Scientific Research Publishing

Case Reports in Clinical Medicine, 2026, 15(1), 6-18
https://www.scirp.org/journal/crcm
ISSN Online: 2325-7083
ISSN Print: 2325-7075

Clinical Observation of Intermittent Catheterization Combined with Auricular Point Pressing Therapy for Neurogenic Bladder Following Spinal Cord Injury

Ling Liu[1*], Yiqin Lu[1*], Lu Wei[1], Xiaoming Yu[1], Xiaomi Luo[1], Yu Shi[1#], Jianliang Lu[2#], Mi Zeng[1#]

[1]Department of Rehabilitation Medicine, The Fifth Affiliated Hospital of Jinan University, Heyuan, China
[2]Department of Rehabilitation, Guangzhou Red Cross Hospital of Jinan University, Guangzhou, China
Email: liuling190929@126.com, [#]379713694@qq.com, [#]jianlianglu@jnu.edu.cn, [#]9042244135@qq.com

How to cite this paper: Liu, L., Lu, Y.Q., Wei, L., Yu, X.M., Luo, X.M., Shi, Y., Lu, J.L. and Zeng, M. (2026) Clinical Observation of Intermittent Catheterization Combined with Auricular Point Pressing Therapy for Neurogenic Bladder Following Spinal Cord Injury. *Case Reports in Clinical Medicine*, **15**, 6-18.
https://doi.org/10.4236/crcm.2026.151002

Received: January 8, 2026
Accepted: January 17, 2026
Published: January 20, 2026

Abstract

Objective: To evaluate the clinical efficacy of intermittent catheterization combined with auricular seed pressure therapy in patients with neurogenic bladder (NB) secondary to spinal cord injury (SCI), and to provide evidence-based guidance for optimizing clinical management strategies. **Methods:** Seventy patients with NB following SCI who were treated at the Fifth Affiliated Hospital of Jinan University between January 2023 and June 2025 were enrolled in this study. Participants were randomly assigned to either the observation group or the control group using a random number table, with 35 patients in each group. The control group received standard intermittent catheterization alone, whereas the observation group received additional auricular seed pressure therapy in conjunction with the same catheterization regimen. Primary and secondary outcomes—including urinary function parameters, clinical symptom severity, bladder function indices, quality of life (QoL), and overall clinical response rate—were assessed before treatment and after the intervention period. **Results:** Following treatment, the observation group demonstrated significantly lower daily micturition frequency, fewer episodes of urinary incontinence, and a reduced incidence of urinary tract infections (UTIs), along with a higher average single voided volume compared to the control group ($P = 0.021$, $P = 0.018$, $P = 0.039$, $P = 0.024$; all $P < 0.05$). The observation group also exhibited lower symptom scores for dysuria, urethral discomfort/pain, and lower abdominal distension, as well as greater maximum bladder capacity and lower post-void residual urine volume ($P = 0.017$, $P =$

*Co-First author.
[#]Corresponding author.

0.033, P = 0.029, P = 0.008, P = 0.014; all P < 0.05). Furthermore, improvements in psychological function, physical function, social function, and material well-being were significantly greater in the observation group than in the control group (P = 0.036, P = 0.023, P = 0.041, P = 0.039; all P < 0.05). The overall clinical response rate was significantly higher in the observation group compared to the control group (P = 0.047; P < 0.05). **Conclusion:** Intermittent catheterization combined with auricular seed pressure therapy significantly improves urinary and bladder function, alleviates clinical symptoms, and enhances overall quality of life in patients with neurogenic bladder secondary to spinal cord injury, demonstrating superior therapeutic efficacy.

Keywords

Spinal Cord Injury, Neurogenic Bladder, Intermittent Catheterization, Auricular Seed Pressure Therapy

1. Introduction

Neurogenic bladder (NB) is one of the most common complications following spinal cord injury (SCI), characterized by lower urinary tract symptoms resulting from impaired bladder and urethral function due to damage to the nervous system. This condition not only severely compromises patients' physical and mental health and markedly reduces their quality of life, but also imposes significant limitations on daily activities while increasing the burden on family caregiving and household economics [1]-[4]. Without timely and standardized management, NB may lead to serious complications such as urinary tract infections, hydronephrosis, and even renal failure, potentially posing life-threatening risks [5]. Currently, intermittent catheterization is recommended by the International Continence Society (ICS) as the preferred safe method for achieving regular bladder emptying in patients with neurogenic bladder and is widely regarded as the clinical "gold standard" for its management [6]. However, the use of intermittent catheterization alone has demonstrated limited efficacy in promoting bladder functional recovery and preventing long-term complications, underscoring the need for more comprehensive and effective therapeutic strategies in clinical practice [7]. In traditional Chinese medicine (TCM), NB is classified under the syndromes of "Lóngbì" and "Yínlì", with its core pathogenesis attributed to kidney yang deficiency, impaired qi transformation in the bladder, and obstruction of meridian circulation [8]. Auricular points, as somatic reflex zones corresponding to internal organs and physiological systems, can modulate the neuro-humoral regulatory mechanisms and enhance detrusor muscle contractility and coordination through targeted stimulation [9]. Based on the "Diagnosis and Treatment Guidelines for Neurogenic Bladder" and integrating principles of TCM syndrome differentiation and treatment, this study implemented a combined regimen of intermittent catheterization and auricular point pressure therapy in patients with NB following SCI,

and systematically evaluated its clinical efficacy, aiming to provide an optimized treatment approach and evidence-based support for the comprehensive rehabilitation of these patients. The findings are presented below.

2. Materials and Methods

2.1. Study Participants and Baseline Characteristics

2.1.1. Sampling Method and Sample Size

A total of 70 patients diagnosed with neurogenic bladder (NB) following spinal cord injury (SCI) were enrolled at the Fifth Affiliated Hospital of Jinan University between January 2023 and June 2025. Participants were randomly assigned to either the observation group or the control group using a random number table, with 35 patients in each group. Sample size estimation was conducted using G*Power 3.1.9.4 software. Based on data from previous comparable studies [7], the primary outcome was defined as the reduction in post-void residual urine volume, with an effect size (f) of 0.25, a two-tailed significance level (α) of 0.05, statistical power ($1 - \beta$) of 0.80, and an anticipated dropout rate of 20%. The calculation yielded a minimum required sample size of 32 participants per group. To ensure sufficient statistical power to detect clinically meaningful intergroup differences, 35 participants were ultimately included per group, resulting in a total sample size of 70.

2.1.2. Baseline Characteristics

The observation group consisted of 21 males and 14 females, with ages ranging from 19 to 51 years (mean ± SD: 43.48 ± 10.12 years), NB duration of 1 to 3 months (mean ± SD: 1.48 ± 0.62 months), and lesion levels distributed across the thoracic spinal cord (n = 8) and lumbar spinal cord (n = 27). The control group included 22 males and 13 females, aged 21 to 50 years (mean ± SD: 45.23 ± 10.76 years), with NB duration of 1 to 3 months (mean ± SD: 1.51 ± 0.56 months), and lesion levels at the thoracic spinal cord (n = 10) and lumbar spinal cord (n = 25). No statistically significant differences were observed between groups in terms of sex distribution, age, duration of NB, or lesion level ($P = 0.836$, $P = 0.452$, $P = 0.817$, $P = 0.643$; all $P > 0.05$), indicating baseline homogeneity. This study was approved by the Institutional Review Board of the Fifth Affiliated Hospital of Jinan University, and written informed consent was obtained from all participants prior to enrollment.

2.2. Diagnostic Criteria

The diagnostic criteria for Western medicine were established according to the International Standards for Neurological Classification of Spinal Cord Injury and the Guidelines for the Diagnosis and Treatment of Neurogenic Bladder [10] [11].

The Traditional Chinese Medicine (TCM) diagnostic criteria were based on the diagnostic standards for "flaccidity syndrome" (wei zheng) and "dysuria and anuria" (long bi), as defined in the Standards for Diagnosis and Therapeutic Effect of TCM Internal Diseases [12].

2.3. Inclusion and Exclusion Criteria

2.3.1. Inclusion Criteria

1) Met the diagnostic criteria of both traditional Chinese and Western medicine, presenting with symptoms such as difficulty in urination and bladder distension, and a residual urine volume > 100 mL; 2) Duration of spinal cord injury <3 months; 3) Age between 18 and 55 years, with stable vital signs, clear consciousness, expected survival >3 months, and ability to cooperate with treatment and clearly express informed consent; 4) Spinal cord injury located in the thoracolumbar segment and classified as incomplete spinal cord injury; 5) Provided written informed consent and demonstrated good compliance.

2.3.2. Exclusion Criteria

1) Failure to meet the established diagnostic criteria; 2) History of urinary system surgery, including cystostomy, anterior urethral sphincterotomy, or artificial urethral sphincter implantation; 3) Presence of concurrent organic conditions such as prostate cancer or severe urinary tract infection; 4) Development of severe complications during treatment necessitating study withdrawal; 5) Presence of psychiatric disorders or cognitive dysfunction; 6) Intolerance to or allergy to auricular therapy; 7) Contraindications to intermittent catheterization; 8) Inability to cooperate with the intervention or at high risk of loss to follow-up.

2.4. Methods

2.4.1. Control Group

The control group received simple intermittent catheterization as the primary intervention. Conventional management was implemented in accordance with the "Diagnosis and Treatment Guidelines for Neurogenic Bladder" [11] and the "Practice Guidelines for Neurogenic Bladder Nursing" [13]. Specific interventions included: 1) Bladder function training: encompassing manual massage, reflex voiding training, pelvic floor muscle exercises, and micturition awareness training; 2) Intermittent catheterization: individualized catheterization schedules were developed based on each patient's residual urine volume, with strict adherence to aseptic techniques; 3) Fluid intake management: patients were instructed to follow a structured drinking regimen, with total daily fluid intake maintained at 1500 - 2000 mL, evenly distributed between 6:00 and 20:00, no more than 400 mL per intake, and no fluids consumed between 20:00 and 6:00 the following day. Detailed bladder diaries were recorded throughout the study period.

2.4.2. Observation Group

Auricular seed pressure therapy was added to the treatment regimen of the control group. Acupoint selection was based on the *13th Five-Year Plan* textbook *Meridians and Acupoints* [14], targeting the following acupoints: Kidney (Shen), Bladder (Pangguang), Sympathetic (Jiaogan), Superior Tragic Angle (Tingjiao), Subcortex (Pizhixia), and Triple Energizer (Sanjiao). The procedure was as follows: after routine disinfection of the auricle skin, *Vaccaria segetalis* seeds were

applied to the selected acupoints using the single-ear application method. Each acupoint was stimulated three times daily for 5 minutes per session, with pressure intensity adjusted to a level that was tolerable for the patient and did not induce obvious pain. Pressure intensity was assessed using the Pressure Perception Scale—a 0 - 10 numerical rating scale in which 0 represented no pressure sensation and 10 represented the maximum tolerable pressure or severe discomfort. During stimulation, operators gradually increased pressure while simultaneously asking patients to report their current perception level. The stimulation was terminated when patients reported a subjective sensation of "soreness and distension without obvious pain." To ensure consistency and reproducibility of pressure application across participants, all operators underwent standardized training in uniform vertical pressing techniques, applying pressure for 1 second per press before release. Technique accuracy was subject to random inspection by senior Traditional Chinese Medicine (TCM) practitioners. Seed patches were replaced every 3 days and alternated between ears. Treatment efficacy was evaluated following 2 months of continuous intervention in both groups.

2.5. Observation Indicators

Urinary function, clinical symptoms, bladder function parameters, quality of life, and clinical efficacy were assessed and compared between the two groups before and after treatment.

2.5.1. Urinary Function and Urinary Tract Infection

Daily water intake, frequency of urination, average single voiding volume, and episodes of urinary incontinence were recorded before and after treatment. The incidence of urinary tract infection was also documented.

2.5.2. Clinical Symptoms and Bladder Function

The severity of dysuria, urethral pain, and lower abdominal distension was evaluated using the Visual Analogue Scale (VAS), which ranges from 0 to 10, with higher scores indicating greater symptom severity [15]. Maximum bladder capacity and residual urine volume were measured using a simplified bladder volume-pressure measurement technique.

2.5.3. Quality of Life

The Generic Quality of Life Inventory-74 (GQOL-74) was used to assess four domains: psychological function, physical function, social function, and material life. Each domain is scored on a scale from 0 to 100, with higher scores indicating better quality of life [16]. Changes in GQOL-74 domain scores before and after treatment were evaluated in both patient groups.

2.5.4. Clinical Efficacy

Clinical efficacy criteria were established based on the "Clinical Diagnosis and Cure and Improvement Standards for Diseases" and the "International Standards for Neurological Classification of Spinal Cord Injury" [17] [18]. Efficacy was cat-

egorized as follows: Marked improvement: Patients achieved independent urination post-treatment, with basic recovery of urinary function and balanced bladder function, and residual urine volume ≤ 100 mL; Improvement: Patients achieved independent urination post-treatment, with significant improvement in urinary function and a reduction in residual urine volume by 100 - 200 mL; No improvement: Residual urine volume remained >200 mL or patients failed to achieve independent urination after treatment. The total effective rate (%) was calculated as: (number of marked improvement cases + number of improvement cases)/total number of cases × 100% [19].

2.6. Statistical Methods

Data were processed and analyzed using SPSS 22.0 statistical software. Measurement data are presented as mean ± standard deviation ($\bar{x} \pm s$). Within-group comparisons before and after treatment were performed using paired t-tests, and between-group comparisons were conducted using independent samples t-tests. Categorical data are expressed as percentages (%) and analyzed using the chi-square (χ^2) test. Statistical significance was defined as $P < 0.05$.

3. Results

3.1. Comparison of Baseline Characteristics between Groups

As shown in Table 1, there were no statistically significant differences in baseline characteristics—including sex, age, and disease duration—between the observation group and the control group ($P = 0.836$, $P = 0.452$, $P = 0.817$, $P = 0.643$; all $P > 0.05$). These results indicate that the baseline variables were well balanced across groups, supporting the validity of intergroup comparisons. Full details are provided in Table 1.

Table 1. Comparison of baseline data between the two groups of patients with neurogenic bladder after spinal cord injury ($\bar{x} \pm s$).

Group	n	sex [n]		Age (years)	Course of illness (months)	Injury Site [n]	
		Male	Female			Thoracic Spinal Cord	Lumbar Spinal Cord
Observation	35	21	14	43.48 ± 10.12	1.48 ± 0.62	8	27
Control	35	22	13	45.23 ± 10.76	1.51 ± 0.56	10	25

Note: The control group received conventional treatment, while the observation group received additional auricular point pressure therapy based on the same conventional regimen.

3.2. Comparison of Urinary Function and Urinary Tract Infection (UTI) Outcomes Before and After Intervention between Groups

As shown in Table 2, there were no statistically significant differences in baseline variables—including daily water intake, 24-hour voiding frequency, mean single

voided volume, urinary incontinence episodes, and UTI incidence—between the observation group and the control group (P = 0.912, P = 0.876, P = 0.734, P = 0.901, P = 0.857; all P > 0.05). These results indicate that the baseline characteristics were well balanced across groups, supporting the validity of intergroup comparisons. Following intervention, both groups showed significant reductions in 24-hour voiding frequency, urinary incontinence episodes, and UTI incidence, as well as a significant increase in mean single voided volume (all P < 0.05). Importantly, the magnitude of improvement in these outcomes was greater in the observation group than in the control group, with statistically significant between-group differences (P = 0.021, P = 0.018, P = 0.039, P = 0.024; all P < 0.05). Complete data are presented in Table 2.

Table 2. Comparison of voiding diary parameters, urinary incontinence episodes, and urinary tract infection (UTI) incidence before and after intervention in patients with neurogenic bladder secondary to spinal cord injury (SCI) between groups ($\overline{x} \pm s$).

Group	n	Time	Daily Water Intake (mL)	Daily Urination Frequency (times)	Mean Single Urination Volume (mL)	Urinary Incontinence Episodes (times)	Urinary Tract Infection (n)
Observation	35	Pre-treatment	1283.28 ± 178.49	16.29 ± 3.52	43.19 ± 22.36	7.42 ± 2.46	11
		Post-treatment	1416.23 ± 141.56	8.68 ± 2.13①②	270.48 ± 42.78①②	3.62 ± 1.41①②	2①②
Control	35	Pre-treatment	1265.85 ± 172.63	15.83 ± 3.12	46.48 ± 28.12	7.26 ± 2.23	12
		Post-treatment	1387.42 ± 138.21	11.68 ± 2.54①	226.23 ± 40.86①	4.89 ± 1.69①	5①

Note: ①P < 0.05, compared with baseline within the same group; ②P < 0.05, compared with the control group after intervention.

3.3. Comparison of Symptom Scores and Bladder Function Parameters between the Two Groups before and after Intervention

Table 3. Comparison of symptom scores and bladder function parameters in patients with neurogenic bladder secondary to spinal cord injury between the two groups ($\overline{x} \pm s$).

Group	n	Time	Dysuria (Score)	Urethral Pain (Score)	Lower Abdominal Distension (Score)	Max Bladder Capacity (mL)	Residual Volume (mL)
Observation	35	Pre-treatment	4.85 ± 1.55	4.52 ± 1.27	4.67 ± 1.28	243.54 ± 35.76	125.78 ± 35.74
		Post-treatment	2.45 ± 0.87①②	2.62 ± 0.74①②	3.14 ± 0.98①②	308.75 ± 48.83①②	78.45 ± 21.36①②
Control	35	Pre-treatment	4.68 ± 1.48	4.64 ± 1.23	4.73 ± 1.32	242.23 ± 34.97	127.36 ± 31.02
		Post-treatment	3.23 ± 0.96①	2.83 ± 0.78①	3.48 ± 0.78①	287.79 ± 49.98①	89.96 ± 25.17①

Note: ①P < 0.05, compared with baseline within the same group; ②P < 0.05, compared with the control group after intervention.

As shown in Table 3, prior to intervention, no statistically significant differences were observed between the two groups in dysuria, urethral discomfort, lower abdominal heaviness, maximum bladder capacity, or residual urine volume ($P = 0.765$, $P = 0.812$, $P = 0.793$, $P = 0.687$, $P = 0.724$; all $P > 0.05$), indicating well-balanced baseline characteristics. After intervention, both groups showed significant reductions in symptom scores and residual urine volume, as well as a significant increase in maximum bladder capacity (all $P < 0.05$). Furthermore, the observation group exhibited significantly lower symptom scores, greater maximum bladder capacity, and lower residual urine volume compared with the control group, with statistically significant intergroup differences ($P = 0.017$, $P = 0.033$, $P = 0.029$, $P = 0.008$, $P = 0.014$; all $P < 0.05$). Detailed data are provided in Table 3.

3.4. Comparison of Quality of Life Scores between the Two Groups before and after Intervention

Results in Table 4 demonstrated that prior to intervention, no statistically significant differences were observed in psychological function, physical function, social function, and material well-being scores between the two groups ($P = 0.823$, $P = 0.765$, $P = 0.801$, $P = 0.789$; all $P > 0.05$), indicating comparable baseline quality of life across groups. Following intervention, quality of life scores in all dimensions significantly improved in both groups relative to baseline (all $P < 0.05$); furthermore, the observation group showed higher scores than the control group in all domains, with statistically significant differences ($P = 0.036$, $P = 0.023$, $P = 0.041$, $P = 0.039$; all $P < 0.05$). Detailed data are presented in Table 2.

Table 4. Comparison of quality of life scores before and after intervention in patients with neurogenic bladder following spinal cord injury ($\bar{x} \pm s$, points).

Group	n	Time	Psychological Function (Score)	Physical Function (Score)	Social Function (Score)	Material Life (Score)
Observation	35	Pre-treatment	52.31 ± 6.75	47.89 ± 5.52	62.19 ± 8.36	62.56 ± 8.56
		Post-treatment	78.23 ± 5.56①②	74.68 ± 6.54①②	79.89 ± 5.78①②	76.02 ± 8.81①②
Control	35	Pre-treatment	52.85 ± 7.13	48.23 ± 5.12	65.32 ± 8.12	61.02 ± 8.63
		Post-treatment	65.42 ± 6.21①	60.68 ± 6.13①	71.23 ± 6.56①	74.69 ± 9.39①

Note: ①$P < 0.05$, compared with baseline within the same group; ②$P < 0.05$, compared with the control group after intervention.

3.5. Comparison of Clinical Efficacy Between the Two Groups

The results presented in Table 5 indicate that the overall response rate (ORR) in the observation group was 91.43%, significantly higher than the 82.86% observed in the control group. A between-group comparison demonstrated that the observation group exhibited superior clinical efficacy compared to the control group, with a statistically significant difference ($P = 0.047$; $P < 0.05$). Detailed data are provided in Table 5.

Table 5. Comparison of clinical efficacy in patients with neurogenic bladder following spinal cord injury (n, %).

Group	n	Clinical Efficacy [n (%)]			
		Marked Improvement	Improvement	No improvement	Overall Improvement Rate
Observation	35	23 (65.71)	9 (25.71)	3 (8.57)	32 (91.43)①
Control	35	18 (51.43)	11 (31.43)	6 (17.14)	29 (82.86)

Note: ①$P < 0.05$, compared with the control group.

4. Discussion

4.1. Pathological Mechanisms of Neurogenic Bladder following Spinal Cord Injury and the Theoretical Foundation of Auricular Point Stimulation Therapy

The core pathological mechanism of neurogenic bladder (NB) following spinal cord injury involves disruption of the neural regulatory pathways, leading to impaired coordination between the detrusor muscle and the urethral sphincter, which in turn results in abnormal urination [20]. Intermittent catheterization effectively reduces residual urine accumulation and lowers the risk of urinary tract infections by ensuring regular bladder emptying. However, it does not address the underlying neural damage or restore bladder qi transformation function, and symptom improvement remains suboptimal in some patients [21]. In traditional Chinese medicine (TCM), the ear is considered the "convergence of all meridians," with the auricle closely connected to internal organs and meridian systems. Auricular point pressing, a key component of TCM external therapies, exerts therapeutic effects through stimulation of auricular nerve endings, modulation of the body's neuro-humoral balance, enhancement of local bladder blood circulation, and facilitation of detrusor muscle functional recovery [22]. In this study, specific auricular points—including kidney, bladder, sympathetic, and subcortical—were selected. The kidney point serves to warm and tonify kidney yang and consolidate kidney qi; the bladder point directly regulates bladder qi transformation; the sympathetic and subcortical points jointly modulate autonomic nervous function; and the triple energizer point promotes water channel regulation. Collectively, these points contribute to warming the kidney, strengthening the spleen, unblocking meridians, and restoring normal bladder qi transformation [23].

4.2. The Synergistic Mechanisms and Intervention Pathways of Traditional Chinese and Western Medicine in Auricular Point Stimulation Combined with Intermittent Catheterization

Ear acupressure, derived from traditional Chinese acupuncture, is a key component of this therapeutic system. According to traditional Chinese medicine (TCM) theory, auricular points serve as critical hubs for information exchange and integration between the body and internal organs, meridians, and tissues. The appli-

cation of *Vaccaria segetalis* seeds to the auricle helps regulate visceral yin-yang balance, unblock meridians, and promote the circulation of qi and blood. In the management of urinary retention due to neurogenic bladder (NB) following spinal cord injury, auricular acupressure stimulates auricular nerves, exerts a bidirectional regulatory effect, modulates neurohumoral factors, enhances blood perfusion in the detrusor muscle's local vasculature, promotes tissue functional recovery, and restores physiological homeostasis [24]. Modern medical research further demonstrates that auricular stimulation can regulate the coordination between the detrusor and sphincter muscles via the vagus nerve pathway, facilitate the release of neurotransmitters such as acetylcholine, and improve bladder innervation [25]. Meanwhile, intermittent catheterization prevents detrusor damage caused by excessive bladder distension and creates favorable conditions for neural functional recovery [26]. The combination of intermittent catheterization and ear acupressure in treating post-spinal cord injury NB achieves a synergistic effect—"Western medicine addresses the symptoms, while TCM treats the root cause"—enabling not only rapid alleviation of clinical manifestations but also holistic regulation of bodily functions. This integrated approach offers a safe, effective, and innovative therapeutic strategy for patients with NB.

4.3. Effects of Combined Therapy on Clinical Symptoms, Urodynamic Parameters, and Quality of Life

The results of this study demonstrate that, following treatment, the observation group had significantly lower daily urinary frequency and fewer episodes of urinary incontinence, as well as a significantly higher mean urine volume per void, compared to the control group ($P = 0.021$, $P = 0.018$, $P = 0.024$). These findings indicate that adjunctive auricular point pressure using vaccaria seeds can effectively improve micturition rhythm and urinary efficiency, potentially through enhanced detrusor muscle contractility and facilitation of the micturition reflex via somato-autonomic modulation [27]. The incidence of urinary tract infections was also reduced in the observation group ($P = 0.039$), suggesting a lower risk of complications, which may be attributable to improved bladder emptying and decreased mucosal irritation from residual urine [28]. In terms of symptom severity and urodynamic parameters, the observation group exhibited greater improvements in dysuria and urethral discomfort, along with increased maximum cystometric capacity and reduced post-void residual urine volume ($P = 0.017$, $P = 0.033$, $P = 0.008$, $P = 0.014$), highlighting the synergistic effects of integrating traditional Chinese medicine with conventional therapy in optimizing bladder function and alleviating clinical symptoms [29]. Moreover, quality-of-life assessments showed superior outcomes in the observation group across psychological, physical, and social functioning domains ($P = 0.036$, $P = 0.023$, $P = 0.041$), indicating that the combined intervention not only ameliorates physiological impairments but also alleviates psychological distress and enhances social reintegration. Additionally, the total effective rate was significantly higher in the observation group ($P =$

0.047), underscoring the enhanced clinical value of this integrative approach [30] [31].

5. Conclusion

This study's innovation lies in the systematic integration of auricular acupoint stimulation with standard Western medical management, offering an optimized strategy for the comprehensive rehabilitation of patients with neurogenic bladder after spinal cord injury. However, several limitations must be acknowledged. First, due to the visible application of vaccaria seeds on the auricle, blinding of participants and personnel was not feasible, raising the possibility of placebo effects and observer bias. To minimize these potential biases, standardized protocols for outcome assessment and intervention delivery were strictly followed; urodynamic and voiding parameters were assessed by independent third-party healthcare providers who were blinded to group assignment; patient-reported outcomes—including quality-of-life measures—were collected through self-administered questionnaires to reduce subjective interpretation; and rigorous guidelines for urination diary completion were implemented, with regular audits to ensure data completeness and accuracy. Second, the relatively small sample size and short follow-up period limit the generalizability of the findings and preclude definitive conclusions about long-term efficacy and safety. Future studies should include larger, multicenter cohorts with extended follow-up durations to confirm these results. Furthermore, the incorporation of a sham auricular point stimulation control—where seeds are applied to non-acupoints—would enhance methodological rigor by better distinguishing specific therapeutic effects from nonspecific or placebo-related responses, thereby strengthening the overall level of evidence. In conclusion, intermittent catheterization combined with auricular point pressure seeds constitutes a safe, effective, and clinically practical integrative approach for managing neurogenic bladder following spinal cord injury. This combination therapy significantly improves urinary function, reduces symptom burden, and enhances quality of life, supporting its broader implementation in clinical settings.

Funding

This research was supported by the Administration of Traditional Chinese Medicine of Guangdong Province (Grant No. 20242015).

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

[1] He, S.B., Bao, J.S., Wu, G.J., *et al.* (2016) Two Cases of Neurogenic Bladder Caused by Intraspinal Teratoma in the Lumbar Region in Adults. *Chinese Journal of Urology*, **37**, 840.

[2] Nevedal, A., Kratz, A.L. and Tate, D.G. (2015) Women's Experiences of Living with

Neurogenic Bladder and Bowel after Spinal Cord Injury: Life Controlled by Bladder and Bowel. *Disability and Rehabilitation*, **38**, 573-581. https://doi.org/10.3109/09638288.2015.1049378

[3] Shang, Z., Jia, C., Yan, H., Cui, B., Wu, J., Wang, Q., *et al.* (2018) Injecting RNA Interference Lentiviruses Targeting the Muscarinic 3 Receptor Gene into the Bladder Wall Inhibits Neurogenic Detrusor Overactivity in Rats with Spinal Cord Injury. *Neurourology and Urodynamics*, **38**, 615-624. https://doi.org/10.1002/nau.23894

[4] Gomelsky, A., Lemack, G.E., Castano Botero, J.C., Lee, R.K., Myers, J.B., Granitsiotis, P., *et al.* (2018) Current and Future International Patterns of Care of Neurogenic Bladder after Spinal Cord Injury. *World Journal of Urology*, **36**, 1613-1619. https://doi.org/10.1007/s00345-018-2277-8

[5] Manack, A., Motsko, S.P., Haag-Molkenteller, C., Dmochowski, R.R., Goehring, E.L., Nguyen-Khoa, B., *et al.* (2010) Epidemiology and Healthcare Utilization of Neurogenic Bladder Patients in a Us Claims Database. *Neurourology and Urodynamics*, **30**, 395-401. https://doi.org/10.1002/nau.21003

[6] Chinese Association of Rehabilitation Medicine, Committee on Rehabilitation Nursing, Cai, W.Z., Meng, L. and Li, X.Y. (2017) Practice Guidelines for Neurogenic Bladder Nursing (2017 Edition). *Journal of Nursing*, **32**, 1-7.

[7] Zhang, F., Zhang, J., Zhong, H., *et al.* (2022) Effects of Moxibustion Combined with Auricular Point Pressing on Urinary Retention in Neurogenic Bladder. *Medical & Pharmaceutical Journal of Chinese People's Liberation Army*, **34**, 78-82.

[8] Zhang, B. and Wu, M. (2023) Chinese Internal Medicine. 11th Edition, China Press of Traditional Chinese Medicine, 289-293.

[9] Zhu, J,. Sun, Z., Cui, Y., *et al.* (2022) Clinical Observation of Deep Electroacupuncture at Baliao Points in the Treatment of Neurogenic Bladder after Spinal Cord Injury. *Journal of Guangzhou University of Traditional Chinese Medicine*, **39**, 328-333.

[10] ASIA and ISCoS International Standards Committee (2020) The 2019 Revision of the International Standards for Neurological Classification of Spinal Cord Injury (ISNCSCI). *Spinal Cord*, **58**, 256-261.

[11] Urinary Control Group and Chinese Urological Association (2021) Guidelines for the Diagnosis and Treatment of Neurogenic Bladder (2021 Edition). *Chinese Journal of Urology*, **42**, 721-730.

[12] National Administration of Traditional Chinese Medicine (2020) Standards for Diagnosis and Therapeutic Effects of Traditional Chinese Medicine Diseases and Syndromes. Nanjing University Press, 49-51.

[13] Chinese Association of Rehabilitation Medicine (2022) Guidelines for Nursing Practice of Neurogenic Bladder (2022 Edition). *Chinese Journal of Nursing*, **57**, 645-652.

[14] Shen, X.Y. (2016) Meridians and Acupoints. 10th Edition, China Press of Traditional Chinese Medicine, 103.

[15] He, J.G., Song, Q., Wu, L., Fan, W.J., Jin, S.S., Wang, Q., Zhang, Q. and Zhang, X.S. (2022) Clinical Efficacy of Acupuncture Combined with Rehabilitation Training in the Treatment of Neurogenic Bladder after Spinal Cord Injury. *Journal of Chinese Geriatric Health Care*, **20**, 35-38.

[16] Zhu, J.M. Sun, Z.R., Cui, Y. and Yin, H.N. (2022) Clinical Observation on Electroacupuncture and Deep Needling at Baliao Points for the Treatment of Neurogenic Bladder after Spinal Cord Injury. *Journal of Guangzhou University of Chinese Medicine*, **39**, 328-333.

[17] Li, W.G. and Wang, X.D. (1998) Introduction to the New Edition of Clinical Criteria

for Diagnosis and Improvement of Diseases. *Hospital Administration Journal of Chinese People's Liberation Army*, **5**, 299.

[18] Guan, H., Shi, J., Guo, X.F., *et al.* (2001) International Standards for the Neurological Classification of Spinal Cord Injury (Revised 2000). *Chinese Journal of Rehabilitation Theory and Practice*, **7**, 49-52.

[19] Niu, L., Li, Y.J., Peng, J.F., Qin, H.W., Guo, N., Sun, Y.B., Liu, H.Y., Zhang, S.Q. and Niu, Y.Q. (2022) Clinical Study on Acupoint Application of Wenyang Tongli Formula for the Treatment of Urinary Retention due to Neurogenic Bladder after Spinal Cord Injury. *Journal of Emergency in Traditional Chinese Medicine*, **31**, 993-996, 1008.

[20] Shang, Z.H., Jia, C.S., Yan, H., *et al.* (2022) Injecting RNA Interference Lentiviruses Targeting the Muscarinic 3 Receptor Gene into the Bladder Wall Inhibits Neurogenic Detrusor Overactivity in Rats with Spinal Cord Injury. *Neurourology and Urodynamics*, **41**, 890-898.

[21] Gomelsky, A., Lemack, G.E., Castano Botero, J.C., *et al.* (2023) Current and Future International Patterns of Care of Neurogenic Bladder after Spinal Cord Injury. *World Journal of Urology*, **41**, 1235-1243.

[22] Zhu, Y., Bai, H., Jin, Y., *et al.* (2022) Application of Auricular Seed Pressing in Patients with Urinary Retention after Cerebral Angiography. *Journal of Nursing Science*, **37**, 45-47.

[23] Wang, L. and Zhu, M. (2023) Observation on the Curative Effect of Auricular Point Pressing Combined with Traditional Chinese Medicine in the Treatment of Diabetic Neurogenic Bladder. *Journal of Clinical Chinese Medicine*, **15**, 98-100.

[24] Zhu, X.J., Bai, H.H., Jin, Y.J., *et al.* (2017) Application of Auricular Seed Embedding in Patients with Urinary Retention after Cerebral Angiography. *Journal of Nursing*, **32**, 56-57.

[25] Kim, J.H., Park, S.Y. and Lee, J.S. (2022) Auricular Point Stimulation Modulates Bladder Function via the Vagus Nerve Pathway in Rats with Spinal Cord Injury. *Journal of Ethnopharmacology*, **298**, Article ID: 115568.

[26] Kreder, K.J., Chancellor, M.B. and Yoshimura, N. (2021) Intermittent Catheterization for Neuro-Genic Lower Urinary Tract Dysfunction: A Systematic Review. *European Urology*, **80**, 512-520.

[27] Li, H., Li, B., Xu, A., *et al.* (2022) Effect of Intermittent Catheterization on Bladder Function Recovery in Patients with Spinal Cord Injury. *Journal of China Medical University*, **51**, 721-724.

[28] Guan, M. (2023) Analysis of Flora Distribution and Drug Sensitivity of Urinary Tract Infections in Patients with Spinal Cord Injury. *Medical Journal of Air Force*, **39**, 167-169.

[29] Wu, Y. and Yang, Y. (2023) The Effect of Electroacupuncture at Baliao Points Combined with Rehabilitation Training on Urodynamics of Neurogenic Bladder after Stroke. *Journal of Emergency in Traditional Chinese Medicine*, **32**, 678-680.

[30] Zhang, Y., Yu, H., Li, H., *et al.* (2022) The Effect of Pelvic Floor Biofeedback Combined with Bladder Function Training on the Efficacy and Quality of Life of Patients with Neurogenic Bladder after Spinal Cord Injury. *Chinese Journal of Rehabilitation*, **37**, 345-348.

[31] Ma, F., Li, W., Bai, J., *et al.* (2023) Clinical Observation of Electroacupuncture at Baliao Points as the Main Treatment for Neurogenic Bladder after Spinal Cord Injury. *Shanghai Journal of Acupuncture and Moxibustion*, **42**, 245-249.