (IPSS-V/S) is a simple and useful method to differentiate lower urinary tract dysfunction (LUTD).This study investigated the therapeutic results of customized medication for male LUTS according to patients' IPSS-V/S ratio and satisfaction to treatment.

Study design, materials and methods
Adult men with mild to moderate LUTS were prospectively enrolled. The study patients were initially treated with alpha-blockers (Doxazosin 4mg QD) for IPSS-V/S >1 and antimuscarinics (Tolterodine 4mg QD) for IPSS-V/S ≤ 1 for 1 month. At 1 month, patients were questioned of the therapeutic outcomes based on quality of life index (QoL-I) and general response assessment (GRA). If a patient's baseline predominant LUTS (voiding or storage) were improved, the initial medication was continued for 2 months. If they had residual symptoms, alpha-blockers was given for predominant voiding symptoms and antimuscarinics for predominant storage symptoms. If patients had both voiding and storage symptoms, alpha-blockers and antimuscarinics were prescribed simultaneously. The IPSS total score (IPSS-T), IPSS voiding subscore (IPSS-V), IPSS storage subscore (IPSS-S), IPSS-V/S ratio, QoL-I, maximum flow rate (Qmax), voided volume (VV), and post-void residual urine (PVR) volume were assessed at baseline, 1 month and 3 month after initial treatment. The changes of IPSS, uroflow parameters and GRA were compared between baseline and 1 month, as well as from 1 month to 3 months among different treatment arms.

Results
A total of 374 men were enrolled at baseline, and 162 patients were initially treated with Tolterodine for IPSS-V/S ≤1 and 212 treated with Doxazosin for IPSS-V/S >1. At 1 month, patients received Tolterodine had significantly deceased IPSS-T, IPSS-S, and QoL-I, and significantly inceased VV and PVR. Patients received Doxazosin had significantly deceased IPSS-T, IPSS-V, IPSS-S, and QoL-I, and significantly inceased Qmax and VV compared to baseline (Table 1). In antimuscarinics treatment group, 29 of 102 patients stayed on Tolterodine, 15 of 18 shifted to Doxazosin, and 16 of 39 added on Doxazosin till 3 months. Patients shifted to Doxazosin had significantly inceased GRA. Patients added on Doxazosin had significantly inceased Qmax (Table 2). In alpha-blockers treatment group, 71 of 171 patients stayed on Doxazosin, 4 of 7 shifted to Tolterodine, and 15 of 32 added on Tolterodine till 3 months. Patients stayed on Doxazosin had significantly deceased QoL-I and inceased GRA. Patients shifted to Tolterodine had significantly inceased GRA. Patients added on Tolterodine had significantly deceased QoL-I and inceased GRA (Table 2).

Interpretation of results
The therapeutic outcomes of alpha-blockers and antimuscarinics based on IPSS-V/S were good subjectively and objectively at 1 month after initial treatment. Only slightly improvements were noted at 3 months after adjustment for residual symptoms.

Concluding message
Measuring IPSS subscores and calculating IPSS-V/S is a simple and useful method to differentiate failure to voiding and failure to storage LUTD in men with LUTS. IPSS-V/S provides a guide for the initial treatment, especially for primary care physicians without access to urological studies.

Table 1. The study patients' characteristics and changes of parameters from baseline to 1M receiving Tolterodine or Doxazosin according to their subjective symptoms

		IPSS-V/S ≤ 1 Tolterodine (n = 162)	IPSS-V/S > 1 Doxazosin (n = 212)
Age (years)		68.0 ± 11.8	65.8 ± 10.8
TPV (mL)		47.6 ± 30.3	43.3 ± 24.8
TZI (%)		35.0 ± 13.8	33.2 ± 12.6
PSA (ng/mL)		4.72 ± 5.98	3.82 ± 5.57
IPSS-T	BL	11.8 ± 6.47	16.8 ± 6.41
	1M	9.35 ± 6.15 *	9.61 ± 5.65 *
IPSS-V	BL	3.88 ± 3.65	11.6 ± 4.40
	1M	4.01 ± 4.16	5.57 ± 4.64 *
IPSS-S	BL	7.88 ± 3.58	5.25 ± 2.96
	1M	5.35 ± 3.11 *	4.04 ± 2.46 *
IPSS-V/S ratio	BL	0.47 ± 0.34	2.87 ± 2.20
	1M	0.80 ± 0.81	1.72 ± 1.98
QoL-I	BL	3.57 ± 0.88	3.93 ± 0.51
	1M	2.70 ± 0.96 *	2.85 ± 0.77 *
Qmax (mL/s)	BL	13.1 ± 8.05	11.1 ± 6.41
	1M	13.6 ± 7.53	13.5 ± 7.24 *
VV (mL)	BL	217.2 ± 159.9	235.2 ± 158.7
	1M	239.2 ± 152.5 *	268.3 ± 159.7 *
PVR (mL)	BL	49.7 ± 59.8	51.0 ± 58.4
	1M	68.8 ± 65.6 *	44.8 ± 52.4
GRA	1M	1.42 ± 1.19	1.42 ± 1.06

* *P* values < 0.05

Table 2. Changes of parameters from 1M to 3M in patients initially receiving Tolterodine or doxazosin according to their subjective symptoms at 1M

		Tolterodine			**Doxazosin**		
		Stay on Tolterodine (102/29)	Shift to Doxazosin (18/15)	Add-on Doxazosin (39/16)	Stay on Doxazosin (171/71)	Shift to Tolterodine (7/4)	Add-on Tolterodine (32/15)
IPSS-T	1M	8.40 ± 5.73	11.1 ± 5.89	11.2 ± 6.89	9.07 ± 5.20	9.75 ± 4.24	10.8 ± 3.87
	3M	7.40 ± 5.31	9.00 ± 4.14	10.1 ± 6.91	8.09 ± 5.77	9.00 ± 4.24	9.44 ± 3.86
IPSS-V	1M	3.26 ± 3.19	6.50 ± 3.87	5.67 ± 4.66	5.41 ± 4.45	5.50 ± 3.70	6.13 ± 3.86
	3M	2.54 ± 3.34	4.90 ± 3.57	5.33 ± 4.91	4.84 ± 4.86	5.00 ± 2.94	4.81 ± 3.12
IPSS-S	1M	5.14 ± 3.32	4.70 ± 3.30	5.53 ± 3.23	3.66 ± 2.47	4.25 ± 1.71	4.63 ± 1.99
	3M	4.86 ± 2.94	4.10 ± 2.08	4.73 ± 2.40	3.25 ± 1.89	4.00 ± 1.41	4.63 ± 1.89
IPSS-V/S	1M	0.70 ± 0.65	1.61 ± 1.09	1.18 ± 1.14	2.07 ± 2.57	1.31± 0.69	1.59 ± 1.17
	3M	0.62 ± 0.63	1.33 ± 1.20	1.10 ± 0.86	1.79 ± 2.24	1.21 ± 0.46	1.16 ± 0.69
QoL-I	1M	2.49 ± 1.07	3.30 ± 0.82	2.87 ± 1.06	2.76 ± 0.73	3.25 ± 0.96	3.00 ± 0.52
	3M	2.46 ± 0.82	2.40 ± 0.84	2.53 ± 0.74	2.51 ± 0.87 *	2.75 ± 0.50	2.38 ± 0.89*
Qmax	1M	12.8 ± 5.59	11.6 ± 5.73	11.0 ± 4.39	13.8 ± 6.92	15.0 ± 8.92	12.1 ± 4.68
	3M	14.4 ± 7.31	11.3 ± 5.23	14.3 ± 7.33*	13.6 ± 6.87	12.8 ± 5.61	14.0 ± 5.17
VV	1M	222 ± 121	255 ± 151	231 ± 139	311 ± 167	215 ± 122	215 ± 142
	3M	230 ± 104	261 ± 136	273 ± 184	307 ± 159	223 ± 123	292 ± 170
PVR	1M	63.4 ± 63.7	65.4 ± 79.3	71.1 ± 57.9	53.0 ± 55.4	37.5 ± 26.0	30.9 ± 26.1
	3M	59.2 ± 62.5	34.6 ± 30.0	92.6 ± 141.0	56.8 ± 68.1	3.75 ± 4.79	27.6 ± 20.8
GRA	1M	1.80 ± 1.11	0.90 ± 1.10	1.33 ± 1.29	1.54 ± 1.03	0.00 ± 0.00	1.13 ± 0.89
	3M	1.86 ± 1.12	2.00 ± 0.94 *	1.60 ± 0.99	1.88 ± 1.12 *	1.25 ± 0.50	1.81 ± 0.98 *

* P values < 0.05 between 1M and 3M; ( ) indicates patient number at (1M, 3M)

Disclosures
Funding: none **Clinical Trial:** No **Subjects:** HUMAN **Ethics Committee:** Research Ethics Committee, Hualien Tzu Chi Hospital, Buddhist Tzu Chi Medical Foundation **Helsinki:** Yes **Informed Consent:** Yes