Lower urinary tract symptoms in male migraineurs

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Abstract

Objective: To investigate the severity and risk factors of lower urinary tract symptoms (LUTS) in male migraine patients. *Methods:* A total of 137 male migraine patients were enrolled as the case group, and 137 healthy males were selected as the control group. The Core Lower Urinary Tract Symptom Score (CLSS), Numeric Rating Scale (NRS) for pain, Self-Rating Somatic Symptom Scale (SSS), Pittsburgh Sleep Quality Index (PSQI), and Generalized Anxiety Disorder-7 (GAD-7) score were used to assess related symptoms. Prostate volume was measured via ultrasound. *Results:* Compared to the control group, the case group exhibited significantly higher scores in impaired sleep quality, anxiety, depression, and LUTS (P < 0.05). Univariate analysis revealed that smoking, aura, headache severity, headache duration, headache frequency, headache attack duration, sleep quality, anxiety, and somatic symptom scores were significant factors influencing LUTS in male migraine patients (P < 0.05). Multivariate linear regression analysis indicated that smoking, aura, headache severity, headache duration, headache frequency, headache attack duration, sleep quality, anxiety, and somatic symptom scores were independent risk factors for LUTS in male migraine patients.
Conclusion: LUTS are common in male migraine patients. Smoking, aura, headache severity, headache duration, headache frequency, headache attack duration, sleep quality, anxiety, and somatic symptoms are significant risk factors for LUTS in this population.

Keywords: Migraine, male, lower urinary tract symptoms, sleep, anxiety

INTRODUCTION

Migraine is a recurrent neurological disorder and the most common cause of primary headaches, characterized by recurrent, unilateral or bilateral, pulsating severe headaches.[1] Migraine can lead to disability, significantly impacting patients' work and quality of life.[2] Epidemiological studies show a male-to-female incidence ratio of 1:3, with a prevalence of 3% among adult males in Asia.[3] Male migraine is relatively less studied due to its lower incidence. Approximately half of male migraine patients experience their first attack between the ages of 20 and 40, with a notable decline in incidence after the age of 60.[4] While headache symptoms are well-recognized by clinicians, non-headache symptoms are often overlooked.[5] Previous studies by our team have shown that migraine patients frequently experience gastrointestinal symptoms such as bloating, increased flatulence, incomplete bowel movements, nausea, and vomiting.[6] A recent health survey of chronic migraine patients revealed that 73.72% of patients also exhibit significant urinary symptoms.[7] Lower urinary tract symptoms (LUTS), including frequency, urgency, incomplete emptying, hesitancy, weak stream, urge incontinence, stress incontinence, bladder pain, and urethral pain, are among the most common urinary symptoms.[8,9] This study aims to quantify the severity of LUTS in male migraine patients and identify risk factors, providing evidence for comprehensive migraine management and improving patients' quality of life.

METHODS

A total of 137 male migraine patients were recruited from the outpatient and inpatient departments of the Third Affiliated Hospital of Qiqihar Medical University between January 2023 and December 2023. Inclusion criteria: male patients diagnosed with migraine by a neurologist according to the International Classification of Headache Disorders, 3rd edition (ICHD-3).[10] Exclusion criteria: (1) Organic lower urinary tract diseases such as bladder foreign bodies or urethral diverticula; (2) Neurogenic bladder; (3)

Pre-existing LUTS before migraine onset; (4) Urinary tract infection indicated by urinalysis; (5) Congenital mental disorders; (6) Cognitive dysfunction; (7) History of alcohol dependence or substance abuse; (8) Severe organ dysfunction. A control group of 137 healthy male volunteers matched for age and education level was recruited from the hospital's health examination center. Informed consent was obtained from all participants.

Data collection and scale assessment

Demographic data, including age, education level, height, weight, marital status, daily water intake, weekly exercise frequency, and smoking history, were collected. Migraine-related information, such as headache history, duration, frequency, and presence of aura, was recorded. Researchers were trained in the use of assessment tools, and questionnaires were administered and collected on-site to ensure completeness. Male migraine patients completed all scales, while the control group completed all scales except the NRS.

(1) Core Lower Urinary Tract Symptom Score (CLSS)[11]: A 10-item self-report questionnaire with a total score of 30, used to quantify LUTS.
(2) Numeric Rating Scale (NRS)[12]: A self-report scale (0-10) used to quantify headache severity.
(3) Self-Rating Somatic Symptom Scale (SSS)[13]: A 20-item self-report scale (1-4 points per item) used to quantify somatic symptoms.
(4) Pittsburgh Sleep Quality Index (PSQI)[14]: A self-report scale (0-21 points) used to assess sleep quality.
(5) Generalized Anxiety Disorder-7 (GAD-7)[15]: A 7-item self-report scale (0-3 points per item) used to quantify anxiety symptoms.

Ultrasound examination

Prostate volume was measured via transabdominal ultrasound using the formula:
Prostate volume = length × width × height × 0.52.[16]

Statistical analysis

Data were analyzed using the GraphPad Prism 6 program. Normally distributed continuous data were expressed as mean ± standard deviation (SD), and comparisons between groups were performed using independent t-tests or ANOVA. Categorical data were expressed as counts, and chi-square tests were used for comparisons. Multivariate analysis was performed using linear regression. $P < 0.05$ was considered statistically significant.

RESULTS

Comparison of clinical data between groups

No significant differences were observed between the case and control groups in age, BMI, education level, or prostate volume ($P > 0.05$). However, the case group had significantly higher scores in impaired sleep quality, anxiety, depression, and LUTS ($P < 0.05$). LUTS scores > 0 were observed in 25.91% of the control group and 95.61% of the case group. The most common LUTS in the control group were frequency, urgency, and nocturia, while in the case group, they were frequency, nocturia, and urethral pain. (Table 1)

Univariate analysis of LUTS in male migraine patients

Significant factors influencing LUTS in male migraine patients included smoking, aura, headache severity, headache duration, headache frequency, headache attack duration, sleep quality, anxiety, and somatic symptom scores ($P < 0.05$).

Table 1: Comparison of clinical data between the control and case groups

	Control group	Case group	t-value	P-value
Number of cases	137	137		
Age (years)	38.74±12.63	36.73±14.63	0.973	0.284
BMI	22.42±5.63	21.54±5.14	0.825	0.104
Years of education	13.05±4.07	14.65±5.20	1.073	0.174
LUTS score	1.41±0.59	9.87±3.85	4.664	<0.001
Sleep quality score	3.53±0.86	7.50±2.40	2.285	0.006
Anxiety score	2.36±0.59	6.97±1.95	2.894	0.009
Somatic symptom score	22.05±8.53	33.51±10.50	3.104	0.004
Prostate volume (ml)	17.71±3.91	18.57±4.35	1.282	0.12

Table 2: Comparison of LUTS scores in male migraine patients under different factors

Factor	Number of cases (Percentage, %)	LUTS score	Test statistic	P-value
Age (years)			0.962 [a]	0.216
<30	32(23.36)	10.59±4.09		
30–40	75(54.74)	9.59±2.40		
>40	30(21.90)	9.63±3.88		
BMI			1.072 [a]	0.172
<18.5	34(24.82)	9.75±3.56		
18.5–24.9	75(54.74)	9.80±2.35		
>24.9	28(20.44)	10.13±2.00		
Marital status			1.201 [b]	0.082
Married	102(74.45)	10.72±0.39		
Not married	35(25.55)	9.38±2.38		
Years of education			1.351 [b]	0.094
≤12	56(40.88)	9.10±1.54		
>12	81(59.12)	10.55±1.13		
Smoking			1.994 [b]	0.021
Yes	58(42.34)	8.59±1.19		
No	79(57.66)	11.04±1.35		
Daily water intake (mL)			1.391 [a]	0.119
<1,000	34(24.82)	9.28±2.33		
1,000–2,000	54(39.42)	9.86±1.89		
>2,000	49(35.77)	10.37±2.33		
Exercise frequency (times/week)			1.875 [a]	0.061
0	38(27.74)	9.82±2.15		
1–2	61(44.53)	9.99±1.70		
≥3	38(27.74)	10.20±3.65		
Presence of aura			2.817	0.002
Yes	39(28.47)	6.81±1.27		
No	98(71.53)	10.53±0.60		
Headache severity			5.016 [a]	<0.001
Mild	26(18.98)	4.58±0.69		
Moderate	72(52.55)	9.97±1.34		
Severe	39(28.47)	12.75±3.64		
Headache duration (years)			2.105 [a]	0.018
<5	36(26.28)	8.07±1.74		
5–10	82(59.85)	9.80±0.76		
>10	19(13.87)	12.43±4.10		
Headache frequency (times/day)			2.694 [a]	0.010
≤2	80(58.39)	8.55±0.48		
3–5	39(28.47)	10.73±2.85		
>5	18(13.14)	12.91±4.49		
Headache attack duration (hours)			4.918 [a]	0.003
<12	68(49.64)	8.33±0.83		
12–24	41(29.93)	12.37±3.43		
>24	28(20.44)	13.46±4.35		
Sleep quality			3.718 [a]	0.007
Good	41(29.93)	8.66±1.95		
Fair	66(48.18)	9.65±1.43		
Poor	30(21.90)	13.35±4.23		
Anxiety status			4.593 [a]	0.005
None	24(17.52)	8.58±2.54		
Mild	56(40.88)	9.67±1.81		
Moderate	41(29.93)	11.49±3.08		
Severe	16(11.68)	12.29±4.32		

Somatic symptom score			3.139 [b]	<0.001
<40	92(67.15)	8.67±0.09		
≥40	45(32.85)	13.08±3.57		

Note: a represents the F-value; b represents the t-value.

Age, BMI, marital status, education level, daily water intake, and exercise frequency did not significantly affect LUTS (P > 0.05). (Table 2)

Multivariate analysis of LUTS in male migraineurs

Multivariate linear regression analysis revealed that smoking, aura, headache severity, headache duration, headache frequency, headache attack duration, sleep quality, anxiety, and somatic symptom scores were independent risk factors for LUTS in male migraine patients, explaining 86.61% of the total variance. (Table 3)

DISCUSSION

This study found that LUTS are more prevalent in male migraine patients compared to healthy controls. Sleep disturbances, anxiety, and somatic symptoms were significantly higher in migraine patients and were identified as risk factors for LUTS. Previous population-based studies have shown that migraine patients have higher rates of insomnia, poorer sleep quality, and shorter sleep duration compared to non-migraine individuals.[17] Poor sleep quality may precede migraine attacks, and untreated anxiety can exacerbate sleep disturbances, creating a vicious cycle.[18] Comprehensive management of anxiety and sleep quality in migraine patients may improve headache symptoms.[19]

Smoking was found to reduce LUTS in male migraine patients, though further studies with larger sample sizes are needed to confirm this finding. Migraine aura was associated with more severe LUTS, possibly due to its correlation with sleep disturbances and anxiety. Exercise frequency did not significantly affect LUTS, possibly due to the predominance of strength training over aerobic exercise in this study.

Headache severity, duration, frequency, and attack duration were significant risk factors for LUTS, suggesting that more severe migraine episodes are associated with increased urinary symptoms such as frequency, nocturia, and urethral pain.

Migraine is a complex condition involving sensory, emotional, and cognitive processes. Dysfunction in autonomic nervous system regions, such as the insular cortex, amygdala, and periaqueductal gray matter, may contribute to both migraine and associated urinary symptoms. Further research is needed to explore the relationship between migraine and bladder pain syndrome (BPS), a chronic pelvic condition characterized by bladder discomfort and LUTS.

This study highlights the importance of early identification and multidisciplinary management of migraine and its associated symptoms to improve patients' quality of life.

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Table 3: Multivariate linear regression analysis of LUTS scores in male migraine patients

Independent variable	b	SE	β	t-value	P-value	VIF-value
Constant	3.802	0.826	—	2.024	0.021	—
Smoking	1.097	0.962	1.847	1.883	0.019	1.299
Migraine with aura	1.496	0.130	2.455	2.808	0.003	1.333
Headache severity	1.987	0.254	4.064	3.054	<0.001	1.927
Headache duration	1.719	0.103	1.782	1.468	0.003	1.232
Headache frequency	1.166	0.053	2.565	2.556	0.001	1.076
Headache attack duration	2.747	0.103	5.027	1.136	0.009	2.115
Sleep quality	2.598	0.089	4.574	1.034	0.011	1.334
Anxiety status	1.751	0.077	2.769	1.477	0.005	3.121
Somatic symptom score	2.802	0.096	3.460	3.548	<0.001	2.575

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