

THE SEVERITY OF BOWEL DYSFUNCTION IN PATIENTS WITH NEUROGENIC BLADDER

Hypothesis / aims of study

Patients with neurological conditions such as spinal cord injury (SCI), multiple sclerosis (MS), myelomeningocele and transverse myelitis can suffer from severe lower urinary and bowel dysfunction. For individuals with SCI, it is well established that neurogenic bladder and bowel dysfunction significantly impact the quality of life and health, even more than the ability to walk or use their arms (1,2).

Despite the extraordinarily high prevalence of neurogenic bowel (47-52%) and bladder (75-95%)(1,2,3) in these populations, only the bladder has received the attention of medical providers with neurogenic bowel being poorly understood and characterized. Our primary aim in this study was to determine the level of severity of bowel dysfunction in a population with neurogenic bladder using validated Health-related Quality of Life (HRQoL) instruments and severity scores and to determine those patient variables that correlate with worse bowel symptoms. Our second aim was to determine if the severity of bowel dysfunction correlates with the severity of bladder dysfunction. Our hypotheses are: 1) patients with worse bowel dysfunction, particularly fecal incontinence will have worse quality of life; and 2) worse bladder function will independently correlate with more severe bowel dysfunction.

Study design, materials and methods

This is a cross-sectional analysis of a prospective institutional Neurogenic Bladder Database (NBD) from 2010-2013. All patients in the database had been referred for evaluation of urologic symptoms/findings potentially associated with an underlying symptomatic neurologic condition. Patient demographics and medical history including urodynamic results were abstracted from medical records and each patient completed a series of validated bladder (American Urological Association Symptom Index-AUA-SI, Michigan Incontinence Symptom Index- M-ISI) and bowel (Fecal Incontinence Severity Index- FISI, Bristol Stool scale, Neurogenic Bowel Dysfunction Score- NBD) symptom severity questionnaires and HRQoL (SF-12). Patients were stratified by several variables such as age, gender, time since injury, level of injury, completeness of injury, neurological diagnosis, and bladder management method to determine if any of these correlate with worse bowel function. The associations between categorical variables were tested using Chi-square test, Fisher's Exact test, or Mantel-Haenszel Chi-square test. Spearman correlation coefficients were calculated to measure the linear relationship between discrete and/or continuous data. The comparisons of means of continuous variables among groups were accomplished using One-way ANOVA. Wilcoxon Rank Sum test or Kruskal-Wallis test was used to compare discrete data.

Results

Among the consecutive 175 patients enrolled in the NBD, 60.6% had traumatic SCI as the cause for their neurogenic bladder with multiple sclerosis (18.3%) being the second most common etiology. 53.7% of the patients were male, and mean age was 44.0 (range 78-19). For bladder drainage 57.7% performed CIC, 10.9% endorsed normal voiding, 12.6% had an indwelling catheter, 4% used a condom catheter and 9.7% had a urinary diversion. Fully 84.0% utilized antimuscarinic medication for bladder management, 15.2% had a bladder augment and 31.4% had received a botulinum toxin bladder injection. Among the 106 patients with SCI, 45.5% had a cervical level injury and 41.1% thoracic with 60.6% having a complete (ASIA A) injury.

FISI scores were a median of 18.0±1.39 (moderate) and were not different based on patient factors except in the SCI cohort where worse scores were reported by patients with less complete (ASIA D) injuries (p=0.02). In the entire cohort there was a trend towards female patients reporting worse FISI scores (p=0.06). Neurogenic Bowel Dysfunction (NBD) scores, which are the only measure specific to patients with neurological disease, were a median of 11.0±0.63 for the entire group (moderate NBD). Scores were worse in those patients with SCI and myelomeningocele compared to other diseases (P=0.020), in younger patients (p=0.020) and in the SCI group those with higher levels of injury (p=0.0046). Neither the FISI nor NBD scores correlated significantly with SF-12 quality of life (QoL) measures.

None of the urodynamic findings (maximum cystometric capacity, the presence of detrusor overactivity, poor bladder compliance (<12 cc/cmH₂O), detrusor sphincter dyssynergia or vesicoureteric reflux) correlated with any of the bowel symptom scores. However, both of the bladder symptom scores M-ISI (p=0.33, p=0.05) and AUA-SI (p=0.26, p=0.03) directly correlated with the FIS and the NBD correlated with the incontinence questionnaire (p=0.29, p=0.02). Bladder management variables that correlated with better bowel symptoms were patients who reported voiding normally (p=0.007) or condom catheter drainage (p=0.002) compared to other bladder management methods.

Interpretation of results

As hypothesized, those patients with worse neurogenic bowel symptoms had worse urinary incontinence and lower urinary tract symptoms. A novel finding was that those patients with focal spinal cord injuries (SIC and myelomeningocele) had the worst bowel function. In the SCI subset, higher level and less complete of injury significantly negatively impacted bowel symptoms. An unexpected finding was worse bowel dysfunction among women and younger patients. Also unexpectedly, fecal incontinence and worse NBD scores did not correlate with worse quality of life indicating that other factors may be driving QoL in this population. These results must be interpreted with caution. This is a small sample size of patients who were actively seeking care for their bladder symptoms hence this may not be representative of a population of patients with these neurologic condition. Patients received multiple active bladder and bowel treatments and were recruited at various time points after the onset of their neurogenic bladder. This tertiary care sample is also overrepresented by patients performing CIC.

Concluding message

Patients with neurogenic bladder have significant bowel dysfunction particularly with SCI or myelomeningocele. Bladder symptoms of incontinence (M-ISI) and lower urinary tract symptoms (AUA-SI) correlated directly with bowel symptom scores signifying how important it is for a treating urologist to address bowel dysfunction along with urinary issues.

Characteristics	N (%)	FISI		NGB Dysfunction Score	
		Doctor Vesion			
		Total	P for Total		P
Gender: Male	94 (53.7)	16 (0, 56) (23)	0.06	12 (0, 34) (27)	0.15
Female	81 (46.3)	22 (0, 57) (17)		10 (1, 32) (25)	
Age: <= 30	39 (22.3)	15 (0, 48) (6)	0.27	10 (1, 29) (7)	0.02
30-40	35 (20.0)	17 (0, 52) (8)		13.5 (2, 32) (11)	
40-50	33 (18.9)	26 (0, 50) (9)		12 (2, 26) (9)	
50-60	41 (23.4)	22 (0, 57) (12)		8 (0, 34) (18)	
>60	27 (15.4)	16 (0, 56) (5)		8.5 (2, 28) (7)	
Augmentation: yes	23 (15.2)	24 (0, 52) (5)	0.14	11 (2, 28) (9)	0.54
no	128 (84.8)	16 (0, 57) (31)		11 (0, 34) (36)	
Diagnosis: SCI	106 (60.6)	15 (0, 56) (24)	0.08	11.5 (1, 34) (26)	0.02
MS	32 (18.3)	27 (0, 57) (7)		8 (0, 22) (11)	
Spina Bifida	23 (13.1)	30 (0, 36) (6)		11 92, 28) (10)	
Other	14 (8.0)	27 (2, 48) (3)		5 (0, 11) (3)	
Level of injury: Cervical	51 (45.5)	10 (0, 56) (13)	0.62	14 (1, 34) (12)	0.046
Thoracic	46 (41.1)	17 (0, 52) (7)		11 (3, 26) (9)	
Lumbar	14 (12.5)	20 (0, 42) (4)		7 (2, 23) (5)	
Sacral	1 (0.9)	33 (33, 33) (0)		3 (3, 3) (0)	
Asia A	49 (60.0)	15 (0, 56) (11)	0.02	12 (4, 34) (12)	0.16
Asia B	9 (11.0)	7.5 (0, 15) (3)		15 (1, 20) (2)	
Asia C	13 (15.9)	9 (0, 25) (2)		9.5 (2, 22) (3)	
Asia D	11 (13.4)	40.5 (2, 52) (1)		10 (2, 22) (2)	
Bladder Dysfunction Scores					
M-ISI Bother (mean = 2.46)	2 (8, 8)	$\rho = 0.31$	0.009	$\rho = 0.39$	0.001
M-ISI Severity (mean = 11.10)	8 (0, 37)	$\rho = 0.33$	0.005	$\rho = 0.29$	0.02
AUA-SI Q1-7 (mean = 7.56)	5 (0, 29)	$\rho = 0.26$	0.03	$\rho = 0.10$	0.4
AUA-SI Q8 (mean = 3.21)	3 (0, 6)	$\rho = 0.08$	0.049	$\rho = 0.26$	0.03
Urodynamic Parameters					
Max cystometric capacity (ml)	321.60 ± 17.17	$\rho = 0.05$	0.66	$\rho = 0.005$	0.97
Detrusor overactivity: Yes	31 (35.6)	17 (0, 44) (8)	0.63	12 (1, 27) (6)	0.39
No	56 (64.4)	17 (0, 52) (7)		11 (2, 28) (12)	
Poor Compliance: Yes	19 (21.8)	18 (0, 46) (4)	0.91	9 (2, 27) (6)	0.67
No	68 (78.2)	16 (0, 52) (11)		11 (1, 28) (12)	
Detrusor Sphincter Dyssynergia: Yes	18 (20.7)	15 (0, 44) (5)		10 (1, 23) (4)	0.57
No	69 (79.3)	17 (0, 52) (10)		11 (2, 28) (14)	
Vesicoureteric Reflux: Yes	9 (10.3)	15 (9, 43) (3)		14 (2, 23) (3)	0.50
No	78 (89.7)	17.5 (0, 52) (12)		11 (1, 28) (15)	

References

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